

Keysight 85331B/85332B Solid State Switch

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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.

Waste Electrical and Electronic Equipment (WEEE) Directive

This instrument complies with the WEEE Directive marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a “Monitoring and Control Instrument” product.

The affixed product label is as shown below.



Do not dispose in domestic household waste.

To return this unwanted instrument, contact your nearest Keysight Service Center, or visit <http://about.keysight.com/en/companyinfo/environment/takeback.shtml> for more information.

Sales and Technical Support

To contact Keysight for sales and technical support, refer to the support links on the following Keysight websites:

- www.keysight.com/find/switches
(product-specific information and support, software and documentation updates)
- www.keysight.com/find/assist
(worldwide contact information for repair and service)

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1 Introduction

General Information 12

This chapter introduces the 85331B and 85332B solid state switches and gives a brief overview of the drive levels and switch operation logic.

General Information

Solid state switch overview

The Keysight 85331B and 85332B are PIN diode based solid state switches which provide superior performance in terms of fast switching speed, high isolation, and broad operating frequency range.



Figure 1-1 85332B (left) and 85331B (right) solid state switches

Table 1-1 shows the two models of solid state switches available.

Table 1-1 List of solid state switches

Model	Configuration	Frequency range	Connector type	Bias pin
85331B	SP2T	45 MHz to 50 GHz	2.4 mm (f)	The bias connector mates with LEMO 7 pin plug #FGG.1K.307.CLAC60
85332B	SP4T	45 MHz to 50 GHz	2.4 mm (f)	

The 85331B and 85332B solid state switches offer rapid switching capability between test channels. These high- performance solid state switches have 90 dB isolation, low insertion loss and a 45 MHz to 50 GHz bandwidth. They are absorptive and provide good impedance match, which is key to achieve accurate measurements. The switches are small in size and are durable, making the switches useful for applications in antenna test, radar, and other test systems that require fast switching time and high isolation.

A typical configuration with the solid state switches connected to the source antenna and AUT (Antenna under test) is illustrated in [Figure 1-2](#).

NOTE

The 85331B and 85332B do not contain a switch control unit. If your system is configured with an 85330A multiple channel controller, the switch control unit must be ordered separately (Keysight part number 85331-60121).

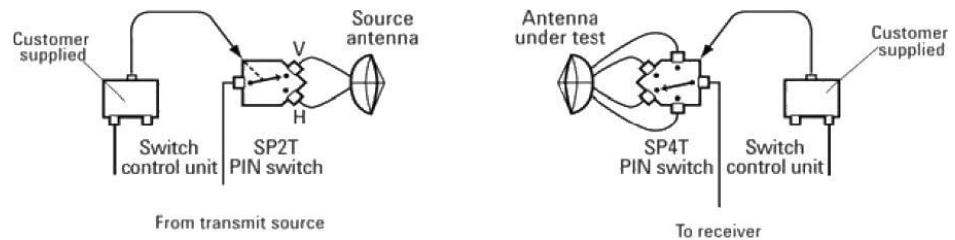


Figure 1-2 A typical multiple-channel, multiple-frequency system configuration

Drive levels/Switch operation logic

Solid state PIN diode switches must always be connected to an active bias supply source to either ON (low insertion loss state) or OFF (high isolation state).

Figure 1-3 illustrates the switch port match definitions during ON and OFF states. Contrary to the normal mechanical latching feature of electromechanical coaxial switches, there is no way to latch a solid state switch in the ON or OFF state with the power source removed.

A solid state switch which is not powered will exhibit neither the low insertion loss nor high isolation characteristics, but rather some intermediate value of loss through all paths.

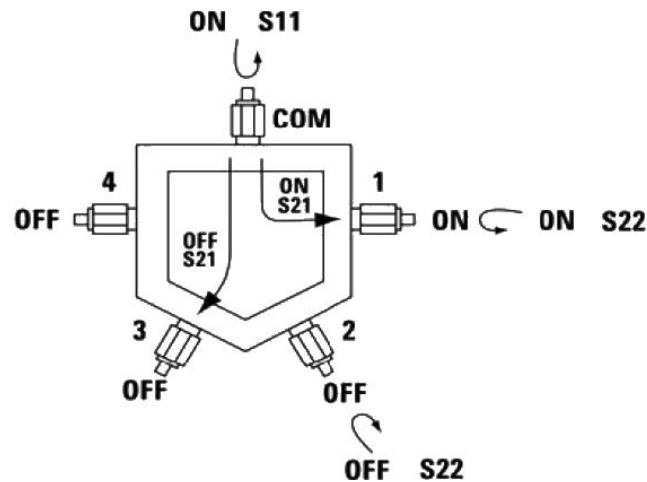


Figure 1-3 Switch port match definitions for switch ON/OFF states

Figure 1-4 shows the pin locations on the bias connector. The notch and red mark on the bias connector outer ring are used as reference.

NOTE

Only one port can be turn ON at a time, or all ports can be OFF. The total current is approximately 480 mA for 85332B and 240 mA for 85331B with all ports OFF.

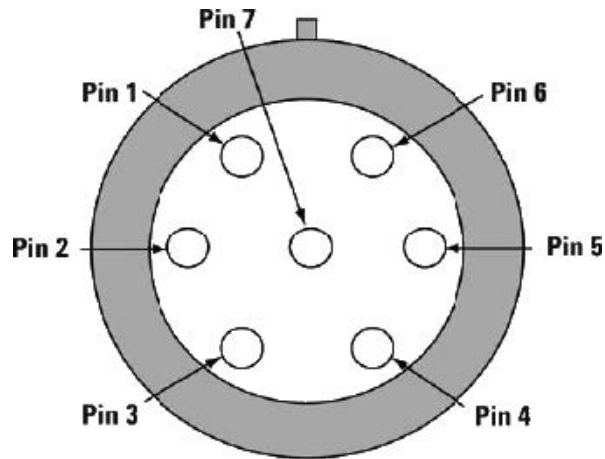


Figure 1-4 Bias connector pin locations

Pin 1 = Port 1 on/off bias

Pin 2 = Port 2 on/off bias

Pin 3 = Port 3 on/off bias (not connected for 85331B)

Pin 4 = Port 4 on/off bias (not connected for 85331B)

Pin 5 = Common/ground (0 VDC)

Pin 6, 7 = Not connected

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2 Operating Guides

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This chapter describes the installation procedures and operating instructions of the 85331B and 85332B solid state switches. The procedures for checking the electrical performance of the solid state switches are also provided.

Installation

Initial inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked both mechanically and electrically.

- Check for mechanical damage such as scratches or dents.
- Procedures for checking electrical performance are given under “Operator’s check” on page 19 or “Performance Tests” on page 21.

If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, contact the nearest Keysight Technologies Sales and Service office. Refer to the Service and Support information in the front matter of this manual.

Keysight Technologies will arrange for repair or replacement of the damaged or defective equipment. Keep the shipping materials for the carrier's inspection.

If you are returning the instrument under warranty or for service, repackaging the instrument requires original shipping containers and materials or their equivalents. Keysight Technologies can provide packaging materials identical to the original materials. Refer to Service and Support information in the front matter of this manual for the Keysight Technologies nearest to you. Attach a tag indicating the type of service required, return address, model number and serial number. Mark the container **FRAGILE** to insure careful handling. In any correspondence, refer to the instrument by model number and serial number.

Operating Instruction

Operator's check

The operator's check is supplied to allow the operator to make a quick check of the solid state switches prior to use or if a failure is suspected.

CAUTION

The RF port center conductors connect directly to the GaAs MMIC and are thus sensitive to electrostatic discharge (ESD).

Description

The solid state switch is connected to a network analyzer configured for the s-parameter measurement. The network analyzer may be set to sweep over the whole or selected frequency range of the solid state switch to be verified.

The S21 (insertion loss) measurement is the best way to determine if the switch is faulty by applying the appropriate bias voltage to the bias connector.

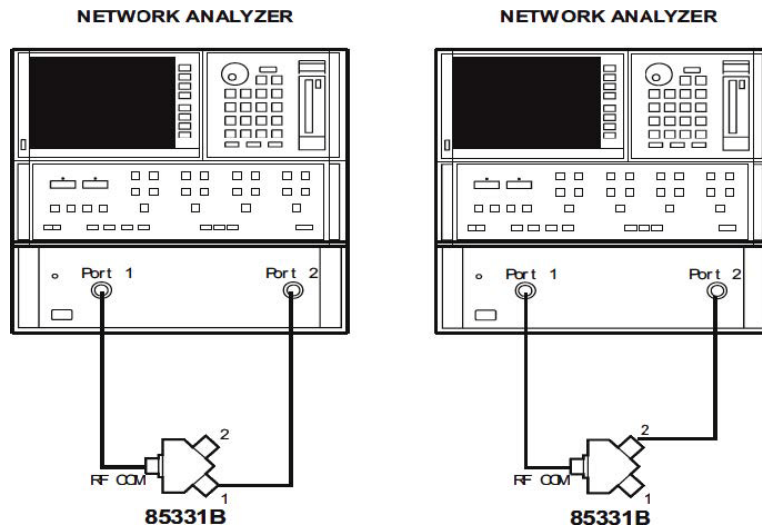


Figure 2-1 Connection to perform quick check

Quick-check procedure

- 1 Connect RFCOM to Port 1 of the network analyzer and either RF1 or RF2 to Port 2 as illustrated in [Figure 2-1](#).
- 2 If RF1 is connected to Port 2, apply -7 Vdc to Pin 1 of bias connector (Refer to [Figure 1-4](#)) and +6.3 Vdc to Pin 2.
- 3 If RF2 is connected to Port 2, apply -7 Vdc to Pin 2 of bias connector (Refer to [Figure 2-1](#)) and +6.3 Vdc to Pin 1.

NOTE

For 85332B, repeat the above steps until all four ports are tested.

Performance Tests

The solid state switches can be tested to the accuracy of the specifications with a network analyzer or equivalent equipment of suitable accuracy. If a network analyzer is available, test the instrument using the procedure in the analyzer's operating manual.

Service instructions

Adjustment

The solid state switches do not have internal adjustments and should not be opened.

Repair

The 85331B and 85332B solid state switches are not recommended for repair as most components are not easily removed.

Maintenance

The connectors, particularly the connector faces, must be kept clean.

For instruction on connecting and care of your connectors, refer to the Microwave Connector Care Quick Reference Card (08510- 90360).

Optional Accessories

Table 2-1 lists the optional accessories for Keysight 85331B and 85332B solid state switches.

Table 2-1 Optional accessories for 85331B and 85332B solid state switches

Description	Keysight part number
Switch control cable - 1 meter	85331-60125
Switch control cable - 2 meter	85331-60126
Switch control cable - 5 meter	85331-60123
Switch control cable - 10 meter	85331-60124
Switch control cable - 15 meter	85331-60127



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