Keysight M8000 Series of BER Test Solutions

J-BERT M8020A High-Performance BERT
M8030A Multi-Channel BERT
M8040A High-Performance BERT
Notice

© Keysight Technologies 2019

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 as governed by United States and international copyright laws.

Trademarks

PCI Express® and PCIe® are registered trademarks of PCI-SIG.

Manual Part Number

M8000-91805

Edition

Edition 2.0, May 2019

Keysight Technologies Deutschland GmbH

Herrenberger Strasse 130,

71034 Böblingen, Germany

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.

U.S. Government Rights

The Software is "commercial computer software," as defined by Federal Acquisition Regulation ("FAR") 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement ("DFARS") 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at http://www.keysight.com/find/sweula. The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software.

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.

Safety Notices

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.

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.
Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or operating instructions in the product manuals violates 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 requirements. Product manuals are provided with your instrument on CD-ROM and/or in printed form. Printed manuals are an option for many products. Manuals may also be available on the Web. Go to www.keysight.com and type in your product number in the Search field at the top of the page.

General

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.

Environment Conditions

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters.

Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Before Applying Power

Verify that all safety precautions are taken. The power cable inlet of the instrument serves as a device to disconnect from the mains in case of hazard. The instrument must be positioned so that the operator can easily access the power cable inlet. When the instrument is rack mounted the rack must be provided with an easily accessible mains switch.

Ground the Instrument

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Do Not Operate in an Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Do Not Remove the Instrument Cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified personnel. Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.
### Safety Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>Indicates warning or caution. If you see this symbol on a product, you must refer to the manuals for specific Warning or Caution information to avoid personal injury or damage to the product.</td>
</tr>
<tr>
<td></td>
<td>Frame or chassis ground terminal. Typically connects to the equipment's metal frame.</td>
</tr>
<tr>
<td>KC</td>
<td>KC is the Korean certification mark to demonstrate that the equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.</td>
</tr>
<tr>
<td></td>
<td>Indicates that anti-static precautions should be taken.</td>
</tr>
<tr>
<td></td>
<td>Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.</td>
</tr>
<tr>
<td></td>
<td>The RCM Mark is a compliance mark to the ACMA (Australian Spectrum Management Agency). This indicates compliance with all Australian EMC regulatory information.</td>
</tr>
<tr>
<td></td>
<td>Indicates that the product was tested and has met the certification requirements for electrical, plumbing and/or mechanical products.</td>
</tr>
</tbody>
</table>
### Symbol Description

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="CE Symbol" /></td>
<td>CE compliance marking to the EU Safety and EMC Directives. ISM GRP-1A classification according to the international EMC standard. ICES/NMB-001 compliance marking to the Canadian EMC standard.</td>
</tr>
<tr>
<td><img src="image" alt="Recycling Symbol" /></td>
<td>This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.</td>
</tr>
</tbody>
</table>
Compliance and Environmental Information

<table>
<thead>
<tr>
<th>Safety Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>This product complies with WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.</td>
</tr>
<tr>
<td></td>
<td>Product Category: With reference to the equipment types in WEEE Directive Annex I, this product is classed as a &quot;Monitoring and Control instrumentation&quot; product. Do not dispose in domestic household waste.</td>
</tr>
</tbody>
</table>
About This Guide

This guide provides detailed information for installing Keysight M8000 modules, including the Keysight M9536A or M9537A AXIe Embedded Controller, AXIe System Module (ASM) in the Keysight M9505A/M9514A AXIe chassis. The procedures in this guide are not required for “bundled” systems such as the M8020A-BU1, M8020A-BU2, M8030A-BU1, M8030A-BU2, M8040A-BU1, M8040A-BU2 or M8040A-BU3. For these systems, refer to the Keysight M8000 Series BER Test Solutions Getting Started Guide and Keysight M8040A Getting Started Guide.

After performing the procedures in this document, you are directed to procedures in the Keysight M8000 Series BER Test Solutions Getting Started Guide and Keysight M8040A Getting Started Guide to complete the installation.
# Contents

Safety Summary 3
Compliance and Environmental Information 6
About This Guide 7

1 System Requirements

**Hardware and Software Requirements** 14

**Hardware Configurations for M8020A** 15
- M8020A Base System Configuration 15
- M8020A Four Channel System Configuration 16
- M8020A 32 Gb/s BERT Configuration (Pattern Generator Only) 17
- M8062A 32Gb/s Front-end for J-BERT M8020A High-Performance BERT 18
- Single M8020A LAN Network Configuration 19

**Hardware Configurations for M8030A** 20

**Hardware Configurations for M8040A** 22
- M8045A Pattern Generator Module 22
- M8046A Analyzer Module 23
- M8057A/B Remote Head 23
- M8040A LAN Network Configuration 24
2 Installing Modules

AXIe Instrument Modules 26

Installing M8020A Module(s) 27
  To install the M8041A module 28
  To install the M8041A and M8051A modules 30
  To install the M8041A and M8061A modules 33
  To install the M8041A and M8062A modules 35
  To remove an M8020A module 37

Setting up the M8020A 39
  Benchtop Configuration 39
  Benchtop Configuration with Support Assembly 40
  Rack Mounted Configuration 40
  Installing the AXIe Embedded Controller Module 41

Setting up the M8030A 43
  Removing Filler Panels 46
  Installing the AXIe Embedded Controller Module 46
  Installing a Module 49
  Removing a Module 52
  Synchronization Cable Configuration 52

Installing M8040A Module(s) 55
  To install the M8045A module 56
  To install the M8045A and M8046A modules 58
  To Connect the M8057A/B Remote Head 60
  To remove an M8040A module 61

Setting up the M8040A 63
  Benchtop Configuration 63
  Rack Mounted Configuration 63
  Installing the AXIe Embedded Controller Module 64

Completing the Installation and Setup Process 66
3 Controlling Multiple Instruments

Controlling Multiple Instruments by Multiple Instances of M8070B System Software 70

Remote Control of Multiple M8070B Software Instances 74
  Command Line Options 74

Creating M8070B Software Shortcut on the Desktop 75

Index
1 System Requirements

Hardware and Software Requirements / 14
Hardware Configurations for M8020A / 15
Hardware Configurations for M8030A / 20
Hardware Configurations for M8040A / 22

This chapter provides information about possible configurations for Keysight M8020A, M8030A and M8040A systems.
Hardware and Software Requirements

The following are the hardware and software requirements that should be met before the installation of software components on the controller (host computer):

Minimum hardware requirements
- Pentium® processor 1 GHz or equivalent
- 16 GB available RAM
- USB 3.0 connection
- PCIe 2.0/8x (only for highest data throughput and desktop PC)
- VGA resolution 1024 x 768
- 1.5 GB or more free hard disc space

Software requirements
- The following operating systems are supported:
  - Windows 7 (64 bit) SP1
  - Windows 8 (64 bit)
  - Windows 8.1 (64 bit)
  - Windows 10 (64 bit)
- Keysight I/O libraries version 17.2

**NOTE**
The M8070B software is required to control the M8020A, M8030A and M8040A systems.

**NOTE**
In case of M8020A, PCIe connectivity between the M9505A AXIe Chassis and an external desktop PC controller is recommended when full channel plus large patterns need to be downloaded.
Hardware Configurations for M8020A

The following section describes and illustrates various setup combinations in which you can install the M8020A modules.

**NOTE**

The M8041A module must be installed in slots 1 through 3 of the M9505A AXIe Chassis for proper local bus communication unless the M9536A or M9537A AXIe Embedded Controller is installed (must be in slot 1).

M8020A Base System Configuration

The base configuration is a single channel system (a second channel can be added with license) consisting of the 5-slot M9505A AXIe Chassis and an M8041A module. The M8041A occupies three slots. A maximum of two M8020A modules can be installed in a 5-slot chassis.
M8020A Four Channel System Configuration

The four channel configuration consists of the 5-slot M9505A AXIe Chassis, an M8041A module, and an M8051A module. The M8041A occupies three slots and the M8051A occupies two slots.

NOTE

This configuration requires a cable (provided with the M8051A) that connects the M8041A SYNC OUT to the M8051A SYNC IN to synchronize the two modules to a common system clock.
M8020A 32 Gb/s BERT Configuration (Pattern Generator Only)

A typical configuration using the M8061A 32 Gb/s multiplexer with de-emphasis consists of the 5-slot M9505A AXiLe Chassis, an M8041A module, and an M8061A module. The M8041A occupies three slots and the M8061A occupies two slots.

Figure 3  M8020A configuration for 32 Gb/s BERT (external demultiplexer is recommended)
M8062A 32Gb/s Front-end for J-BERT M8020A High-Performance BERT

A typical configuration for an M8020A 32 Gb/s full BERT consists of the 5-slot M9505A AXIe Chassis, an M8041A module, and an M8062A module. The M8041A occupies three slots and the M8062A occupies two slots.

Figure 4 M8020A configuration for 32 Gb/s BERT
Single M8020A LAN Network Configuration

Multiple engineers can all be connected to a single M8020A via a LAN network and controlled using the M8070B software running on a host PC. The host PC tracks the number of licenses checked out and the number of licenses available for use. In addition, the host PC can be a dedicated computer running the license server or it can also run the M8070B software concurrently. The M9536A or M9537A AXiE Embedded Controller can also be used as the host PC in this configuration.

Figure 5 Single M8020A LAN network configuration
Hardware Configurations for M8030A

The M8030A is a modular test solution which can be tailored to your specific needs from two channels with one M8041A to up to 10 channels.

The M8030A supports the following modules.
- M8041A high-performance BERT generator-analyzer-clock 8/16 Gb/s
- M8051A high-performance BERT generator-analyzer 8/16 Gb/s
- M8192A Multi-channel synchronization module

The modules must be installed in the M9514A AXIe 14-slot chassis as shown in Table 3 on page -20:

Table 3  M8030A modules' arrangement in the M9514A AXIe chassis

<table>
<thead>
<tr>
<th>Slot Number</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
<td># 1</td>
<td>For M8030A-BU1, M9536A or M9537A AXIe embedded controller. For M8030A-BU2, this slot is empty and covered with filler front-panel</td>
</tr>
<tr>
<td># 2-4</td>
<td>M8041A module</td>
</tr>
<tr>
<td># 5-6</td>
<td>M8051A module</td>
</tr>
<tr>
<td># 7</td>
<td>M9521A AXIe system module, always included in M8030A-BU1 or M8030A-BU2, mandatory</td>
</tr>
<tr>
<td># 8-9</td>
<td>M8051A module</td>
</tr>
<tr>
<td># 10-11</td>
<td>M8051A module</td>
</tr>
<tr>
<td># 12-13</td>
<td>M8051A module</td>
</tr>
<tr>
<td># 14</td>
<td>M8192A multi-channel synchronization module, mandatory</td>
</tr>
</tbody>
</table>
Figure 6 on page -21 shows an example of modules arrangement in the M9514A AXIe 14-slot chassis.
1 System Requirements

Hardware Configurations for M8040A

The M8040A is a modular test solution which simplifies accurate receiver characterization of devices operating up to 32 and 64 GBaud with NRZ and PAM-4. It supports the following modules.

- M8045A pattern generator
- M8046A analyzer
- M8057A/B remote head

The following section describes and illustrates various setup combinations in which you can install the M8040A modules.

M8045A Pattern Generator Module

The M8045A module can be a one or two data channel system (a second channel can be added with license). A one channel instrument has to be returned to the factory for installing the second channel (hardware) and license. It occupies three slots of the 5-slot M9505A AXIe chassis. The following figure illustrates an M8045A module (two data channel system) installed in an M9505A AXI chassis.

The M8045A module must be installed in slots 1 through 3 of the M9505A AXIe chassis for proper local bus communication unless the M9537A AXIe Embedded Controller is installed (must be in slot 1).
M8046A Analyzer Module

The M8046A module occupies single slot of the 5-slot M9505A AXIe chassis. The following figure illustrates an M8045A module with M8046A module installed in an M9505A AXI chassis.

M8046A Module

Figure 8 M8045A and M8046A configuration

M8057A/B Remote Head

The M8057A/B remote head is an external box which can be connected to each channel of M8045A module, using the matched pair of cables. It helps in minimizing signal degradations caused by lossy channels. The following figure illustrates an M8057A/B remote head connected with one channel of M8045A module.

M8057A/B Remote Head

Figure 9 M8045A, M8046A and M8057A/B configuration
1 System Requirements

M8040A LAN Network Configuration

Multiple engineers can all be connected to a single M8040A via a LAN network and controlled using the M8070B software running on a host PC. The host PC tracks the number of licenses checked out and the number of licenses available for use. In addition, the host PC can be a dedicated computer running the license server or it can also run the M8070B software concurrently. The M9537A AXIe Embedded Controller can also be used as the host PC in this configuration.

Figure 10 M8040A LAN network configuration
Keysight M8000 Series of BER Test Solutions
Installation Guide

2 Installing Modules

AXIe Instrument Modules / 26
Installing M8020A Module(s) / 27
Setting up the M8020A / 39
Setting up the M8030A / 43
Installing M8040A Module(s) / 55
Setting up the M8040A / 63
Completing the Installation and Setup Process / 66

This chapter provides hardware installation procedures for M8020A, M8030A and M8040A modules.
AXIe Instrument Modules

The chassis slots accept AXIe instrument modules. These may comprise one or more instruments for signal injection, data acquisition, and measurement. Install them in any available AXIe slot.

The drawing below illustrates the AXIe module’s general layout, backplane connections and chassis fasteners, viewed from the top.

Test connections are made at the module’s front panel. The front panel and backplane connectors will vary depending on the module.
Installing M8020A Module(s)

**NOTE**

The procedures in this section are not required if your system is an M8020A-BU1 or M8020A-BU2, which have their modules pre-installed.

The M9505A AXIe chassis and M8020A module(s) will come in separate shipments. This section shows how to carefully insert a module in an empty slot of an M9505A AXIe chassis. The slots are identified by the slot numbers written on the front panel of the chassis.

**NOTE**

If you plan to use the M9536A or M9537A AXIe Embedded Controller as the host computer, then you must reserve slot 1 of the chassis for this module’s installation.

**CAUTION**

- The instrument modules are not hot swappable. You must power down the AXIe chassis and host PC before inserting, replacing, or removing a module.
- The enclosure surface of the instrument module may become hot during use. If you need to remove the module, first power down the AXIe chassis, allow the module to cool, and then pull the module out of the chassis.
To install the M8041A module

Figure 11 Installed M8041A module in slots 1 through 3

Ensure that the chassis is NOT powered up or connected to a power source while installing an instrument/embedded controller module.

1 If you are not installing the M9536A or M9537A AXIe Embedded Controller, remove the filler panel modules that cover slots 1, 2, and 3. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.

2 If you are installing the M9536A or M9537A AXIe Embedded Controller, remove the filler panel modules that cover slots 2, 3, and 4. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.

Figure 12 Filler panel module removed
3 Locate the module insertion/extraction handles at both ends of the instrument module. Extend the ends of both handles, by pulling them inwards towards each other. Then fully open the handles by pivoting them out towards you.

4 Align the module’s PCA board with the guide rails on both ends of the M9505A AXIe chassis.

5 Push the module into the chassis slot until the leading edges of the insertion/extraction latches rest against the front surface of the chassis. The insertion/extraction latch handles should be perpendicular to the front surface of the chassis (aligned with the direction of module insertion). Nudge the module gently inward to allow the latches to engage.

6 Using your thumbs, press inward firmly on the insertion/extraction handles until the module is seated firmly in the chassis backplane. The module front panel should lie flush with the chassis front panel.

7 Push the handles ends towards the edge of the chassis to tuck them away.

8 Tighten the retaining screws on either end of the module to ensure the ground connection.

![Tighten retaining screw](image)

Figure 13 Tighten retaining screws

After you have installed the module in the chassis, ensure that remaining slots have filler panel modules installed.

**NOTE**

Do not operate the chassis without filler panels in empty slots. This is especially important for the slots on either side of the instrument module. This allows proper air flow and cooling, and provides EMI shielding for the chassis and installed components. Leaving slots empty can increase fan speed, raise ambient noise, overheat components, and can cause the module to shut down.
To install the M8041A and M8051A modules

The M9505A AXIe chassis has 5 slots for installing M8020A instrument modules. Install the M8041A in slots 1 through 3 and the M8051A in slots 4 and 5.

Ensure that the chassis is NOT powered up or connected to a power source while installing an instrument/embedded controller module.

1. Remove the filler panel modules that cover slots 1 through 5. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.
2 Locate the module insertion/extraction handles at both ends of the instrument module. Extend the ends of both handles by pulling them inwards towards each other. Then fully open the handles by pivoting them out towards you.

3 Align the module's PCA board with the guide rails on both ends of the M9505A AXIe chassis. If the module has metal plates covering the board, be sure to insert the PCA board and not the metal plates into the rails.

4 Push the module into the chassis slot until the leading edges of the insertion/extraction latches rest against the front surface of the chassis. The insertion/extraction latch handles should be perpendicular to the front surface of the chassis (aligned with the direction of module insertion). Nudge the module gently inward to allow the latches to engage.

5 Using your thumbs, press inward firmly on the insertion/extraction handles until the module is seated firmly in the chassis backplane. The module front panel should lie flush with the chassis front panel.

6 Push the handle ends towards the edge of the chassis to tuck them away.

7 Tighten the retaining screws on either end of the module to ensure the ground connection.

8 Locate the synchronization cable that was shipped with the M8051A module as shown in Figure 17 on page -31.
9 Route the synchronization cable as shown in Figure 18 on page 32 using the two self-adhesive cable holders.
To install the M8041A and M8061A modules

The M9505A AXIe chassis has 5 slots for installing M8020A instrument modules. Install the M8041A in slots 1 through 3 and the M8061A in slots 4 and 5.

![Figure 19 Installed M8041A and M8061A module](image1)

Ensure that the chassis is NOT powered up or connected to a power source while installing an instrument /embedded controller module.

1. First, remove the filler panel modules that cover slots 1 through 5. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.

![Figure 20 Filler panel module removed](image2)
2 Locate the module insertion/extraction handles at both ends of the instrument module. Extend the ends of both handles by pulling them inwards towards each other. Then fully open the handles by pivoting them out towards you.

3 Align the module's PCA board with the guide rails on both ends of the M9505A AXIe chassis. If the module has metal plates covering the board, be sure to insert the PCA board and not the metal plates into the rails.

4 Push the module into the chassis slot until the leading edges of the insertion/extraction latches rest against the front surface of the chassis. The insertion/extraction latch handles should be perpendicular to the front surface of the chassis (aligned with the direction of module insertion). Nudge the module gently inward to allow the latches to engage.

5 Using your thumbs, press inward firmly on the insertion/extraction handles until the module is seated firmly in the chassis backplane. The module front panel should lie flush with the chassis front panel.

6 Push the handles ends towards the edge of the chassis to tuck them away.

7 Tighten the retaining screws on either end of the module to ensure the ground connection.

Figure 21  Tighten retaining screws
To install the M8041A and M8062A modules

The M9505A AXIe chassis has 5 slots for installing M8020A instrument modules. Install the M8041A in slots 1 through 3 and the M8062A in slots 4 and 5.

Ensure that the chassis is NOT powered up or connected to a power source while installing an instrument/embedded controller module.

1 First, remove the filler panel modules that cover slots 1 through 5. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.
2 Locate the module insertion/extraction handles at both ends of the instrument module. Extend the ends of both handles by pulling them inwards towards each other. Then fully open the handles by pivoting them out towards you.

3 Align the module’s PCA board with the guide rails on both ends of the M9505A AXIe chassis. If the module has metal plates covering the board, be sure to insert the PCA board and not the metal plates into the rails.

4 Push the module into the chassis slot until the leading edges of the insertion/extraction latches rest against the front surface of the chassis. The insertion/extraction latch handles should be perpendicular to the front surface of the chassis (aligned with the direction of module insertion). Nudge the module gently inward to allow the latches to engage.

5 Using your thumbs, press inward firmly on the insertion/extraction handles until the module is seated firmly in the chassis backplane. The module front panel should lie flush with the chassis front panel.

6 Push the handles ends towards the edge of the chassis to tuck them away.

7 Tighten the retaining screws on either end of the module to ensure the ground connection.

Figure 24  Tighten retaining screws
To remove an M8020A module

**CAUTION**

The enclosure surface of the module may become hot during use. If you need to remove the module, first power down the M9505A AXIe chassis, allow the module to cool, and then pull the module out of the chassis.

1. Loosen the retaining screws on both ends of the module until the module is completely disengaged to prevent damaging your chassis or module.

![Loosening retaining screw](image)

Figure 25  Loosening retaining screws

2. Extend the ends of both module insertion/extraction handles, by pulling them inwards towards each other.

![Removing an instrument module](image)

Figure 26  Removing an instrument module

3. To remove the module: Open the module insertion/extraction handles by pivoting them out towards you. This unseats the module from the chassis backplane.

4. Once the module is unseated, use the module insertion/extraction handles by pulling directly outward to remove the module from the chassis.
Do not remove the AXIe ESM, which is integral to the operation of the chassis. An AXIe ESM that needs servicing should be removed by Keysight personnel only.
Setting up the M8020A

Benchtop Configuration

If you want to use the M8020A in a benchtop configuration, then retain the plastic bumpers and carry handle(s) for benchtop use.

Figure 27 Chassis bumpers and carry handles
2 Installing Modules

Benchtop Configuration with Support Assembly

If you want to install the M8061-64761 support AXIe chassis to support an oscilloscope placed on top of the M8020A:

1. Place the M8061-64761 on top of the M8020A as shown in Figure 28 on page -40.

![Figure 28 M8061-64761 support assembly](image)

2. Attach the assembly to the top of the M8020A with screws provided as shown in Figure 28 on page -40.

Rack Mounted Configuration

If you want to use the M8020A in a rack mounted configuration:

1. Remove the bumpers and carry handle(s) from the chassis. The procedure and tools needed to remove these is documented in the Keysight M9502A/M9505A AXIe chassis User’s Guide which is available on [www.keysight.com](http://www.keysight.com).

2. Attach the rack mount brackets to the chassis and mount onto a rack. The rack mount brackets are available in the Keysight rack mount kit that you can order for the chassis. Refer to this kit for rack mounting instructions.
Installing the AXIe Embedded Controller Module

If you plan to use the Keysight M9536A or M9537A Embedded Controller as the host computer, then:

1. Install this module in slot 1 of the M9505A AXIe chassis.

   **NOTE**
   This module must be installed in slot 1 of the M9505A AXIe chassis.

2. Connect the keyboard, mouse, and monitor to various ports available on the front panel of the M9536A or M9537A Embedded Controller.

3. If needed, connect the M9536A or M9537A Embedded Controller to LAN using the GbE LAN port on the front panel of this module. You need Internet connectivity later to perform firmware upgrades, download instrument module control software, or the latest Keysight I/O libraries suite.

   **NOTE**
   Do not use the ESM LAN port as the remote control port. Use the LAN port of the controller (on M9536A or M9537A or external PC).

   **NOTE**
   You do not need to manually establish any external PCIe/USB or LAN connection between the M9536A or M9537A AXIe Embedded Controller and M8020A because this controller communicates with the ESM through the chassis backplane.

   You do not need to manually install any operating system or drivers for this module. The Windows 7 (64 bit) operating system is pre-installed based on your choice and the module is ready to use as the host computer.
The following figure displays the M9537A Embedded Controller installed in slot 1 of the M9505A AXIe chassis.

![M9537A embedded controller with M8041A](image)

Detailed information and user guide for the M9536A or M9537A Embedded Controller module is available at:

- [www.keysight.com/find/M9536A](http://www.keysight.com/find/M9536A)
- [www.keysight.com/find/M9537A](http://www.keysight.com/find/M9537A)

**NOTE**
The M9536A or M9537A Embedded Controller module will successfully connect with M8020A only when installed in slot 1 of the M9505A chassis. Make sure that you install the module in the M8020A before powering up the complete setup.

**NOTE**
You should not connect the M8020A to multiple operating host computers at the same time. If you plan to use the M9536A or M9537A AXIe Embedded Controller as the host computer, then do not connect an external host computer to the M8020A.
Setting up the M8030A

The AXIe chassis accepts modules conforming to the single slot, 1U AXIe standard. These include:
- AXIe instrument modules
- AXIe System Module (ASM)
- AXIe filler panels

**NOTE**
The procedure described in this section is not required in case of a bundled system wherein modules are pre-installed.

If the M9514A AXIe chassis and M8030A module(s) come in separate shipments, please go through this section which shows how to carefully insert a module in an empty slot of an M9514A AXIe chassis. The slots are identified by the slot numbers written on the front panel of the chassis.

**NOTE**
Slot 1 is reserved for M9536A or M9537A AXIe Embedded Controller.

**CAUTION**
The instrument modules are not hot swappable. You must power down the AXIe chassis and host PC before inserting, replacing, or removing a module. The enclosure surface of the instrument module may become hot during use. If you need to remove the module, first power down the AXIe chassis, allow the module to cool, and then pull the module out of the chassis.
CAUTION

Static Electricity—The components and connectors on modules are sensitive to static electricity. To minimize electrostatic damage, take the necessary anti-static precautions. The chassis provides a grounding terminal to connect a wrist strap. To locate this terminal, see Figure 30 on page -45.

Empty Slots—Except for performing initial chassis verification or troubleshooting, do not operate the chassis with empty slots.

Always insert a filler panel or an instrument module into empty slots. This is especially important for the slots on either side of an instrument module. This allows proper air flow and cooling, and provides EMI shielding for the chassis and installed components.

Leaving slots empty can increase fan speed, raise ambient noise, overheat components, and shut down modules.

ASM—The AXIe System Module is integral to the operation of the chassis. Except for troubleshooting purposes, do not remove it.

Hot Swap—AXIe does not explicitly support hot swap for instrument modules. Keysight recommends fully powering down the chassis before installing or removing modules.

AXIe System Module—Shutdown of the controller operating system and power off the chassis before removing.
Detailed information, consisting of user guide and other documents for the M9514A AXIe chassis is available at www.keysight.com/find/M9514A.
Removing Filler Panels

1. Power down the AXIe chassis.
2. Fully loosen the captive retaining screws on both sides of the filler panel.

**CAUTION**
Ensure you fully loosened the captive module retaining screws before trying to extract any module. If you attempt to pull the module out by the screws (for filler panels) or by using the extraction handles (other modules) with these screws still engaged, damage to the chassis or module could result.

3. Grasp the panel by the two retaining screws, and slide it out of the chassis.

Installing the AXIe Embedded Controller Module

If you plan to use the Keysight M9536A or M9537A Embedded Controller as the host computer, then:
1. Install this module in slot 1 of the M9514A AXIe chassis.

**NOTE** This module must be installed in slot 1 of the M9514A AXIe chassis.

2. Connect the keyboard, mouse, and monitor to various ports available on the front panel of the M9536A or M9537A Embedded Controller.
3. If needed, connect the M9536A or M9537A Embedded Controller to LAN using the GbE LAN port on the front panel of this module. You need Internet connectivity later to perform firmware upgrades, download instrument module control software, or the latest Keysight I/O libraries suite.

**NOTE** Do not use the ASM LAN port as the remote control port. Use the LAN port of the controller (on M9536A or M9537A or external PC).
NOTE

You do not need to manually establish any external PCIe/USB or LAN connection between the M9536A or M9537A AXIe Embedded Controller and M8020A because this controller communicates with the ASM through the chassis backplane.

You do not need to manually install any operating system or drivers for this module. The Windows 7 (64 bit) operating system is pre-installed based on your choice, and the module is ready to be used as the host computer.

The following figure displays the M9536A Embedded Controller installed in slot 1 of the M9514A AXIe chassis.

---

Figure 31  M9536A embedded controller installed in M9514A AXIe chassis
Installing Modules

Detailed information, consisting of user guide and other documents, for the M9536A or M9537A Embedded Controller module is available at:

www.keysight.com/find/M9536A
www.keysight.com/find/M9537A

**NOTE**

The M9536A or M9537A Embedded Controller module will successfully connect with M8030A only when installed in slot 1 of the M9514A chassis. Make sure that you install the module in the M8030A before powering up the complete setup.

**NOTE**

You should not connect the M8030A to multiple operating host computers at the same time. If you plan to use the M9536A or M9537A AXIe Embedded Controller as the host computer, then do not connect an external host computer to the M8030A.
Installing Modules

Installing a Module

1. Power down the AXIe chassis.
2. Locate the (top and bottom) guide rails for each slot. The example below shows the guide rails in the chassis with all slots empty; typically one or more will be covered.
3 Align the module’s circuit board with the chassis guide rails. If the module has metal plates covering the board, be sure to insert the circuit board and not the metal plates into the rails. Slide the board gently into the two rails. If the fit is tight, slide the board back out and recheck alignment.

4 Locate the insertion/extraction handles at each side of the module’s front panel. Extend the ends of both handles, by pulling them inwards towards each other; the plastic handle end slides about 1 cm on the metal handle shaft. Then fully open the handles by pivoting them out towards you until they are perpendicular to the front panel. The left handle is shown below, from the top view, correctly extended.

If either handle is misaligned, you will not be able to properly install the module.
5 Slide the module completely into the chassis. When the module’s backplane connectors contact the chassis backplane, you will feel resistance and the two handles will begin to close toward each other. The module’s faceplate will be about 1 cm from the chassis front panel.

6 Continue nudging the module faceplate gently but firmly with your thumbs, until the handles are pressed up against the chassis and the module’s front panel lies flush with the chassis’ front panel. This seats the module firmly in the chassis backplane. If necessary, gently press inward (toward the chassis) on the handles to ensure full insertion.

7 Tighten the captive retaining screws at both sides of the module.

---

**CAUTION**

Modules are grounded through the chassis. Tighten the module retaining screws to ensure a proper ground connection.

---

8 Retract the handle ends by sliding them outward on their metal shafts, away from each other, toward the chassis edge; this secures them out of the way of test connections.

9 Repeat steps 3 through 8 for additional modules, as needed. Ensure that each slot has an instrument module or filler panel installed.

10 Power up the AXIe chassis. Verify that the chassis fans are operating and free of obstructions that may restrict airflow.

---

**NOTE**

Do not operate the chassis without filler panels in empty slots. This is especially important for the slots on either side of the instrument module. This allows proper air flow and cooling, and provides EMI shielding for the chassis and installed components. Leaving slots empty can increase fan speed, raise ambient noise, overheat components, and can cause the module to shut down.
Removing a Module

The instructions below apply to all module types. The AXIe System Module (ASM) has the same extraction handles and retaining screws as instrument modules. If you should ever have to remove the ASM, follow the instructions for instrument modules below.

1. Power down the AXIe chassis.
2. Fully loosen the captive retaining screws on both sides of the module.

Ensure you fully loosened the captive module retaining screws before trying to extract any module. If you attempt to pull the module out by the screws (for filler panels) or by using the extraction handles (other modules) with these screws still engaged, damage to the chassis or module could result.

3. For a filler panel, grasp the panel by the two captive retaining screws, and slide it out of the chassis. For all other modules, locate the insertion/extraction handles at each side of the module's front panel. Extend the plastic ends of both handles by sliding them outward on their metal handle shafts, inwards towards each other.

4. Open the handles by pivoting them out towards you, away from the chassis. This is easiest to do with thumb and forefinger of both hands simultaneously. Place each thumb at the inside of the handle, forefinger outside the handle, and rotate the handles with your thumbs. When the handles are perpendicular with the chassis, stop. The module should now be unseated the module from the chassis backplane and its faceplate from the chassis front panel.

5. Grasp the levers to slide the module out of the chassis.

Synchronization Cable Configuration

This configuration requires 6 cables (provided with the M8030A), one of them connects the M8041A SYNC OUT to the M8192A SYNC IN and rest five connect M8192A SYNC OUT to the individual SYNC IN ports of the M8041A and the four M8051A modules in order to synchronize the data channels of all modules to a common system clock.
Route the synchronization cable as shown in the following figure.
While connecting a module which requires the sync cable connection (e.g. M8051A, M8062A) to the test setup, make sure to connect the sync cable after completing the other connections and also remove the sync cable first while disconnecting the connections.
Installing M8040A Module(s)

The procedures in this section are not required if your system is an M8040A-BU1, M8040A-BU2 or M8040A-BU3, which have their modules pre-installed.

The M9505A AXIe chassis and M8040A module(s) will come in separate shipments. This section shows how to carefully insert a module in an empty slot of an M9505A AXIe chassis. The slots are identified by the slot numbers written on the front panel of the chassis.

If you plan to use the M9537A AXIe Embedded Controller as the host computer, then you must reserve slot 1 of the chassis for this module’s installation.

- The instrument modules are not hot swappable. You must power down the AXIe chassis and host PC before inserting, replacing, or removing a module.
- The enclosure surface of the instrument module may become hot during use. If you need to remove the module, first power down the AXIe chassis, allow the module to cool, and then pull the module out of the chassis.
To install the M8045A module

Ensure that the chassis is NOT powered up or connected to a power source while installing an instrument/embedded controller module.

1. If you are not installing the M9537A AXIe Embedded Controller, remove the filler panel modules that cover slots 1, 2, and 3. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.

2. If you are installing the M9537A AXIe Embedded Controller, remove the filler panel modules that cover slots 2, 3, and 4. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.
3 Locate the module insertion/extraction handles at both ends of the instrument module. Extend the ends of both handles, by pulling them inwards towards each other. Then fully open the handles by pivoting them out towards you.

4 Align the module’s PCA board with the guide rails on both ends of the M9505A AXiE chassis.

5 Push the module into the chassis slot until the leading edges of the insertion/extraction latches rest against the front surface of the chassis. The insertion/extraction latch handles should be perpendicular to the front surface of the chassis (aligned with the direction of module insertion). Nudge the module gently inward to allow the latches to engage.

6 Using your thumbs, press inward firmly on the insertion/extraction handles until the module is seated firmly in the chassis backplane. The module front panel should lie flush with the chassis front panel.

7 Push the handles ends towards the edge of the chassis to tuck them away.

8 Tighten the retaining screws on either end of the module to ensure the ground connection.

After you have installed the module in the chassis, ensure that remaining slots have filler panel modules installed.

NOTE

Do not operate the chassis without filler panels in empty slots. This is especially important for the slots on either side of the instrument module. This allows proper air flow and cooling, and provides EMI shielding for the chassis and installed components. Leaving slots empty can increase fan speed, raise ambient noise, overheat components, and can cause the module to shut down.
To install the M8045A and M8046A modules

The M9505A AXIe chassis has 5 slots for installing M8040A instrument modules. Install the M8045A in slots 1 through 3 and the M8046A in slot 4.

Ensure that the chassis is NOT powered up or connected to a power source while installing an instrument/embedded controller module.

1. Remove the filler panel modules that cover slots 1 through 5. Loosen the retaining screws on both sides of the filler panel module until the filler panel module is completely disengaged. Then gently pull the module out of the chassis holding the screws.
2 Locate the module insertion/extraction handles at both ends of the instrument module. Extend the ends of both handles by pulling them inwards towards each other. Then fully open the handles by pivoting them out towards you.

3 Align the module’s PCA board with the guide rails on both ends of the M9505A AXiLe chassis. If the module has metal plates covering the board, be sure to insert the PCA board and not the metal plates into the rails.

4 Push the module into the chassis slot until the leading edges of the insertion/extraction latches rest against the front surface of the chassis. The insertion/extraction latch handles should be perpendicular to the front surface of the chassis (aligned with the direction of module insertion). Nudge the module gently inward to allow the latches to engage.

5 Using your thumbs, press inward firmly on the insertion/extraction handles until the module is seated firmly in the chassis backplane. The module front panel should lie flush with the chassis front panel.

6 Push the handle ends towards the edge of the chassis to tuck them away.

7 Tighten the retaining screws on either end of the module to ensure the ground connection.
To Connect the M8057A/B Remote Head

The M8057A/B remote head box can be connected to each channel of M8045A module. Connect the M8057A/B to the M8045A remote head controls (P and N) as shown in the Figure 42 on page -60.

Ensure that the chassis is NOT powered up or connected to a power source while making connections to M8057A/B.

Also, make sure NOT to remove the M8057A/B connections when it is powered on. However, if you wish to remove the M8057A/B connections, ensure that the instrument is powered off.
To remove an M8040A module

**CAUTION** The enclosure surface of the module may become hot during use. If you need to remove the module, first power down the M9505A AXIe chassis, allow the module to cool, and then pull the module out of the chassis.

1. Loosen the retaining screws on both ends of the module until the module is completely disengaged to prevent damaging your chassis or module.

![Loosening retaining screw](image)

**Figure 43** Loosening retaining screws

2. Extend the ends of both module insertion/extraction handles, by pulling them inwards towards each other.

![Removing an instrument module](image)

**Figure 44** Removing an instrument module

3. To remove the module: Open the module insertion/extraction handles by pivoting them out towards you. This unseats the module from the chassis backplane.

4. Once the module is unseated, use the module insertion/extraction handles by pulling directly outward to remove the module from the chassis.
Do not remove the AXIe ESM, which is integral to the operation of the chassis. An AXIe ESM that needs servicing should be removed by Keysight personnel only.
Setting up the M8040A

Benchtop Configuration

If you want to use the M8040A in a benchtop configuration, then retain the plastic bumpers and carry handle(s) for benchtop use.

![Chassis bumpers and carry handles](image)

1. Place the assembly on top of the M8040A.
2. Attach the assembly to the top of the M8040A with screws provided.

Rack Mounted Configuration

If you want to use the M8040A in a rack mounted configuration:

1. Remove the bumpers and carry handle(s) from the chassis. The procedure and tools needed to remove these is documented in the Keysight M9502A/M9505A AXIe chassis User’s Guide which is available on [www.keysight.com](http://www.keysight.com).

2. Attach the rack mount brackets to the chassis and mount onto a rack. The rack mount brackets are available in the Keysight rack mount kit that you can order for the chassis. Refer to this kit for rack mounting instructions.
Installing the AXIe Embedded Controller Module

If you plan to use the Keysight M9537A Embedded Controller as the host computer, then:

1. Install this module in slot 1 of the M9505A AXIe chassis.

This module must be installed in slot 1 of the M9505A AXIe chassis.

2. Connect the keyboard, mouse, and monitor to various ports available on the front panel of the M9537A Embedded Controller.

3. If needed, connect the M9537A Embedded Controller to LAN using the GbE LAN port on the front panel of this module. You need Internet connectivity later to perform firmware upgrades, download instrument module control software, or the latest Keysight I/O libraries suite.

Do not use the ESM LAN port as the remote control port. Use the LAN port of the controller (on M9537A or external PC).

You do not need to manually establish any external PCIe/USB or LAN connection between the M9537A AXIe Embedded Controller and M8040A because this controller communicates with the ESM through the chassis backplane.

You do not need to manually install any operating system or drivers for this module. The Windows 7 (64 bit) operating system is pre-installed based on your choice and the module is ready to use as the host computer.
The following figure displays the M9537A Embedded Controller installed in slot 1 of the M9505A AXIe chassis.

![M9537A Embedded Controller with M8045A and M8046A](image)

Figure 46  M9537A embedded controller with M8045A and M8046A

Detailed information and user guide for the M9537A Embedded Controller module is available at [www.keysight.com/find/M9537A](http://www.keysight.com/find/M9537A).

**NOTE**

The M9537A Embedded Controller module will successfully connect with M8040A only when installed in slot 1 of the M9505A chassis. Make sure that you install the module in the M8040A before powering up the complete setup.

**NOTE**

You should not connect the M8040A to multiple operating host computers at the same time. If you plan to use the M9537A AXIe Embedded Controller as the host computer, then do not connect an external host computer to the M8040A.
Completing the Installation and Setup Process

Refer to the Keysight M8020A/M8030A Getting Started Guide for procedures required to complete the installation and setup process.

The Keysight M8020A/M8030A Getting Started Guide contains procedures for the following:

- Set up an external host computer
- Power up and power down the system
- Verify basic operation
- Install Keysight IO Libraries Suite
- Install M8070B software
- Install the measurement plugins
- Install module licenses (for on-site upgrades only)

The Keysight M8020A/M8030A Getting Started Guide also contains the following information:

- Starting the M8070B software interface
- Making a basic measurement

Detailed information, consisting of User Guide, Programming Guide and other documents for the Keysight M8020A, M8030A and M8040A are available at:

www.keysight.com/find/M8020A
www.keysight.com/find/M8030A
www.keysight.com/find/M8040A
This chapter describes how the M8070B system software allows a PC to control multiple instruments.
The M8070B system software (3.x.x.x version) allows a PC to control different connected instruments. These instrument can be either BERT modules, AWG modules or combination of both. The possible setup combinations are described and illustrated in this section.

- **CASE 1** - A PC can be connected to an AXIe 5 Slot frame and runs a M8041A as clock/data module and a M8051A as data module. It's a four channel instrument. The M8051A module can be replaced by a M8061A or by a M8062A, depending upon the requirement.

- **CASE 2** - A PC is connected to an AXIe 5 Slot frame and runs a M8045A as generator module, a M8046A as analyzer module and a M8195A/M8196A as AWG module. Ensure that the M8195A/M8196A soft front panel should be properly installed on the host PC. Also ensure that the M8195A/M8196A should be always be mounted in a slot number higher that M8045A modules in the AXIe chassis. In other words, the M8195A/M8196A module should always be mounted last in the chassis.

- **CASE 3** - A PC is connected to two AXIe 5 slot frames, with each frame running one M8045A module and two M8046A modules. This setup would require M8070B and respective module licenses. To ensure that the both instruments operate on same clock, the Ref Clk Out port of the M8045A (frame 1) is connected to the Ref Clk In port of M8045A (frame 2).
It is also possible to connect a PC to smaller AXIe frame (2 slots) as shown in the following figure:

![Figure 48 PC connected to AXIe 2 slot frame](image1)

Also, it is also possible to connect a PC to large AXIe frame (14 slots) as shown in the following figure:

![Figure 49 PC connected to AXIe 14 slot frame](image2)

All these configurations are controlled by a single instance of a M8070B system software.
Controlling Multiple Instruments by Multiple Instances of M8070B System Software

A single PC can also control multiple instruments by multiple instance of the M8070B software. For every connected instrument a separate instance of the M8070B software has to be started. You have to pass command line options to the M8070B system software to address/specify connected instruments.

Instrument settings, pattern etc. are stored in a so called workspace. To avoid conflicts between multiple running M8070B system software instances working on a single workspace you must specify a new name for every workspace. For every running M8070B software, a separate workspace must be defined.

Following are some possible configurations:

1. **One PC connected to multiple instruments**
   Figure 50 on page -70 shows one PC connected to multiple instruments via USB.

![Figure 50](PC_connected_to_multiple_instruments_via_USB.png)
For this configuration you have to start the M8070B software twice with different command line options.

1. Start a command line window
2. Type in the following syntax:
   
   ```
   > keysight.M8070B.exe /chassisid 1 /workspace "InstrumentOne"
   > keysight.M8070B.exe /chassisid 2 /workspace "InstrumentTwo"
   ```

   In this configuration only one PC is required to run two M8070B instances simultaneously and both control their assigned instrument.

   **NOTE**

   A second or further instance of M8070B software is only required if there is another BERT PG module in the second / further chassis. This means that, if there are only AWG module(s) and/or M8046A modules within the second / further chassis, then these are also recognized within the first (single) instance of M8070B software.

2. **One PC with multiple instruments in a M9514A frame**

   Figure 51 on page -71 shows two instruments (shaded transparent rectangles) hosted by a M9514A and controlled by a single PC only.
In this setup, the two instruments (shaded transparent rectangles) are hosted by a M9514A AXIe frame and controlled by a single PC. The first instrument will be addressed by chassis identifier 1 and slot number 1 and the second instrument will be addressed by chassis identifier 1 and slot number 8 (slot numbers are printed above a slot). The slot number specifies the first module to be built an instrument.

For starting the software specify following command line option

```
> keysight.M8070B.exe /chassisid 1 /slotnumber 1 /workspace "InstrumentOne"
> keysight.M8070B.exe /chassisid 1 /slotnumber 8 /workspace "InstrumentTwo"
```

3 Mixed connection (One PC with multiple M8070B instances and multiple instruments in a M9514A frame)

In this configuration, multiple Instruments in a M9514A frame are connected via PCIe connection to the PC while multiple M8070B instances are connected via USB connection to the PC. See Figure 52 on page 72.

![PC connected to multiple instruments via USB and PCIe](image-url)
To run this configuration, use in the following syntax:

> keysight.M8070B.exe /chassisid 1 /slotnumber 1 /workspace "InstrumentOne"
> keysight.M8070B.exe /chassisid 1 /slotnumber 8 /workspace "InstrumentTwo"
> keysight.M8070B.exe /chassisid 2 /workspace "InstrumentThree"

4 Workaround to identify a particular frame when multiple frames are connected to a PC

Follow the given steps to identify a particular frame when multiple frames connected to one PC:

a Switch on all the frames connected to the PC.

b Start one instance of the M8070B system software.

c Using the command line arguments (described in previous steps), switch to /chassisid 1 and observe the frames. The blinking LEDs show the addressed frame.

d Start the next instance M8070B system software with /chassisid 2 and so on.

e This will let you know which frame is associated with the entered /chassisid.

f If you restart the M8070B system software with the same command line arguments, it will address the same frame again. In other words as long as the set-up is not changed e.g. /chassisid 1 will address always the same frame.
Remote Control of Multiple M8070B Software Instances

You can also use SCPI to remotely control multiple instances of the M8070B software. To know the VISA Resource Strings for SCPI Access, click on the front panel on **Utilities > SCPI Server Information**.

The dialog shows the VISA Resource Strings for SCPI access as shown in the following figures:

![SCPI Server Information showing VISA Resource Strings for SCPI Access](image1)

![SCPI Server Information showing VISA Resource Strings for SCPI Access](image2)

### Command Line Options

The following command line options are required for connecting a PC with instrument(s).

- `/chassisid`  Chassis Identifier - defines a number for using the corresponding frame
- `/slotnumber`  Slot Number – defines a slot number of the first module to constitute an instrument
- `/workspace`  Workspace Name – defines a name for a workspace in which the settings are stored
Creating M8070B Software Shortcut on the Desktop

Follow the given steps to create M8070B software shortcut on desktop:
1. Open file explorer and go to `C:\Program Files\Keysight\M8070B\bin` location as shown in the Figure 55 on page -75:

![Figure 55 File explorer](image.png)

2. Click on the highlighted executable with the right mouse button and move the cursor with pressed button on the desktop, release the mouse button and select in the context menu Create shortcut.

3. Rename the created shortcut to a meaningful name, right click and select in the context menu Properties.

4. Choose the Shortcut tab and change the Target entry field as shown in the following example:

   "C:\Program Files\Keysight\M8070B\bin\KeysightM8070B.exe" /chassisid 1 /slotnumber 1 /workspace "InstrumentOne"
3 Controlling Multiple Instruments

![Image of shortcut target properties]

Figure 56 Changing shortcut target

5 Click **Apply**.

You can now start the 'configured' M8070B system software by a simple double click on the desktop icon.
Index

A
AXIe instrument modules, 26

B
Benchtop configuration, 39, 63

C
Configuration
32G BERT, 17, 18
Base, 15, 22, 23
Benchtop, 39, 63
LAN network, single M8020A, 19, 24
M8020A 32 Gb/s BERT, 17, 18
M8030A multi-channel BERT, 20, 22
M8041A with M8061A, 17

E
Embedded controller, install, 41

F
Filler panel removal, 28, 56

H
Handles, insertion/extraction, 29, 57
Hardware requirements, 14

I
I/O libraries, 14

K
Keysight I/O libraries, 14

M
M8020A
Four channel configuration, 16
Installing modules, 27
Modules, 15, 22
M8030A
10-channel system configuration, 20, 22
Install a module, 49
Install M9536A embedded controller, 46
Removing module, 52
Sync cable, 53
M8040A, 22
Installing modules, 55
M8040A LAN Network Configuration, 24
M8041A and M8051A, install, 30, 58
M8041A and M8061A, install, 33, 35, 60
M8041A module, 15, 22
M8041A, install, 28, 49, 56
M8045A Pattern Generator Module, 22
M8046A Analyzer Module, 23
M8061A 32 Gb/s multiplexer with de-emphasis, 17
M8070B, 14
M9505A AXIe chassis, 14, 15, 22, 27, 43, 55
M9536A AXIe embedded controller, 15, 22
M9536A, install, 41, 46, 64
Module removal, 37, 61

O
Operating systems, 14
Oscilloscope, 40

P
PCA board, 31, 59

R
Removing filler panels, 46

S
Safety summary, 3
Setup process, completing, 66
Single M8020A LAN network configuration, 19
Software requirements, 14
Support assembly, 40
Synchronization cable, 31

Keysight M8000 Series of BER Test Solutions Installation Guide

77