

Keysight N1022B Active Probe Adapter

User's
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.

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Keysight N1022B Active Probe Adapter

The N1022B Active Probe Adapter provides the interface to connect an Keysight Infiniimax active probe to an Keysight 86100-series Infiniium DCA. To use the N1022B requires that firmware revision A.03.05 or later be installed on the Infiniium DCA.

The Infiniimax Active Probes include the 1131A, 1132A, and 1134A. Other supported active probes include the 1152A, 1156A, 1157A, and 1158A.

CAUTION

When using the N1022B, always work at a static-safe work station and wear a wrist-strap or heel-strap. **"Static-Safe Workstation"** on page 12.

CAUTION

The probe adapter connections can be damaged if it is dropped from excessive heights onto a hard surface.



General Safety Considerations

This product has been designed and tested in accordance with the standards listed in the Manufacturer's Declaration of Conformity, and has been supplied in a safe condition. The product documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Before using this product, review the safety information for cautions and warnings.

Use this product according to the enclosure protection provided. This product does not protect against the ingress of water. This product protects against finger access to hazardous parts within the enclosure.

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.

WARNING

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

WARNING

To prevent electrical shock, disconnect the N1022B from probe power before cleaning. Use a dry cloth to clean the external case parts. Do not attempt to clean internally.

CAUTION

Do not use too much liquid in cleaning the product. Water can enter the adapter, damaging sensitive electronic components.

CAUTION

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

Installation Category

Installation Categories (overvoltage categories) are determined by the transient overvoltage levels that may be expected. CAT I: Mains isolated. CAT II: Line voltage in appliance and to wall outlet. CAT III: Line voltage behind wall outlet to next level of distribution.

Instrument Markings



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



The AC symbol is used to indicate the required nature of the line module input power.



The Standby symbol is used to mark the position of the instrument power line switch.



The CE mark is a registered trademark of the European Community.



The CSA mark is a registered trademark of the Canadian Standards Association.



The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.

ISM1-A

This text denotes the instrument is an Industrial Scientific and Medical Group 1 Class A product.

ICES/NMB-001

This text indicates product compliance with the Canadian Interference-Causing Equipment Standard.



South Korean Class A EMC Declaration

Using the Probe Adapter

There are a few things to consider when connecting the N1022B Active Probe Adapter to an active probe and the Infiniium DCA.

- The dynamic range of the system will be 3.2V (6.4 Vp-p), which with probe offset, covers most digital technologies.
- The Infiniium DCA provides both power and offset control to the active probe adapter through the plug-in module front panel connector.
- Probe offset is changed by adjusting the vertical offset control located on the plug-in module front panel. The control should be adjusted to center your signal within the 5V peak-to-peak (12 volts peak-to-peak for slow signals) dynamic range of the probe.

Available Accessories

An 8 in-lbs torque wrench accessory (P/N 8710-1764) is available from Keysight.

Cleaning

If the probe adapter requires cleaning, disconnect it from both the instrument and the probe. Wipe with a soft cloth dampened with a mild soap and water solution. Make sure the adapter is completely dry before reconnecting to the probe and instrument.

Inspecting

- Inspect the shipping container for damage.
- Keep a damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the probe adapter has been checked mechanically and electrically.
- Inspect the probe adapter.
- If there is mechanical damage or defect, or if the probe adapter does not operate properly or pass performance tests, notify your Keysight Technologies sales office.
- If the shipping container is damaged, or the cushioning materials show signs of stress, notify the carrier as well as your Keysight sales office. Keep the shipping materials for the carrier's inspection. The Keysight office will arrange for replacement of the N1022B at Keysight's option without waiting for claim settlement.

Connecting the N1022B

CAUTION

When using the N1022B, always work at a static-safe work station and wear a wrist-strap or heel-strap, as described in "[Static-Safe Workstation](#)" on page 12. Electrical channel input circuits can be damaged by electrostatic discharge (ESD). Therefore, avoid applying static discharges to the front-panel input connectors. Avoid touching the front-panel input connectors without first touching the frame of the instrument. Be sure that the instrument is properly earth-grounded to prevent buildup of static charge.

NOTE

The N1022B can be directly connected to any 86100-series or 83480-series module with a 3.5 mm electrical channel input. You can also connect the probe adapter to a module with 2.4 mm electrical input. However, in order to connect to a 2.4 mm input, you must use a 2.4 mm (f) - 3.5 mm (m) adapter, Keysight part number 85130-60010.

- 1 Connect the N1022B probe adapter to the module's electrical input connector. This requires holding the N1022B connector steady while turning the module's input connector. This action threads the module's connector into the N1022B's connector. Torque the connection to 8 in-lbs. An 8 in-lbs torque wrench is available from Keysight. Order part number 8710-1764.

CAUTION

To ensure a good connection and to avoid damaging the connectors, tighten the connection to 8 in-lbs of torque. After the adapter is connected, do not allow the adapter to rotate on the front-panel connection. For more information on caring for precision electrical connectors, refer to the online help that is accessed from the 86100C/D Infiniium DCA's menu.

- 2 Connect the probe's output to the probe adapter's input. The probe tip should not be connected to a device under test at this time.
- 3 Connect the probe adapter's power connector to the module's front-panel Probe Power connector for the associated channel. Do not make the connection to any Aux Power connector, if one is present on the module's front panel. Connecting to an Aux Power connector prevents the probe from being automatically calibrated.

CAUTION

The probe power cable connector automatically locks in the mating power connector. To separate the connection, you must pull on the knurled part of the cable connector housing. This releases the lock. If you pull directly on the power cable, the connectors will not release and may damage the connector or cable. An effort has been made to design this active probe adapter to take more than the average amount of physical and electrical stress. However, the technologies necessary to achieve high performance do not allow the probe to be unbreakable. Treat the probe adapter with care.

NOTE

During operation, the N1022B probe adapter's temperature may feel warm when you touch it. This is normal and does not indicate a problem.

NOTE

Before using the active probe adapter with an active probe, perform a probe calibration. When the probe has been calibrated, the dc gain, offset zero, and offset gain will be calibrated. The degree of accuracy specified at the probe tip is dependent on the instrument system specifications.

- 4 The 86100D's Probe Channel dialog box automatically opens as shown in [Figure 1](#) on page 11.

NOTE

If the probe and probe adapter is connected to the module front panel when the DCA is not in operation, the Probe Channel dialog box will not appear on the instrument display screen when the DCA is turned on. To open the Probe Channel dialog box, choose Setup > Channels > Channel X, then click Probes.

- 5 Select the probe model that is currently connected to the probe adapter. If you are using a probe that is not listed in the supported probe list, select one of the probes from the supported list that is closest in type to your unspecified probe.
- 6 Click Close. You can now change the probe tips or probe attenuation. You can also perform a probe calibration.

NOTE

If you are using an AutoProbe style probe that is not listed in the supported probe list, select one of the probes from the supported list that is closest in type to your unspecified probe.

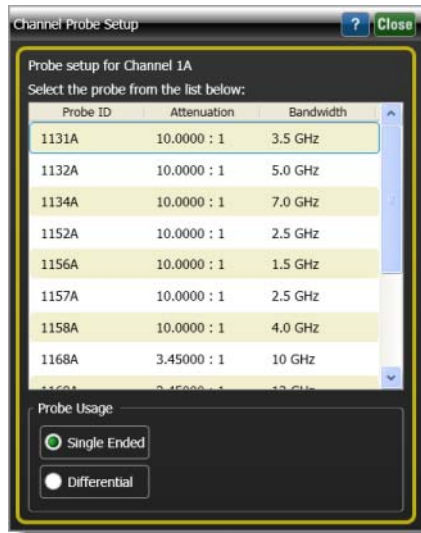


Figure 1 Probe Channel Dialog Box

- 7 Perform the probe calibration procedure so that the DC gain, offset zero, and offset gain will be calibrated. You can access information about probe attenuation and probe calibration in the Infiniium DCA Help system.

Static-Safe Workstation

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. The following figure shows an example of a static-safe work station using two types of ESD protection:

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

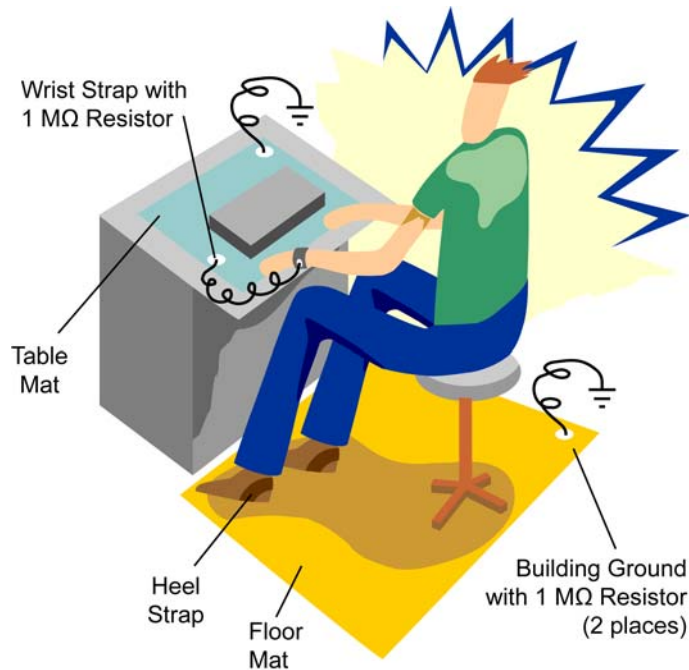


Figure 2 Static Safe Workstation

Both types, when used together, provide a significant level of ESD protection. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone. To ensure user safety, the static-safe accessories must provide at least 1 MΩ of isolation from ground. Purchase acceptable ESD accessories from your local supplier.

WARNING

These techniques for a static-safe work station should not be used when working on circuitry with a voltage potential greater than 500 volts.

The following suggestions may help reduce ESD damage that occurs during testing and servicing operations.

- Personnel should be grounded with a resistor-isolated wrist strap before removing any assembly from the unit.
- Be sure all instruments are properly earth-grounded to prevent a buildup of static charge.

Specifications and Regulatory Information

This section lists specifications and characteristics and regulatory information of the probe adapter.

Specifications

The distinction between specifications and characteristics is described as follows:

- Specifications describe warranted performance over the temperature range 0°C to +55°C and relative humidity <95% (unless otherwise noted). All specifications apply after the temperature of the probe and the probe adapter has been stabilized after 30 minutes of continuous operation.
- *Characteristics* provide useful information by giving functional, but nonwarranted, performance parameters. *Characteristics are printed in italics.*

Review the following specifications to ensure that your operating or storage environment is suitable for the adapter.

Table 1 Environmental Specifications

Item	Specification
Operating Temperature	0° C to +55°C
Storage Temperature	-40° C to +70°C
Use	Indoor
EMC	Conducted and radiated Emission is in compliance with CISPR 11 Class A and IEC 61326
ESD Tolerance	4 kV contact 8 kV air discharged
Operational Humidity (type tested)	95% R.H. (non-condensing) at +40°C (+104°F)
Altitude	Up to 4600 meters
Storage Humidity (type tested)	90% R.H. (non-condensing) at +65°C (+149°F), 24 hrs
Shock (type tested)	30 g (half sine), 11 ms pulse
Vibration (type tested)	Random, 0.21g rms, 5 to 500 Hz, 10 minutes per axis Sine, 0.5g (0 to peak), 5 to 500 Hz, 1 octave/min
Weight	200 g (7 oz) max
Dimensions (excludes power cable)	
Height	34 mm (1.34 in.)
Weight	38 mm (1.50 in.)
Length	61 mm (2.4 in.)
Power Cable Length	200 mm (7.9 in.) from connector tip to N1022B body

N1022B Probe Adapter

Table 2 Performance Specifications

Item	Specification
Frequency Range (<i>Characteristic</i>)	0 - 18 GHz
Power Input	+17V 225 mA -17V 225 mA
Output Voltage	+12V ±5% -12V ±5% V prog ±5% -V prog ±5%
Output Current	0 - 200 mA (+12V) 0 - 200 mA (-12V) 0 - 200 mA (V prog) 0 - 200 mA (-V prog) ≤ 200 mA combined current: +12V and V prog ≤ 200 mA combined current: -12V and -V prog
Probe Compatibility ^a	Compatible with all Infiniimax active probes, such as the 1131A/1132A/1134A and other active probes such as the 1152A/1156A/1157A/1158A.
Connector I/O (see figure below)	
DCA Connector	Custom ruggedized 3.5 mm connector
Probe Connector	Precision BNC connector
Power Connector	Lemo push-pull 7-pin circular connector (works only with probe power)
System Compatibility	Compatible with Keysight 86100-series Infiniium DCA

^a Other Infiniium instruments in compliance with the Autoprobe interface can be added using the Probe dialog box located in the Infiniium graphical user interface.

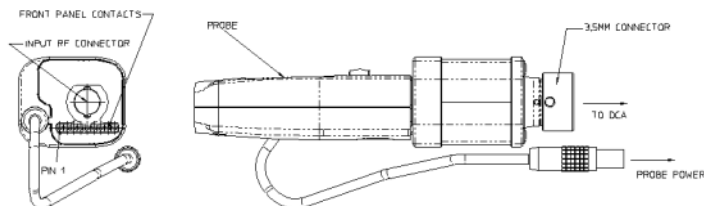


Figure 3 N1022B I/O Connections

Regulatory Information

Electrostatic Discharge Immunity - IEC 61000-4-2: 1995 passes criterion B.

This product complies with the Electrostatic Discharge immunity requirement in IEC/EN 61326 using performance criterion B. Degradation of some product specifications can occur during the instance of an electrostatic discharge. The product self-recovers and operates as specified after the discharge.

South Korean Class A EMC Declaration

A 급 기기 (업무용 방송통신기자재)

This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Compliance with Canadian EMC Requirements

This ISM device complies with Canadian ICES-001.

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

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 Maschinenlaermverordnung -3.GSGV Deutschland).

Table 3 Notice for Germany: Noise Declaration

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

Service

Service Keysight for the N1022B Active Probe Adapter is by replacement only. To order a new N1022B, contact your local Keysight Technologies Sales Office. Return the failed probe adapter to your local Keysight service center.

If the probe adapter is still under warranty or is covered by an Keysight maintenance contract, it will be replaced under the terms of the warranty or contract.

For technical assistance, you can contact your local Keysight Technologies Call Center.

- In the Americas, call 1 (800) 829-4444
- Visit <http://www.keysight.com/find/assist>

Checking Probe Power Outputs

The probe power output is located on the front panel of the probe adapter, surrounding the BNC input.

Use [Table 4](#) on page 20 to check the power output at the connectors. The DCA module provides the probe adapter with +17V and -17V supplies. The probe adapter generates the +12V and -12V supplies and the +3V and -3V supplies.

Measure the voltages with respect to the DCA mainframe's front panel ground connector or the outside conductor of the Cal BNC connector.

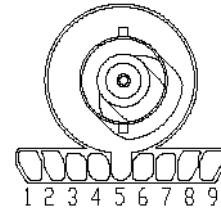
CAUTION

Do not attempt to measure voltages at pins 3 through 7.

Any failure may be a problem with the probe adapter assembly.

Table 4 Probe Power Outputs

Pin	Supply	Power Output
1	+3V	
2	-3V	
3	Offset	
4	NC	
5 and ring	Probe ID	
6	NC	
7	R _p	
8	-12V	
9	+12V	



Returning the N1022B

When the probe adapter is returned to an Keysight service office for servicing, it must be adequately packaged and have a complete description of the failure symptoms attached.

Please notify the service office before returning your probe adapter for service. Any special arrangements for the adapter can be discussed at this time. This will help the Keysight service office repair and return your adapter as quickly as possible.

- 1 Write the following information on a tag and attach it to the probe adapter. Include any specific performance details related to the problem. The following information should be returned with the instrument.
 - Company name and return address.
 - Name and phone number of technical contact person.
 - Probe adapter model number.
 - Probe adapter serial number.
 - Description of the service required or failure indications.

CAUTION

Cover electrical connectors to protect sensitive components from electrostatic damage.

CAUTION

Use original packaging or comparable. Instrument damage can result from using packaging materials other than the original materials. Never use styrene pellets as packaging material. They do not adequately cushion the instrument or prevent it from shifting in the carton. They may also cause instrument damage by generating static electricity.

-
- 2 Return the probe adapter in its case or pack the adapter in foam or other shock absorbing material and place it in a strong shipping container.
 - 3 Seal the shipping container securely.
 - 4 In all correspondence, refer to the probe adapter by model number and full serial number.
 - 5 Retain copies of all shipping papers.

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