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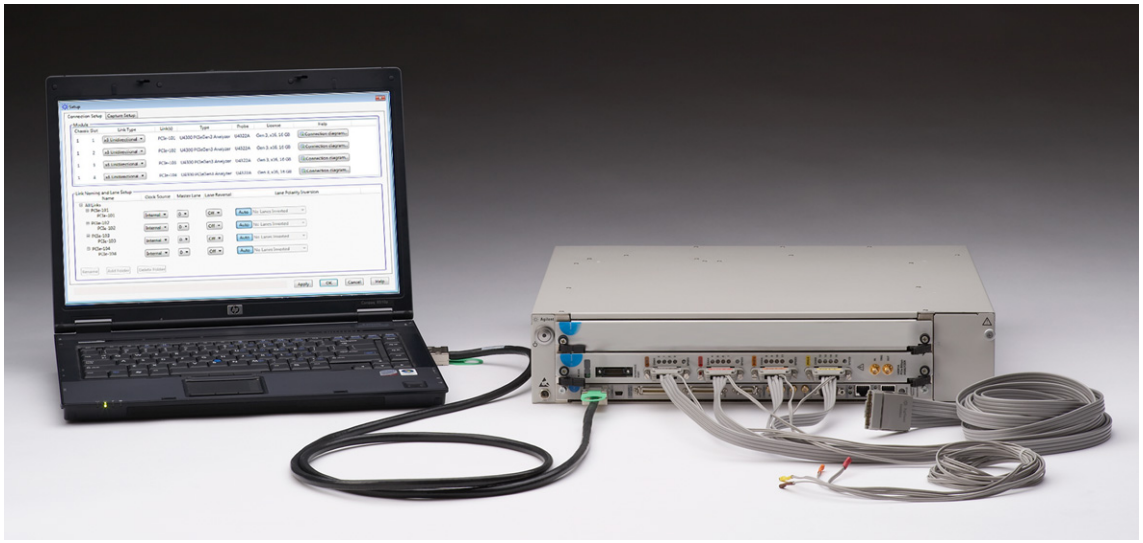
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Agilent Digital Test Console



Installation Guide

Agilent Technologies

Notices

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This manual provides these notices:

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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.

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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.

Certification

For specific information on regulatory compliance, refer to the Declarations of Conformity for the chassis and blades.

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

Additional Information for Test and Measurement Equipment

To comply with EMC regulations, supplied or recommended cables must be used on all appropriate connections. Otherwise, the user has to ensure that, under operating conditions, the Radio Interference Limits are still met at the border of the user's premises.

To ensure continued compliance to radiated emissions standards, all RJ45 connections must be made using shielded Category 5 (STP) cables.

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The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

Ground the Equipment: For safety, Class 1 equipment (equipment having a protective earth terminal), an uninterruptible safety ground must be provided from the mains power source to the product input wiring terminals or supplied power cable. Before operating the equipment, guard against electric shock in case of fault by always using the provided 3-conductor power cords to connect the equipment to a grounded power outlet.

DO NOT use in hazardous environments: Do not operate the product in an explosive atmosphere or in the presence of flammable gases or fumes. This product is designed for indoor use only.

Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers and shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to an Agilent Technologies Sales and Service Office for service and repair to ensure the safety features are maintained.

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to an Agilent Technologies Sales and Service Office for service and repair to ensure features are maintained.

DO NOT clean with fluids: Doing so may make the equipment unsafe for use. Power down the equipment and disconnect the power cord before cleaning. To clean, use a soft dry cloth.

DO NOT block the primary disconnect: The primary disconnect device is the appliance connector/power cord when a chassis used by itself, but when installed into a rack or system the disconnect may be impaired and must be considered part of the installation.

Blades can become hot during use: DO NOT touch any of the components on a blade as you remove it from the chassis. Beware especially of the power module, which is situated at the rear of the blade.

Cautions

Do NOT block vents: To ensure adequate cooling and ventilation, leave a gap of at least 50mm (2") around all vent holes.

Do NOT operate with empty slots: To ensure proper cooling and avoid damaging equipment, fill any empty slots with the filler blade, Part Number N5650-00080.

Do NOT stack more than the recommended number of free-standing chassis: With the U4002A 2-slot chassis, do not stack more than five chassis.

All RFI gaskets must remain in place: Any damaged gaskets must be replaced.

All blades are grounded through the chassis: During installation, tighten the blade's retaining screws to secure the blade to the chassis and to make the ground connection.

Safety Symbols

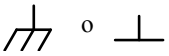
Products display the following symbols:



If you see this symbol on a product, you must refer to this guide for specific Warning or Caution information to avoid personal injury or damage to the product.



Indicates the field wiring terminal that must be connected to ground before operating the equipment. Protects against electrical shock in case of fault.



Frame or chassis ground terminal. Typically connects to the equipment's metal frame.



Alternating current (AC).



Direct current (DC).



Standby. This device is not completely disconnected from the AC mains when its power switch is off.



Indicates hazardous voltages and potential for electrical shock.



Indicates that antistatic precautions should be taken.



Operate the U4002A 2-slot chassis in the horizontal orientation. Do NOT operate this chassis in the vertical orientation.



The CSA mark is a registered trademark of the Canadian Standards Association and indicates compliance to the standards laid out by them. Refer to the product Declaration of Conformity for details.



Notice for European Community: This product complies with the relevant European legal Directives: EMC Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC).



Notice for the European Community: This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a "Monitoring and Control instrumentation" product.

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ICES/NMB-001

ICES/NMB-001 indicates that this ISM device complies with the Canadian ICES-001.

Contents

1 Introduction

About the Agilent Digital Test Console 8
- U4002A 2-Slot Chassis 8
- Chassis Manager 9
- System Controller 10
- Application Blade 11

2 Hardware Installation

Overview 14

Step 1: Plan the installation 15
- Power 15
- Rackmounting 15
- Ventilation 16
- Static Electricity 16
- To manage cables 17

Step 2: Set up the U4002A 2-slot chassis 18
- To rackmount the U4002A 2-slot chassis 18
- To set up a portable U4002A 2-slot chassis 20

Step 3: Insert and remove blades 22
- To insert a blade into the chassis 23
- To remove a blade from the chassis 25

Step 4: Set up a system controller 26
- To set up a laptop controller 26

Step 5: Power up the system 27
- To power up the U4002A 2-slot chassis 27
- To power down the chassis 28

Step 6: Troubleshoot problems 29
- To troubleshoot powerup problems 29
- To diagnose LEDs 30

3 Software Installation

4 For More Information

On the U4301A PCIe Analyzer Blade 34

On the U4998A HDMI Tester Blade 35

5 Characteristics

Standards 38

Environmental 38

Electrical 38

Mechanical 39

Calibration 39

Connectors 40

Chassis Manager 40

To contact us ... 41

Index



1 Introduction

About the Agilent Digital Test Console 8
U4002A 2-Slot Chassis 8
Chassis Manager 9
System Controller 10
Application Blade 11

About the Agilent Digital Test Console

The Agilent Digital Test Console is a modular and scalable test system that supports complex, high-density testing. The platform includes a general-purpose chassis, chassis manager, and application-specific blades. Multiple chassis can be connected and managed by a central system controller running a variety of test applications.

These chassis models are available:

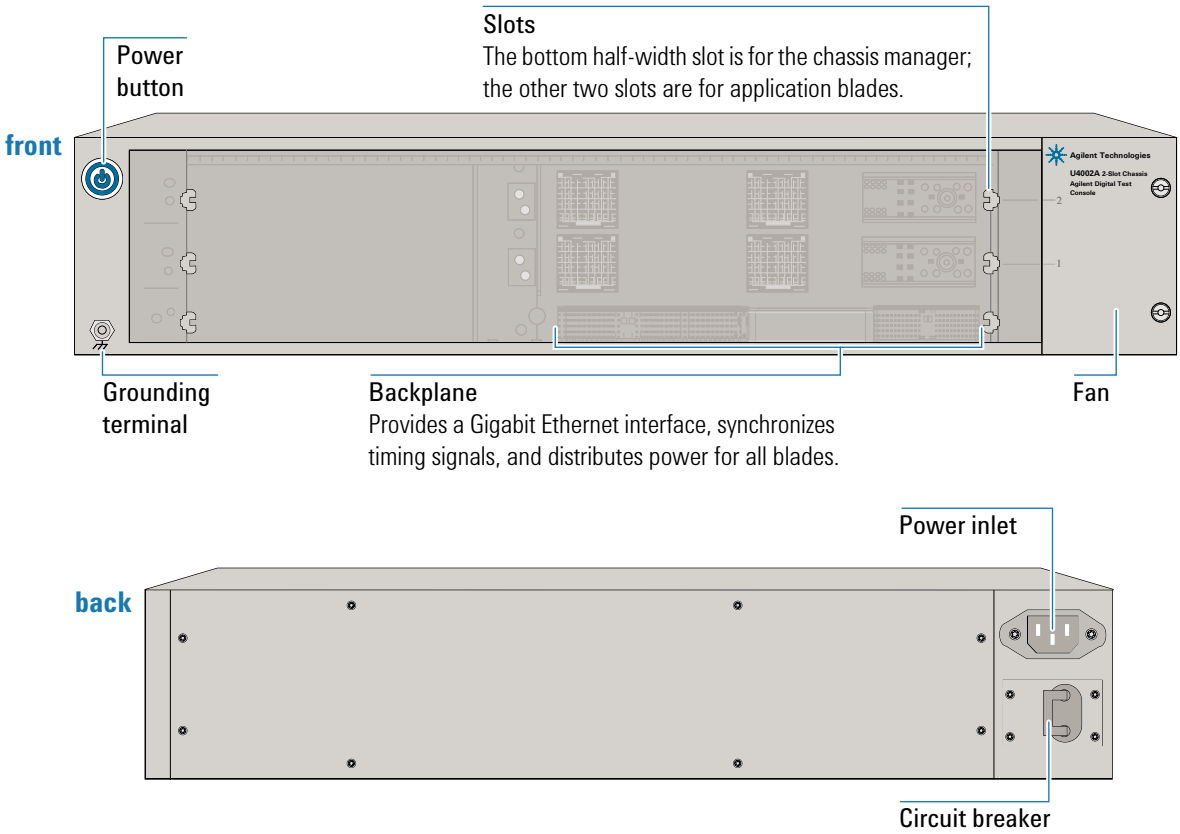
- U4002A — a portable 2-slot chassis

U4002A 2-Slot Chassis

Designed for portable or small system testing, the U4002A 2-slot chassis comes with the following:

- a removable plastic handle
- optional transit case
- rackmount brackets for lab installation

The components on a U4002A 2-slot chassis are as follows:



Chassis Manager

The chassis manager performs the following functions:

- tracks inserted blades, manages blade power
- monitors chassis temperature, controls variable-speed chassis fans
- monitors blade sensors, reports component failures to a system log
- acts as a Gigabit Ethernet switch, forwards frames along the backplane
- connects to other chassis through a Gigabit Ethernet network
- synchronizes timing across all blades through an Agilent Test Bus
- synchronizes timing with an internal or external clock source

The chassis manager is factory-installed into the bottom slot of the U4002A 2-slot chassis. This chassis managers is available:

- U4002-00101 – Chassis manager with PCIe and USB.



PCIe (x4, Gen1 and Gen2 compliant)
(Available on U4002-00101) Connects an external system controller to the chassis via PCIe.

USB
(Available on U4002-00101) Not supported in intitial release.

Agilent Test Bus
Synchronizes timing signals with multiple daisy-chained chassis.

- IN—Gets timing signals from the previous chassis. If this chassis is at the head of the chain, the chassis becomes the master, using an internal or external clock to send timing signals to other chassis in the chain.
- OUT—Provides timing signals to the next chassis.
- EXT—(not used).

Trigger
Connects external trigger devices.

Clock
Connects external clocks.

RS232
For Agilent use only; do not connect any serial devices. Enables Agilent personnel to do local diagnostics.

LAN 1 & 2 (not used)

Status
Indicates the status of the chassis manager: For operational details, see "To diagnose LEDs" on page 30.

System Controller

The Agilent Digital Test Console requires a system controller PC. A system controller centrally configures and reports test results from multiple chassis.

The system controller PC communicates with a chassis via the chassis manager's PCIe interface, so the system controller must have a PCIe interface.

The system controller is typically a laptop PC with an ExpressCard PCIe adapter, but it could also be a desktop PC ar any other PC with a PCIe interface.

Application Blade

An application blade connects to a System Under Test (SUT), injects test data, and makes real-time measurements. Application blades in the Agilent Digital Test Console have the following common components:



OOS (Out of Service)
Indicates blade health:

- red, steady—The blade detected a failure, for example, an unsuccessful bootup test or corrupted firmware. To diagnose problems, see "To diagnose LEDs" on page 30.
- off—The blade detects no failures.

Display
(Optional) Provides status information about the blade:

- During bootup—May indicate the bootup progress to enable fast diagnostics if a blade experiences a problem.
- After bootup—Identifies the following:
  - chassis number (two digits)—The number starts at 1. If there are multiple, daisy-chained chassis, the number is 1 for the chassis at the head of the chain, and increments by 1 for each chassis in the chain.
  - slot number (two digits)—Starts at 1 for the slot next to the chassis manager, and increments by 1 for each slot to the right.
- During operation—Identifies each active test session and its associated ports, by scrolling text across the display (right to left) at least once per minute.

Ports
Connect to the DUT.

Serial Number (On Top)
Uniquely identifies the blade. When contacting Agilent support, report this number so that any manufacturing information or past servicing associated with the blade can be noted. The serial number is also provided in a Code 128 bar code for inventory purposes.

Reset Button
(Optional) Gracefully reboots a blade. If a blade does not provide this button, you can reboot the blade by removing the blade from the chassis then re-inserting the blade. However, while doing this, ensure that the blade is not powered on.

Blade Description
Identifies the blade's product number, title, and class. When contacting Agilent support, report this information.

Ejector Levers (top and bottom)
Releases the blade from the chassis. For details, see "To remove a blade from the chassis" on page 25.

1 Introduction



2
Hardware Installation

Overview 14
Step 1: Plan the installation 15
Step 2: Set up the U4002A 2-slot chassis 18
Step 3: Insert and remove blades 22
Step 4: Set up a system controller 26
Step 5: Power up the system 27
Step 6: Troubleshoot problems 29

Overview

Step 1: Plan the installation.

Consider the power, rackmounting, and ventilation requirements of the system.

Step 2: Set up the U4002A 2-slot chassis.

If you are using the U4002A 2-slot chassis in a portable application, attach the plastic bumpers and handle. If you are using it in a lab, attach the rackmount brackets and mount onto a rack.

Step 3: Insert blades.

Insert any application blades that are not already in the chassis, ensuring that empty slots have filler blades.

Step 4: Set up a system controller.

Connect an external system controller to the chassis manager's PCIe interface.

Step 5: Power up the system.

Attach the power cords, switch the circuit breakers on, and press the power buttons on the chassis.

Step 1: Plan the installation

WARNING **Before installing equipment, always review your corporate safety policies and consult with your lab manager to avoid equipment damage and personal injury.**

Power

For the power requirements of the chassis, see “Electrical" on page 38.

WARNING **Avoid overloading an electrical circuit.**

In case you need to power down the chassis in an emergency, make sure that you have clear and quick access to the primary disconnect. If the chassis is rackmounted, this primary disconnect can be a power system on the rack and not the power button or circuit breaker on a chassis.

Rackmounting

The following rackmounting options are possible:

- **4-post rack**—With the U4002A 2-slot chassis, the brackets are provided separately (N5650-00035) and must be attached to the chassis before rackmounting.
- **4-post shelf**—You can order a kit (E3664AC), which provides rails that attach to the front and back posts in a 4-post rack, forming a shelf onto which you can slide the chassis. You can then secure the chassis onto the front two posts using the chassis brackets.
- **2-post rack**—You can front-mount a chassis into a telecom-style 19” 2-post rack.

WARNING **Always install the heaviest equipment at the bottom of a rack and deploy anti-tip and anti-rolling mechanisms on the rack.**

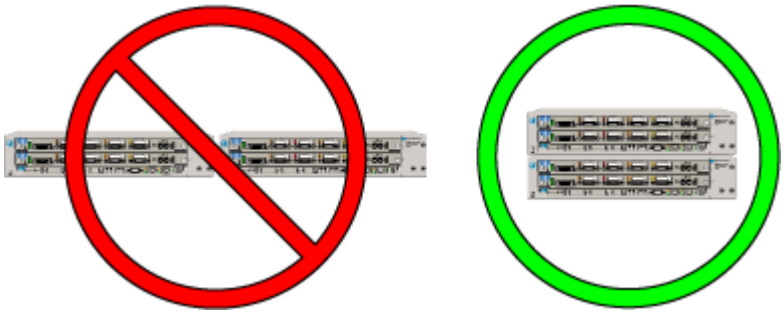
The bottom chassis becomes the head of the chain. Position the system controller near the head chassis at the bottom of the chain.

When connecting other chassis to the chain, add them to the top of the chain, such that an Agilent Digital Test Console chassis is at the bottom and serves as the master controlling the entire chain.

Ventilation

CAUTION Do not block the vent holes on the chassis. This overheats and damages their components. Leave a gap of at least 2” (50mm) around all vent holes.

CAUTION Do not place multiple chassis side-by-side. This feeds exhaust air from one chassis into the air intake of the other chassis and overheats and damages components. Stack multiple chassis on top of each other.



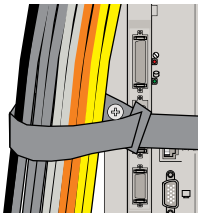
Static Electricity

CAUTION The components and connectors on blades are sensitive to static electricity. To minimize electrostatic damage, take the necessary anti-static precautions. Both chassis provide a grounding terminal, to which you can connect a wrist strap. To locate this terminal, see “U4002A 2-Slot Chassis" on page 8.

To manage cables

The Agilent Digital Test Console has high-density blades that provide many connectors, each of which can have an attached cable. To facilitate the insertion and removal of blades, neatly route cables around the chassis. Doing this enables you to insert and remove blades without having to navigate a web of cables crossing the fronts of blades.

Each chassis includes cable ties, which are secured onto the rackmount brackets. Use these ties to bundle and route cables:



To minimize having cables cross in front of blades, locate blades that are not often removed in the bottom slots. This leaves the top slots free for frequently inserted and removed blades.

Step 2: Set up the U4002A 2-slot chassis

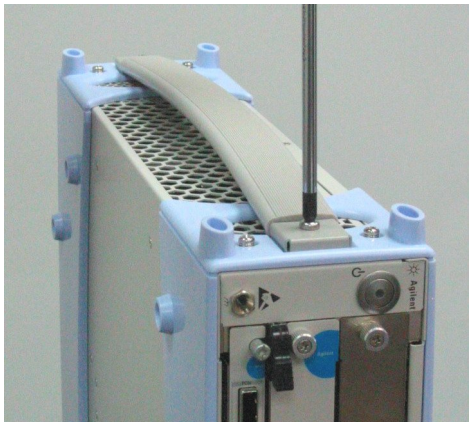
To rackmount the U4002A 2-slot chassis

The U4002A 2-slot chassis ships with plastic bumpers that slide onto the front and back of the chassis, and a handle that attaches to the bumpers on the left side of the chassis. To rackmount the chassis, you must remove the bumpers first.

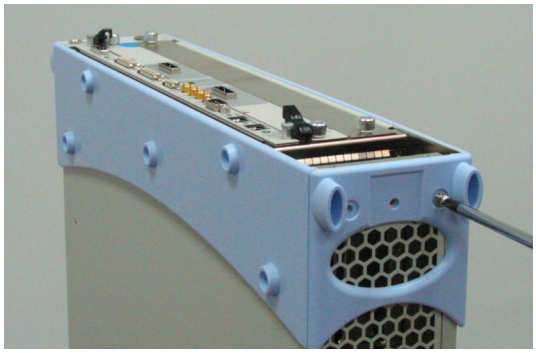
To remove the bumpers

1 Place the chassis on its side with the handle oriented upwards.

2 Use a Phillips screwdriver to remove the two screws securing the handle.



3 Use a Phillips screwdriver to remove the four screws securing the front bumper to the chassis.



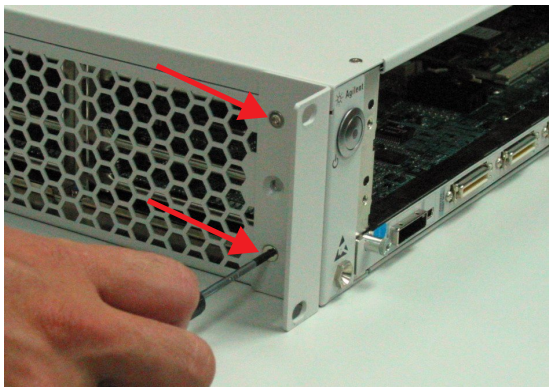
4 Slide the front bumper off the chassis.

5 Repeat steps 3 to 4 for the rear bumper.

To attach the 2-slot brackets

The U4002A 2-slot chassis ships with brackets (N5650-00035) that attach to the sides of the chassis and front two posts of a 4-post rack.

1 Use a Torx T10 screwdriver with a torque of 1.37 Nm or 14 kgf-cm (12.15 lbs-in) to attach the two rackmount brackets to both sides of the chassis.



2 Position the U4002A 2-slot chassis in the 19” rack.

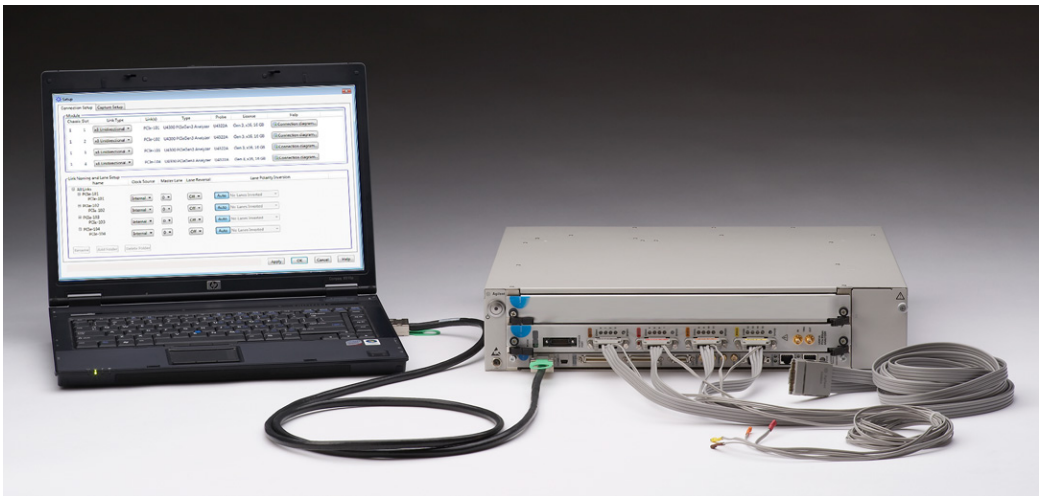
3 Secure the chassis to the rack using four screws that are appropriate for the rack.



To set up a portable U4002A 2-slot chassis

WARNING **As a safety precaution, always operate a U4002A 2-slot chassis in the horizontal orientation shown below. Do not operate in a vertical orientation.**

To begin using the U4002A 2-slot chassis, you need to connect the system controller. For details, see "Step 4: Set up a system controller" on page 26.



The following options are also available for the U4002A 2-slot chassis:

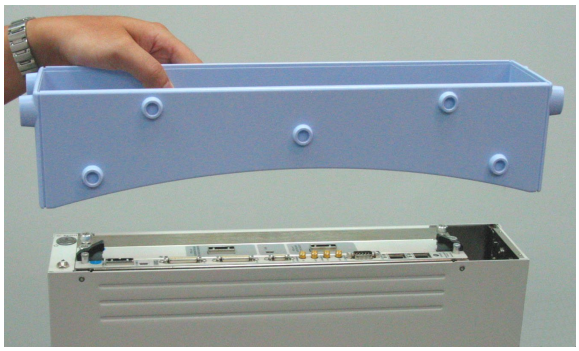
- N5650-80012 – Soft-sided Carry Case (Option SFT)
- U4002-60002 – Accessories Pouch Kit (Option PCH)

NOTE Depending on the test system you have ordered, the U4002A 2-slot chassis might have application blades factory-installed. If the blades are separate, install them as described in "To insert a blade into the chassis" on page 23.

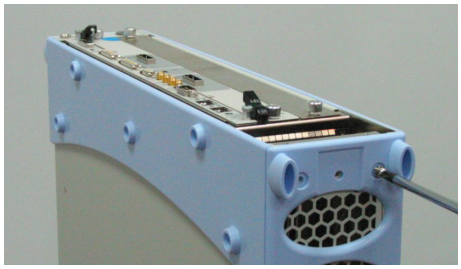
To attach the bumpers

If the U4002A 2-slot chassis does not have its plastic bumpers (for example, it was previously rackmounted), you must install them first. For instructions, see “To attach the bumpers" on page 21.

1 Align the bumper with the front of the chassis and make sure that the bumper feet are facing the bottom of the chassis.

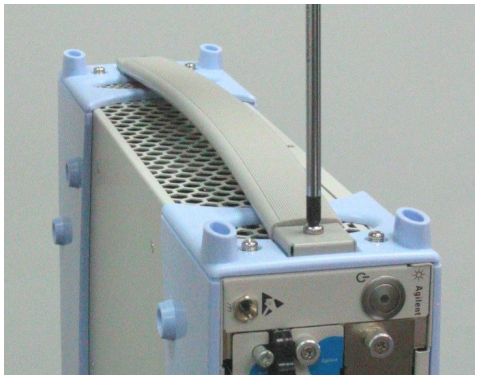


2 Use a Phillips screwdriver to secure the four screws on both sides of the bumper.



3 Repeat steps 2 to 3 to attach the bumper at the rear of the chassis.

4 Use a Phillips screwdriver to secure the handle to the left side of the bumpers.



Step 3: Insert and remove blades

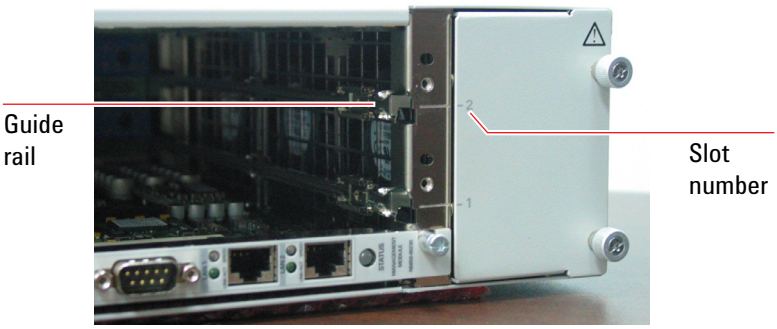
The blades are *not* hot swappable: You *must* power down the chassis to insert or remove blades.

CAUTION

- **Empty Slots**—Do not operate the chassis with empty slots. Always insert a filler blade (N5650-00080) or application blade into empty slots. This is especially important for the slots on either side of an application blade. 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 blades.
- **Chassis Manager**—Do not remove the chassis manager, which is integral to the operation of the chassis. Chassis managers that need servicing are to be removed by Agilent personnel only.

To insert a blade into the chassis

The chassis has guide rails for each slot in the chassis:



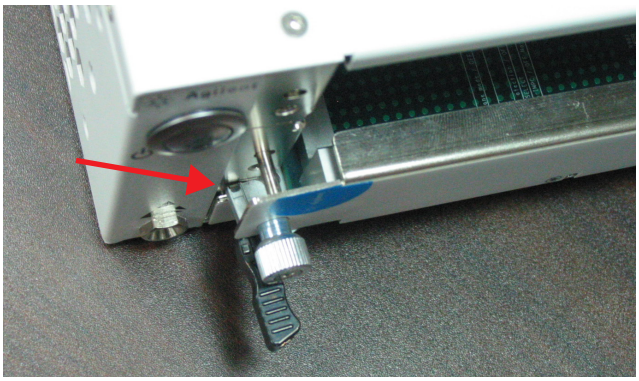
If there are blades that will be removed often, insert them into the topmost slots. For tips on keeping cables tidy, see “To manage cables" on page 17.

1 For application blades, locate the ejector levers at both ends of the blade. Extend the ends of both levers, by pulling them inwards towards each other. Then fully open the levers by pivoting them out towards you. (You can skip this step for filler blades, which do not have ejector levers.)

2 Align the blade’s green PCA board with the guide rails on both ends of the chassis. If the blade has metal plates covering the board, be sure to insert the green PCA board and *not* the metal plates into the rails.



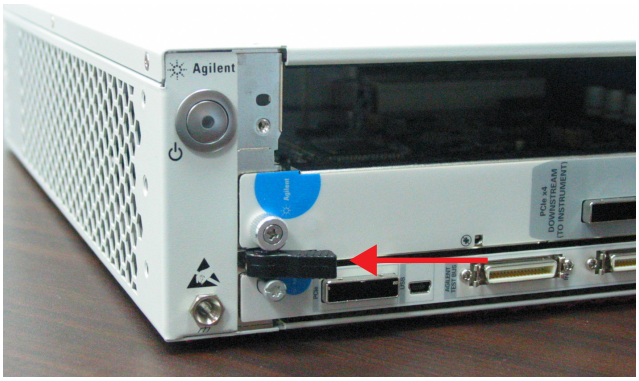
3 Push the blade into the chassis. For application blades, push until the ejector levers are pressed up against the chassis. Nudge the blade gently to allow the levers to engage.



4 Using your thumbs, press inwards firmly until the blade is seated firmly in the backplane. The blade's front panel should lie flush with the chassis front panel.



5 Push the lever ends towards the edge of the chassis to tuck them away.



6 Tighten the retaining screws on either end of the blade.

CAUTION Blades are grounded through the chassis. Tightening the retaining screws ensures the ground connection.

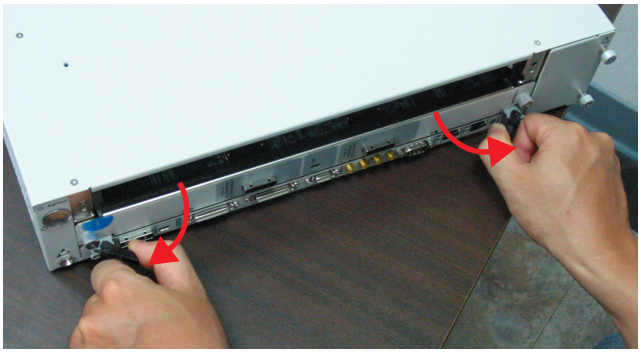
To remove a blade from the chassis

1 Loosen the retaining screws on both ends of the blade.

2 For application blades, extend the ends of both levers, by pulling them inwards towards each other.



3 Remove the blade: Open the levers by pivoting them out towards you. This unseats the blade from the chassis backplane.



4 Use the levers to pull the blade out from the chassis.

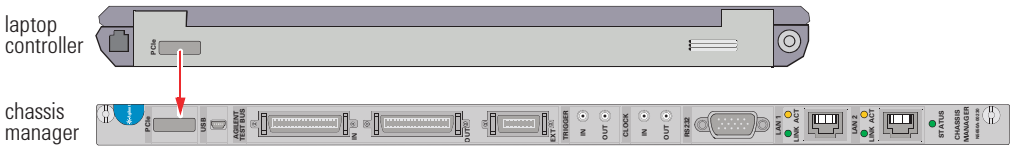
CAUTION Blades may become hot during use. Do not touch any of the components on a blade as you remove it from the chassis. Beware especially of the power module at the rear of the application blades.

5 Replace the removed blade with another blade, either a filler blade or an application blade.

Step 4: Set up a system controller

The system controller is typically a laptop PC with an ExpressCard PCIe adapter, but it could also be a desktop PC or any other PC with a PCIe interface.

To set up a laptop controller



1 Install the ExpressCard PCIe adapter into the laptop PC.

2 Connect a PCIe cable between the laptop PC's adapter and the chassis manager's PCIe interface.

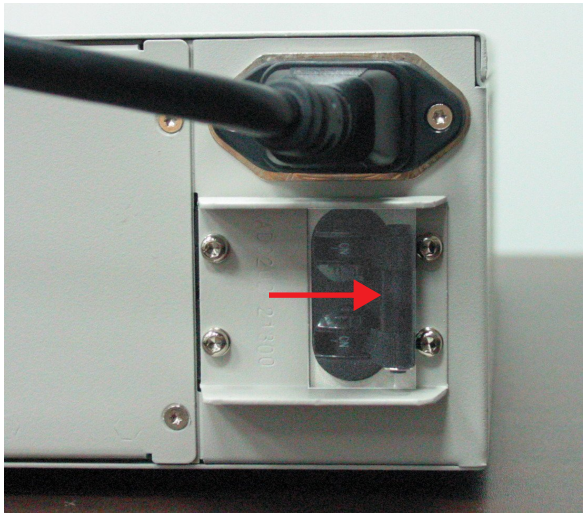
Step 5: Power up the system

To power up the U4002A 2-slot chassis

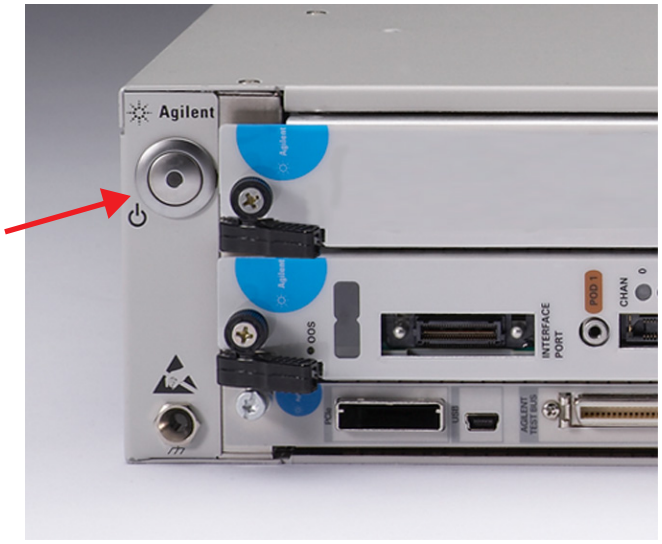
1 Insert the AC power cord into the inlet at the rear of the chassis.

2 Plug the power cord into a power source.

3 Push the circuit breaker to the right, which is the ON position.



4 Press the power button.



To power down the chassis

To power down the chassis, press the power button. The blue LED in the power button turns off and the cooling fans stop rotating.

WARNING **Powering down a chassis places it in standby mode. The chassis still receives electrical current and can pose an electrical shock risk (for example, in the event of flooding).**

Step 6: Troubleshoot problems

When you power up the chassis, the chassis does the following:

- Lights the blue LED inside the power button.
- Rotates the cooling fans.
- Boots up and runs the chassis manager.
- Boots up any inserted application blades.

To troubleshoot powerup problems

If the chassis or a blade does not appear to have power, check the following:

1. The circuit breakers at the rear of the chassis are set to the right, which is the ON position.
2. The AC power cords are connected to a working power source.
3. The electrical circuits are not overloaded. Check the combined power requirements of all equipment on the same circuit.
4. There are no empty slots in the chassis. Leaving slots empty can overheat the inserted blades, causing them to shut down.
5. The chassis manager LEDs are lit as described in “To diagnose LEDs" on page 30.

To diagnose LEDs

The LEDs on the chassis manager use the following LEDs during powerup.

Blade	LED	Color	When lit, indicates ...
chassis manager	STATUS	Green	The chassis manager has powered up, passed its self test, and detects no serious problems in the chassis.
		Amber	The blade is booting and undergoing self tests. If the LED remains amber after 120 seconds, this indicates an unrecoverable problem, for example: • hardware problem (bad memory, bad CPU, bad PCA board) • powerup self-test (POST) failure • ROM programming failure, software error Contact your Agilent representative to replace or service the blade.
		Red	There is a serious problem in the chassis, for example: • an overheated blade • bad power supply

To replace a fan, air filter, power supply, or blade, contact your Agilent representative. For contact information, see “To contact us ..." on page 41.

3 Software Installation

Once the hardware installation is completed, you must install application software on the controller PC.

The application software, version 4.00 or greater, is supported on Windows XP or Windows 7 (32-bit) operating systems.

Download the application software from the Agilent web site at:

www.agilent.com/find/pcie3

Once the application software install package is downloaded to the controller PC, double-click the .exe file, and follow its installation instructions.

Application Software Troubleshooting

There are known problems with PCI Express bus enumeration on some controller PCs. For the latest list of known good controller PCs, see the Agilent web site at:

www.agilent.com/find/dtc-controllers



4
For More Information

On the U4301A PCIe Analyzer Blade 34
On the U4998A HDMI Tester Blade 35

On the U4301A PCIe Analyzer Blade

For information on probing a PCI Express device under test, refer to the *Hardware and Probing for PCI Express Gen3 User's Guide* which is included in electronic format with the application software (and on the Agilent web site at www.agilent.com/find/pcie3manuals).

For information on controlling the U4301A PCIe analyzer blade, refer to the online help included with the application software.

On the U4998A HDMI Tester Blade

You can install the U4998A HDMI Tester blade in the U4002A 2-slot chassis. The blade provides features for testing the HDMI sink and source devices. You can use it to perform HDMI compliance testing and debugging on HDMI devices.

For information on the hardware details of this blade and installing its software components, refer to the *U4998A HDMI Tester Installation guide* which is included in the electronic format with the *U4998A* application software.

For information on how to configure and use this blade for HDMI testing, refer to the *U4998A HDMI Tester Online help* which is included in the electronic format with the *U4998A* application software.

4 For More Information

5 Characteristics

Standards 38
Environmental 38
Electrical 38
Mechanical 39
Calibration 39
Connectors 40
To contact us ... 41

Standards

The chassis and blades comply with the following standards:

EMC	• IEC 61326-1:2005 / EN 61326-1:2006 • Canada: ICES-001:2004 • Australia/New Zealand: AS/NZS CISPR 11:2004
Safety	• IEC 61010-1:2001 / EN 61010-1:2001 • CAN/CSA-C22.2 NO. 61010-1-04 / ANSI/UL 61010-1:2004
Rackmounting	• IEC-60297-2 19" 4-post racks

Environmental

Use Condition	Location	Indoor use only
Altitude	Operating	up to 3000 m (9,843 ft)
	Storage	up to 4600 m (15,092 ft)
Temperature	Operating	0° to 40°C (32°F to 104°F)
	Storage	-25°C to 60°C (-13°F to 140°F)
Humidity	Operating	up to 80% non-condensing, 5° to 40° C (41°F to 104°F)
	Storage	up to 90% non-condensing, 12 hr max, -25° to 60° C (-13°F to 140°F)
Safety Conditions	Installation Category	II
	Pollution Degree	2

Electrical

U4002A 2-slot chassis	Input Voltage	100 - 240 VAC nominal
	Power Consumption	800 VA
	Frequency	50 - 60 Hz
	Input Voltage Tolerance	+/- 10%

Mechanical

U4002A 2-slot chassis	Width	432 mm (17")
	Height	2U — 87 mm (3.5")
	Depth	414 mm (16.3")
	Weight	7.7 kg (17 lbs) — with only chassis manager installed
chassis manager	Width	15.2 mm (0.6")
	Height	322.25 mm (12.7")
	Depth	280 mm (11")
	Weight	1.2 kg (2.6 lbs) — U4002-00101

Calibration

The Agilent Digital Test Console chassis and blades do not require re-calibration.

Connectors

Chassis Manager

For introductory information about how the connectors are used, see "Chassis Manager" on page 9.



PCIe

- PCI Express x4
- Gen 1 and Gen 2 compliant

USB

- USB 2.0 Type B, not supported in initial release.

AGILENT TEST BUS

- Mini-D connectors
- two 36-pin: IN, OUT
- one 14-pin: EXT (not used)

TRIGGER

- SMA
- IN: adjustable threshold input, +/- 5V range, 200 mV minimum swing, with ESD suppression
- OUT: 3.3V CMOS, 50 ohm line drive, 3-state with ESD suppression

CLOCK

- SMA
- 10 MHz clock reference
- IN: -5V to +5V input, AC coupled, unterminated, 100 mV minimum swing, with ESD suppression
- OUT: 3.3V CMOS, 50 ohm line drive, 3-state with ESD suppression

RS232

- ultra thin DB9
- (not normally connected)

LAN 1 & 2 (not used)

- RJ45
- tri-rate 10/100/1000BASE-T
- auto-crossover
- auto-negotiation

To contact us ...

Should you require technical assistance, contact the center in your region. See:

http://www.agilent.com/find/contactus

5 Characteristics

Index

Numerics

2-post rack, 15
4-post rack, 15
4-post shelf, 15

A

accessories pouch, 20
Agilent contacts, 41
Agilent Digital Test Console, 8
Agilent Test Bus, 9
  connectors, 40
air filter
  replacing, 30
air flow, 22
application blade, 11

B

backplane
  U4002A 2-slot chassis, 8
blades
  hot swapping, 22
  inserting, 23
bumpers, for 2-slot
  attaching, 21
  removing, 18

C

cables
  ties, 17
calibration, 39
chassis manager
  connectors, 40
  removing, 22
chassis number, 11
circuit breaker
  U4002A 2-slot chassis, 8
  U4002A 2-slot chassis, switching on, 27
clock
  chassis manager, 9
  connectors, 40
code display, see display
connectors
  chassis manager, 40
customer support, 41

D

Declaration of Conformity, 3
display, on application blades, 11

E

E3664AC, 15
ejector levers, 25
  application blade, 11
electrical characteristics, 38
electrostatic discharge, 16
EMC, 38
EMI shielding, 22
environmental conditions, 38

F

fan
  replacing, 30
  U4002A 2-slot chassis, 8
filler blade, 22

G

grounding terminal, 16
  U4002A 2-slot chassis, 8

H

H/S, see Hot Swap LED
Hot Swap LED
  application blade, 11
humidity characteristics, 38

I

Installation Category, 38

L

LAN 1 & 2
  chassis manager, 9
  connectors, 40

M

mechanical characteristics, 39

N

N5650-80012, 20

O

OOS LED
  application blade, 11
operating temperature, 38

P

PCIe
  chassis manager, 9
  connectors, 40
Pollution Degree, 38
ports, on application blades, 11
power button
  U4002A 2-slot chassis, 8
power down, 28
power inlet
  U4002A 2-slot chassis, 8
power requirements, 38
power supply
  replacing, 30
primary disconnect, 15

R

rackmount brackets
  attaching to U4002A 2-slot chassis, 19
re-calibration, 39
reset button
  application blade, 11
RS232 port
  chassis manager, 9
  connectors, 40

S

safety standards, 38
serial number
  application blade, 11
serial port, see RS232
slots
  U4002A 2-slot chassis, 8
soft-sided carry case, 20
standards, 38
standby, 28
static electricity, 16
Status LED
  chassis manager, 9
storage temperature, 38
support, 41
system controller, 10, 15
  connecting, 26

T

technical support, 41
temperature characteristics, 38
trigger
  chassis manager, 9
  connectors, 40

U

U4002-00101, 9
U4002-60002, 20
U4002A, 8
U4002A 2-slot chassis, 8
  accessories pouch, 20
  mechanical characteristics, 39
  power requirements, 38
  powering up, 27
  proper orientation, 20
  rackmounting, 18
U4998A HDMI Tester blade, 35
USB
  chassis manager, 9
  connectors, 40

V

ventilation, 16

W

wrist strap, 16

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