

11612B
Bias Network

Operating and Service
Manual



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General Information

The 11612B bias network provides a means of supplying dc bias to the center conductor of a coaxial line of a biasable component or device while blocking the dc bias to the RF input port.

Instruments Covered by Manual

Each bias network has a five digit serial number. The contents of this manual apply to bias networks having a serial number with the last five digits 02234 and higher.

Incoming Inspection

If the bias network or its case appear to be damaged, set aside the device and all packaging materials. Contact the nearest Agilent Technologies office listed in [“Service and Support” on page v](#) in the front matter of this manual.

Agilent will arrange for repair or replacement of incomplete or damaged shipments without waiting for a settlement from the transportation company.

Returning for Service

If you need to return the bias network for service, attach a tag indicating the type of service required, your return address, model number, and serial number of the device to be repaired.

Repackaging the device requires original shipping containers and materials or their equivalents. Agilent Technologies can provide packaging materials identical to the original materials. Contact the nearest Agilent office listed in [“Service and Support” on page v](#) in the front matter of this manual.

Preparation for Use

The 11612B bias network is connected in line with the device to be biased. Refer to Figure 2 for a typical test setup. The bias is applied through the SMB snap-on connector. A BNC to SMC adapter cable is included in the 11612B bias network assembly.

Specifications

Specifications describe warranted performance of the device.

Table 1 *Specifications*

Frequency Range		DC Resistance from Bias Port to Output Port (typical)	
0.045 to 50 GHz			
Return Loss (both ports)	Minimum	At 23 °C	.31 ohm
0.045 to 10 GHz	20 dB	At 23 °C, full rated current	.35 ohm
10 to 20 GHz	15 dB	Operating Environment	
20 to 30 GHz	12 dB	Temperature: 0 to +55 °C	
30 to 50 GHz	10 dB	Humidity: Up to 95%	
Insertion Loss	Maximum	Altitude: Up to 7,625 meters (25,000 feet)	
0.045 to 10 GHz	0.8 dB	Storage and Shipment	
10 to 30 GHz	1.5 dB	Temperature: – 40 +75 °C	
30 to 45GHz	2.5 dB	Humidity: Up to 95%	
45 to 50 GHz	3.2 dB	Altitude: Up to 7,625 meters (25,000 feet)	

Supplemental characteristics are non-warranted performance parameters. They are included to provide useful operating information.

Table 2 *Supplemental Characteristics*

Pin depth ¹	0.0000 to 0.076 mm (0.0000 to 0.0030 in)
Impedance	50 ohms, nominal
Maximum bias voltage	±40 Vdc
Maximum bias current	500 mA
Maximum dc leakage current	100 nA
RF connectors	2.4 mm female
Bias connector (non-hermetic)	SMB male
Net weight	0.072 kg (0.158 lb)
Dimensions	50.8 mm x 38 mm x 25.4 mm (2.0 in x 1.5 in x 1.0 in)

1. The electrical performance of the bias network is independent of its pin depth within the range stated above.

Operation

Figure 1 shows a schematic diagram of the bias network. The circuit is a 'tee' in which the capacitor in the left arm acts as a dc block/high pass filter. The vertical arm, with its series inductance and shunt capacitance, acts as a low pass filter.

NOTE

Transistors and negative resistance devices may oscillate if the bias port of the 11612B bias network is not properly terminated.

Agilent recommends that bias from the bias supply be routed through the 11635A bias decoupling network before being applied to the bias port of the 11612B. An adapter cable (part number 5062-4550) is included to connect the bias network and the bias decoupling network.

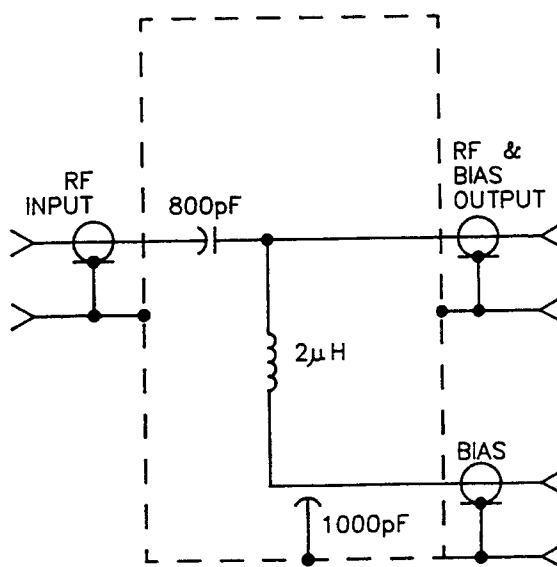


Figure 1 Bias Network Schematic Diagram

Operation

Figure 2 shows the 11612B bias network connected in a typical measurement setup. Although other applications are possible, the general method of setup and operation is the same.

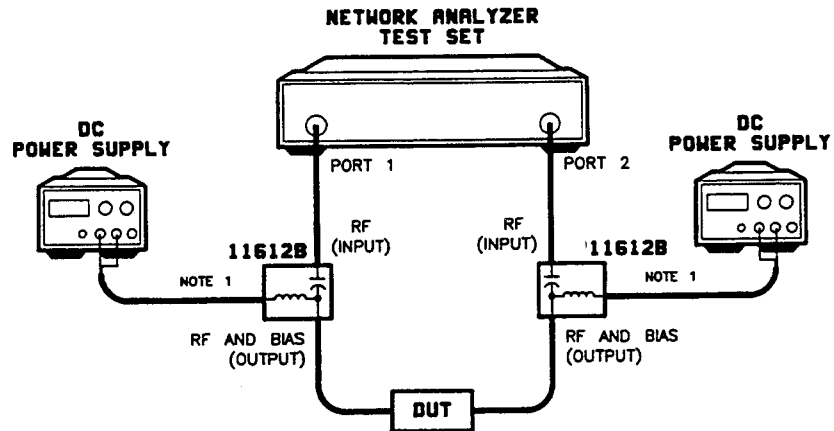


Figure 2 Typical Measurement Setup

Performance Tests

The procedures in this section test the electrical performance of the 11612B using the specifications of Table 1 as performance standards.

Performance may be verified using either a vector or scalar network analyzer setup. Errors due to directivity, source match, and return loss of the ‘opposite port’ termination (and detector match in a scalar system) will add uncertainties to your measurement. The most accurate method uses an error corrected instrument. However, a scalar system will have acceptable results depending on the quality of the components.

Record the results of the performance tests in [Table 3 on page 6](#).

Return Loss of Input and Output Ports

The following instructions apply to both vector and scalar network analyzers.

1. Connect the equipment for a standard reflection measurement.
2. Calibrate the system with an open and a short.
3. Connect the appropriate RF port of the 11612B to the test port. Terminate the opposite port with a 50 ohm load.

NOTE

The return loss of the terminating load should be at least 20 dB better than the desired measurement value.

4. Measure the return loss. The specifications are as follows:

Return Loss (both ports)	Minimum
0.045 to 10 GHz	20 dB
10 to 20 GHz	15 dB
20 to 30 GHz	12 dB
30 to 50 GHz	10 dB

Insertion Loss

1. Connect the equipment for a standard insertion loss measurement.
2. Calibrate the system the system with a through line.
3. Replace the through line with the 11612B bias network.

Performance Tests

4. Measure the insertion loss. The specifications are as follows:

Insertion Loss	Maximum
0.045 to 10 GHz	0.8 dB
10 to 30 GHz	1.5 dB
30 to 45 GHz	2.5 dB
45 to 50 GHz	3.2 dB

Table 3 11612B Performance Test Record

Serial Number _____	Test Date _____
	Tested By _____
Return Loss	Measured Value
Input Port	
0.045 to 10 GHz	_____
10 to 20 GHz	_____
20 to 30 GHz	_____
30 to 50 GHz	_____
Output Port	
0.045 to 10 GHz	_____
10 to 20 GHz	_____
20 to 30 GHz	_____
30 to 50 GHz	_____
Insertion Loss	
0.045 to 10 GHz	_____
10 to 30 GHz	_____
30 to 45 GHz	_____
45 to 50 GHz	_____