



RFS8 and RFS44 RF Antenna Switch Product Manual

Signal Hound RFS8 – RFS44 Product Manual

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1 Overview

The RFS8 is a single pole 8 throw (SP8T) RF antenna switch that operates from 100 kHz to 8 GHz. The RFS44 is a single pole 4 throw (SP4T) RF antenna switch that operates from 100 kHz to 44 GHz.

The RFS8 and RFS44 can be controlled in the following ways,

- 1) Using the SM200/SM435 with a DB15 cable to provide power and commands.
- 2) Using the USB for power and a BB60D/SP145 with an SMA cable for commands.
- 3) Using the USB for power and commands.

1.1 Applications

With a 3 ns rise/fall time and 20 ns typical switching time, the RFS44 is well suited for antenna switching, and Signal Hound software supports antenna switching at user-specified frequencies within a sweep, or at user-specified intervals while streaming I/Q, typically for pseudo-doppler or antenna polarization applications. The RFS8 has 100 ns rise/fall time and 230 ns typical switching time, and is well suited for antenna switching at user-specified frequencies within a sweep, but may also be used for pseudo-doppler techniques in most circumstances.

1.2 Software and Installation

The Spike software allows for intra-sweep switching and manual switch control through the GPIO control panel (with supported devices).

The device APIs allow for programmatic control of the switch for high speed antenna switching during sweeps and pseudo-doppler type measurements during I/Q streaming.

The switch API allows for direct control over USB.

The Spike software can be downloaded from the following link, <https://signalhound.com/spike/>.

All Signal Hound APIs can be downloaded in our software development kit with the following link, <https://signalhound.com/software/signal-hound-software-development-kit-sdk/>.

1.3 Front Panel

The RFS8 front panel has 8 connectors: RF1 through RF8.

The RFS44 front panel has 5 connectors: RF1, RF2, RF IN, RF3, and RF4.

1.4 Back Panel

The RFS8 back panel has a power LED (red for DB15 power, green for USB power), the UART IN SMA, USB type B, RF IN, and DB15.

The RFS44 back panel has a power LED (red for DB15 power, green for USB power), the UART IN SMA, DB15, and USB type B.

1.5 Connecting the RF Switch

1.5.1 SM200A/B/C – SM435B/C

It is best to connect the RF switch with the spectrum analyzer powered down. Connect a DB15 M/M cable between the RF switch and the spectrum analyzer, then power on the spectrum analyzer.

1.5.2 BB60D / SP145A

Connect the USB cable between the RF switch and an available USB port on your PC / laptop. Connect an SMA cable between the spectrum analyzer's Trigger port and the RF Switch's UART port.

1.6 Controlling the RF Switch

Port to Select	UART	USB	DB15 for RFS8 (Select bits 2 1 0)	DB15 for RFS44
RF 1	'1' or 0x01	'1'	0 0 0	0 0 1
RF 2	'2' or 0x02	'2'	0 0 1	0 0 0
RF 3	'3' or 0x03	'3'	0 1 0	0 1 1
RF 4	'4' or 0x04	'4'	0 1 1	0 1 0
RF 5	'5' or 0x05	'5'	1 0 0	1 x x deselects all
RF 6	'6' or 0x06	'6'	1 0 1	1 x x deselects all
RF 7	'7' or 0x07	'7'	1 1 0	1 x x deselects all
RF 8	'8' or 0x08	'8'	1 1 1	1 x x deselects all

Note: the RFS8 always has one of the 8 outputs connected, but the RFS44 deselects all ports when a port number higher than 4 is selected. A virtual COM port is used over USB, so actual baud rate is not important, but the SMA UART input is set to 500 kbps, N, 8, 1, 3.3V logic high, 0V logic low, high impedance input. The source for the UART signal must be series terminated with 50 ohms +/- 10%.

1.6.1 LED States

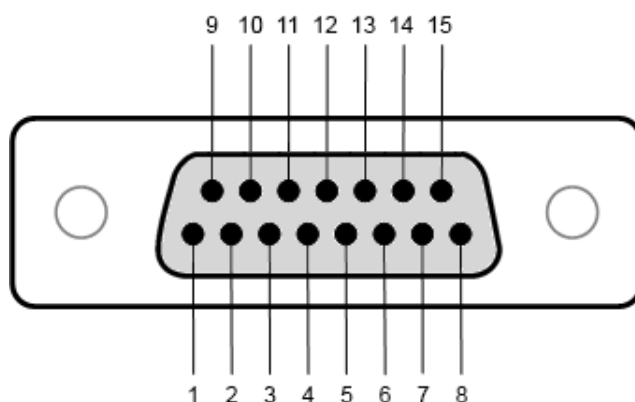
OFF – RF Switch is not powered.

RED – RF switch powered from DB15.

GREEN – RF switch powered from USB.

1.6.2 DB15 Port

On the back panel of the RF switch there is a DB15 port for power and control using an SM200/435.



Front panel female DB15 port on SM200

1.6.3 Pinout

1	Select (0)
2	Select (2)
3	3.3V loopback for logic level
4	GND
5	Unused
6	Unused
7	Unused
8	Unused

9	Select (1)
10	Unused
11	3.3V in
12	Unused
13	Unused
14	Unused
15	Unused
Shell	GND

2 Specifications

2.1 RFS44 Preliminary Specifications

	Min	Typ	Max
Frequency	100 kHz		44 GHz
Impedance		50 ohms	
VSWR (RF1-4)		<2.0:1	
Insertion Loss		1.5 dB + 0.15dB/GHz	
Isolation		>28 dB	
Input power, >100 MHz			+20 dBm
Input power, <100 MHz			+10 dBm
Rise and fall time		3 ns, 10%-90%	
On/Off time, DB15		20 ns	

Warranty and Disclaimer | RF Connectors: 2.4 mm is standard, 2.92 mm is Opt 17 (40 GHz), and 4 x 2.92mm + 1 x 2.4mm is Opt 18 (40 GHz)

On/Off time, USB		20 ms	
On/Off time, UART		20 μ s	
ESD on RF ports			375V HBM
Operating Temperature	-40°C	+25°C	+85°C
DC voltage, ports 1-4	-16V		+16V
DC voltage, RFC	-0.2V		0.2V

RF Connectors: 2.4 mm is standard, 2.92 mm is Opt 17 (40 GHz), and 4 x 2.92mm + 1 x 2.4mm is Opt 18 (40 GHz)

2.2 RFS8 Preliminary Specifications

	Min	Typ	Max
Frequency	100 kHz		8 GHz
Impedance		50 ohms	
VSWR		<1.25 below 2.5 GHz <1.6 above 2.5 GHz	1.5 below 2.5 GHz 2.0 above 2.5 GHz
Insertion Loss		1.0 dB + 0.5dB/GHz	
Isolation, adjacent channel		40 dB below 2.5 GHz 30 dB above 2.5 GHz	30 dB below 2.5 GHz 20 dB above 2.5 GHz
Isolation, other channels		45 dB below 2.5 GHz 35 dB above 2.5 GHz	
Input power			+20 dBm
Rise and fall time		100 ns, 10%-90%	
On/Off time, DB15		230 ns	
On/Off time, USB		20 ms	
On/Off time, UART		20 μ s	
ESD on RF ports			1000V HBM
Operating Temperature	-40°C	+25°C	+85°C
DC voltage, ports 1-8	-16V		+16V
DC voltage, RFC	-0.2V		0.2V
Input IP2		+105 dBm	
Input IP3		+60 dBm	

3 Warranty and Disclaimer

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3.5 Certification

Signal Hound certifies that, at the time of shipment, this product conformed to its published specifications.