N9029BV

Mini Signal Analyzer Frequency Extension Module

The Keysight N9029BV Mini Signal Analyzer Frequency Extension (Mini SAX) Modules are a smaller version of the Keysight N9029AVxx SAX modules, and are also manufactured by Virginia Diodes, Inc (VDI).

KEYSIGHT

PRODUCT NOTE

Notices

Trademark Acknowledgments

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Warranty

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Safety Notices

NOTE

A **NOTE** calls the user's attention to an important point or special information in the text.

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.

Keysight Technologies
Mini SAX Modules

Mini Signal Analyzer Frequency Extension Modules and Accessories

The Keysight N9029BV Mini Signal Analyzer Frequency Extension (Mini SAX) Modules are a smaller version of the Keysight N9029AVxx SAX modules, and are also manufactured by Virginia Diodes, Inc (VDI). The modules are for use with Keysight's X-Series EXA, MXA, or PXA spectrum analyzers with external mixer option EXM recommended for ease of use. See Table 2 on page 5 for available mm-Wave band options.

The modules provide high performance broadband frequency down-conversion, and for modules with Option UDC, frequency up-conversion. These modules achieve low conversion loss and excellent noise figure. Refer to the VDI User's Guide included on the USB drive.

For more information, see the product manual at https://www.vadiodes.com/images/Products/SAX/SAX_Product_Manual/VDI-731_SAX_Product_Manual.pdf.

Specifications can be found on the VDI website at https://www.vadiodes.com/images/Products/SAX/VDI_Mini_SAX_Specifications_2021.12.29.pdf.

The cables and power supply will be included with the module in the transport case. Cutouts have been created for the accessories within the transport case.

Accessories [1.] (Optional)

Transport Case

USB Drive and Tools

Cable

Mini VDI Module

Power Supply and AC Power Cable

1. To order accessories, see Accessories and Information on page 10. For the **Keysight Millimeter Wave Frequency Extenders Technical Overview** document, visit http://literature.cdn.keysight.com/litweb/pdf/5991-3161EN.pdf

Power Requirements

- **Voltage and/or range (V):** 100-240 Vac (AC input for AC/DC adapter), 9 Vdc (input for module)
- **Frequency and/or range (Hz):** 50-60 Hz (AC input for AC/DC adapter)
- **Power in Watts, VA or Current (A):** 1.2 A max (input for AC/DC adapter), 4 A (input for module)

NOTE The instrument can operate with mains supply voltage fluctuations up to ± 10% of the nominal voltage.

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. 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 An external attenuator is recommended when using N9029BV Mini-SAX with the EXM option to avoid exceeding the damage input LO power (16 dBm).

Environmental Conditions

- For indoor use only

CAUTION This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 2.

CAUTION Be aware of the power level applied to the waveguide input. Non-warrantied damage to the internal mixer can occur if the power level is at or above the damage level specified in the VDI User's Guide for "RF Input."

NOTE Before using your SAX module, please read all documentation from VDI (included on the USB drive).

Physical Characteristics

Table 1 Dimensions

Height	1.50 inches
Width	5.25 inches
Length	3.50 inches

Typical Connection Diagram for External Mixing

NOTE The product serial number is the OEM serial number **SAXxxxx** (xxxx = numbers in the OEM serial number) assigned by Virginia Diodes, Inc. Refer to the label on the product for the serial number.

Table 2 SAX Mini Modules

Order the Keysight model listed in the table. The Keysight P/N is for reference only to confirm shipment for the Keysight model ordered. Table sorted by Keysight Model Number.

Keysight Model Number	VDI Model Number	Frequency (GHz)
N9029BV-W01	WR1.0 (WM-250) Mini SAX	750 to 1100
N9029BV-W02	WR2.2 (WM-570) Mini SAX	330 to 500
N9029BV-W03	WR3.4 Mini SAX	220 to 330
N9029BV-W04	WR4.3 Mini SAX	170 to 260
N9029BV-W05	WR5.1 Mini SAX	140 to 220
N9029BV-W06	WR6.5 Mini SAX	110 to 170
N9029BV-W08	WR8.0 Mini SAX	90 to 140
N9029BV-W10	WR10 Mini SAX	75 to 110
N9029BV-W12	WR12 Mini SAX	60 to 90
N9029BV-W15	WR15 Mini SAX	50 to 75
N9029BV-W19	WR19 Mini SAX	40 to 60
N9029BV-W1B	WR1.5 (WM-380) Mini SAX	500 to 750
N9029BV-W28	WR28 Mini SAX	26.5 to 40

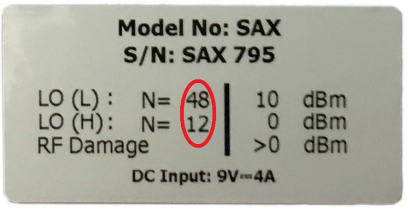
Table 3 Mini SAX Options

Option	Description
UDC	Adds IF input data (on USB) for frequency up-conversion
1GD	Adds data (on USB) at 1 GHz spacing

NOTE Always use the information printed on the SAX label of your module.

- When using the **LO/IF (L) Input** (External Mixing), use **LO (L): N= X**, with "X" being the multiplication factor value shown on your SAX label.
- When using the **LO/IF (H) Input**, use **LO (H): N= X**, with "X" being the multiplication factor value shown on your SAX label.

SAX Label



On the SAX label, the multiplication factor values are circled. This is an example only; the actual values will vary.

When using your signal analyzer with the SAX, you must set the analyzer to external mixing, including harmonic and Doubler Switched parameters.

For the N90x0A Models:

[Input/Output] > External Mixer > External Mixer > Ext Mix Setup > Edit Harmonic Table > [Enter] (or select **OK**).
Table Type > Doubler Switching > Harmonic > [N] > Enter **N** value *(see SAX label on module, or see VDI document, for N value)*

For the N90x0B Models:

[Input/Output] > Select Input > External Mixer > External Mixer Setup > Table Type > Doubler Switching > Harmonic (under **Harmonic Table**) > Enter **N** value *(see SAX label on module, or see VDI document, for N value)*

NOTE For improved spurious response:

- Change the number of sweep points:
  [Sweep/Control] > Points > [40001]
  Multi-Touch Sweep > Sweep Config > Points > [40001]
- Reduce resolution bandwidth:
  [BW] > Res BW > [300 kHz]
- Turn on Signal ID:
  [Input/Output] > External Mixer > Signal ID > On > Signal ID Mode > Image Suppress
  Multi-Touch Input > Output > Signal ID > On > Signal ID Mode > Image Suppress

There is data on the USB drive that can be used to create a corrections file to improve amplitude accuracy.

Frequency Up-Converter Operation

The option UDC has an IF input and 9 volt connections for external devices. For frequency up-conversion, the left jumper is to be removed.

The IF input frequency will be up-converted to the multiplication factor of the LO input (H) ++ IF input {*N x LO input (H) + IF input = waveguide output frequency*}. Refer to the VDI User's Guide for frequencies and power levels.

1. Connect RF source to LO input (H), such as an E8257D PSG.
2. Connect RF signal to be up-converted to the IF input, such as an E8257D PSG.

NOTE Other modes of operation may be found in the VDI documentation.
VDI-731.3 Mini SAX Manual.pdf
VDI Mini SAX Specifications 2025.09.14.pdf

NOTE Maximum conversion loss of WR-15, WR-12, WR-10, WR-8.0, WR-6.5, and WR-5.1 SAX-M is 4 dB at the High IF Port after IF amplification.

WARNING	Use the Keysight supplied power cord or one with the same or better electrical rating.
WARNING	No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.
WARNING	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.
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	This instrument has auto-ranging line voltage input. Be sure the supply voltage is within the specified range and voltage fluctuations do not to exceed 10 percent of the nominal supply voltage.
CAUTION	Use ESD precautions when using these devices. The IF port for CCDs has ESD protection, but the IF port for CCUs is extremely ESD sensitive. Do not apply any DC biases or surges when connecting or disconnecting from the IF port. Discharge static from cables befor connecting to the device. Replace the IF with provided 50 Ω termination when IF port is not in use.
CAUTION	Observe the power level you are applying to the LO, IF, and RF waveguide input ports. Damage will occur if it is not observed.
NOTE	Before using your converter module, please read all documentation from VDI (included on the USB drive). It is important to follow the General Operating Procedures and Guidelines section.
NOTE	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.
NOTE	Only Keysight approved accessories shall be used.
NOTE	The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

Instrument Markings

Listed below are definitions for the markings that may be found on the product.

	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 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 ON.
	This symbol indicates that the power line switch is in the OFF position.
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.
	The CE mark is a registered trademark of the European Community.
ccr.keysight@keysight.com	The Keysight email address s required by EU directives applicable to our product.
ISM1-A	This is a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 5).
ICES/NMB-001	This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). Cet appareil ISM est conforme à la norme NMB du Canada.
	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 this format: MSIP-REM-YYY-ZZZZZZZZZZZZZZ.
	The UK conformity mark is a UK government owned mark. Products showing this mark comply with all applicable UK regulations.

Safety

Complies with the following standard (dates and editions are cited in the Declaration of Conformity):
IEC/EN 61010-1.

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 VDI's Declaration of Conformity):

- IEC/EN 61326-1
- CISPR Pub 11 Group 1, Class A
  Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.
- AS/NZS CISPR 11
- CAN ICES/NMB-001(A)
  This ISM device complies with Canadian ICES-001.
  Cet appareil ISM est conforme a la norme NMB-001 du Canada.

When the N5179V-Wxx (VDI SGX mini) and the N9029BV-Wxx (VDI SAX mini) are used together, there may be some performance loss when exposed to ambient continuous electromagnetic phenomenon similar to those used in testing per IEC 61000-4-3 (3V/m Radiated Immunity) and IEC 61000-4-4 (3V AC port Conducted Immunity). Sidebands offset from the carrier signal may be up to 50dBc higher than a clean environment without any electromagnetic phenomenon. The operating environment should be shielded or decoupled for best performance.

Acoustic Statement (European Machinery Directive)

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

Accessories and Information

A list of accessories for the N9029BV Mini SAX Modules can be found on the N9029AV99 Waveguide Accessories for mm-Wave Product Note (N9029-90035) at: https://www.keysight.com/us/en/assets/9921-01743/user-manuals/N9029AV99-Millimeter-Waveguide-Accessories-Product-Note.pdf.

For information concerning the operation and connections, reference the VDI User Guide (included on the USB Drive), or the Keysight X-Series Signal Analyzer's documentation by searching http://www.keysight.com/find/pxa_manuals. You may also reference the X-Series Signal Analyzer On-line Help System for operational information.

For more information, visit the Virginia Diodes, Inc. website at: https://www.vadiodes.com/en/products/signal-analyzer

Contacting Keysight

Keysight Technologies does not guarantee the performance of the VDI modules, or system performance. However, if warranty or repair is needed Keysight will provide full support to our customer.

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 mechanical damage or if the instrument does not pass the performance tests, notify the nearest Keysight Technologies office. Keep the damaged shipping materials (if any) for inspection by the carrier and a Keysight Technologies representative.

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 find 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.**

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