

Keysight Technologies
N5256/7/8A/B

Millimeter-wave Module

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SERVICE NOTE

For models N5256AW12, N5257AR12, N5258AD12, N5256AX12, N5257AX12, N5256AW15, N5257AR15, and N5258AD15, the LO multiplier number has changed from 5 to 6. Modules with OML s/n \leq 16xxxx (made before 2017) have the LO multiplier number 5 indicated on the module's rear label and are not compatible with new modules for system configuration.

Please note that "A" models are not compatible with "B" models.

N5256/7/8A/B

Introduction

The Keysight Technologies N5256A/B, N5257A/B and N5258A/B are Millimeter-wave Modules that are manufactured for Keysight by Oleson Microwave Labs (OML) as a customer ordering convenience. This document provides information for the models and options available for each product. Refer to documentation supplied with this product or go to the OML website at: <http://www.omlinc.com>.

The Keysight Technologies N5256AW01 and N5257AR01 are manufactured for Keysight by Virginia Diodes, Inc. (VDI). Refer to the Product Note (N5256-90002) and the VDI document included with this product or go to the VDI website at: <http://www.vadiodes.com>.

For system configuration information refer to the Keysight Millimeter-wave Network Analyzer 10 MHz to 110 GHz, with Extensions to 1.1 THz (5989-7620EN), available on the Keysight Technologies web site at: <http://literature.cdn.keysight.com/litweb/pdf/5989-7620EN.pdf>.

For Directly Connecting a millimeter-wave module to a network analyzer, the following are recommended:

- OML VDCPW12-5, 12 VDC Power Supply (7-pin output circular jack)
or
- U8100A DC Power Supply (0 to 30 V, 0 to 3 A, 90 W) or equivalent
- DC Bias Cable (N5260-60042)

Table 1 Power Supply Voltage, Frequency, and Power Ratings

Nominal Voltage and/or Range:	Input: 100-240 VAC (AC/DC Adapter) Output: 12 VDC (AC/DC Adapter)
Nominal Frequency and/or Range:	Input: 50-60 Hz (AC/DC Adapter)
Power in Watts, VA, or Current:	Input: 1.4 A (AC/DC Adapter) Output: 5 A (AC/DC Adapter)

Figure 1 OML Network Analysis Products



Description

The millimeter-wave modules are designed for use with the N5260/61/62A Millimeter-wave Module Controllers for banded vector network analyzer systems. Refer to the N5250C or N5261/62A Users Guides (N5260-90001 or N5262-90001) for system connections, operation and functional check.

The N5256A/B “T/R” Millimeter-wave Module contains an RF source multiplier, dual directional coupler, reference downconverter and a test downconverter. The T/R Millimeter-wave Module is usually the primary module of a millimeter-wave VNA system. A single T/R module allows the measurement of S11 reflection coefficient only.

The N5257A/B “T” Millimeter-wave Module is a “receive only” module that contains a test downconverter to receive the test signal from a T/R Millimeter-wave Module. The use of a T module, as the second module, allows the system capability to measure S11 and S21 only.

The N5258A/B “T2” series is a “dual receive only” module that contains two test downconverters to receive test signals from two antennas, a power splitter or two T/R Millimeter-wave Modules.

The use of two T/R modules in the millimeter-wave VNA system allows for all four S-parameters to be measured. The test downconverters of T/R modules are the receivers for the signal from the modules sources. When the two modules waveguide are connected, S11 and S21 are measured on the forward direction, S22 and S11 are measured when the signal path is reversed.

Table 2 Model List

Instrument ¹	Description
N5256A/B	Transmission / Reflection Modules for use with N526xA Controller.
N5257A/B	Single Path Transmission (Receiver) Modules for use with N526xA Controller.
N5258A/B	Dual Path Transmission (Receiver) Modules for use with N526xA Controller.

1. Refer to individual tables for specific model and options.

Verifying the Shipment

To verify the contents shipped with your product, refer to the "Box Content List" and the documentation 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 [“Keysight Support, Services, and Assistance” on page 30](#). Keep the damaged shipping materials (if any) for inspection by the carrier and an Keysight Technologies representative.

NOTE

The Keysight part number and serial number is on the bottom of the module, refer to the model and serial number when requesting service or information.

N5256/7/8A Model Features

- The millimeter-wave modules have a power connector feature that is designed to operate with the N5260/61/62A Millimeter-wave Module controllers. A separate external power supply from OML (VDCPW12-5, 12 VDC, with a 7-pin output circular jack) is included for a direct connection configuration.
- The RF, LO and IF connectors are 3.5 mm female SMA type.
- RF and DC power cables are included with millimeter-wave controllers, or may be purchased separately. A separate power supply is recommended if the millimeter-wave modules are placed greater than 30 feet from the controller.
- The waveguide connectors uses a 4-40 thread screw. OML supplies a 3/32 inch captive screw and VDI supplies a 5/64 inch captive screw.
- The millimeter-wave modules have adjustable feet for leveling height when connecting to other equipment.
- For indoor use only.

CAUTION

Do not remove the feet. Air flow on the bottom and rear panel of the module must be unobstructed.

Table 3 Waveguide Flange

Frequency Range	Frequency Band	EIA Waveguide	Mil Spec Flange MLF-3955/	UG-XXX/U Equivalent
500 to 750 GHz	n/a	WR-1.5	n/a	n/a
325 to 500 GHz	n/a	WR-2.2	n/a	UG-387/U-M
220 to 325 GHz	n/a	WR-03	74-005	UG-387/U-M
140 to 220 GHz	G	WR-05	74-003	UG-387/U-M
110 to 170 GHz	D	WR-06	74-002	UG-387/U-M
90 to 140 GHz	F	WR-08	74-001	UG-387/U-M
75 to 110 GHz	W	WR-10	67B-010	UG-387/U-M
60 to 90 GHz	E	WR-12	67B-009	UG-387/U
50 to 75 GHz	V	WR-15	67B-008	UG-385/U
33 to 50 GHz	Q	WR-22	67B-006	UG-383/U
56 to 94 GHz	E (extended)	WR-12	67B-M03/74-001	UG-387/U

Ordering Configurations

Table 4 N5256A Waveguide Model and Options¹

Waveguide Modules	Frequency Range	Waveguide Band
N5256AW02	325 to 500 GHz	WR-2.2
N5256AW03	220 to 325 GHz	WR-03
N5256AW05	140 to 220 GHz	WR-05
N5256AW06	110 to 170 GHz	WR-06
N5256AW08	90 to 140 GHz	WR-08
N5256AW10	75 to 110 GHz	WR-10
N5256AW12	60 to 90 GHz	WR-12 ²
N5256AW15	50 to 75 GHz	WR-15 ²
N5256AW22	33 to 50 GHz	WR-22
N5256AX10	67 to 110 GHz	WR-10
N5256AX12	56 to 94 GHz	WR-12 ²

1. Waveguide models may be ordered with Option 001 (Adjustable RF Attenuator), Option 002 (15 dB Gain, RF and LO Internal Amplifiers), Option 003 (Option 001 and Option 002), or Option 004 (IF amp bypass jumpers).

Table 5 N5257A Waveguide Model and Options¹

Waveguide Modules	Frequency Range	Waveguide Band
N5257AR02	325 to 500 GHz	WR-2.2
N5257AR03	220 to 325 GHz	WR-03
N5257AR05	140 to 220 GHz	WR-05
N5257AR06	110 to 170 GHz	WR-06
N5257AR08	90 to 140 GHz	WR-08
N5257AR10	75 to 110 GHz	WR-10
N5257AR12	60 to 90 GHz	WR-12 ²
N5257AX12	56 to 94 GHz	WR-12 ²
N5257AR15	50 to 75 GHz	WR-15 ²

2. These models are non-RoHS compliant models. Refer to the B model for RoHS compliant versions.

Table 5 N5257A Waveguide Model and Options¹ (Continued)

Waveguide Modules	Frequency Range	Waveguide Band
N5257AR22	33 to 50 GHz	WR-22

1. Waveguide models maybe ordered with Option 001 (15 dB Gain LO Internal Amplifier).

Table 6 N5258A Waveguide Model and Options¹

Waveguide Modules	Frequency Range	Waveguide Band
N5258AD02	325 to 500 GHz	WR-2.2
N5258AD03	220 to 325 GHz	WR-03
N5258AD05	140 to 220 GHz	WR-05
N5258AD06	110 to 170 GHz	WR-06
N5258AD08	90 to 140 GHz	WR-08
N5258AD10	75 to 110 GHz	WR-10
N5258AD12	60 to 90 GHz	WR-12 ²
N5258AD15	50 to 75 GHz	WR-15 ²
N5258AD22	33 to 50 GHz	WR-22

1. Waveguide models maybe ordered with Option 001 (15 dB Gain LO Internal Amplifier).

Table 7 N5256B Waveguide Model and Options¹

Waveguide Modules	Frequency Range	Waveguide Band
N5256BW12	60 to 90 GHz	WR-12, T/R module (LO x6), cables not included
N5256BX12	56 to 94 GHz	Extended WR-12, T/R module (LO x6), cables not included
N5256BW15	50 to 75 GHz	WR-15, T/R module (LO x6), cables not included

1. Waveguide models maybe ordered with Option 001 (Adjustable RF Attenuator), Option 002 (15 dB Gain, RF and LO Internal Amplifiers), Option 003 (Option 001 and Option 002), or Option 004 (IF amp bypass jumpers).

2. These models are non-RoHS compliant models. Refer to the B model for RoHS compliant versions.

Table 8 N5257B Waveguide Model and Options¹

Waveguide Modules	Frequency Range	Waveguide Band
N5257BR12	60 to 90 GHz	WR-12, Receiver module (LO x6), cables not included
N5257BX12	56 to 94 GHz	Extended WR-12, Receiver module (LO x6), cables not included
N5257BR15	50 to 75 GHz	WR-15, Receiver module (LO x6), cables not included

1. Waveguide models maybe ordered with Option 001 (15 dB Gain LO Internal Amplifier).

Table 9 N5258B Waveguide Model and Options¹

Waveguide Modules	Frequency Range	Waveguide Band
N5258BD12	60 to 90 GHz	WR-12, Dual receiver module (LO x6), cables not included
N5258BD15	50 to 75 GHz	WR-15, Dual receiver module (LO x6), cables not included

1. Waveguide models maybe ordered with Option 001 (15 dB Gain LO Internal Amplifier).

Cross Reference Model and Option Numbers

The following millimeter-wave module model part numbers correspond with the Keysight Technologies part numbers.

Each module ordered includes one each of the standard accessories listed below:

- Documentation Envelope (Performance Graphs and Certificate of Compliance).
- Millimeter-wave Module (Refer to [Table 9](#), [Table 10](#) and [Table 11](#) for your specific module).
- Model N5256A/B includes a Waveguide Section.
- Model N5257A (W02, W03) and N5258A (W02, W03) includes a Waveguide Section.
- Model N5257A (W05, W06, W08) and N5258A (W05, W06, W08) includes a Waveguide 10 dB Attenuator.
- Model N5257A/B (W10, W15) and N5258A (W10, W15) includes a Waveguide 20 dB Attenuator.

NOTE

Only Keysight approved accessories shall be used.

Table 10 **N5256A/B Waveguide Models**

Keysight Model Number	Keysight Part Number	Vendor Module Part Number
N5256A/B Standard (Note: "A" models are not compatible with "B" models)		
N5256AW02-STD	N5260-80039	V02VNA2-T/R
N5256AW03-STD	N5260-80017	V03VNA2-T/R
N5256AW05-STD	N5260-80019	V05VNA2-T/R
N5256AW06-STD	N5260-80012	V06VNA2-T/R
N5256AW08-STD	N5260-80015	V08VNA2-T/R
N5256AW10-STD	N5260-60020	V10VNA2-T/R
N5256AW12-STD	N5260-80011	V12VNA2-T/R
N5256AW15-STD	N5260-80024	V15VNA2-T/R
N5256AW22-STD	N5260-80042	V22VNA2-T/R
N5256AX10-STD	N5260-60004	N21VNA2-T/R-67-1
N5256AX12-STD	N5260-80047	V12VNA2-TR-5694
N5256BW12-STD	TBA	V12VNA2R-T/R
N5256BW15-STD	TBA	V15VNA2R-T/R
N5256BX12-STD	N5260-80668	V12VNA2R-TR-5694
N5256A/B Option 001¹ (Note: "A" models are not compatible with "B" models)		
N5256AW03-001	N5260-80038	V03VNA2-T/R-A
N5256AW05-001	N5260-80035	V05VNA2-T/R-A
N5256AW06-001	N5260-80044	V06VNA2-T/R-A
N5256AW08-001	N5260-80116	V08VNA2-T/R-A
N5256AW10-001	N5260-80036	V10VNA2-T/R-A
N5256AW12-001	N5260-80112	V12VNA2-T/R-A
N5256AW15-001	N5260-80052	V15VNA2-T/R-A
N5256AX10-001	N5260-60003	N21VNA2-T/R-67-A-1
N5256AX12-001	N5260-80115	V12VNA2-T/R-A-5694
N5256BW12-001	TBA	V12VNA2R-T/R-A
N5256BX12-001	N5260-80667	V12VNA2R-T/R-A-5694
N5256BW15-001	TBA	V15VNA2R-T/R-A

Table 10 **N5256A/B Waveguide Models (Continued)**

Keysight Model Number	Keysight Part Number	Vendor Module Part Number
N5256A/B Option 002² (Note: "A" models are not compatible with "B" models)		
N5256AW02-002	N5260-80061	V02VNA2-T/R-RLA
N5256AW03-002	N5260-80142	V03VNA2-T/R-RLA
N5256AW05-002	N5260-80143	V05VNA2-T/R-RLA
N5256AW06-002	N5260-80063	V06VNA2-T/R-RLA
N5256AW08-002	N5260-80144	V08VNA2-T/R-RLA
N5256AW10-002	N5260-80053	V10VNA2-T/R-RLA
N5256AW12-002	N5260-80134	V12VNA2-T/R-RLA
N5256AX12-002	N5260-80215	V12VNA2-T/R-5694-RLA
N5256AW15-002	N5260-80056	V15VNA2-T/R-RLA
N5256BW12-002	TBA	V12VNA2R-T/R-RLA
N5256BW15-002	TBA	V15VNA2R-T/R-RLA
N5256BX12-002	TBA	V12VNA2R-T/R-5694-RLA
N5256A Option 003³		
N5256AW03-003	N5260-80130	V03VNA2-T/R-A-RLA
N5256AW05-003	N5260-80129	V05VNA2-T/R-A-RLA
N5256AW06-003	N5260-80117	V06VNA2-T/R-A-RLA
N5256AW08-003	N5260-80118	V08VNA2-T/R-A-RLA
N5256AW10-003	N5260-80054	V10VNA2-T/R-A-RLA
N5256AW12-003	N5260-80135	V12VNA2-T/R-A-RLA
N5256AW15-003	N5260-80057	V15VNA2-T/R-A-RLA
N5256A Option 004^{4,5}		
N5256AW03-004	N5260-80058	V03VNA2-T/R
N5256AW10-004	N5260-80055	V10VNA2-T/R
N5256A Option HLP		
N5256AW10-HLP	N5260-80227	V10VNA2-T/R-LP
N5256AW12-HLP	N5260-80228	V12VNA2-T/R-LP
N5256AW15-HLP	N5260-80229	V15VNA2-T/R-LP

Table 10 N5256A/B Waveguide Models (Continued)

Keysight Model Number	Keysight Part Number	Vendor Module Part Number
N5256A Option IMD ⁶		
N5256AW10-IMD	N5260-80230	V10VNA2-T/R-IMD
N5256AW12-IMD	N5260-80225	V12VNA2-T/R-IMD
N5256AW15-IMD	N5260-80231	V15VNA2-T/R-IMD

1. Waveguide models with Option 001 (Adjustable RF Attenuator).
2. Waveguide models with Option 002 (15 dB Gain, RF and LO Internal Amplifiers).
3. Waveguide models with Option 003 (Option 001 and Option 002), or Option 004 (IF Amplifier Bypass Jumpers).
4. Waveguide modules with IF Amplifier Bypass Jumpers.
5. Refer to [Figure 5 on page 16](#) for Option 004 rear panel features.
6. Refer to http://www.omlinc.com/images/pdf/Library/Application_Notes/Simplified_Millimeter_Wave_IMD_Measurements.pdf for Option IMD

Table 11 N5257A/B Waveguide Models

Keysight Model Number	Keysight Part Number	OML Part Number
N5257A/B Standard	(Note: "A" models are not compatible with "B" models)	
N5257AR02	N5260-80062	V02VNA2-T
N5257AR03	N5260-80037	V03VNA2-T
N5257AR05	N5260-80041	V05VNA2-T
N5257AR06	N5260-80013	V06VNA2-T
N5257AR08	N5260-80045	V08VNA2-T
N5257AR10	N5260-80023	V10VNA2-T
N5257AR12	N5260-80034	V12VNA2-T
N5257AX12	N5260-80057	V12-VNA2-T-5694
N5257AR15	N5260-80033	V15VNA2-T
N5257BR12	TBA	V12VNA2R-T
N5257BR15	TBA	V15VNA2R-T
N5257BX12	TBA	V12-VNA2R-T-5694

Table 11 N5257A/B Waveguide Models (Continued)

Keysight Model Number	Keysight Part Number	OML Part Number
N5257A Option 001 ¹	(Note: "A" models are not compatible with "B" models)	
N5257AR02-001	N5260-80072	V02VNA2-T-LOA
N5257AR03-001	N5260-80071	V03VNA2-T-LOA
N5257AR05-001	N5260-80070	V05VNA2-T-LOA
N5257AR06-001	N5260-80069	V06VNA2-T-LOA
N5257AR08-001	N5260-80068	V08VNA2-T-LOA
N5257AR10-001	N5260-80067	V10VNA2-T-LOA
N5257AR12-001	N5260-80211	V12VNA2-T-LOA
N5257AX12-001	N5260-80216	V12-VNA2-T-5694-LOA
N5257AR15-001	N5260-80066	V15VNA2-T-LOA
N5257BR12-001	TBA	V12VNA2R-T-LOA
N5257BR15-001	TBA	V15VNA2R-T-LOA
N5257BX12-001	TBA	V12-VNA2R-T-5694-LOA

1. Waveguide models with Option 001 (15 dB Gain LO Internal Amplifier).

Table 12 N5258A/B Waveguide Models

Keysight Model Number	Keysight Part Number	OML Part Number
N5258A Standard	(Note: "A" models are not compatible with "B" models)	
N5258AD03	TBA	V03VNA2-T2
N5258AD05	TBA	V05VNA2-T2
N5258AD06	N5260-80043	V06VNA2-T2
N5258AD08	TBA	V08VNA2-T2
N5258AD10	N5260-80021	V10VNA2-T2
N5258AD12	N5260-80034	V12VNA2-T2
N5258AD15	N5260-80026	V15VNA2-T2
N5258BD12	TBA	V12VNA2R-T2
N5258BD15	TBA	V15VNA2R-T2

Table 12 **N5258A/B Waveguide Models (Continued)**

Keysight Model Number	Keysight Part Number	OML Part Number
N5258A Option 001 ¹	(Note: "A" models are not compatible with "B" models)	
N5258AD03-001	TBA	V03VNA2-T2-LOA
N5258AD05-001	TBA	V05VNA2-T2-LOA
N5258AD06-001	TBA	V06VNA2-T2-LOA
N5258AD08-001	TBA	V08VNA2-T2-LOA
N5258AD10-001	N5260-80029	V10VNA2-T2-LOA
N5258AD12-001	N5260-80211	V12VNA2-T2-LOA
N5258AD15-001	N5260-80031	V15VNA2-T2-LOA
N5258BD12-001	TBA	V12VNA2R-T2-LOA
N5258BD15-001	TBA	V15VNA2R-T2-LOA

1. Waveguide models with Option 001 (15 dB Gain LO Internal Amplifier).

Front and Rear Panel Features

Figure 2 Rear Panel Power Supply Connector

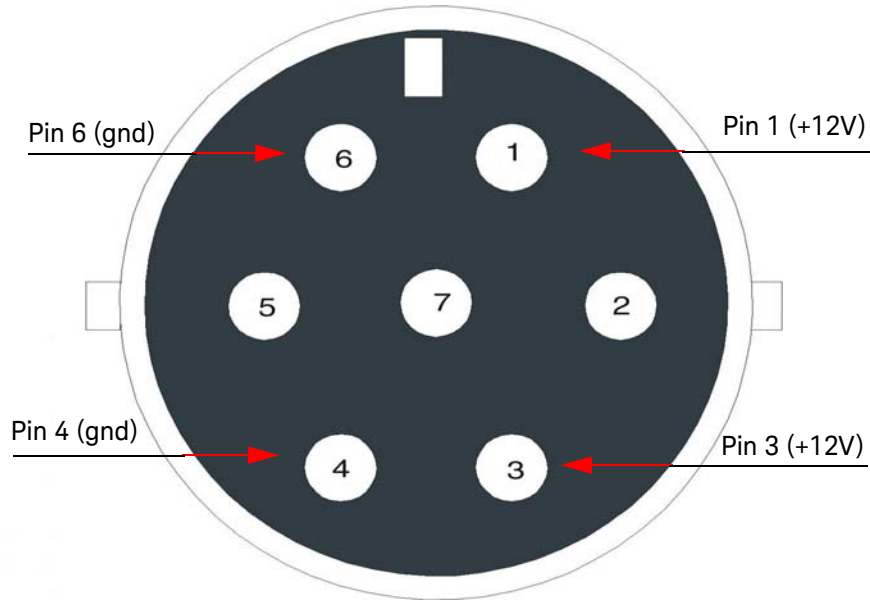


Figure 3 N5256A/B or N5257A/B Front Panel



Figure 4 N5256A/B Rear Panel



Figure 5 N5256A/B Option 001, 003 or 004

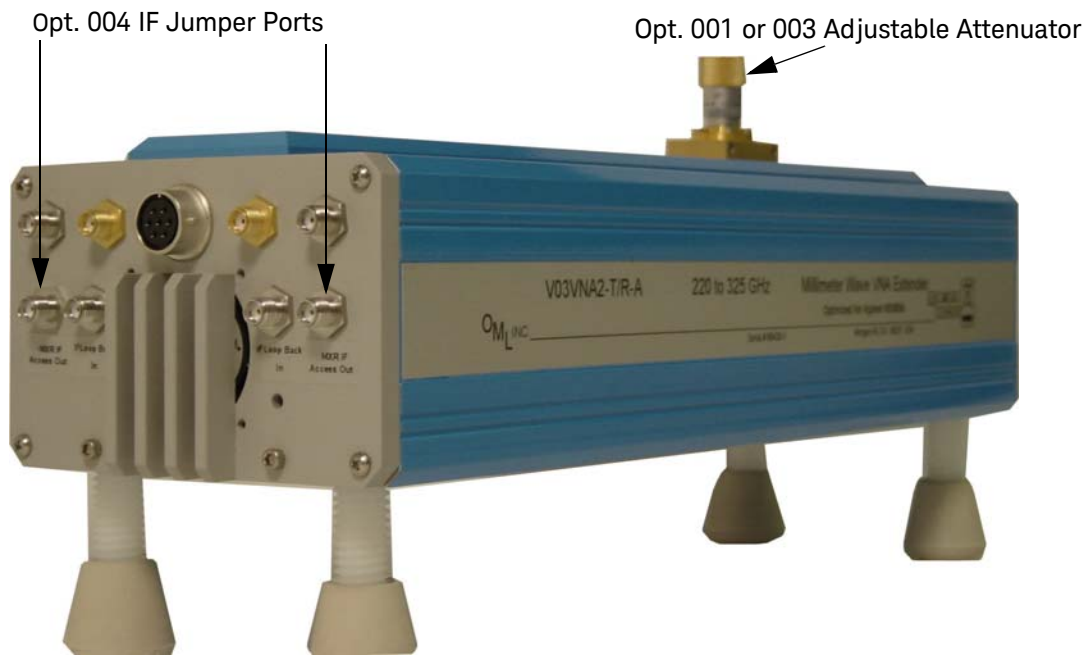


Figure 6 N5257A/B Single Receiver Rear Panel

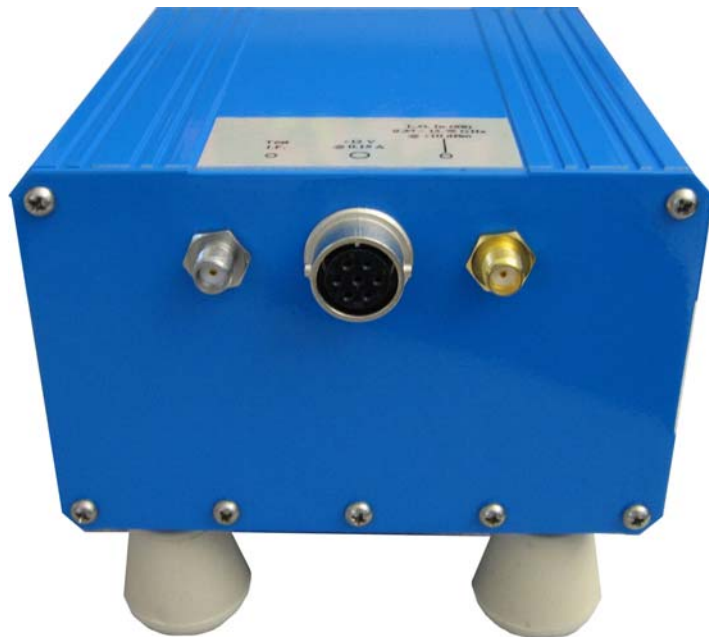


Figure 7

N5258A/B Dual Receiver Front Panel



Figure 8

N5258A/B Dual Receiver Rear Panel

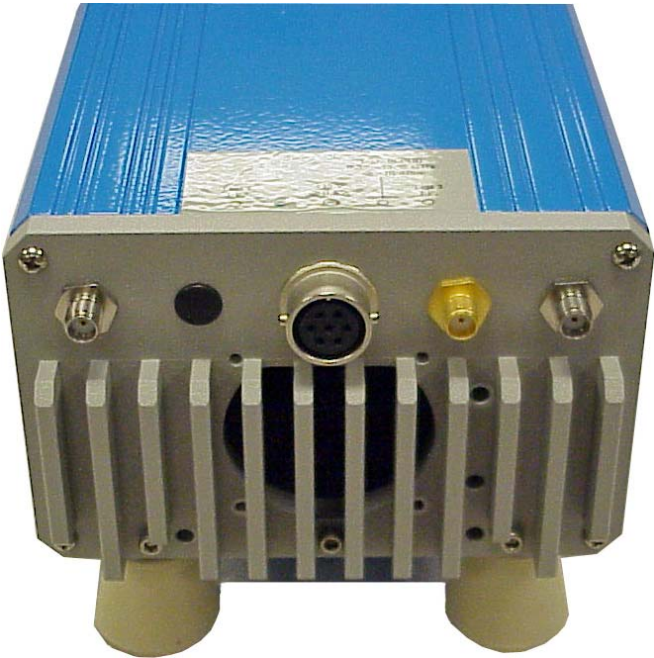


Figure 10 N5256A Option 004

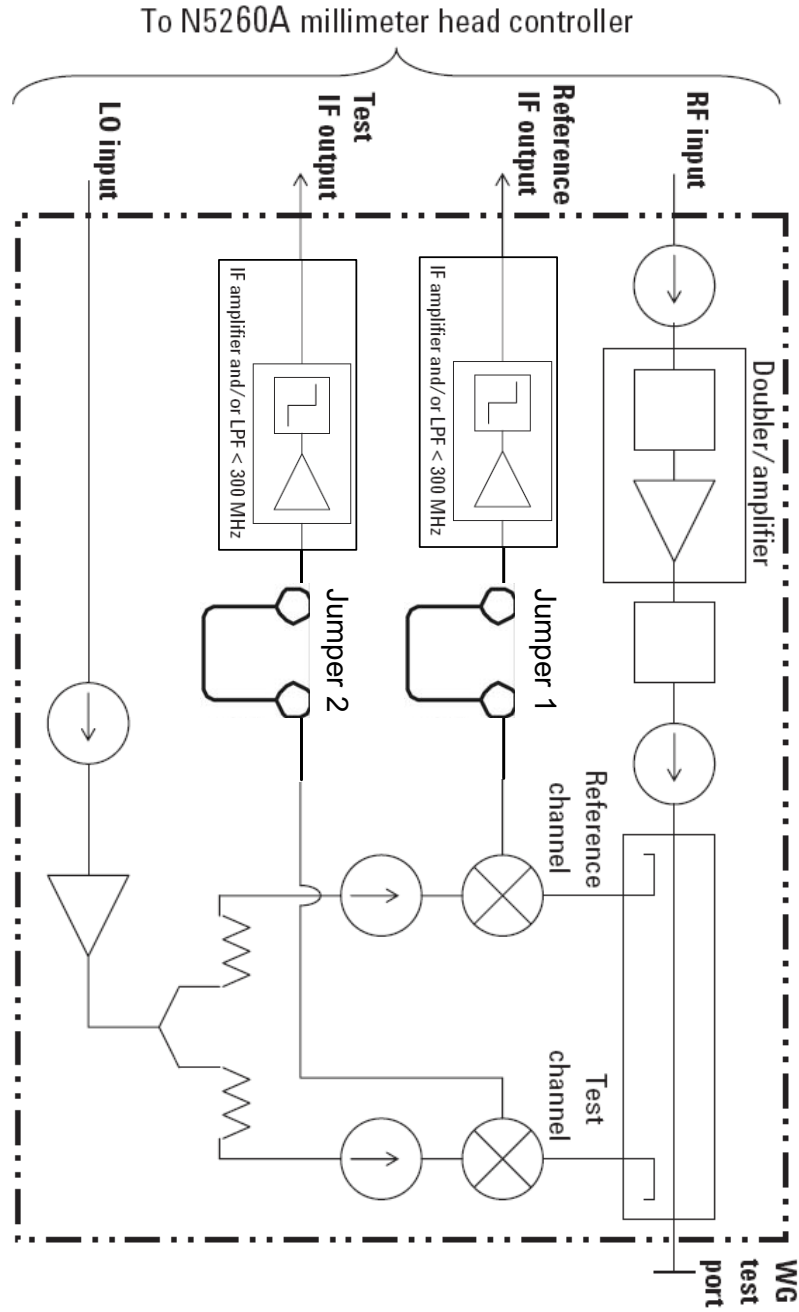


Figure 11

N5257A/B

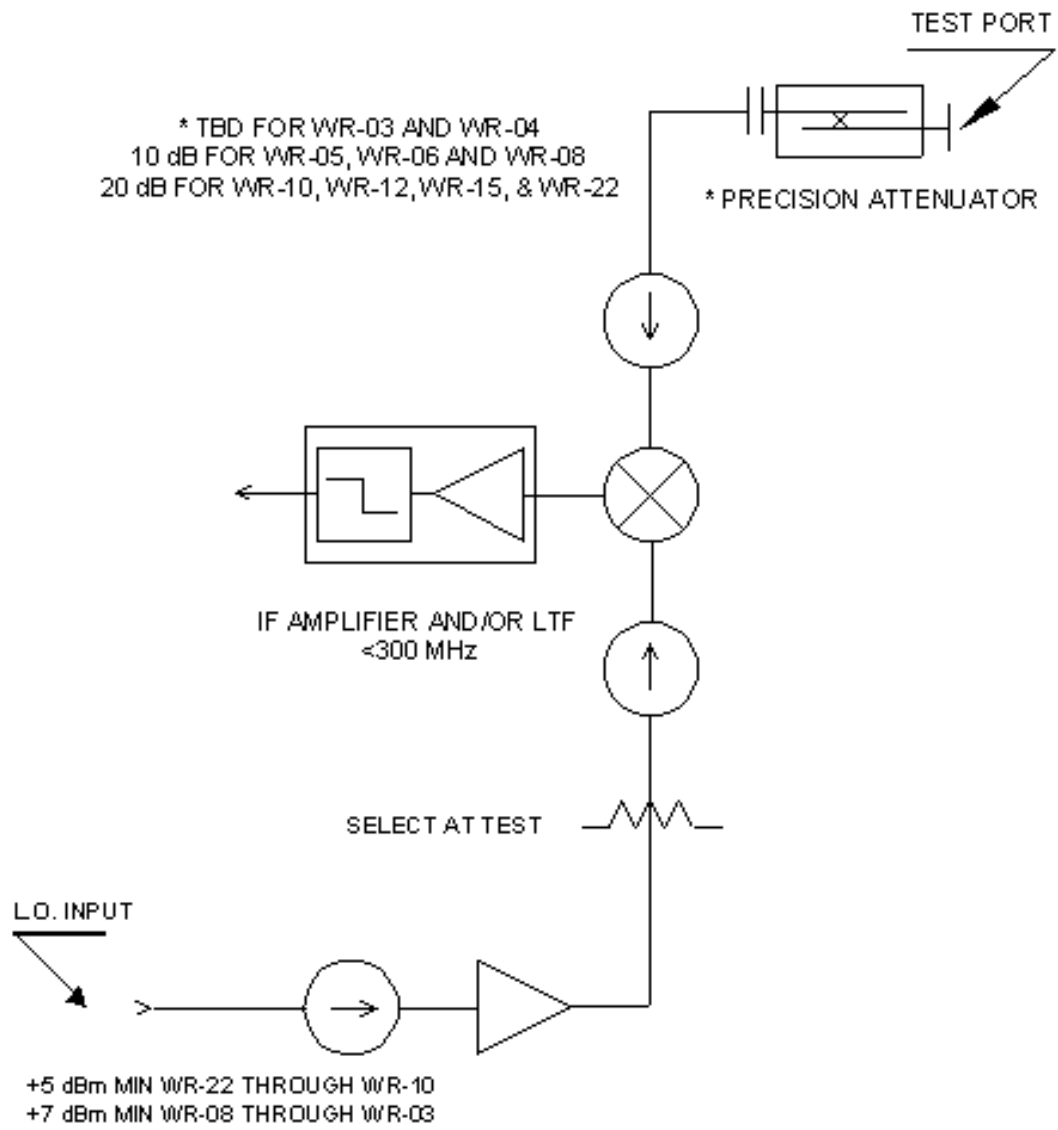
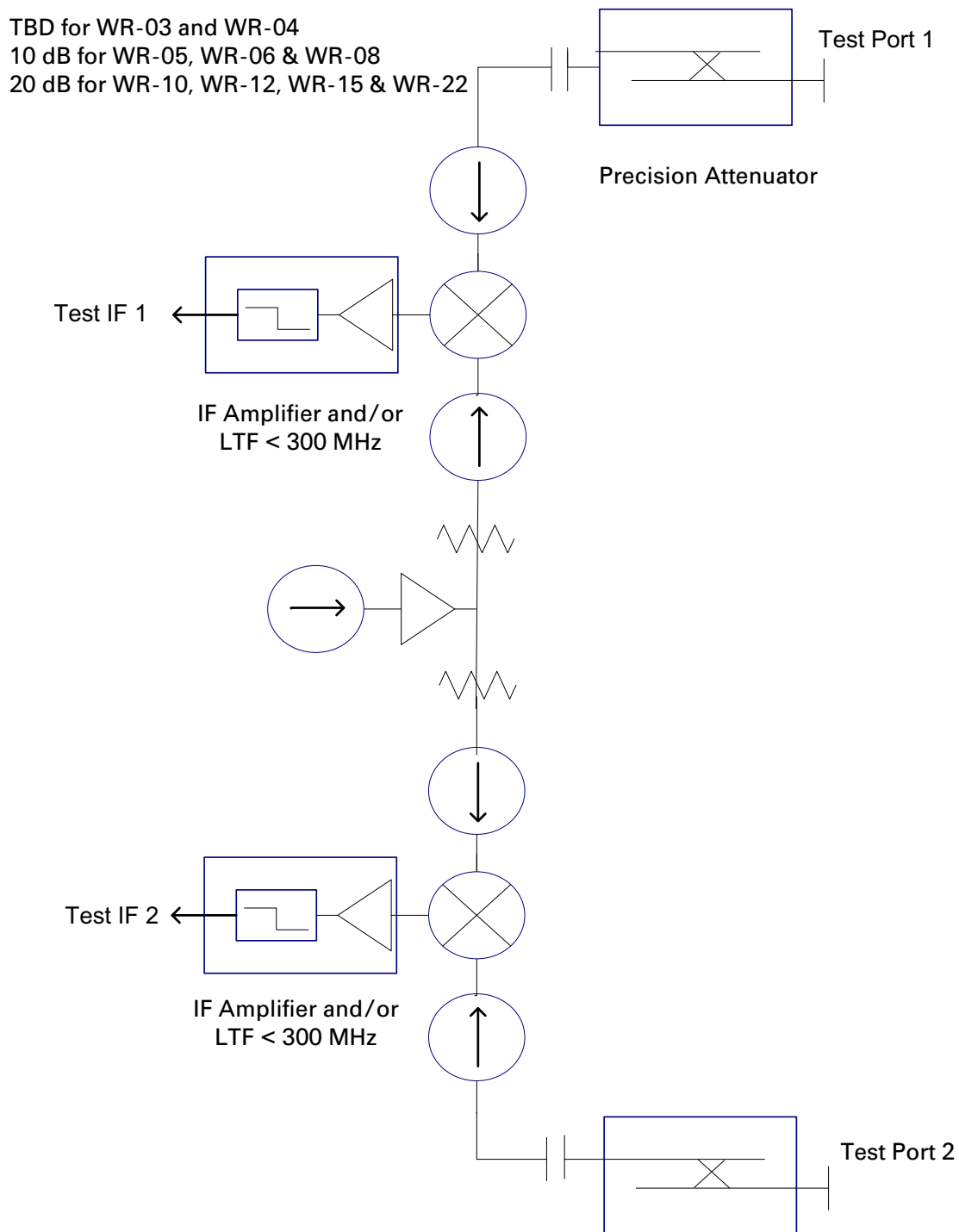


Figure 12

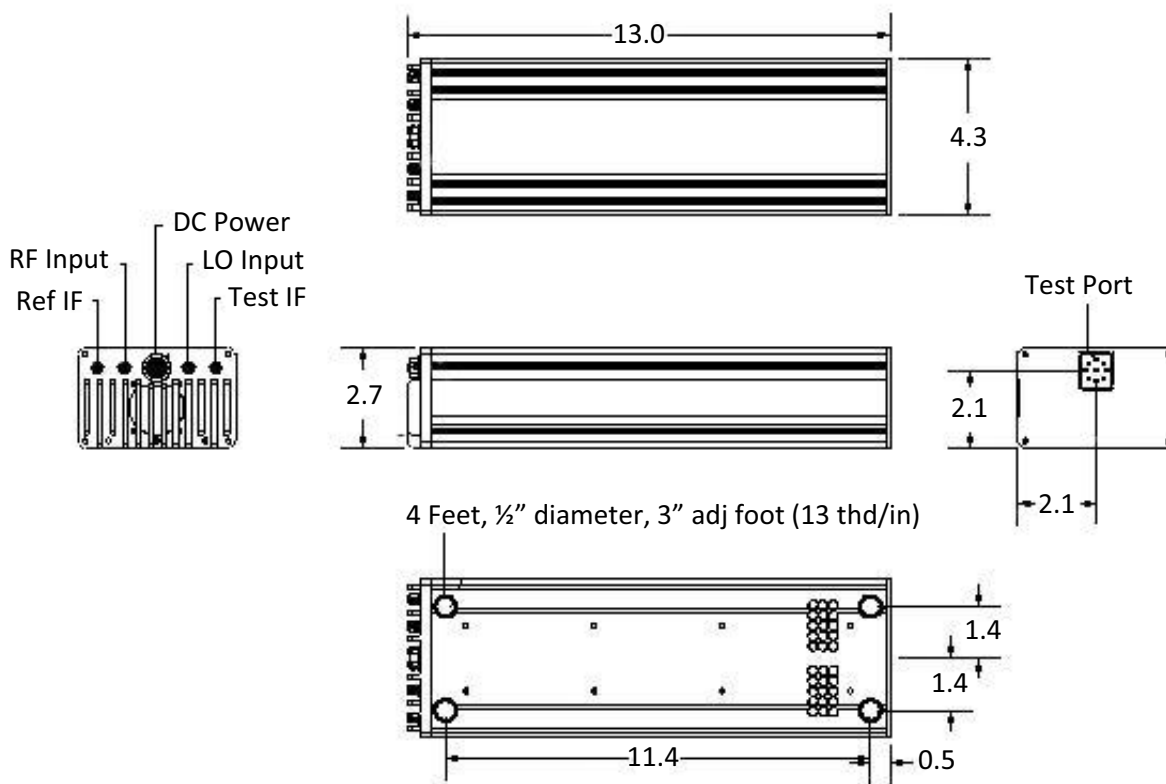
N5258A/B



Drawings and Dimensions

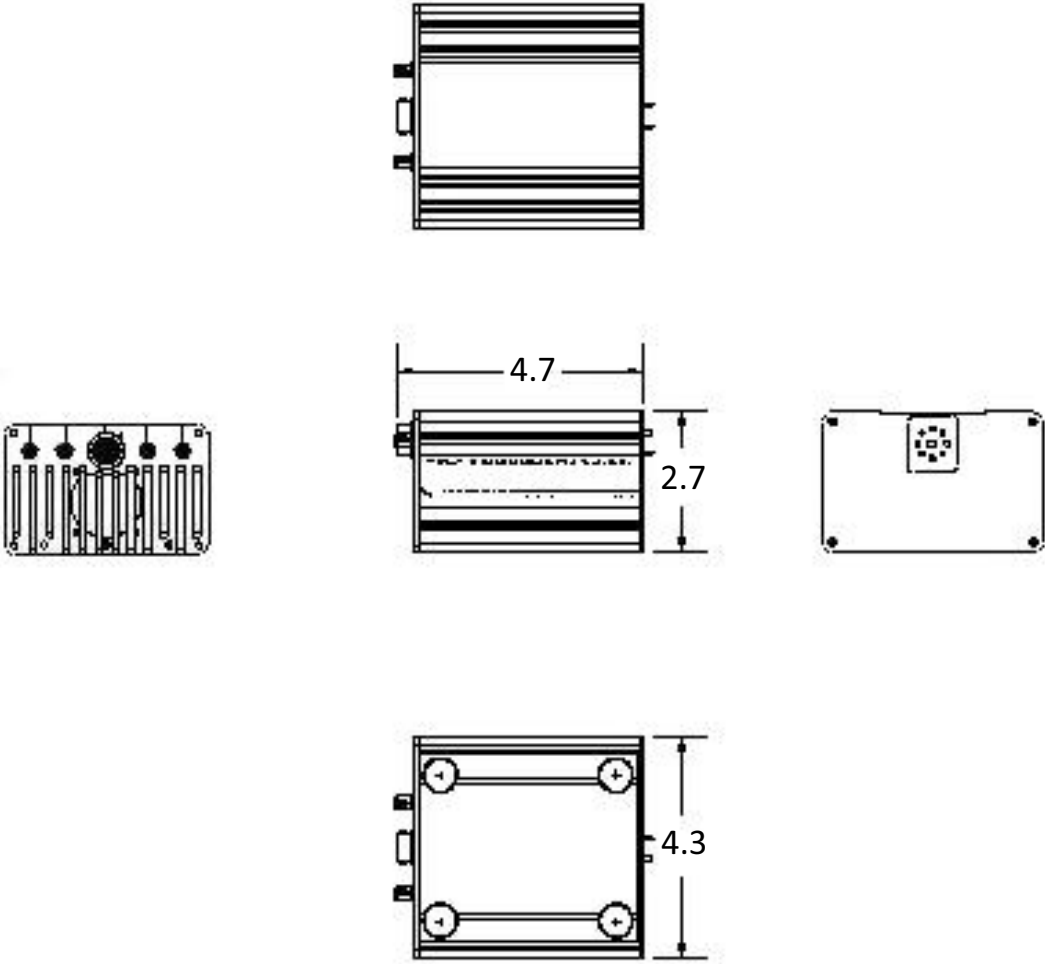
Weight of VNA2-T/R Series Module: ≤ 6.0 lbs.

Figure 13 VNA2-T/R Series Modules



Weight of VNA2-T Series Module: ≤ 3.0 lbs.

Figure 14 VNA2-T Series Modules



Safety and Regulatory 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 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.

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.

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.about.keysight.com/DoC/search.htm>

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.

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

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

CAUTION

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

CAUTION

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

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.

Servicing

NOTE

For models **N5256AW12**, **N5257AR12**, **N5258AD12**, **N5256AW15**, **N5257AR15**, and **N5258AD15**, the LO multiplier number has changed from 5 to 6. Modules with OML s/n $\leq 16xxxx$ (made before 2017) have LO multiplier number 5 indicated on the module's rear label and are not compatible with new modules for system configuration. **Please note that "A" models are not compatible with "B" models.**

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

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

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 (disconnecting device). Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and easily reached by the operator) may be used as a disconnecting device.

WARNING

The power cord is connected to internal capacitors that may remain live for 5 seconds after disconnecting the plug from its power supply.

WARNING

To prevent electrical shock, disconnect the Keysight Technologies N5256/7/8A/B 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.

Connector Care and Cleaning Precautions

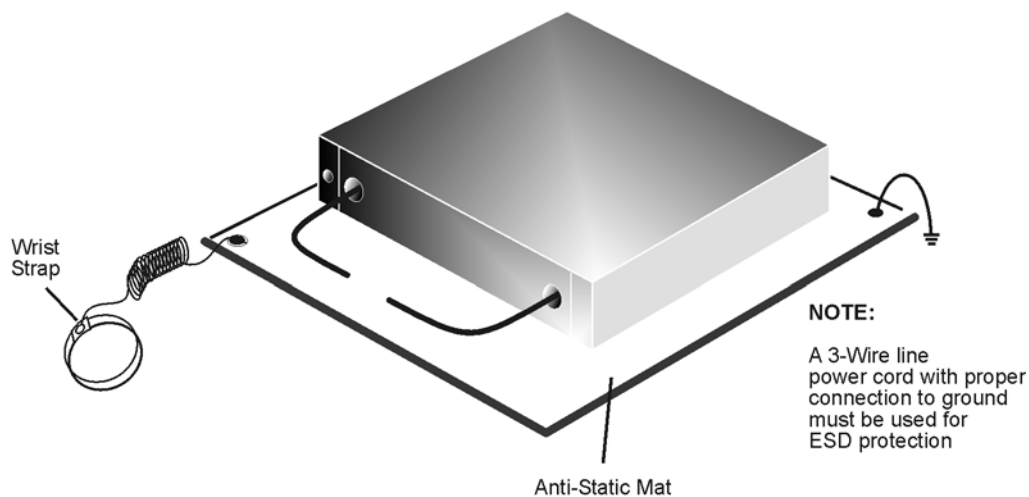
Remove the power cord to the instrument. To clean the connectors use alcohol in a well ventilated area. Allow all residual alcohol moisture to evaporate, and fumes to dissipate prior to energizing the instrument.

Electrostatic Discharge Protection

Protection against electrostatic discharge (ESD) is essential while removing assemblies from or connecting cables to the instrument. Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- always have a grounded, conductive table mat in front of your test equipment.
- always wear a grounded wrist strap with grounding cord, connected to a grounded conductive table mat, having a 1 MW resistor in series with it, when handling components and assemblies or when making connections.
- always wear a heel strap (9300-1126) when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- always ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.
- always ground the center conductor of a test cable before making a connection to the analyzer test port or other static-sensitive device. This can be done as follows:
 1. Connect a short to one end of the cable to short the center conductor to the outer conductor.
 2. While wearing a grounded wrist strap, grasp the outer shell of the cable connector.
 3. Connect the other end of the cable to the test port and remove the short from the cable.

Figure 15 ESD Protection Setup



ku310b

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. 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.
Note: Some options of this product may not conform to the EU Directive. In this case, the CE mark may be removed.

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.



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: R-R-Kst-PLYXXXXXXXXXXXX.

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 30 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 11 Group 1, class A
- AS/NZS CISPR 11
- ICES/NMB-001

This ISM device complies with Canadian ICES-001.

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

South Korea Class A EMC Declaration

If there is a "KC" mark on the product, then the following statement applies:

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

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

사용자 안내문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

※ 사용자 안내문은 "업무용 방송통신기자재"에만 적용한다.

Safety:

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

Declaration of Conformity:

To find a current Declaration of Conformity for a specific Keysight product, go to:
<http://www.keysight.com/go/conformity>

Acoustic Statement (European Machinery Directive):

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

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 measurements needs and information or finding a local Keysight office are available at: <http://www.keysight.com/find/assist>

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

NOTE

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:

- To improve turn-around time, return your test set along with your analyzer and cables to Keysight so that we may verify the operation of the complete system.
- 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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Print Date: December 2018
Supersedes: January 2018



N5256-90001