Keysight Technologies U3020AD01

User's and Service Guide

KEYSIGHT TECHNOLOGIES

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U3020AD01

KEYSIGHT TECHNOLOGIES

Introduction

This document describes how to use and service the Keysight U3020AD01 Dynamic Accuracy Test Set.

Figure 1 U3020AD01 Dynamic Accuracy Test Set

Description

The Keysight U3020AD01 Dynamic Accuracy Test Set is designed for the Keysight PNA-X network analyzer as a test accessory in performing the power linearity test (dynamic accuracy) of the network analyzer receivers. As of this manual edition, other Keysight network analyzer product families have also incorporated the Test Set in their production and service processes.

The U3020AD01 Test Set can only be controlled via the rear panel GPIB or LAN interfaces.

When using the Connection Expert utility program, available on the PNA-X platform and other computer platforms, the program may identify the Test Set as "L449XA" or "U3020A." The full Test Set model number can be found on its rear panel serial label.

For more PNA-X network analyzer Dynamic Accuracy measurement information, refer to the PNA-X Service Guide for the model you have: http://www.keysight.com/find/pna

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 35. Keep the damaged shipping materials (if any) for inspection by the carrier and an Keysight Technologies representative.

Table 1 U3020AD01 Accessories Supplied

Description	Part Number	Quantity
RF cable, Flex 3.5 mm M/F, 61 cm (2 ft.) long	8121-2111	4
Manual, User's Guide	U3020-90004	1

General Performance

The Test Set is used to characterize the receiver power linearity of a network analyzer. Actual performance of the system is based on your network analyzer and options that are used with the Test Set. The Test Set is not specified for overall system performance. A functional certificate is supplied for the U3020AD01.

There are no internal adjustment in the U3020AD01, therefore an annual calibration is not required.

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

Power Requirements

Verify that the required AC power is available at all necessary locations before installing the Test Set and Network Analyzer.

- 100-240 V (50/60 Hz)
- The instruments can operate with mains supply voltage fluctuations up to ± 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.
- U3020AD01 maximum power is 50 W.

Environmental Requirements

Refer to the Network Analyzer documentation for environmental requirements.

Environmental Tests

The U3020AD01 complies with all applicable safety and regulatory requirements for the intended location of use.

- Operating Environment (Indoor Use)
- Operating Ambient: Temperature 0 to 40 °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.

Equipment Heating and Cooling

If necessary, install air conditioning and heating to maintain the ambient temperature within the appropriate range. Air conditioning capacity must be consistent with the rating listed in the PNA standard documentation.

Required Conditions for Accuracy Enhanced Measurement

Accuracy–enhanced (error–corrected) measurements require the ambient temperature of the PNA-X and Test Set to be maintained within ± 1 °C of the ambient temperature at calibration.

Dimensions and Space Requirements

Standard installation of the U3020AD01 and PNA includes configuration and installation on a customer provided lab bench or table top of adequate size and strength.

Table 2 Test Set Physical Parameters

Item	Value
Height	8.8 cm (3.5 in)
Width	42.5 cm (16.73 in)
Depth	58 cm (23 in)
Weight	9 kg (19.8 lb)

Maximum Power Levels and Performance Characteristics

Table 3 Power Levels

RF Input/Output Power Damage Levels:	
SRC 1 IN	+30 dBm
SRC 2 IN	+30 dBm
SRC 2 CPLD OUT	+30 dBm
RCVR OUT	+30 dBm

NOTE Refer to your PNA-X standard documentation specifications to determine the maximum input power levels for the PNA-X access and test ports, or to optimize the power levels in the receivers.

NOTE Damage and maximum levels are not necessarily the optimum level.

Table 4 Performance Characteristics

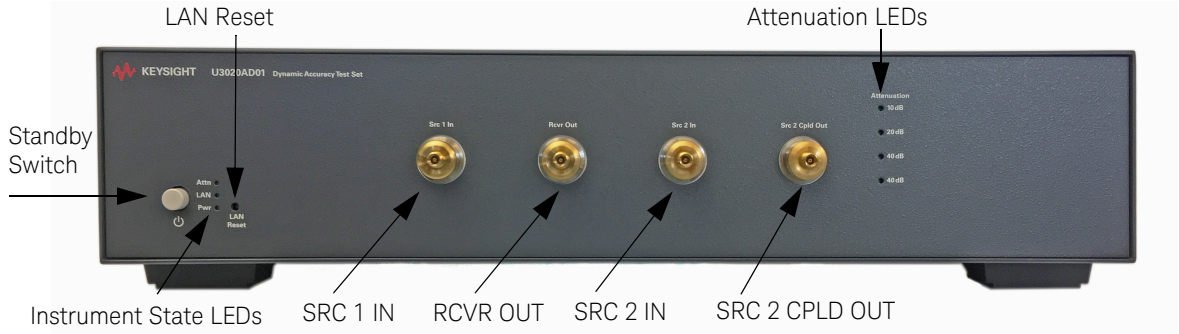
Parameter	**Freq. Range (GHz)**	**Typical (dB)**
Path Insertion Loss:		
SRC1 IN to RCVR OUT	1.8 - 2.2	-3 to -9
	3.5 - 4.0	< -34
SRC2 IN to RCVR OUT	1.8 - 2.2	-3 to -9
	3.5 - 4.0	< -38
SRC2 IN to SRC2 CPLD OUT	1.0 - 4.0	-14 to -18
Path Isolation:[1]		
RCVR OUT to SRC2 CPLD OUT	1.8 - 2.2	< -80
RCVR OUT to SRC1 IN	1.8 - 2.2	< -45
RCVR OUT to SRC2 IN		
SRC1 IN to SRC2 IN	1.8 - 2.2	< -70
Port Match:		
All Ports	1.8 - 2.2	< -12

1. Unconnected ports must be terminated in 50 Ohms.

Front and Rear Panel Features

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.

Figure 2 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.

Attenuation LEDs

The LEDs indicate the attenuation value of the programmable step attenuator in the RCVR OUT path.

RF Input/Output Ports - 3.5 mm (Female)

- SRC 1 IN (Source 1 Input)
- RCVR OUT (Receiver Out)
- SRC 2 IN (Source 2 Input)
- SRC 2 CPLD OUT (Coupler Out)

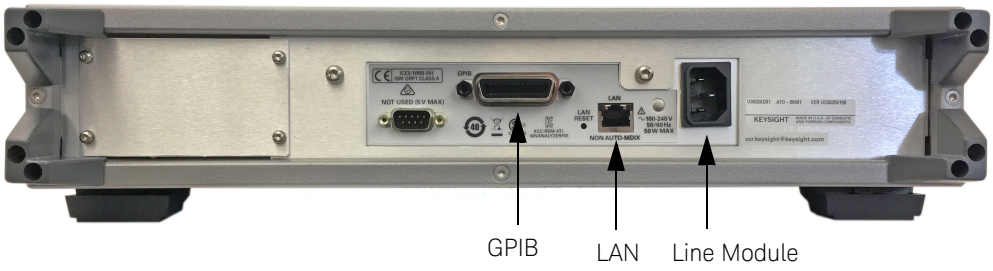
Instrument State LEDs

When the power is applied to the U3020AD01, 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 identifies the instrument states based on the color and functioning of the LEDs.

Table 5 LED Definitions and Instrument States

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 3 Rear Panel



GPIB Connector

This connector allows the Test Set to be connected directly to a controller. GPIB address = 9.

LAN

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

Line Module

The line module contains the power cord receptacle. The line fuse, as well as a spare, reside within the line module.

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.

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.

Power Cords

A line power cord is supplied in one of several configurations, depending on the destination of the original shipment. Keysight can supply additional certified power cords to meet region electrical supply and receptacle configurations. Please contact Keysight at: www.keysight.com for assistance in power cord selection.

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.**

Controlling the Test Set

The Keysight U3020AD01 is a “slave” instrument and requires a controller to be used to control the Test Set. There are two methods that can be used to control the Test Set:

- LAN connection
- GPIB connection

When the controller is connected to the Test Set, the use of the following SCPI commands can be used for both service and measurement applications.

NOTE **Refer to the Service section for information on obtaining interface control of the Test Set.**

Test Set SCPI Commands

The following commands in Table 6 can be used to execute the factory defined sequences from the non-volatile memory. If the specified command sequences named are not currently stored in the memory, this may be due to an instrument error. In this case, the instrument will need to be serviced.

The command entry syntax: ROUTe:SEQuence:TRIGger <Command>

Example:

The following executable sequence name, ATT1_00, will set the internal programmable step attenuator to 0 dB:

ROUT:SEQ:TRIG ATT1_00

Table 6 SCPI Command List

Commands	Description	Explanatory Remarks
ATT1_00	Attenuator setting = 0 dB	Receiver path attenuator value. LED on the front panel will indicate current attenuator setting.
ATT1_10	Attenuator setting = 10 dB	
ATT1_20	Attenuator setting = 20 dB	
ATT1_30	Attenuator setting = 30 dB	
ATT1_40	Attenuator setting = 40 dB	
ATT1_50	Attenuator setting = 50 dB	
ATT1_60	Attenuator setting = 60 dB	
ATT1_70	Attenuator setting = 70 dB	
ATT1_80	Attenuator setting = 80 dB	
ATT1_90	Attenuator setting = 90 dB	
ATT1_100	Attenuator setting = 100 dB	
ATT1_110	Attenuator setting = 110 dB	

Table 6 SCPI Command List (Continued)

Commands	Description	Explanatory Remarks
ATT1_CARD1	10 dB Attenuator Bank On	Diagnostic check of the four programmable attenuator sections.
ATT1_CARD2	20 dB Attenuator Bank On	
ATT1_CARD3	40 dB Attenuator Bank 1 On	
ATT1_CARD4	40 dB Attenuator Bank 2 On	
LED_ALL	All LEDs On	Diagnostic checks of the attenuator LEDs.
LED_OFF	All LEDs Off	

Operational Verification

The following procedure will confirm that the Test Set signal paths are functional. Refer to the "Test Set Block Diagram" in Figure 9, page 18.

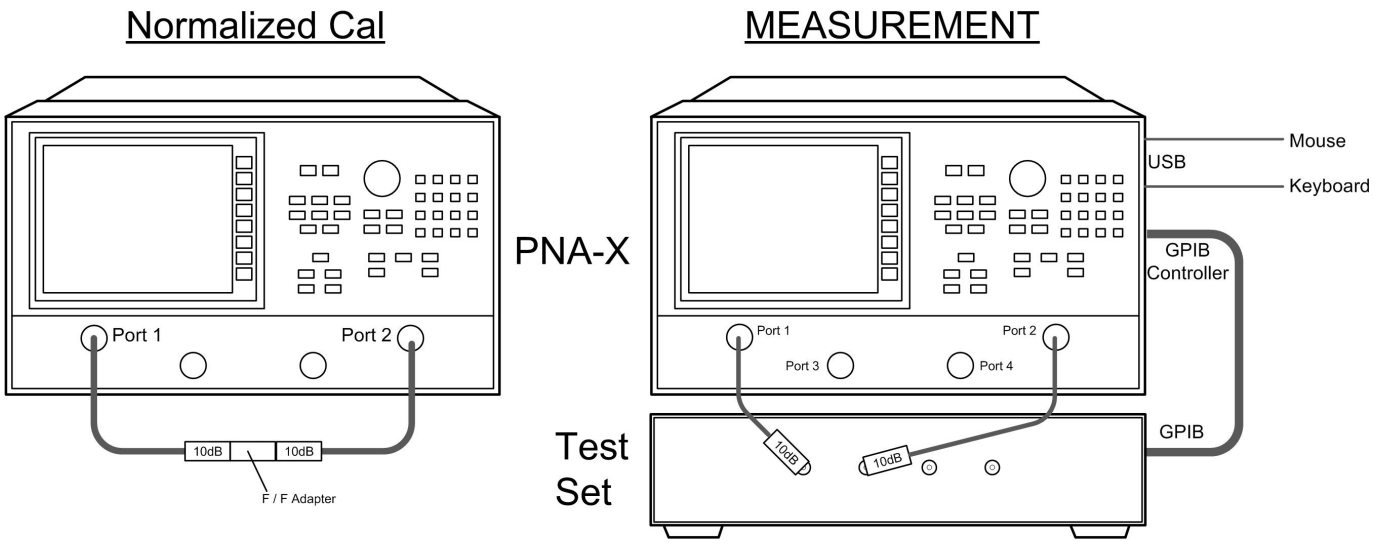
Equipment Required

- PNA-X Network Analyzer with up to 4 GHz frequency range
- RF coaxial cables with 3.5 mm connectors (included accessory)
- Coax Attenuators 3.5 mm Fixed, 10 dB (2)
- Coax Adapter 3.5 mm (female-female)
- Two 50 Ohm Loads, 3.5 mm male (for isolation measurement)

Equipment Setup

1. Configure PNAx and Test Set as shown in Figure 4 below.
2. Turn On the PNAx and Test Set.
   - The Test Set LED Indicators should indicate the following after one minute:
     - ATTN - OFF
     - LAN - RED
     - PWR - ON
3. Preset the PNAx.
4. Set PNA-X IFBW: 100 Hz, Number of points: 401
5. PNA-X frequency range: 1 to 4 GHz.
6. Set the PNA-X to Measure S21, Scale to 10 dB/Div.
7. Set PNA-X markers to 2.0 and 3.5 GHz.

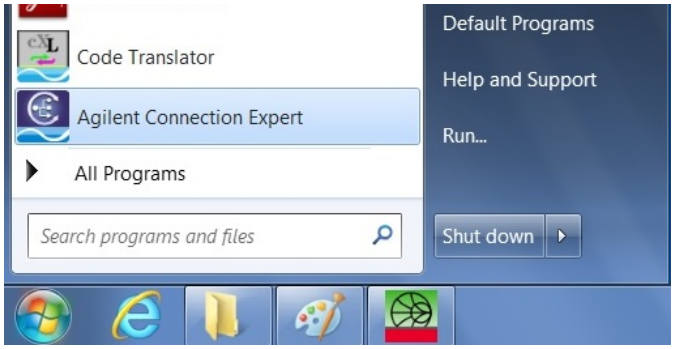
Figure 4 Equipment Setup



Measurement Setup

1. As shown in **Figure 4**, connect the two RF cable ends together using a 3.5 mm female-to-female adapter.
2. Normalize the displayed response trace on the network analyzer.
3. Remove the 3.5 mm adapter from the setup.
4. At this time, it is recommended that you [SAVE] the present setup to create a State File (*.csa) on the network analyzer for RECALL, if needed for future use.
5. Minimize the PNA-X application, **FILE > Minimize Application**, to access the Test Set command application.
6. Select the Windows Start menu and select the "Agilent Connection Expert."

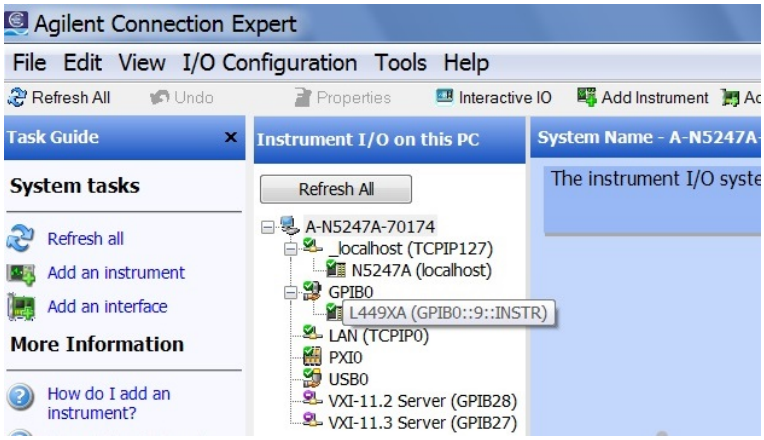
Figure 5 Windows Start Menu



7. When the Connection Expert application appears, close the Welcome screen (if it appears) and look for the Test Set identified as **L449XA**. If L449XA is not showing, go to the top of the screen and select Add Instrument.
   - Enter GPIB address in the field for your instrument
   - Check the two boxes for:
     - Check this GPIB Address
     - Auto ID this Instrument
   - OK

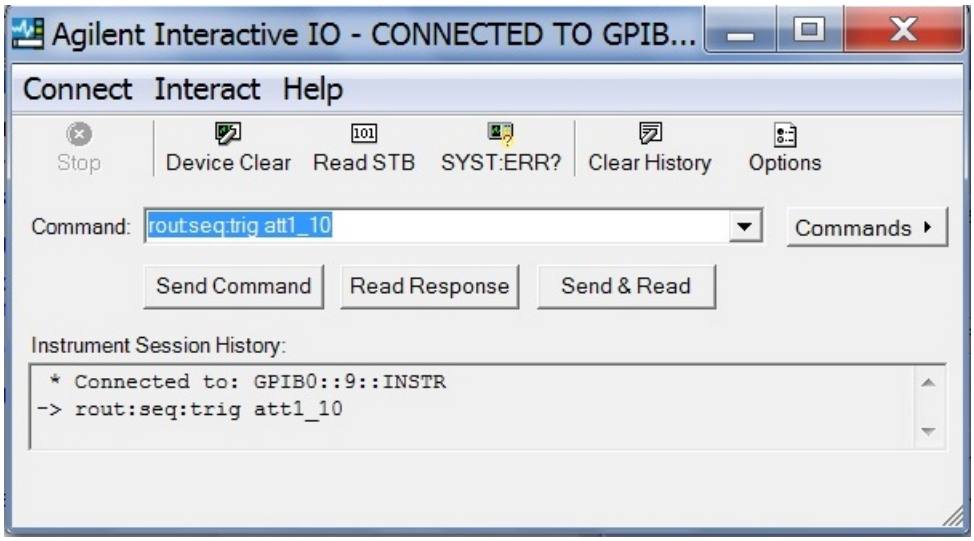
   Information related to the L449XA or U3020A will be displayed on the right side of the window.

Figure 6 Connection Expert, Connected Instruments



8. To the left is a Task Guide pane. Select "Send Commands to this Instrument." If you don't see this pane, select: View > Task Guide. A command window should appear as shown in Figure 7 below.

Figure 7 Connection Expert, Command Execution1



9. To confirm that the Connection Expert can control the Test Set, type the following command as shown in the Command field: ROUT:SEQ:TRIG ATT1_10 [Send Command] The 10 dB LED indicator on the Test Set front panel should be ON.

10. To begin the testing, set the path attenuator to 0 dB and type the following command as shown in the Command field: ROUT:SEQ:TRIG ATT1_00 [Send Command] All LED indicators on the Test Set should be OFF.

Measurement Sequence, Test Instructions

During the following measurement sequence, in order to make the measurements you will be moving between two PNA-X applications: the Network Analyzer and the Connection Expert Command Window. Measured results can be recorded on Table 7 and Table 8 below.

1. In the RF Path Description in the tables below, connect the PNA-X Port 1 test cable to the first designated Test Set Port, and PNA-X Port 2 test cable to the next Test Set port.
2. You will be instructed to enter a specific Test Set SCPI command in the Command Window using this format: ROUT:SEQ:TRIG: <SCPI Command> [Send Command]
3. Follow the test measurement sequence given in Table 7 and Table 8 below.

Table 7 Path Insertion Loss Test Instructions

#	RF Path Description	SCPI Command	Attn LED ON	Freq. (GHz)	Typical Value (DB)	Measured Result
1	SRC1 IN to RCVR OUT	ATT1_00	None	2.0	-3 to -9	
2				3.5	< -34	
3		ATT1_CARD1	10 dB	2.0	-13 to -19	
4		ATT1_CARD2	20 dB		-23 to -29	
5		ATT1_CARD3	40 dB		-43 to -49	
6		ATT1_CARD4	40 dB		-43 to -49	
7	SRC2 IN to RCVR OUT	ATT1_00	None	2.0	-3 to -9	
8				3.5	< -38	

Table 8 Path Isolation Loss Test Instructions

#	RF Path Description[1]	SCPI Command	Freq. (GHz)	Typical Value (DB)	Measured Result
1	RCVR OUT to SRC2 CPLD OUT	ATT1_00	2.0	≤ -80	
2	RCVR OUT to SRC1 IN			≤ -45	
3	RCVR OUT to SRC2 IN				
4	SRC1 IN to SRC2 IN			≤ -70	

1. Terminate unconnected ports with a 50 Ohm Load.

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.

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.**

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 heal-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 MΩ of isolation from ground.

Replaceable Parts

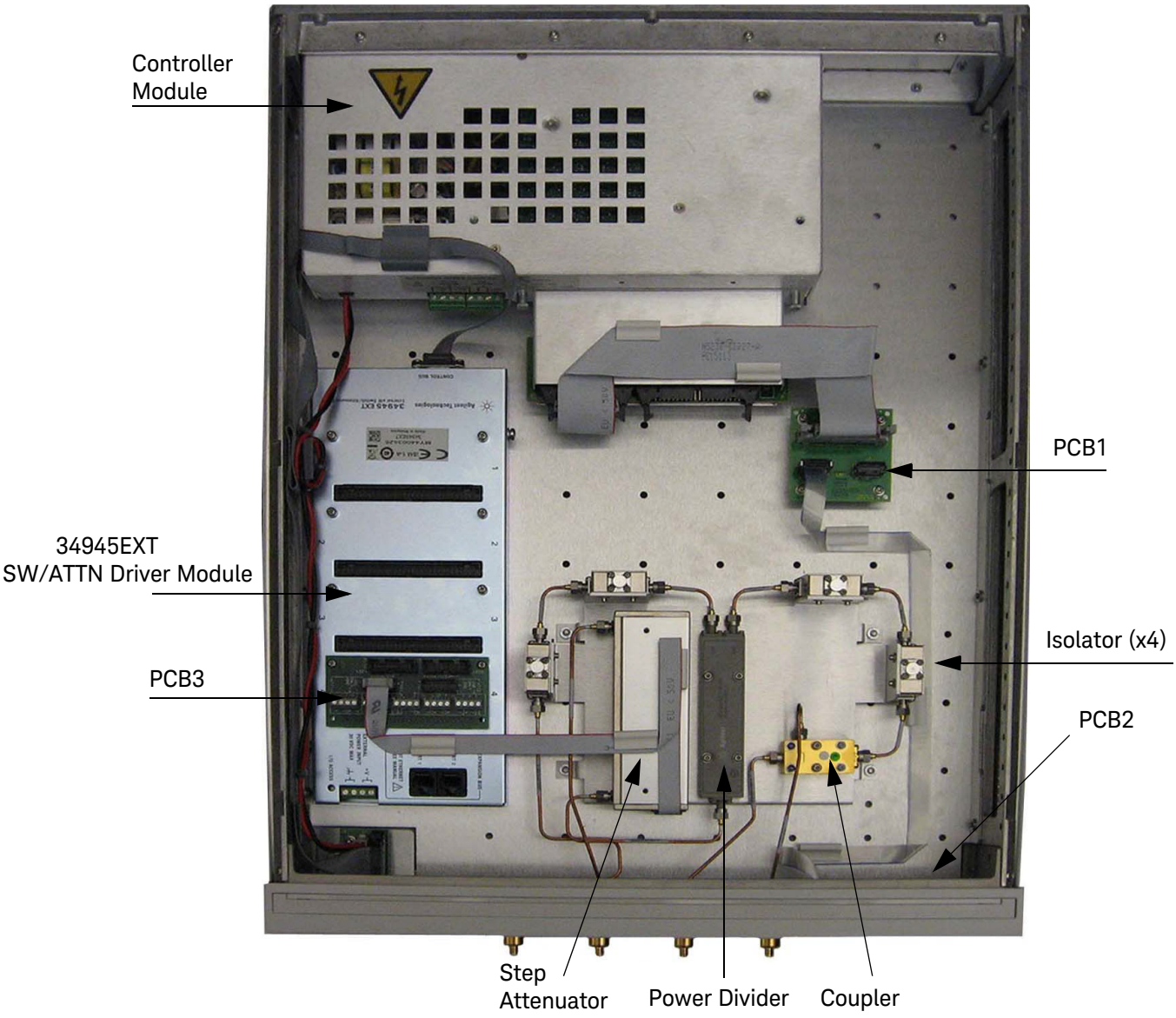
Special options are built to order, long lead times may be encountered when ordering replacement parts.

Table 9 Replaceable Parts

Replacement Part	Part Number	Qty
Power divider, 1 to 26.5 GHz	0955-1421	1
RF Isolator, 1.7 - 2.2 GHz, 2 W (SMA female - female)	0955-2284	4
RF 50 Ohm Termination (SMA male)	1810-0118	1
Attenuator, Programmable - 0 - 110 dB	33322-60010	1
Bulkhead Connector, 3.5 mm, (female - female)	5062-6618	4
Coupler, Bridge -15 dB	5087-7794	1
Cable, RF 50 Ohm, 3.5 mm, (male - female), 24" long	8121-2111	4
2U RF Switch Platform with Integrated Switch Driver, includes 64 Switch Drive lines with Option 004	L4490A-CFG002	1
Switch / Attenuator Driver Module	34945EXT-CFG001	1
PCA, Front Panel	34989-66502	1
Controller Module for L4490A	L4490-60001	1
LED Display (PCB2)	N5261-63005	1
Attenuator LED Interface Board (PCB1)	U3020-63114	1
Distribution Card (PCB3)	Y1153-66511	1

NOTE Before replacing an assembly or board, inspect the assembly for obvious, easily repaired defects such as bent pins on ICs or cold solder joints.

Figure 8 U3020AD01 (top view)



Theory of Operation

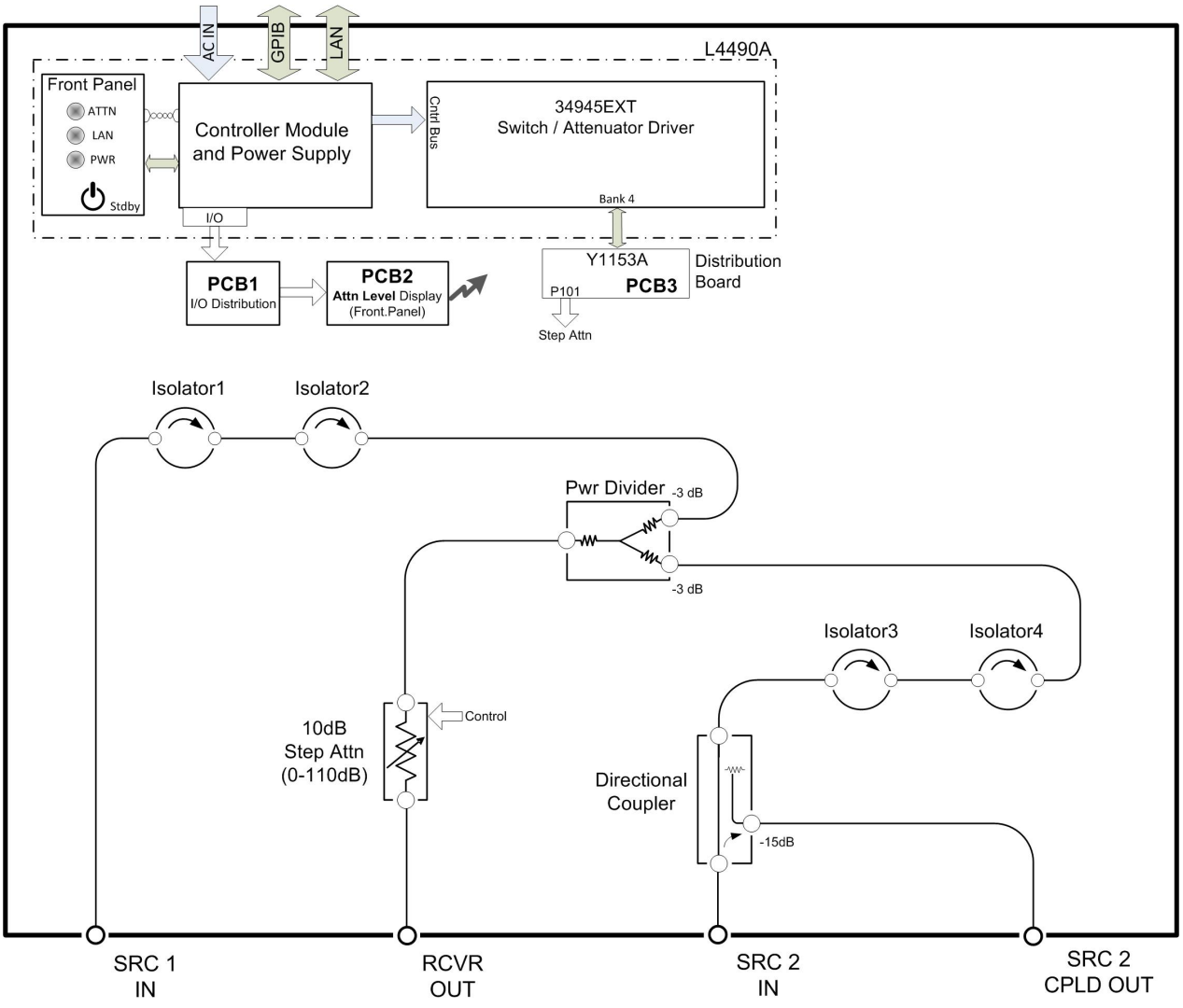
This section provides a general description of the Dynamic Accuracy Test Set. This is followed by a more detailed operating theory. The operation of each group is described briefly to the assembly level only. Detailed component level circuit theory is not provided.

Dynamic Accuracy Test Set System Operation

Figure 9 below illustrates the components and interconnects of the Dynamic Accuracy Test Set.

The main function of this Test Set is to provide a means to measure the receiver's relative power linearity of the network analyzer. The Test Set consists of four main non-RF components: a controller module, a 39495EXT module, distribution board for programmable step attenuator, and front panel LED indicator circuits.

Figure 9 Test Set Block Diagram



Controller Module

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 as well as following voltages to drive programmable step attenuator in the Test Set. The internal DC voltage has the following specification:

- +24V/0.6A
- +12V/3A fuse
- +5V/1A

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. Refer to “Controlling the Test Set” on page 9.

39495EXT Module

This module drives the programmable step attenuators. The attenuators are connected to the Test Set through the distribution board (Y1153A), which is installed on the 34945EXT module.

The 34945EXT is divided into four banks, organized by channel number. We only use Bank 4.

Distribution Board (PCB3)

The distribution board (Y1153A) provides an interface between the 34945EXT switch/attenuator driver module and the programmable step attenuator.

LED Indicator Board (PCB2)

This board provides an LED indication of the step attenuator value setting in the Test Set. The LED indicator board is driven by the digital port of the controller module.

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, "Test Set Block Diagram," as an aid in troubleshooting.

NOTE Refer to the L449xA Service manual for lower level component replacement.

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).

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.

RF Switch 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.

Instrument Settings

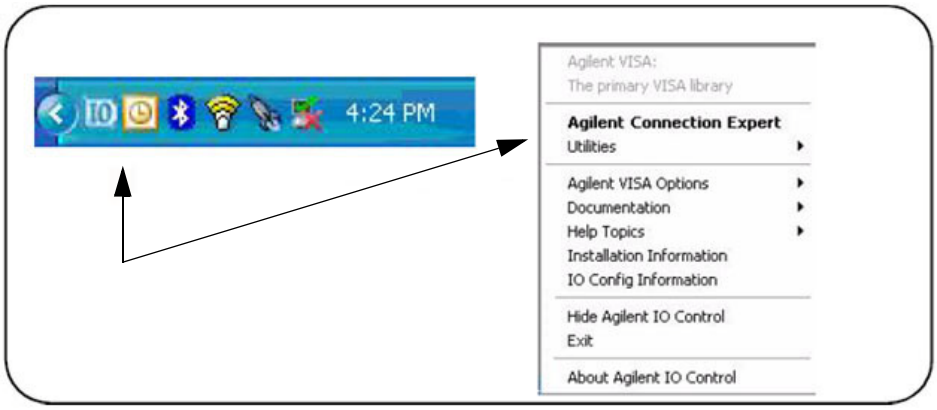
Keysight Connect Expert

This section contains information to configure the U3020A LAN and GPIB interfaces 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 > Agilent Connection Expert from the application window.

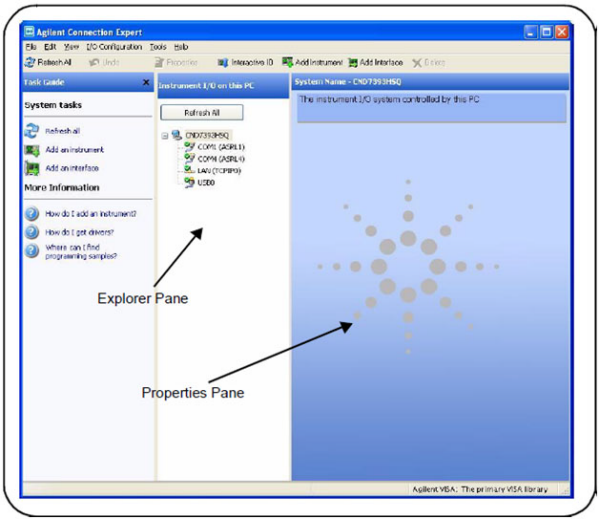
Figure 10 Keysight Connection Expert



Locating the Instrument

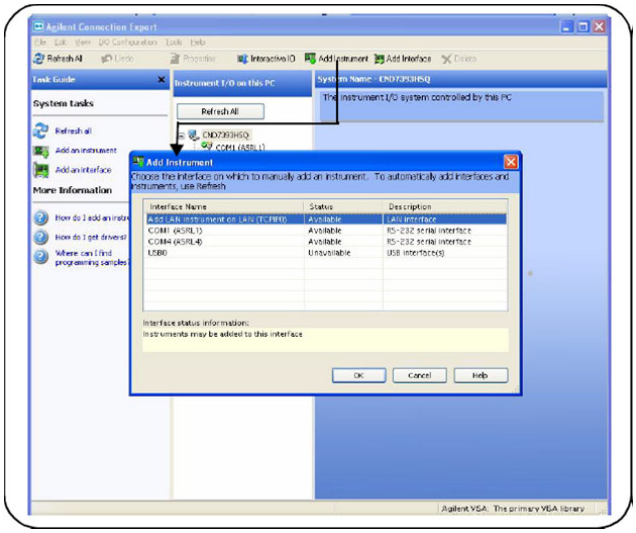
Keysight Connection Expert opens with a “Welcome Screen,” and a window similar to that shown in Figure 10. The available computer interfaces are configured during installation of the Keysight IO Libraries and are displayed in the left column (Explorer Pane). The properties of the configured interface are displayed in the right column (Propertied Pane).

Figure 11 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 12 Adding Instruments

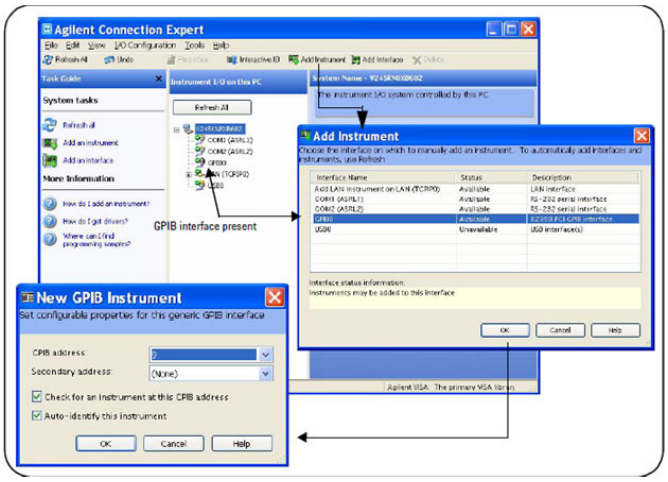


Configuring the GPIB Interface

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 13 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 = 9)

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 and GPIB Interface Configuration Commands

Reset Command

Description

This command resets the instrument.

Syntax

*RST

IP Address Command

Description

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.

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

Syntax

SYSTem:COMMunicate:LAN:IPADdress <address>

SYSTem:COMMunicate:LAN:IPADdress?

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

Example:

The following command sets the IP address:

SYST:COMM:LAN: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

Description

This command will 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

Description

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

Description

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

Description

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

Description

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

Description

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 "LAB1-U3020A"

The following query returns the Host Name currently being used by the instrument

(the quotes are also returned):

SYST:COMM:LAN:HOST?

Typical Response: "LAB1-U3020A"

GPIB Configuration 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.

Example

The following command sets the GPIB address to 9:

SYST:COMM:GPIB:ADDR 9

The following query returns the current GPIB address:

SYST:COMM:GPIB:ADDR?

Typical Response: 9

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

Safety 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

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 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.

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.

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.

WARNING **To prevent electrical shock, disconnect the Keysight U3020AD01 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.**

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.**

Before Applying Power

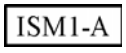
Verify that the premises electrical supply is within the range of the instrument. The instrument has an autoranging power supply.

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.**
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.
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.
CAUTION	This product is designed for use in Installation Category II and Pollution Degree.
CAUTION	Before switching on this instrument, make sure the supply voltage is in the specified range.
CAUTION	Verify that the premise electrical voltage supply is within the range specified on the instrument.
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.

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

Instrument Markings

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

	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.
	The AC symbol indicates the required nature of the line module input power.
	This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is in the STANDBY position.
	This symbol indicates that the power line switch is in the OFF 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.
ccr.keysight@keysight.com	The Keysight email address is required by EU directives applicable to our product.
	The CSA mark is a registered trademark of the CSA International.
	This is a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 5).
	This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). Cet appareil ISM est conforme à la norme NMB du Canada.
	Direct Current.
IP 2 0	The instrument has been designed to meet the requirements of IP 2 0 for egress and operational environment.
	The RCM mark is a registered trademark of the Australian Communications and Media Authority.
	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.
	South Korean Certification (KC) mark; includes the marking's identifier code which follows the format: MSIP-REM-YYY-ZZZZZZZZZZZZZZ.

Regulatory Information

Battery

Do not throw batteries away but collect as small chemical waste, or in accordance with your country's requirements. You may return the battery to Keysight Technologies for disposal. Refer to "Contacting Keysight" on page 35 for assistance.

EMC

Complies with the essential requirements of the European EMC Directive as well as current editions of the following standards (dates 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-00 1
  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 is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

A 급 기기 (업무용 방송통신기자재) 이 기기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주 의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으 로 합니다 .

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 int he 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):

- Accoustical noise emission
  LpA<70 dB
  Operator position
  Normal operation mode Per ISO 7779

Declaration of Conformity

To find a current Declaration of Conformity for specific Keysight product, go to:
http://regulations.about.keysight.com/DoC/search.htm

Keysight Support, Services, and Assistance

Service and Support Options

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.

Contacting Keysight

Assistance with test and measurement needs, and information on finding a local Keysight office are available on the Internet at:
http://www.keysight.com/find/assist

You can also purchase accessories or documentation items on the Internet at:
http://www.keysight.com/find

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

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.

Shipping Your Product to Keysight for Service or Repair

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.

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.
- 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.
- Contact Keysight for instructions on where to ship your analyzer.

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Supersedes: August 2019

U3020-90004

KEYSIGHT TECHNOLOGIES

www.keysight.com