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# **U3020AS26**

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## Description

The Keysight U3020AS26 Test Set is a DC to 26.5 GHz Signal Distribution instrument. The Test Set functionally is a Dual SP6T 6-Port Latching, Terminated switch in which both switches are functionally ganged together. The Test Set mainframe is a rack mountable 2 EIA units high. Switch control is only processed via the LAN or GPIB rear panel interfaces.

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## Verifying the Shipment

To verify the contents shipped with your product, refer to the “Box Content List” included with the shipment.

Inspect the shipping container. If the container or packing material is damaged, it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is physical damage refer to [“Contacting Keysight” on page 31](#). Keep the damaged shipping materials (if any) for inspection by the carrier and a Keysight Technologies representative.

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## General Performance

The Test Set performance is specified for a standalone instrument.

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**CAUTION** This product has an autoranging line voltage input. Be sure the supply voltage is within the specified range.

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## Power Requirements

- 100/120/220/240 VAC (50/60 Hz)
- The instruments can operate with mains supply voltage fluctuations up to  $\pm 10\%$  of the nominal voltage.
- Air conditioning equipment (or other motor-operated equipment) should not be placed on the same ac line that powers the Test Set.
- U3022AS26 maximum power is 50 W.

## Environmental Tests

The U3020AS26 complies with all applicable safety and regulatory requirements for the intended location of use.

- Operating Environment (Indoor Use)
- Operating Temperature 0 to 55 °C
- Storage Temperature: -40 to +70 °C
- Operating Altitude: 0 to 2000 meters (~ 6,562 feet)
- The instrument can safely operate in a relative humidity of 80% for temperatures to 31 degrees C, decreasing linearly to 50% relative humidity at 40 degrees C.

## Dimensions and Space Requirements

Standard installation of the U3020AS26 includes configuration and installation on a customer provided lab bench, or table top of adequate size and strength.

**Table 1** Test Set Dimensions

Item	Length/Weight
Width	42.5 cm (16.73 in)
Depth	58 cm (22.83 in)
Weight	8 kg (17.64 lb)

## General RF Switch Specifications

**Table 2** Internal RF Switch and Key Parameters

Maximum Input Power Rating	1 Watt (+30 dBm) average into 50 Ohm internal loads.
Switch Life	5 million cycles minimum
Switch Speed	15 ms

### Typical RF Channel Performance

**Table 3 Performance Characteristics**

Amplitude Response (Port IN to OUT)	
Frequency Range	Insertion Loss (dB)
DC to 1.0 GHz	0.5
1.0 to 6.0 GHz	1.2
6.0 to 12 GHz	2.0
12 to 20 GHz	2.5
20 to 26.5 GHz	3.7
Amplitude Tracking, Channel A to B	
Frequency Range	Amplitude Tracking (dB)
DC to 1.0 GHz	$\pm 0.05$
1.0 to 6.0 GHz	$\pm 0.1$
6.0 to 12 GHz	$\pm 0.2$
12 to 20 GHz	$\pm 0.3$
20 to 26.5 GHz	$\pm 0.8$
Phase Tracking, Channel A to B	
Frequency Range	Phase Tracking (skew) Spec (ps)
DC to 0.1 GHz	$\pm 40$
0.1 to 6.0 GHz	$\pm 5$
6.0 to 12 GHz	$\pm 6$
12 to 20 GHz	$\pm 8$
20 to 26.5 GHz	$\pm 20$
26.0 to 26.5 GHz	$\pm 40$

**Table 4 Port Match**

Frequency Range	Output Ports A & B	Input Ports 1 to 6	Input Ports 1 to 6 (internal termination)
DC to 1.0 GHz	30	30	32
1.0 to 6.0 GHz	18	18	20
6.0 to 12 GHz	10	10	12
12 to 20 GHz	10	10	11
20 to 26.5 GHz	7	7	8

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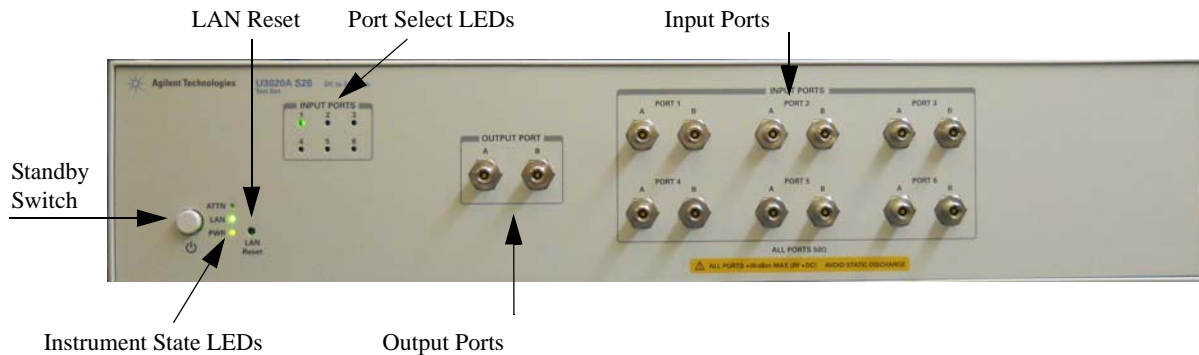
## Front and Rear Panel Features

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**CAUTION** Refer to the standard instrument documentation for damage limits to the ports. Verify that your test setup will not cause those limits to be exceeded.

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**Figure 1** Front Panel



### Standby Switch

Note that this switch is Standby only, not a line switch. The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

### LAN Reset

The LAN reset button restores the instrument's default LAN configuration.

### Port Select LEDs

The LED's indicate the RF Port path that is presently operational, all other port inputs are terminated by an internal 50 Ohm load.

### Input/Output Ports

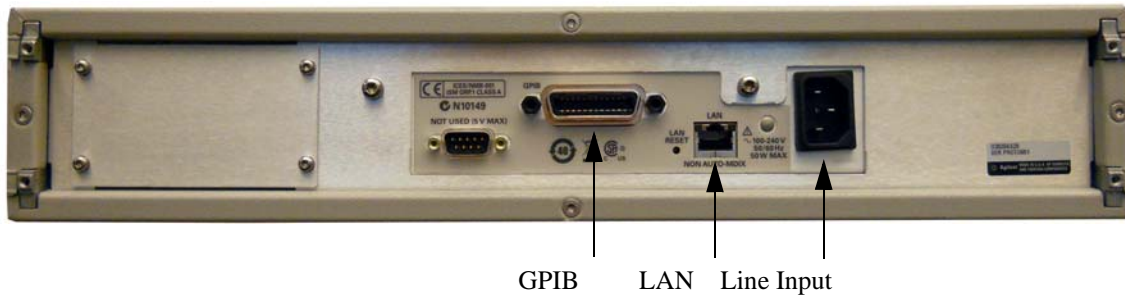
There are two separate signal channels, A and B. Each channel has one output port and six input ports. All connectors are 3.5 mm female.

### Instrument State LEDs

When the power is applied to the U3020AS26, the instrument enters its power-on sequence which requires several seconds to complete. The LEDs provide information on the state of the instrument during power-on and during upgrades of the instrument firmware. [Table 5 on page 7](#) identifies the instrument states based on the color and functioning of the LEDs.

**Table 5 Instrument State LED Definitions**

LED	Color	Instrument State
ATTN LAN PWR	Off Green Green	Instrument in “ready” state LAN connection established - instrument has an IP address firmware download complete
ATTN LAN PWR	flashing flashing Green	Power-on/boot-up. ATTN and LAN will flash red and then green during the power-on self-test.
ATTN LAN PWR	Off Red Green	No LAN connection due to: - disconnected LAN cable - failure to acquire and IP address - waiting for DHCP-assigned address
ATTN LAN PWR	Green (flashing) Green Green	Instrument Busy State - firmware download (LAN LED red if download over GPIB) - lengthy instrument operation in progress
ATTN LAN PWR	Red (flashing) Green Green	Instrument programming error or self-test error. Error queue is read using SYSTem:ERRor?
ATTN LAN PWR	Off Green (flashing) Green	Instrument identification. Activated from instrument Web interface: ON: Turn on Front Panel Interface Indicator OFF: Turn off Front Panel Interface Indicator

**Figure 2** Rear Panel**GPIB Connector**

This connector allows the Test Set to be connected directly to a controller.

**LAN**

The instrument is controlled over Local Area Network (LAN).

**Line Input**

The line input contains the power cord receptacle.

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.

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**CAUTION** Always use the three-prong ac power cord supplied with this product. Failure to ensure adequate grounding by not using this cord may cause damage to the product.

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## Controlling the Test Set

### Controlling the Test Set and Making Measurements

Keysight U3020A is a “slave” instruments. A controller must be used to control the Test Set. There are two methods that can be used to control the Test Set.

- Using LAN connection
- Using GPIB connection

Once the connection between the Controller and the Test Set has been established (LAN or GPIB), the Test Set can be controlled using SCPI commands.

### LAN Connection using Your Companies Intranet

Connect the Test Set and your controlling computer to an active instrument LAN line. Open the internet browser application on the computer. Enter this default web address on your browser application:

<http://U3020as26-xxxx>

The Welcome screen for the instrument should be viewable if the LAN connection is working. Select the following screen control buttons to access the SCPI command control window.

1. Browser Web Connect (control button on the left side of the screen)
2. Allow Full control
3. Commands

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**NOTE** The last four digits in the web address (xxxx) are the last four digits of the instruments serial number.

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Once the connection between the controller and the Test Set has been established (LAN or GPIB), the test set can be controlled using SCPI commands. Refer to [Table 6 on page 10](#).

## Test Set Control Commands

The Test Set has predefine sequence command sets defined at the factory and stored in the non-volatile memory of the controller module. If the specified sequence name is not currently stored in the memory, due to corrupted program or accidentally deleted, an error will be generated. Refer to the Service section of this manual for instructions to remedy this issue.

### Syntax

```
ROUTE:SEQuence:TRIGger <command>
```

### Parameters

Refer to [Table 6](#) for commands use to control the Test Set's programmable switches.

### Example

The following executed sequence command, "SEL\_PORT1", will position the RF switches to create a signal path through Port 1, Input to Output for Channels A and B. All other remaining Port Inputs will be terminated by an internal 50 Ohm load.

```
ROUT:SEQ:TRIG SEL_PORT1
```

**Table 6** Test Set Control Commands

Commands	Description	comments
SEL_PORT1	Select Port 1 Input of Chan A and B	All unselected Port Inputs are terminated
SEL_PORT2	Select Port 2 Input of Chan A and B	All unselected Port Inputs are terminated
SEL_PORT3	Select Port 1 Input of Chan A and B	All unselected Port Inputs are terminated
SEL_PORT4	Select Port 2 Input of Chan A and B	All unselected Port Inputs are terminated
SEL_PORT5	Select Port 1 Input of Chan A and B	All unselected Port Inputs are terminated
SEL_PORT6	Select Port 2 Input of Chan A and B	All unselected Port Inputs are terminated
TERM_ALL_INPUTS	Terminate all Input Ports (50 Ohm)	Output Ports are not terminated
LED_ALL	All LEDs ON	Diagnostic Check
LED_OFF	All LEDs OFF	Diagnostic Check

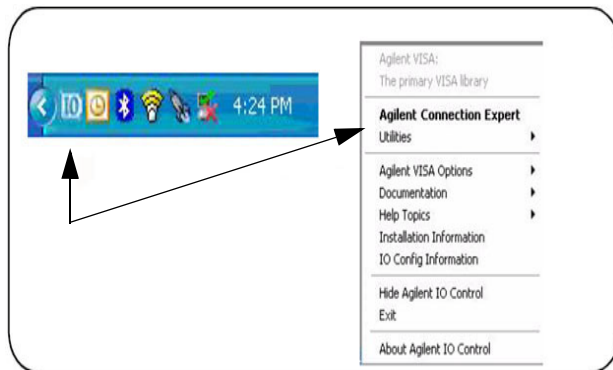
### Adding Instruments to the LAN Interface

This section contains information to configure the U3020A LAN and using Keysight IO Libraries “Connection Expert Utility.”

#### Configuring the LAN Interface

1. Connect the Test Set to the PC.
2. Turn On the Test Set.
3. Select **IO Control** icon > **Keysight Connection Expert** from the application window.

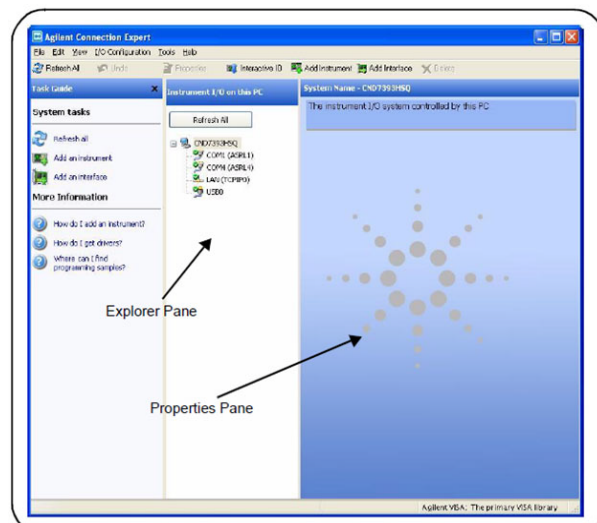
**Figure 3** Keysight Connection Expert



#### Locating the Instrument

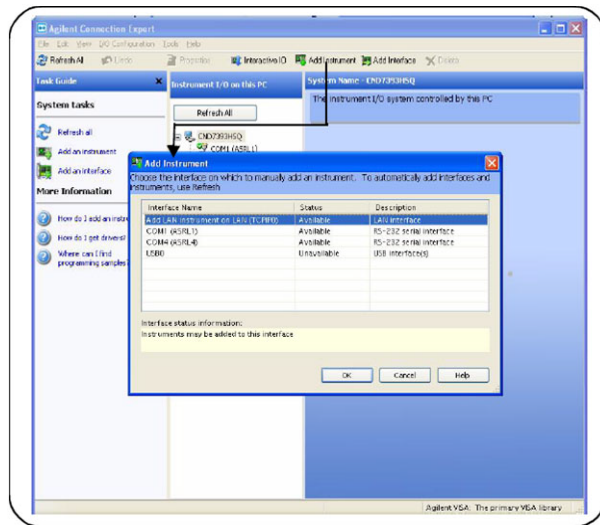
Keysight Connection Expert opens with a “Welcome Screen,” and a window similar to that shown in **Figure 3**. The available computer interfaces are configured during installation of the Keysight IO Libraries and are displayed in the left column (Explorer Pane). The properties of the configured interface are displayed in the right column (Properties Pane).

**Figure 4** Explorer and Properties Pane



1. Click **Add Instrument** on the tool bar to search the network for instruments.
2. Select **Add LAN Instrument on LAN (TCPIP0) > OK**. Keysight Connection Expert performs an automatic find of all instruments on the same subnet as the computer.
3. Select the desired instruments from the list and click **OK**. Communication paths to the instruments are verified and the instruments are added to the configured interface.

**Figure 5 Adding Instruments**

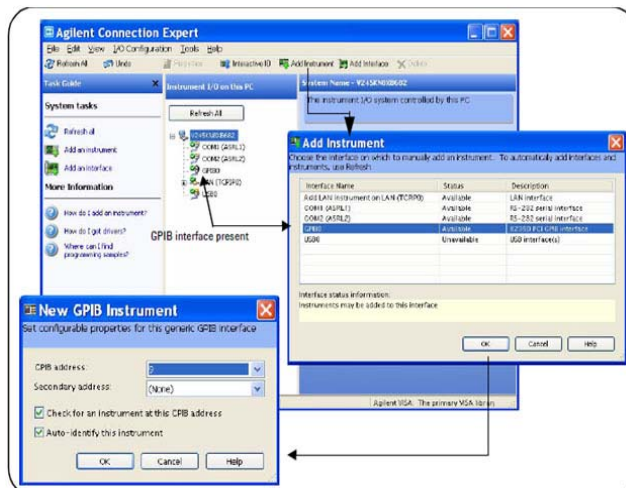


### Configuring the GPIB Interface

Programming access to the Test Set is also available through the instrument's GPIB interface. The GPIB connector is located on the rear panel of the instrument.

1. Select the **Keysight Control** icon > **Keysight Connection Expert**. If a GPIB card is installed in your computer, the GPIB interface was configured during installation of the IO libraries and is displayed in the Explorer Pane of the “Welcome” Screen.

**Figure 6 Keysight Connection Expert**



### Adding Instruments to the GPIB Configuration

1. Select **Add Instrument** on the tool bar.
2. Select **GPIB Interface > OK**.
3. Select **U3020A's Address** in the GPIB address drop-down list > **OK**.  
(Factory set address = 26)

### Changing the GPIB Address

The U3020A GPIB address can only be changed programmatically. The GPIB address command is:

```
SYSTem:COMMunicate:GPIB:ADDRESS <address>
```

When the address is changed, the new GPIB address is *not* updated in the Keysight Connection Expert if the instrument was previously configured.

1. From the Keysight Connection Expert application window, highlight the instrument that's address was changed and click **Change Properties** in the Configurable Properties application window, change the address to the new address setting and select **OK**.

### LAN Configuration Commands

#### IP Address Command

This command assigns a static Internet Protocol (IP) address for the U3020A. Contact your network administrator for the valid IP address to use for your instrument.

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**NOTE** If you change the IP address, you must cycle power on the U3020A to activate the new address.

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#### Syntax

```
SYSTem:COMMunicate:LAN:IPADDRESS <address>
```

```
SYSTem:COMMunicate:LAN:IPADDRESS?
```

You can also queries the U3020A for the IP address it was assigned to.

#### Example

The following command sets the IP address:

```
SYST:COMM:IPAD 169.254.149.35
```

The following query returns the IP address currently being used by the instrument (quotes are also returned).

```
SYST:COMM:LAN:IPAD?
```

Typical Response: "169.254.149.35"

### Auto IP Address Command

This command disable or enable the use of Auto-IP standard to automatically assign an IP address to the U3020A when on a network that does not have DHCP servers.

Syntax

```
SYSTem:COMMunicate:LAN:AUTOip {OFF|0|ON|1}
```

```
SYSTem:COMMunicate:LAN:AUTOip?
```

Example

The following command disable the Auto-IP:

```
SYST:COMM:LAN:AUTOIP OFF
```

The following query returns the current Auto-IP setting:

```
SYST:COMM:LAN:AUTOIP?
```

Typical Response: 0

### DHCP Command

This command disables or enables the use of the Dynamic Host Configuration Protocol (DHCP).

Syntax

```
SYSTem:COMMunicate:LAN:DHCP {OFF|0|ON|1}
```

```
SYSTem:COMMunicate:LAN:DHCP?
```

When DHCP is enable (factory setting), the instrument will try to obtain an IP address from the DHCP server. If a DHCP server is found, it will assign a Dynamic IP address, Subnet Mask, and Default Gateway to the instrument.

When the DHCP is disable or unavailable, the instrument will use the Static IP address, Subnet Mask, and Default Gateway during power-on.

---

**NOTE** If you change the DHCP setting, you must cycle power on the U3020A to activate the new setting.

---

Example

The following command disables DHCP:

```
SYST:COMM:LAN:DHCP OFF
```

The following query returns the current DHCP setting:

```
SYST:COMM:LAN:DHCP?
```

Typical Response: 0

### DNS Command

This command assigns the IP address of the Domain Name System (DNS) server. Contact your network administrator to determine if DNS is being used and for the correct address.

Syntax

```
SYSTem:COMMunicate:LAN:DNS <address>
```

```
SYSTem:COMMunicate:LAN:DNS?
```

---

**NOTE** If you change the DNS address, you must cycle power on the U3020A to activate the new address.

---

Example

The following command sets the DNS address:

```
SYST:COMM:LAN:DNS 198.105.232.4
```

The following query returns the DNS address currently being used by the instrument (the quotes are also returned).

```
SYST:COMM:LAN:DNS?
```

Typical Response: "198.105.232.4"

### Domain Name Command

This command assigns a Domain Name to the U3020A. The Domain Name is translated into an IP address.

Syntax

```
SYSTem:COMMunicate:LAN:DOMain "<name>"
```

```
SYSTem:COMMunicate:LAN:DOMain?
```

---

**NOTE** If you change the Domain Name, you must cycle power on the U3020A to activate the new address.

---

Example

The following command defines the Domain Name:

```
SYST:COMM:LAN:DOM www.keysight.com
```

The following query returns the Domain Name currently being used by the instrument:

```
SYST:COMM:LAN:DOM?
```

Typical response: www.keysight.com

### Gateway Address Command

This command assigns a Default Gateway for the U3020A. The specified IP Address sets the Default Gateway which allows the instrument to communicate with systems that are not on the local subnet. Thus, this is the Default Gateway where packets are sent which are destined for a device not on the local subnet, as determined by the Subnet Mask setting. Contact your network administrator to determine if a gateway is being used and for the correct address.

Syntax

```
SYSTEM:COMMunicate:LAN:GATEway <address>
```

```
SYSTEM:COMMunicate:LAN:GATEway?
```

Example

The following command sets the Default Gateway address:

```
SYST:COMM:LAN:GATEWAY 255.255.20.11
```

The following query returns the Default Gateway address currently being used by the instrument (the quotes are also returned).

```
SYST:COMM:LAN:GATEWAY?
```

Typical Response: "255.255.20.11"

### Host Name Command

This command assigns a Host Name to the U3020A. The Host Name is the host portion of the domain name, which is translated into an IP address.

Syntax

```
SYSTEM:COMMunicate:LAN:HOSTname "<name>"
```

```
SYSTEM:COMMunicate:LAN:HOSTname?
```

---

**NOTE** If you change the Domain Name, you must cycle power on the U3020A to activate the new address.

---

Example

The following command defines a Host Name:

```
SYST:COMM:LAN:HOST "U3020AS26-0001"
```

The following query returns the Host Name currently being used by the instrument (the quotes are also returned):

```
SYST:COMM:LAN:HOST?
```

Typical Response: "U3020AS26-0001"



## **GPIB Address Command**

### GPIB Address Command Description

This command assigns a GPIB address to the U3020A.

### Syntax

```
SYSTem:COMMunicate:GPIB:ADDRESS <address>
```

```
SYSTem:COMMunicate:GPIB:ADDRESS?
```

---

**NOTE** If you change the GPIB address, you must cycle power on the U3020A to activate the new address.

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### Example

The following command sets the GPIB address to 10:

```
SYST:COMM:GPIB:ADDR 10
```

The following query returns the current GPIB address:

```
SYST:COMM:GPIB:ADDR?
```

Typical Response: 10

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**NOTE** For a complete list of SCPI commands, refer to the Keysight L449xA RF Switch Platform User's Guide (L4490-90001).

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## Performance Verification

The following procedure will confirm that the Test Set is functional.

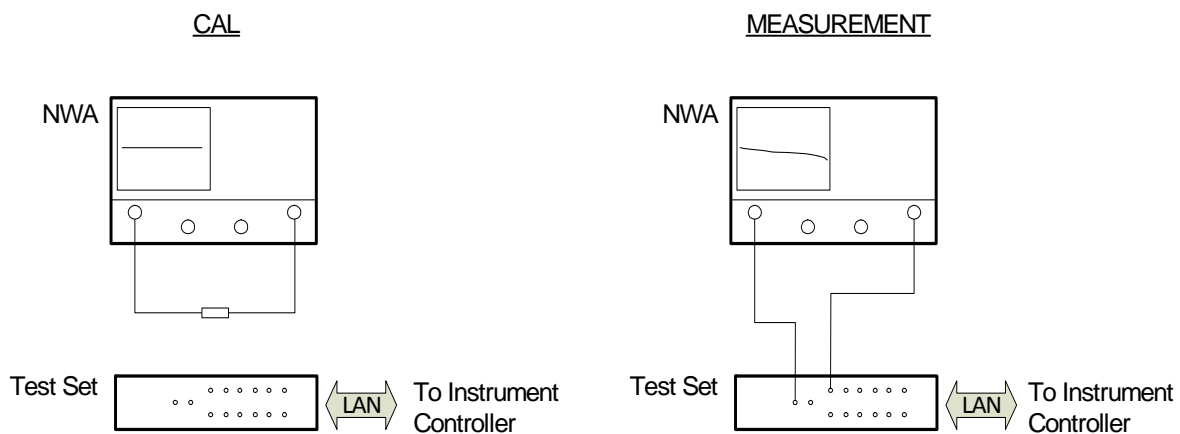
### Equipment Required

- Working LAN System
- PNA Network Analyzer with up to 26.5 GHz frequency range
- RF coaxial cables with 3.5 mm connectors

### Equipment Setup

1. Configure PNA and Test Set as shown in Figure 7
2. Turn On the PNA and Test Set.
  - The Test Set LED Indicators should indicate the following after 1 minute:
    - ATTN - OFF
    - LAN - ON
    - PWR - ON
3. Preset the PNA.
4. PNA frequency range: 10 MHz to 26.5 GHz.
5. Set the PNA to Measure S21, Scale to 5 dB/Div.

**Figure 7** Equipment Setup

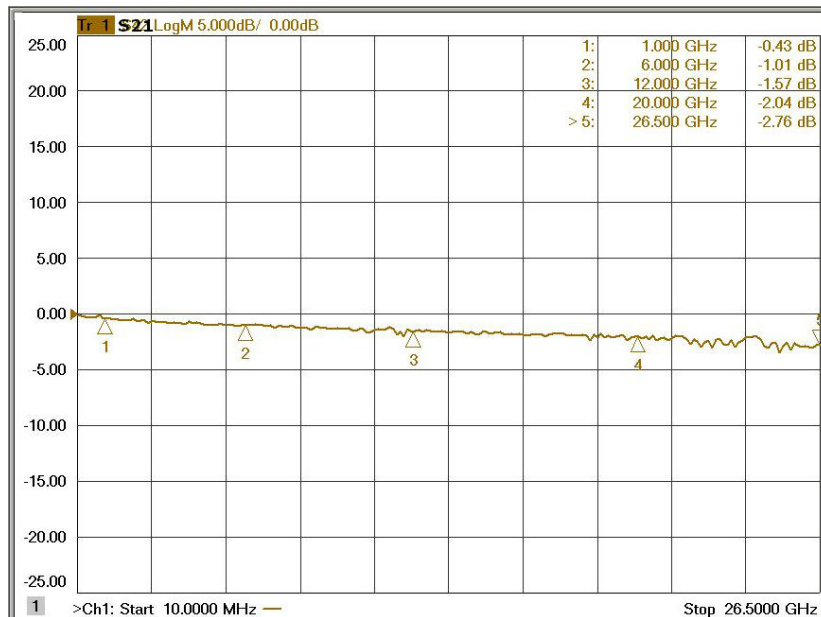


### Measurement Setup

1. Cal S21 as shown above by connecting the two RF cable using a 3.5 mm female to female adapter.
2. Normalize the displayed response trace on the PNA.
3. Remove the 3.5 mm adapter from the setup.
4. Connect PNA Port 1 cable to the Test Set Output Port A.
5. Connect PNA Port 2 cable to the Test Set Input Port 1 A.
6. Establish control of the Test Set with the controller via the LAN connection.
7. Execute the sequence command <ROUT:SEQ:TRIG SEL\_PORT1> to select Port 1.

Figure 8 is representation of the S21 response trace. Markers shown are not provided in the procedure above.

**Figure 8 Typical S21 Response Plot**



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## Service Information

There are many other repair and calibration options available from the Keysight Technologies support organization. The options cover a range of service agreements with varying response times. Contact Keysight for additional information on available service agreements for this product.

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**WARNING** These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

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## Electrostatic Discharge Protection

Electrostatic discharge (ESD) can damage or destroy electronic components. The instrument is shipped in materials that prevent damage from static, and should only be removed from the packaging in an anti-static area ensuring that the correct anti-static precautions are taken.

Two types of ESD protection are listed below. Purchase acceptable ESD accessories from your local supplier.

- Conductive table-mat and wrist-strap combination
- Conductive floor-mat and heel-strap combination

Both types, when used together, provide a significant level of ESD protection. To ensure user safety, static-safe accessories must provide at least 1 M $\Omega$  of isolation from ground.

## Theory of Operation

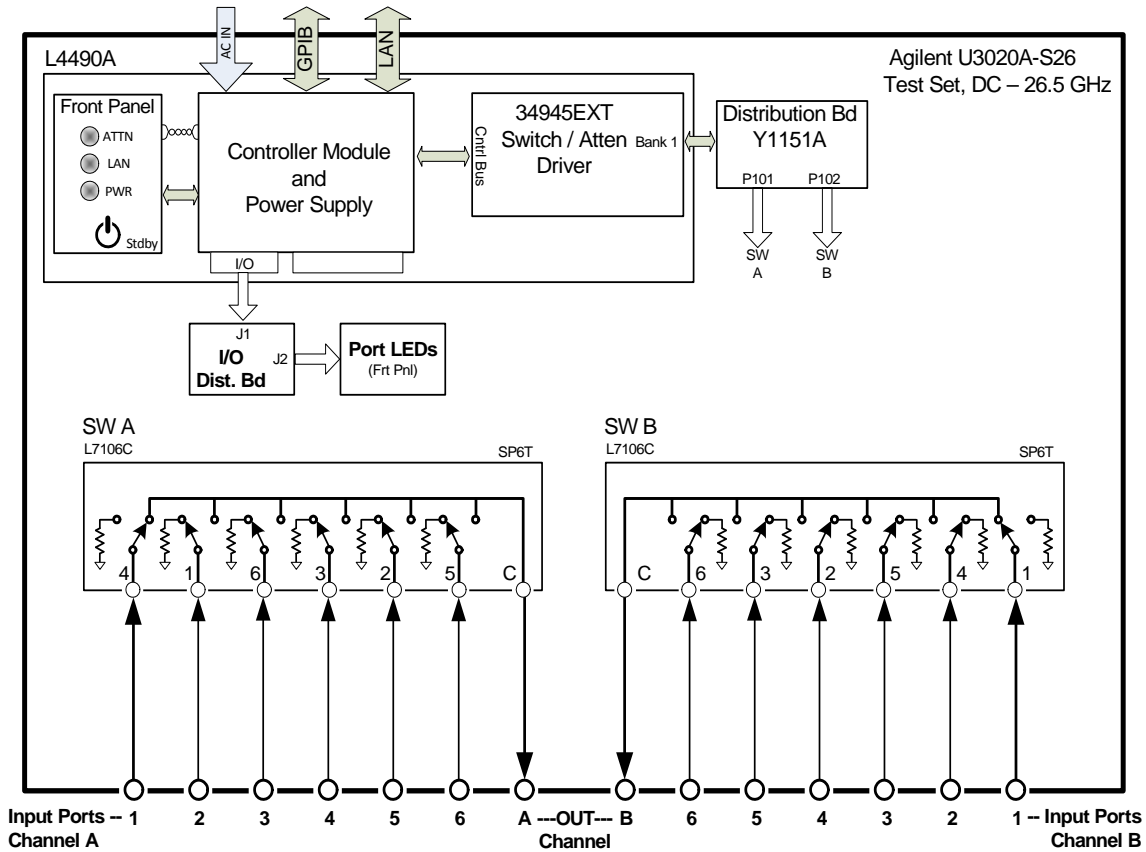
This section provides a general description of the U3020AS26 Test Set, followed by a more detailed operating theory. The operation of each component group is briefly described to the assembly level only.

**NOTE** If you need to disassemble the instrument, be sure to work at an antistatic workstation and use a grounded wrist strap to prevent damage from electrostatic discharge (ESD). See [“Electrostatic Discharge Protection”](#) on page 20.

## Test Set System Operation

Figure 9 illustrates the components and interconnects of the Test Set. The main function of this Test Set is Dual Channel Signal Distribution. The Test Set consists of six main components: a controller module, a 39495EXT module, distribution board for RF switches, two SP6T RF switches and a front panel LED indicator. There are no adjustments required for the Keysight U3020AS26 Test Set.

**Figure 9 Test Set Block Diagram**



## **Controller Module and Power Supply**

Inside the controller module there are two main components, the AC-DC power supply and controller board. The AC-DC power supply is a 12V/65W power supply that is converted to various voltages by means of DC-DC converter inside the module. It provides regulated voltages to all assemblies in the Test Set. The internal DC voltage has the following nominal specification:

- +24 V
- +12 V
- +5 V

The controller board is the “brain” of the Test Set, it handles all the communication between the Controller and the Test Set via LAN or GPIB connectivity.

## **39495EXT Module**

This module provides the bias and control signals for the RF Switches.

## **Distribution Board**

The Distribution board (Y1151A) provides a passive control signal interface between the 39495EXT module and the RF Switches.

## **I/O Distribution Board**

The I/O Distribution board provides a passive control signal interface between the controller module I/O port and the front panel Port LED board.

## **LED Indicator Board**

This board provides an LED indication of the Port setting in the Test Set. The LED indicator board is driven by the digital IO of the Test Set.

## Troubleshooting

This section contains information for troubleshooting the Test Set to the assembly level only. By following these procedures, you may determine if the power supply, front panel, or main switch board needs replacing. Refer to [Figure 9 on page 21](#) as an aid in troubleshooting.

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**NOTE** If you need to disassemble the instrument, be sure to work at an antistatic workstation and use a grounded wrist strap to prevent damage from electrostatic discharge (ESD).

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### Front Panel Instrument State LEDs

If you suspect a problem with the Instrument State or Input Port LEDs, first refer to the status definitions in [Table 5 on page 7](#) before proceeding. Note that with only a power cable connected to the rear panel of the Test Set, the PWR LED = Green and LAN LED = Red.

1. If the green PWR LED is OFF after depressing the front panel button continue with the following procedure:
  - a. Remove the top cover of the instrument.
  - b. Ensure that the ribbon cable and 2-wire connector are properly in place.
  - c. Measure the DC voltage between the red and black wires. The red wire should measure approximately +12 Vdc.
  - d. If the +12 Vdc is not present on the red wire, measure the three labeled output power supply voltages on the controller module at the green connector.
  - e. If any voltages are not present, the controller module power supply will need to be replaced.
2. If the green PWR LED is 'ON' after depressing the front panel button and the LAN LED is OFF continue with the following procedure:
  - a. Remove the top cover of the instrument.
  - b. Ensure that the ribbon cable and 2-wire connector are properly in place.
  - c. Measure the DC voltage between the red and black wires. The red wire should measure approximately +12 Vdc.
  - d. If any voltages are not present, the controller module power supply will need to be replaced.

**Front Panel Input Port LEDs**

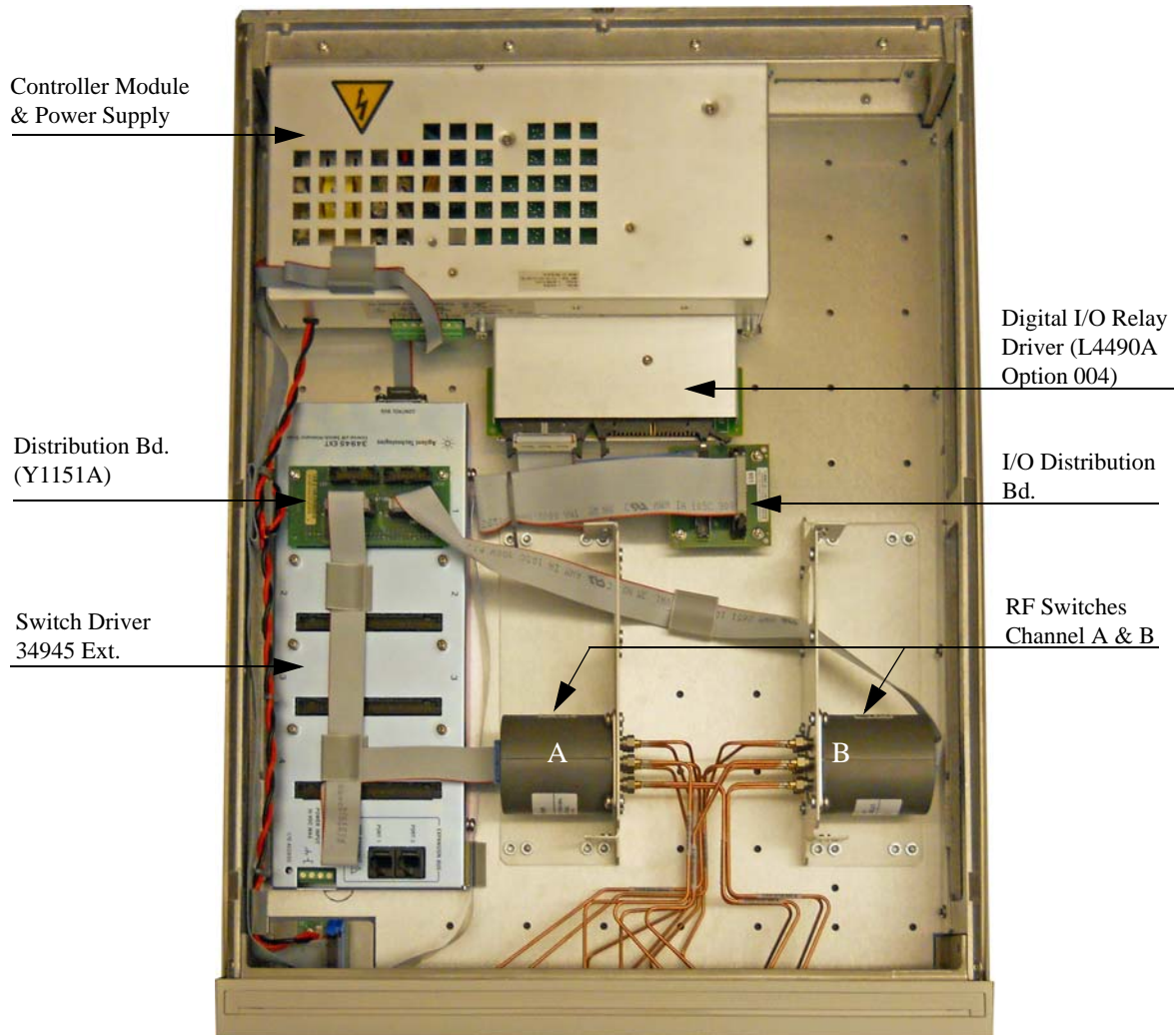
1. If the Input Port LEDs do not operate when you have executed a Port Selection command on the Test Set continue with the following procedure:
  - a. If you have determined that the RF switch is operating, either by an audible sound or by an RF Input to Output port measurement, remove the top cover of the instrument.
  - b. Ensure that the two ribbon cables going from the Controller Module I/O port to the front panel LED board are properly in place.
  - c. Measure the three labeled output power supply voltages on the Controller Module at the green connector.
  - d. If any voltages are not present, the Controller Module Power Supply will need to be replaced.
  - e. If the Power Supply voltage are all present, suspect the front panel Input Port LED board or the Controller Module I/O section.

**RF Switch is Not Switching**

1. If the RF Switches are not operating continue with the following procedure:
  - a. Determined if you can hear an audible switching sound.
  - b. If an audible sound is heard, but the switch is not being properly control in order for the correct Port to be selected, it is possible that the instrument Power On preset set has been corrupted.
  - c. Contact Keysight Technologies for support in recovering this preset set.
  - d. If no audible sound is heard, remove the top cover of the instrument.
  - e. Insure that the ribbon cable connections at the distribution board and switch are properly in place.
  - f. Measure the three labeled output power supply voltages on the Controller Module at the green connector.
  - g. If any voltages are not present, the Controller Module Power Supply will need to be replaced.



**Figure 10** Top View



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## Safety and Information

### Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument.

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.

### Safety Earth Ground

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**WARNING** This is a Safety Class I Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be 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.

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**CAUTION** Always use the three prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage and the risk of electrical shock.

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### Declaration of Conformity

A copy of the Declaration of Conformity is available upon request, or a copy is available on the Keysight Technologies web site at <http://regulations.products.keysight.com/DoC/search.htm>.

### Statement of Compliance

This instrument has been designed and tested in accordance with CAN/CSA 22.2 No. 61010-1-04, UL Std No. 61010-1 (2nd Edition).

## Before Applying Power

Verify that the premises electrical supply is within the range of the instrument. The instrument has an autoranging power supply.

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**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.

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**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.

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**CAUTION** This product is designed for use in Installation Category II and Pollution Degree 2.

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**CAUTION** Before switching on this instrument, make sure the supply voltage is in the specified range.

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**CAUTION** Verify that the premise electrical voltage supply is within the range specified on the instrument.

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**CAUTION** Ventilation Requirements: When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the instrument by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, forced convection must be used.

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**WARNING** These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

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**WARNING** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer's instructions.

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**WARNING** For continued protection against fire hazard replace line fuse only with same type and rating. The use of other fuses or material is prohibited.

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**WARNING** These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

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**WARNING** The opening of covers or removal of parts is likely to expose the user to dangerous voltages. Disconnect the instrument from all voltage sources before opening.

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

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**WARNING** 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 (disconnecting device).

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## Connector Care and Cleaning Precautions

Remove the power cord to the instrument. To clean the connectors use alcohol in a well ventilated area. Allow all residual alcohol moisture to evaporate, and fumes to dissipate prior to energizing the instrument.

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**WARNING** To prevent electrical shock, disconnect the **Keysight U3020AS26** from mains electrical supply before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

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**WARNING** If flammable cleaning materials are used, the material shall not be stored, or left open in the area of the equipment. Adequate ventilation shall be assured to prevent the combustion of fumes, or vapors.

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## Regulatory Information

This section contains information that is required by various government regulatory agencies.

### Instrument Markings



The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation.



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).



This symbol indicates that the power line switch is in the STANDBY position.



This symbol is used to identify a terminal which is internally connected to the product frame or chassis.



The CE mark is a registered trademark of the European Community. (If accompanied by a year, it is when the design was proven.)



The CSA mark is a registered trademark of the CSA International. This instrument complies with Canada: CSA 22.2 No. 61010-1-04.



This is a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 54)



This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001).



The instrument has been designed to meet the requirements of IP 2 0 for ingress and operational environment.



This is a required mark signifying compliance with an EMC requirement. The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.



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.



This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.

## Compliance with German Noise Requirements

This is to declare that this instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermrerordnung-3. GSGV Deutschland).

Acoustic Noise Emission/Geraeuschemission	
LpA<70 dB	Lpa<70 dB
Operator Position	am Arbeitsplatz
Normal Operation	normaler Betrieb
per ISO 7779	nach DIN 45635 t .19

## EMC Information

Complies with European EMC Directive 2004/108/EC

- IEC/EN 61326-1
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11
- This ISM device complies with Canadian ICES-001.  
Cet appareil ISM est conforme a la norme NMB du Canada.

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## Keysight Support, Services, and Assistance

### Service and Support Options

The standard product warranty is a *one-year return to Keysight Technologies* service warranty.

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**NOTE** There are many other repair and calibration options available from the Keysight Technologies support organization. These options cover a range of service agreements with varying response times. Contact Keysight for additional information on available service agreements for this product.

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### Contacting Keysight

Assistance with test and measurements needs and information or finding a local Keysight office are available on the Web at:

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

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

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**NOTE** In any correspondence or telephone conversation, refer to the Keysight product by its model number and full serial number. With this information, the Keysight representative can determine the warranty status of your unit.

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### Shipping Your Product to Keysight for Service or Repair

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**IMPORTANT** Keysight Technologies reserves the right to reformat or replace the internal hard disk drive in your analyzer as part of its repair. This will erase all user information stored on the hard disk. It is imperative, therefore, that you make a backup copy of your critical test data located on the analyzer's hard disk before shipping it to Keysight for repair.

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If you wish to send your instrument to Keysight Technologies for service or repair:

- Include a complete description of the service requested or of the failure and a description of any failed test and any error message.
- Remove and retain the front handles and all rack mount hardware. The analyzer should be sent to Keysight in the same configuration as it was originally shipped.
- Ship the analyzer using the original or comparable antistatic packaging materials.
- Contact Keysight for instructions on where to ship your analyzer.





This information is subject to change without notice.  
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[www.keysight.com](http://www.keysight.com)