

Keysight
N5192A/94A UXG X-Series
Agile Vector Adapter

Getting
Started Guide

Notices

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Where to Find the Latest Information

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

<http://www.keysight.com/find/MyKeysight>

Information on preventing instrument damage can be found at:

www.keysight.com/find/PreventingInstrumentRepair

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

<http://www.keysight.com/find/techsupport>

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Documentation Overview

Getting Started Guide

Available in hardcopy and as part of the online help file.

- Safety Information
- Receiving the Instrument
- Obtaining User Documentation
- Environmental & Electrical Requirements
- Basic Setup
- Self Tests
- Accessories
- Regulatory Information

User's Guide

Available as part of the online help file.

- Vector Adapter Overview
- LO Control
- Multi-Box Synchronization
- Streaming Use
- Pulse Waveform Maker
- CSV File Use
- Import Amptd/Phase/Time User Corrections Files
- Phase Transitions
- File Management and Structure

Programming Guide

Available as part of the online help file.

- Getting Started with Remote Operation
- IO Interfaces
- FTP Use
- Web Server
- SCPI Error Queue
- Programming the Status Register System

SCPI Command Reference

Available as part of the online help file.

- SCPI Basics
- System Commands
- Basic Commands
- Dual Arb Commands
- Stream Commands
- Discontinued Commands
- SCPI Command List

Data Sheet

Available as a PDF and as part of the online help file.

- Product performance values

Configuration Guide

Available as a PDF and as part of the online help file.

- Information to configure instruments for purchase

Error Messages

Available as a PDF and as part of the online help file.

- Provides the instrument's error messages and brief descriptions

Security Features Document

Available as a PDF.

- Working in a Secure Environment

1 Safety Information

- See "Warnings, Cautions, and Notes" on page 9
- See "General Safety Considerations" on page 10
- See "Instrument Markings" on page 11

Warnings, Cautions, and Notes

The documentation for this product uses the following safety notations. Familiarize yourself with each notation and its meaning before operating the instrument.

WARNING

Warning denotes a hazard. It calls attention to a condition or situation that could result in personal injury or loss of life. Do not proceed beyond a warning until you fully understand and meet the indicated conditions or situations.

CAUTION

Caution calls attention to a condition or situation that could result in damage to or destruction of the instrument, or in the loss of a user's settings or data. Do not proceed beyond a caution until you fully understand the indicated conditions.

NOTE

Note calls the user's attention to an important point or special information in the text

General Safety Considerations










WARNING If the instrument is not used as specified, the protection provided by the equipment could be impaired. The instrument must be used in a normal condition only, in which all means for protection are intact.




WARNING No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

CAUTION The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

Instrument Markings

The instrument has the following markings. Familiarize yourself with each marking and its meaning before operating the instrument.

| | |
|---|--|
|  | The ON/ STANDBY symbol is used to mark the positions of the instrument power line switch. |
|  | This symbol indicates that the input power required is AC. |
|  | The instruction documentation symbol. The product is marked with this symbol when it is necessary for you to refer to instructions in the documentation. |
|  | The CE mark is a registered trademark of the European Community. |
|  | The CSA mark is a registered trademark of the CSA International. |
|  | The RCM mark is a registered trademark of the Australian Communications and Media Authority |
|  | The Keysight email address is required by EU directives applicable to our product. |
|  | This is the symbol of an Industrial Scientific and Medical Group 1 Class A Product. (CISPR 11, Clause 5) |
| ICES/NMB-001 | This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). |
| IP 2 0 | The instrument has been designed to meet the requirements of IP 2 0 for ingress and operational environment. |
|  | This symbol 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. |

| | |
|---|--|
|  | <p>This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).</p> |
|  | <p>This symbol indicates compliance with the China RoHS regulations for paper/fiberboard packaging.</p> |
|  | <p>South Korean Certification (KC) mark that includes the marking's identifier code which follows this format: R-R-Kst-ZZZZZZZZZZZZZZ.. See "South Korean Class A EMC Declaration:" on page 26</p> |

2 Getting Started

CAUTION

To avoid damaging or degrading the performance of the instrument, do not exceed 0.5 W *maximum* of reverse power levels at the RF input. See also *Tips for Preventing Signal Generator Damage* on <http://www.keysight.com>.

NOTE

Is your product software up-to-date? Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at <http://www.keysight.com>.

NOTE

Is your product documentation up-to-date? To locate documentation updates for your product, contact Keysight:

<http://www.keysight.com/find/assist>

- <http://www.keysight.com/find/N5192A>
 - <http://www.keysight.com/find/N5194A>
-

- See "Statement of Compliance" on page 14
- See "Checking the Shipment" on page 14
- See "Obtaining User Documentation" on page 14
- See "Verifying Pre-Installed Software License" on page 15
- See "Instrument Physical Characteristics" on page 16
- See "Meeting Environmental and Electrical Requirements" on page 16
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- See "Performing Self Test" on page 22
- See "Ordering Accessories" on page 23
- See "Proper Use and Cleaning" on page 24
- See "Returning an Instrument to Keysight Technologies" on page 24
- See "Contacting Keysight" on page 24

Statement of Compliance

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Checking the Shipment

1. Inspect the shipping container for damage.
Signs of damage can include a dented or torn shipping container or cushioning material that indicates signs of unusual stress or compacting.
2. Carefully remove the contents from the shipping container and verify that your order is complete.
The following items are included with each instrument:
 - Quick Start Poster
 - Getting Started Guide
 - documentation CD-ROM (some CD-ROM contents are also available in hardcopy format)
 - three-prong AC power cord specific to geographic location
3. Verify that the options you ordered are included with the shipment by checking the serial number label on the rear of the instrument and the packing literature included with the shipment.
See also, [See "Ordering Accessories" on page 23](#)
4. If a pre-installed software license is part of the instrument order, verify its installation using the directions outlined in [See "Verifying Pre-Installed Software License" on page 15](#).

Obtaining User Documentation

The latest documentation is a composite help file available only online through the product webpage. The product webpage provides ease-of-access to the most up-to-date documentation and should be checked often for any changes.

The documentation may be viewed on the webpage itself as webhelp, or downloaded as a zipped file and installed on your local drive. The same online help file is used for both models. To understand what is in the online help file, [See "Documentation Overview" on page 7](#). This Getting Started Guide is included in the help file.

To access the documentation, click one of the following links:

- <http://www.keysight.com/find/N5192A>
- <http://www.keysight.com/find/N5194A>

Verifying Pre-Installed Software License

If you purchased an instrument where the order included the pre-installation of a Test Management Environment (TME) software license (N78xxA), verify the license installation using the following key path:

System > Instrument Info > Options Info

This opens a menu with the choices: Instrument Options, and Auxiliary Software Options. To view the license, press the appropriate menu key:

- For the TME license, press Auxiliary Software Options.

If a license is pre-installed, the software for the license still needs to be downloaded onto your PC. Use the following link to access the software for download and installation:

- TME software—<http://www.keysight.com/find/calibrationsoftware>

If the software license(s) was ordered with the instrument for pre-installation and it does not show in the instrument, please contact Keysight Technologies:

<http://www.keysight.com/find/contactus>

Instrument Physical Characteristics

- Height: 89 mm (3.5 in)
- Depth: 559 mm (22 in)
- Width : 427 mm (16.8 in)
- Weight: 17.2 kg (37.9 lb)

Meeting Environmental and Electrical Requirements

CAUTION

To avoid the loss of data or current user instrument states that have not been permanently saved to non-volatile memory, the instrument should always be powered down either via the instrument's front panel power button or the appropriate SCPI command. Instrument's installed in rack systems and powered down with the system rack power switch rather than the instrument's front panel switch display an Error - 310 due to the instrument not being powered down correctly.

Environment

- indoor use unless specified otherwise
- altitudes < 9,842.5 feet (3,000 meters)
- 0 to 50°C temperature
- maximum relative humidity (non-condensing): Type Tested, 95% relative humidity up to 40°C decreasing linearly to 45% relative humidity at 50°C.
From 40°C to 50°C, the maximum % Relative Humidity follows the line of constant dew point.

CAUTION

This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 2, per IEC 61010-1 Third Edition and 664 respectively.

Environmental Testing

Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of Storage, Transportation and End-use; those stresses include but are not limited to temperature, humidity, shock, vibration, altitude and power line conditions. Test Methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.

Ventilation

CAUTION

VENTILATION REQUIREMENTS: When installing the instrument(s) into a cabinet consideration shall be given to the convection flow into and out of the cabinet. Consideration shall also be given to the individual instruments to avoid having the heated discharge of one instrument, now becoming the cooling intake air for another instrument.

Another area of concern is verification that the maximum ambient operating temperature of the instrument(s) is not exceeded by cabinet installation.

Keysight recommends forced air convection whenever an instrument(s) are installed in a cabinet and further recommends that the maximum operating temperature of the cabinet be reduced 10°C from the lowest, of the maximum operating temperature of a single instrument.

If there are any concerns or special requirements a Keysight Field Engineer should be consulted to assure instrument(s) temperature compliance and performance.

Line Setting Requirements

CAUTION

Before switching on this instrument, ensure that the following items have been checked:

- the correct rating of the service breaker
 - the supply voltage is in the specified range
-

CAUTION

The instrument has auto-ranging line voltage input; be sure that the supply voltage is within the specified range and voltage fluctuations do not exceed 10 percent of the nominal supply voltage.

NOTE

The instruments can operate with mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage.

| | |
|------------|--|
| Voltage: | 100/120 volts nominal 220/240 volts nominal |
| Frequency: | for 100/120 volts: 50/60/400 Hz nominal for 220/240 volts: 50/60 Hz nominal |
| Power: | 400 W maximum |

Connecting the AC Power Cord

Install the instrument so that the detachable power cord is readily identifiable and is easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

WARNING The instrument shall be set flat in its normal use position so that the detachable power cord is readily identifiable and is easily reached by the operator. It shall not be placed on the four feet of the rear panel in normal use.

WARNING This is a Safety Class I Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.

CAUTION The mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Inadequate earth grounding can damage the instrument. Always use the Keysight supplied power cord or one with same or better electrical rating.

Connect the AC power cord as follows:

1. Ensure that the power cord is not damaged
2. Install the instrument so that one of the following items is readily identifiable and easily reached by the operator: AC power cord, alternative switch, or circuit breaker.
3. Insert the mains plug into a socket outlet provided with a protective earth grounding.

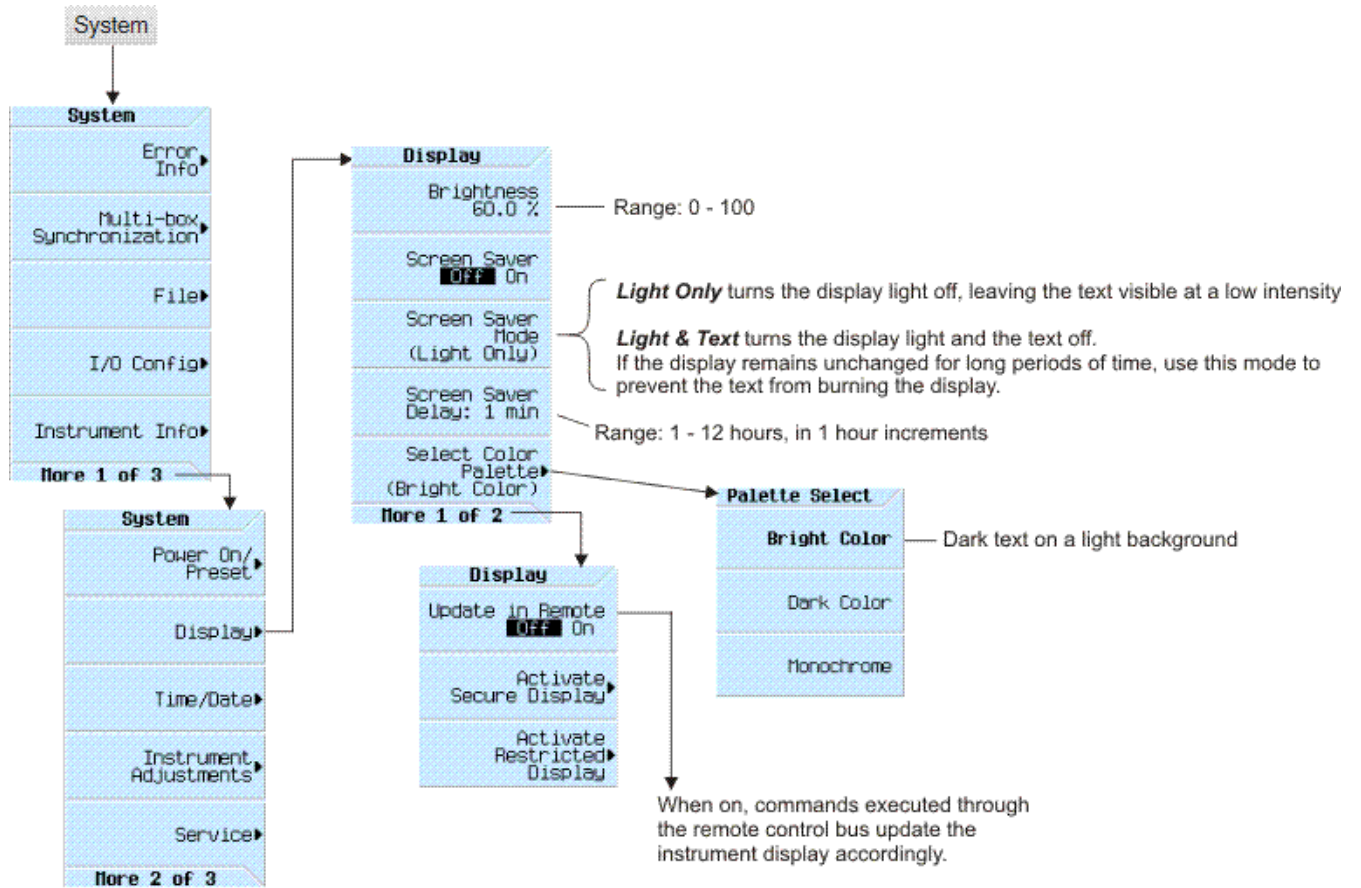
Configuring the Display

Screen saver settings are persistent states; they are unaffected by preset or a power cycle.

Use the arrow keys, numeric keypad, or front panel knob to adjust numeric values.

NOTE UXG agile vector adapters are shipped from the factory with default display settings. When the instrument display is not required to be active for long periods of time, consider using the Screen Saver Mode to extend the life of the display.

Display Softkeys



For details on a key, press **Help** and then the desired key

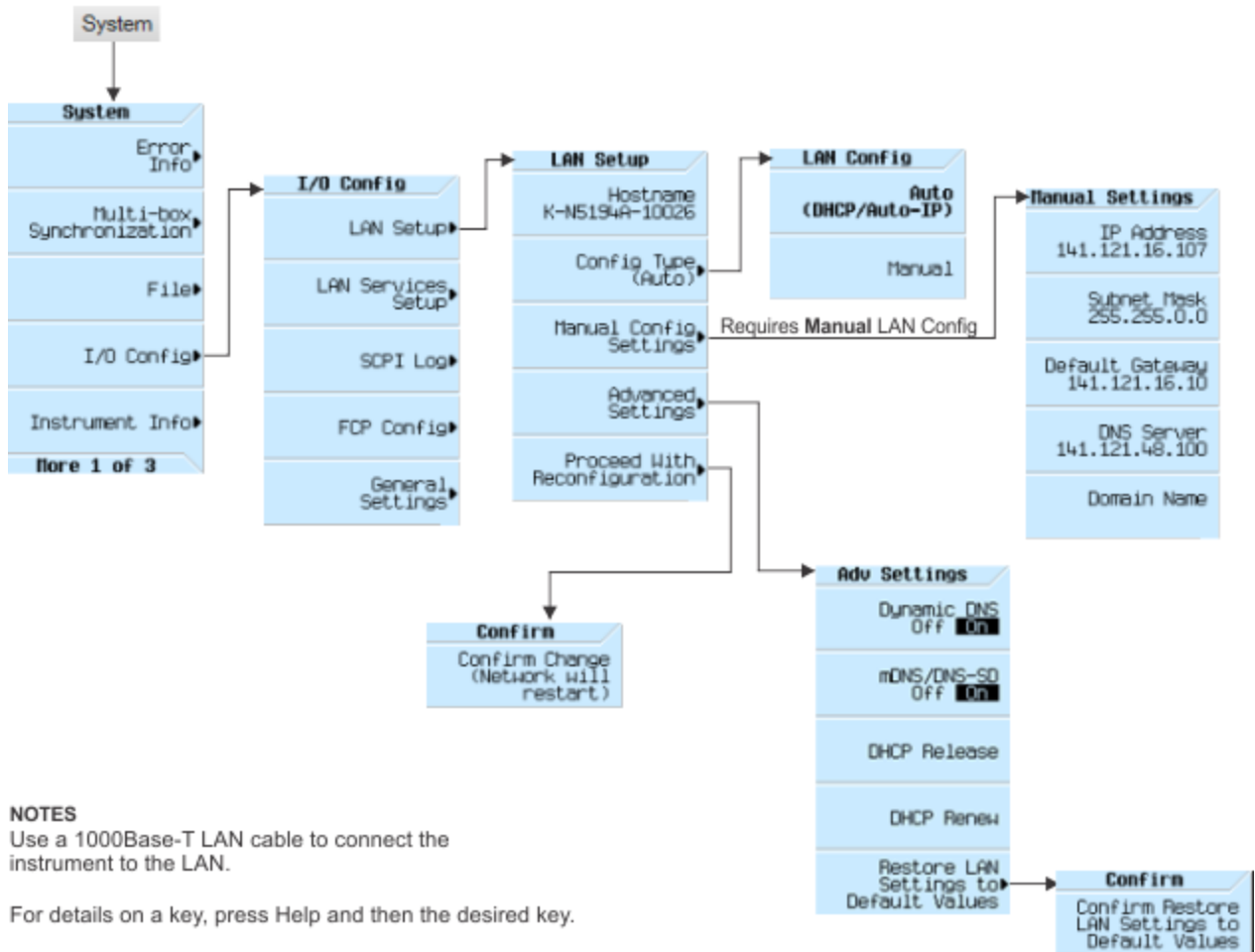
NOTE With the brightness set to minimum, the display may be too dark to see the softkeys. If this happens, use the above figure to locate the brightness softkey and adjust the value so that you can see the display.

Configuring for Remote Control

LAN Configuration

The following figures show the instrument key menu maps to use to configure the LAN interface and the various services.

Configuring the LAN Interface

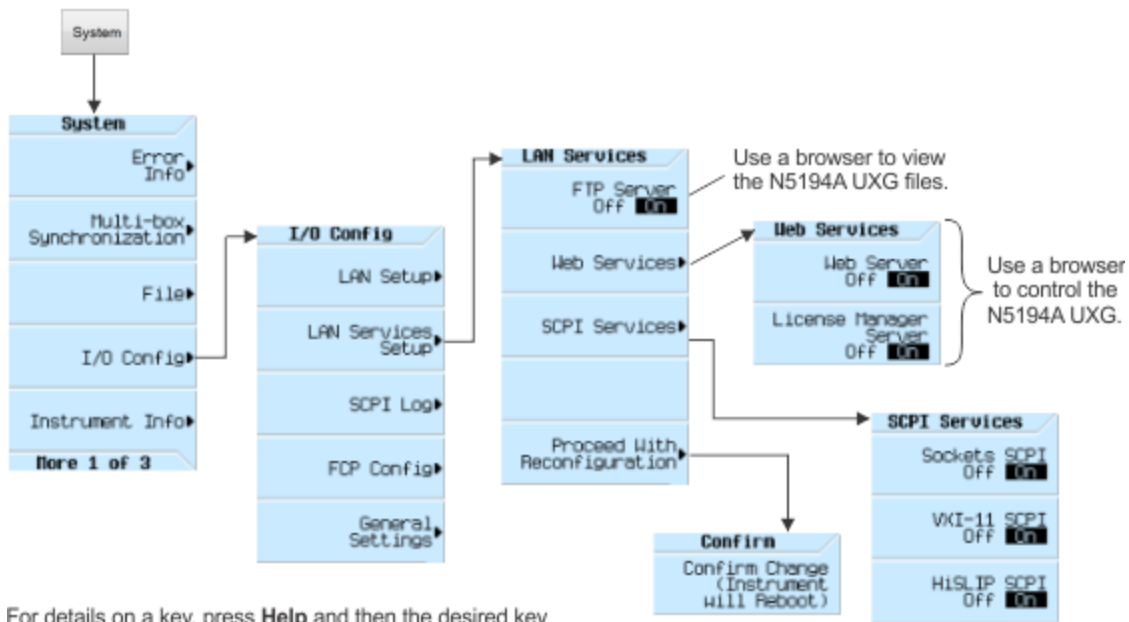


NOTES

Use a 1000Base-T LAN cable to connect the instrument to the LAN.

For details on a key, press Help and then the desired key.

Enabling LAN, Web, and SCPI Services



Performing Self Test

NOTE

For the instrument to meet performance specifications allow a warm up period of 45 minutes within an operational temperature range of 0 to 50 °C. For more information, refer to the instrument Data Sheet.

There is only one type of self test, and it does not use an external LO. But it does require a 6 GHz signal connected to the 6 GHz IN connector. This 6 GHz signal may be supplied from the rear panel 6 GHz OUTPUT connector of an N5191A or N5193A UXG, or from another signal generator's RF output.

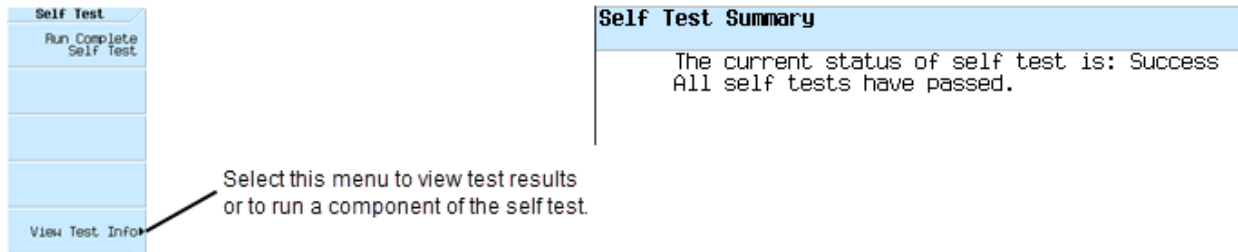
NOTE

The 6 GHz IN is a 50 Ω connector that expects a 6 GHz signal within the power range of 5 dBm to 15 dBm.

Self test helps to confirm that the instrument is operating properly, or to diagnose problems.

Perform self tests when you initially set up the instrument after a minor repair (refer to the Service Guide for details), or when the integrity of the instrument is in question.

The following figure shows the self test menu and the displayed summary. After running the self test, the summary shows the results.



CAUTION

Power levels generated during the self tests can damage sensitive devices. Be sure to follow all instructions.

Run Self Tests

To run self tests, perform the following steps:

1. Turn on the N5192A or N5194A UXG and press **FREQ > LO Setup > LO Source Int Ext** until **Int** is highlighted.
2. Disconnect any device or cable from the RF OUTPUT connector.
3. Press **System > Instrument Info > Self Test**.
4. Press the **Run Complete Self Test** softkey.
5. After the self test has completed, press **View Test Info** to see the test results.

Self Test Failure

1. Confirm that all external cables including LAN and USB cables are disconnected from the instrument, with the exception of the 6 GHz IN and power, and repeat the self-test.
2. If the self-test continues to fail, the instrument may require service. **Contact Keysight** for instructions. If instructed that the instrument requires service and you are unable to service the instrument, send it to a Keysight service center for repair. Include a detailed description of the most significant failure (root failure) and any displayed error messages. Also include the model, serial number, installed options, and firmware version. See ["Returning an Instrument to Keysight Technologies" on page 24](#) for return instructions.

Ordering Accessories

You can purchase instrument accessories or get the latest documentation (see the table below) by contacting Keysight Technologies.

See also, [See "Contacting Keysight" on page 24.](#)

| Model, Option, or Part Number | Description |
|--|--|
| SSD | Additional removable solid state drive |
| AXT | Transit Case |
| 1CC131A | 100-pin LVDS cable, 1.5 m length |
| 1CC133A | 10 GB optical cable, 2 m length, and two SFP+ transceivers |
| 1CN106A | Front Handle Kit, 2U |
| 1CM110A | Rack Mount flange kit, 2U |
| 1CP104A | Rack Mount Flange w/front handles, 2U |
| N5191-90001 | Quick Start Poster |
| N5191-90016 | Getting Started Guide |
| Available online <ul style="list-style-type: none"> - http://www.keysight.com/find/N5192A - http://www.keysight.com/find/N5194A <p>The online documentation is a composite help file that contains the listed documents and is available as a file to download, or to view directly from the website (webhelp).</p> | Online Documentation Set ^a <ul style="list-style-type: none"> - Getting Started Guide - User's Guide - Programming Guide - SCPI Command Reference |

a. For a description of the contents of each guide, [See "Documentation Overview" on page 7.](#)

Proper Use and Cleaning

The instrument cover protects against physical contact with internal assemblies that contain hazardous voltages, but does not protect internal assemblies against contact with liquids. To avoid damage and personal injury, ensure that liquids are positioned away from the instrument.

WARNING If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

Cleaning Suggestions

WARNING To prevent electrical shock, disconnect the instrument from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally. Cleaning connectors with alcohol shall only be done with the instrument's power cord removed, and in a well-ventilated room. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

To ensure good connections, regularly clean the instrument's front and rear panel connectors with alcohol.

To prevent dust build-up that could potentially obstruct ventilation, periodically clean the instrument's cover. Use a dry cloth or a cloth slightly dampened with water to clean the external case parts.

Returning an Instrument to Keysight Technologies

1. Gather as much information as possible about the instrument's problem.
2. Contact Keysight using the phone number that is specific to your geographic location. These phone numbers are listed on the Internet at <http://www.keysight.com/find/assist>. If you do not have access to the Internet, contact your Keysight field engineer.
After you provide information about the instrument and its condition, you will receive information about where to ship your instrument for repair.
3. Ship the instrument in the original factory packaging materials, if available, or use similar packaging to properly protect the instrument.

Contacting Keysight

Assistance with test and measurements needs, information on finding a local Keysight office, and information on purchasing accessories and documentation are available on the Internet at:

<http://www.keysight.com/find/assist>

If you do not have access to the Internet, please contact your Keysight field engineer.

NOTE In correspondence or telephone conversation, refer to the instrument by its model number and full serial number. With this information, the Keysight representative can determine if your unit is still within its warranty period.

3 Regulatory Information

Certification

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

Assistance

Product maintenance agreements and other customer assistance agreements are available for Keysight Technologies products. For assistance, contact Keysight Technologies (see page 16).

EMC

Complies with the essential requirements of the European EMC Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61326-1
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11
- ICES/NMB-001

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme a la norme NMB-001 du Canada.

South Korean Class A EMC Declaration:

This equipment has been conformity assessed for use in business environments. In a residential environment this equipment may cause radio interference.

NOTE This EMC statement applies to the equipment only for use in business environment.

| |
|---|
| 사용자안내문 |
| 이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다. |

※ 사용자 안내문은 "업무용 방송통신기자재"에만 적용한다.

Safety

Complies with the essential requirements of the European Low Voltage Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61010-1
- Canada: CSA-C22.2 No. 61010-1
- USA: UL Std. No. 61010-1

Acoustic Statement: (European Machinery Directive)

Acoustic noise emission
LpA < 70 dB
Operator position
Normal operation mode per ISO 7779

Declaration of Conformity

To find a current Declaration of Conformity for a specific Keysight product, go to:

<http://www.keysight.com/go/conformity>

4 Open Source Licenses

This chapter contains the licenses for open source software used in the instrument.

Apple mDNSResponder

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

1. Definitions

“License” shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

“Licensor” shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

“Legal Entity” shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, “control” means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

“You” (or “Your”) shall mean an individual or Legal Entity exercising permissions granted by this License.

“Source” form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

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