



NoiseTech Microwaves Ltd.

Product Technical Specifications of Cryogenic 10 MHz to 6GHz Dual-SPDT
Switch Matrix
(P/N C-SW00160)
Rev. 1 – June 12, 2019

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2. General

NoiseTech Microwave Ltd. (NoiseTech) has developed a switch matrix to reduce uncertainty in noise-parameter measurements and to permit measurements of many LNAs without the need for recalibrating the system. The switch (SW) matrix consists of two independent USB-driven SPDT switches.

On-board memory stores the manual, technical specifications and can be used to store other information.

The switch can be used for other (non-noise-parameter measurement) applications where wideband USB-controlled switches are needed.

The SW00160 frequency range is optimized for most commercial applications, such as WiFi, WiMax, LTE, 3G, 4G, 5G, Bluetooth wireless standards.



Fig. 1: C-SW00160 Switch Matrix.

3. Specifications

3.1 Physical specifications

Controller

Parameter	Specification	Note	Comment
Housing/Enclosure Dimensions			
Width	4cm		Excluding connectors.
Length	8cm		

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Parameter	Specification	Note	Comment
Height	2.5cm		
Non-RF connectors	USB A 2.0 connector Micro B USB 2.0 connector 3 low-speed SMAs		
Total weight	125 g typ.		

Cryogenic RF Part

Parameter	Specification	Note	Comment
Housing/Enclosure Dimensions			Excluding connectors.
Width	4cm		
Length	8cm		
Height	2.5cm		
RF connectors	Six RF connectors	Fig. 1	- SMA standard, Other types may be installed
Non-RF connectors	3 low-speed SMA		
Total weight	150 g typ.		

3.2 Electrical performance at 25C

3.2.1 RF

Parameter	Specification	Ref	Comment
Reflection coefficient	8 dB min		All RF inputs/outputs
Insertion loss	2.5 dB max		
Isolation	30 dB min		
Bandwidth	0.01GHz to 6GHz		
Turn ON/OFF time	1 ms max		
Input P1dB	33 dBm min		
Self-generated interference	-100 dBm max		Integrated over any 10MHz band

3.2.2 Digital

Parameter	Specification	Note	Comment
Communication protocol	USB 2.0		Connection thru micro-B USB
On-board RAM	192kB min.		
FLASH memory	5 MB min.		
Maximum COM Baud Rate	115.2 kbps typ		

3.2.3 Power supply

Parameter	Specification	Ref	Comment
Power supply voltage (typ)	5V		Supplied by host computer
Power supply voltage (min)	4.75V		Supplied by host computer
Power supply voltage (max)	5.25V		Supplied by host computer
Controller current consumption	55mA max from 5V supply 100 mA max from 5V supply		Supplied by host computer. -Noise Source not connected -Noise source connected
RF-part current consumption	3mA max from 4V supply		Supplied by the controller or user's equipment

3.2.4 Environmental

Parameter	Specification	Ref	Comment
Ambient temperature Operating	0C to 40C 15K to 300K		Controller RF part
Storage	Not specified		
Operating relative humidity	20% to 80% non-condensing		
Storage relative humidity	20% to 80% non-condensing		
Shock resistance	Not specified		
Vibration resistance	Not specified		
ESD	2kV HBM		
EMC	Not specified		

3.2.5 Regulatory

Parameter	Specification	Ref	Comment
FCC part 15 ICES-3	Compliant		

3.3 Interface specifications

3.3.1 RF interface (RF Part)

Description below are as related to noise-parameter measurement system with NoiseTech’s IG0160C.

Connector (VNA port 1 side): Field-replaceable female (SMA, 3.5mm)

Pin	Name	Description
Inner	V1	RF input port 50Ω (nominal)

Connector (Noise source side): Field-replaceable female (SMA, 3.5mm)

Pin	Name	Description
Inner	N1	RF input port 50Ω (nominal)

Connector (IG input side): Field-replaceable female (SMA, 3.5mm)

Pin	Name	Description
Inner	C1	RF input port 50Ω (nominal)

Connector (VNA port 2 side): Field-replaceable male (SMA, 3.5mm)

Pin	Name	Description
Inner	V2	RF input port 50Ω (nominal)

Connector (Noise power meter side): Field-replaceable female (SMA, 3.5mm)

Pin	Name	Description
Inner	N2	RF input port 50Ω (nominal)

Connector (IG or DUT output side): Field-replaceable female (SMA, 3.5mm)

Pin	Name	Description
Inner	C2	RF input port 50Ω (nominal)

3.3.2 Non-RF interface (Controller)

Connector: micro-B USB receptacle

Pin	Name	Specification	Description
1	Vbus	Power supply to C-SW00160 controller	Power supply
2	D-	USB 2.0 compatible data line	USB 2.0 differential pair
3	D+	USB 2.0 compatible data line	
4	NC		NC
5	GND	Ground	Ground

Connector: USB-A

Pin	Name	Specification	Note	Description
1	Vbus	Same as pin 1 on micro-B USB Output current: 50 mA max		Output
2	D+	Noise source control $V_{OL}=0.4V_{max}$ $V_{OH}=3.0V_{min}$		Output from IG0160C
3	D-	Noise source temperature output (0V to 3V) Internal 10k pull up to 3.3V.		Input to SW00160.
4	GND	Ground		

Connector (Vdd): SMA female

Pin	Name	Description
Inner	Vdd = 4V typ $3.8V < V_{dd} < 4.2V$ Max. current source: 10mA min	Power supply for the RF part Typically supplied by the controller

Connector (S1): SMA female

Pin	Name	Description
Inner	Switch 1 control $V_{OL} < 0.4V$ $V_{OH} < 2.3V$ Max. current source: 50uA min	Control of the RF part

Connector (S2): SMA female

Pin	Name	Description
Inner	Switch 2 control $V_{OL} < 0.4V$ $V_{OH} < 2.3V$ Max. current source: 50uA min	Control of the RF part

3.3.3 Non-RF interface (RF part)

Connector (Vdd): SMA female

Pin	Name	Description
Inner	Vdd = 4V typ $3.6V < V_{dd} < 5V$ Current draw: 3mA max	Power supply to the RF part Typically supplied by the controller

Connector (S1): SMA female

Pin	Name	Description
Inner	Switch 1 control $-0.3V < V_{IL} < 0.6V$ $1.2V < V_{IH} < 3.6V$ Current: 50uA max	Typically supplied by the controller

Connector (S2): SMA female

Pin	Name	Description
Inner	Switch 2 control $-0.3V < V_{IL} < 0.6V$ $1.2V < V_{IH} < 3.6V$ Current: 50uA max	Typically supplied by the controller

4. Revision notes