becker nachrichtentechnik

RSWU-2SP4TS+

2 Channel SP4T Switches plus 1 Channel SPDT Switch, Non-reflective,
100 kHz … 8500 MHz

Features

- extremely wideband
- high speed, wear-free semiconductor switches
- non reflective
- also usable as SP8T configuration

Applications

- RF signal routing
- RF switching fields and matrices
- R&D (Research & Development)
- radio monitoring
- production

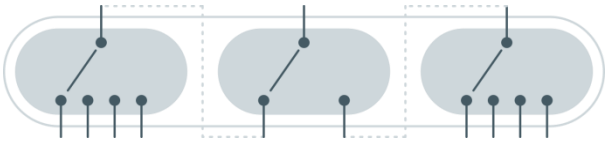
Scope

The RSWU-2SP4TS+ is a two channel SP4T RF switch with an additional SPDT RF switch, suitable for the frequency range 100 kHz … 8500 MHz in 50 ohms technology. All switches are non-reflective, they offer also termination in the open states.

RSWU-2SP4TS+ is designed as a slide-in module for integration into the SR6-11C system platform. In combination with the SR6-CU controller module it can be easy controlled with ASCII strings.

Principal Block Diagram

The RSWU-2SP4TS+ has 3 independent RF switches, two SP4Ts and one SPDT. The module offers high isolation between the switch channels. They can operate with different signals without mutual influence. The switches also can combine to a SP8T switch configuration via 2 short external RF cables.



Wear-free Semiconductor Switches

The switching elements in the RSWU-2SP4TS+ are solid state type. This ensures a short switching time and a huge number of switching cycles with a minimum of maintenance.

Synchronous Operation

In combination with the SR6-CU controller, the execution of commands can be done in two ways:

- Direct execution after receiving single commands.
- Synchronous command execution via hardware, triggered by a SYNC command.

In synchronous execution mode, commands are received without execution. After receiving a SYNC command, all executions are done synchronous in micro seconds.

Remote Control

In combination with the SR6-CU controller module, the RSWU-2SP4TS+ is remote controllable via standard interfaces USB and LAN with simple SCPI orientated ASCII strings.

Built-In Test Function

Internal supply voltages are monitored. The module status can be read out via remote interface.

RF Specification SP4T Channels

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{IN}/Z_{OUT}		50		Ω	
low frequency	f_{MIN}			100	kHz	
high frequency	f_{MAX}	8500			MHz	
insertion loss	S_{21}, S_{12}	-2.5	-1.4		dB	f ≤ 3000 MHz
	S_{21}, S_{12}	-3.8	-2.1		dB	3000 MHz < f ≤ 6000 MHz
	S_{21}, S_{12}	-5.8	-3.3		dB	f > 6000 MHz
return loss	S_{11}, S_{22}		-11	-6	dB	f < 1 MHz
	S_{11}, S_{22}		-17	-9	dB	1 MHz ≤ f ≤ 5000 MHz
	S_{11}, S_{22}		-13	-7	dB	5000 MHz < f ≤ 7500 MHz
	S_{11}, S_{22}		-9	-5	dB	7500 MHz < f ≤ 8500 MHz
output & off isolation	S_{NM}		-50	-36	dB	f ≤ 3000 MHz
	S_{NM}		-35	-27	dB	3000 MHz < f ≤ 6000 MHz
	S_{NM}		-30	-20	dB	f > 6000 MHz
channel isolation	S_{ISO}		-100	-90	dB	f ≤ 3000 MHz
	S_{ISO}		-100	-85	dB	3000 MHz < f ≤ 6000 MHz
	S_{ISO}		-95	-80	dB	f > 6000 MHz
transfer power (CW, switch closed)	P_{RFCW}			+30	dBm	f ≥ 6 MHz
transfer power (CW, hot switch)	P_{RFHOT}			+20	dBm	f ≥ 6 MHz
	P_{RFHOT}			0	dBm	f < 6 MHz
terminated power (CW, switch open)	P_{RFTERM}			+20	dBm	f ≥ 6 MHz
	P_{RFTERM}			0	dBm	f < 6 MHz
input IP3	IIP3		+56		dBm	@ 8000 MHz
input IP2	IIP2		+95		dBm	@ 8000 MHz
switch delay	t_{50-50}		4		µs	50 % trigger to 50 % RF
switch on time	t_{10-90}		4		µs	10 % RF to 90 % RF
switch off time	t_{90-10}		2		µs	90 % RF to 10 % RF
DC voltage	U_{DC}			20	V	input and outputs
ESD discharge resistor	R_{ESD}		4.7		kΩ	input and outputs
RF connectors	X_{RF}		SMA female			

RF Specification SPDT Channel

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ω	
low frequency	f_{MIN}			100	kHz	
high frequency	f_{MAX}	8500			MHz	
insertion loss	S_{21}, S_{12}	-1.9	-1.0		dB	f ≤ 3000 MHz
	S_{21}, S_{12}	-2.6	-1.5		dB	3000 MHz < f ≤ 6000 MHz
	S_{21}, S_{12}	-3.8	-2.0		dB	f > 6000 MHz
return loss	S_{11}, S_{22}		-20	-8	dB	
output & off isolation	S_{NM}		-55	-45	dB	f ≤ 3000 MHz
	S_{NM}		-45	-40	dB	3000 MHz < f ≤ 6000 MHz
	S_{NM}		-40	-30	dB	f > 6000 MHz
channel isolation	S_{ISO}		-100	-90	dB	f ≤ 3000 MHz
	S_{ISO}		-100	-85	dB	3000 MHz < f ≤ 6000 MHz
	S_{ISO}		-95	-80	dB	f > 6000 MHz
transfer power (CW, hot switch)	P_{RFHOT}			+20	dBm	f ≥ 6 MHz
	P_{RFHOT}			0	dBm	f < 6 MHz
transfer power (CW, switch closed)	P_{RFCW}			+34	dBm	f ≥ 6 MHz
	P_{TERM}			+13	dBm	f < 6 MHz
terminated power (CW, switch open)	P_{TERM}			+23	dBm	f ≥ 6 MHz
	P_{TERM}			+13	dBm	f < 6 MHz
input IP3	IIP3		+60		dBm	@ 834 / 1950 / 2700 MHz
input IP2	IIP2		+110		dBm	@ 834 / 1950 MHz
switch delay	t50-50		5		µs	50 % trigger to 50 % RF
switch on time	t10-90		4		µs	10 % RF to 90 % RF
switch off time	t90-10		5		µs	90 % RF to 10 % RF
DC voltage	U_{DC}			20	V	input and outputs
ESD discharge resistor	R_{ESD}		4.7		kΩ	input and outputs
RF connectors	X_{RF}	SMA female				

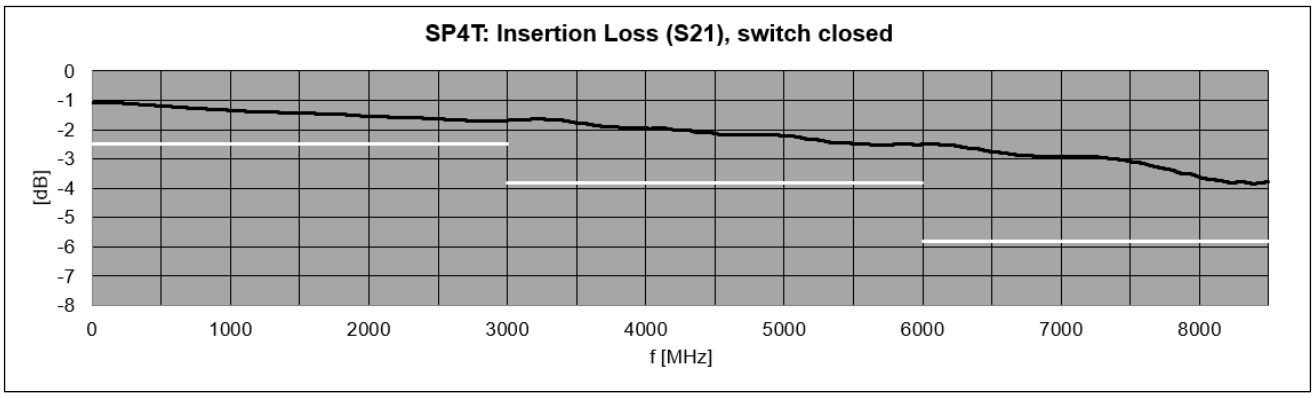
RF Specification SP8T configuration

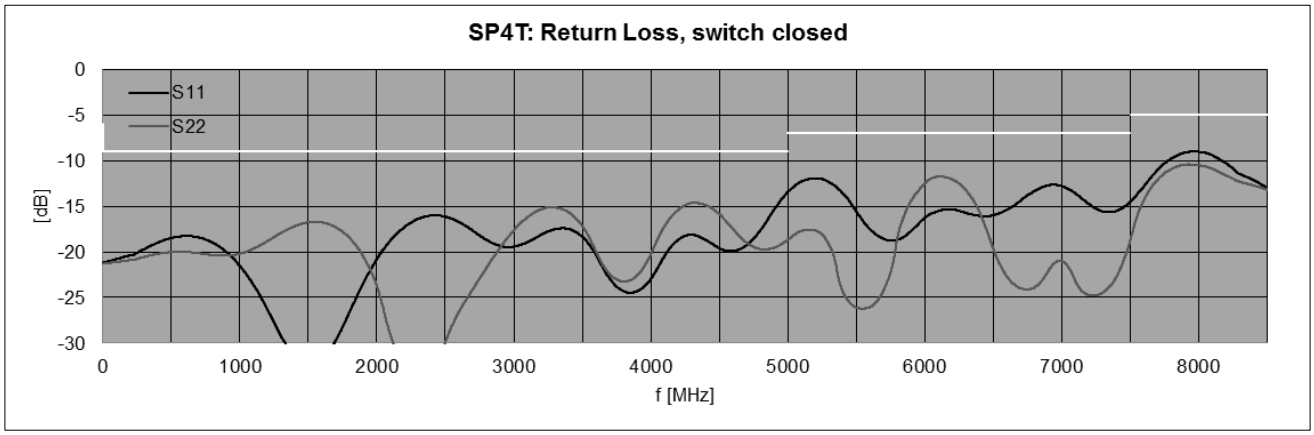
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
insertion loss	S_{21}, S_{12}		-2.5		dB	f ≤ 3000 MHz
	S_{21}, S_{12}		-4		dB	3000 MHz < f ≤ 6000 MHz
	S_{21}, S_{12}		-5.5		dB	f ≥ 6000 MHz
input return loss	S_{11}		-20		dB	f ≤ 1 MHz
	S_{11}		-12		dB	1 MHz < f ≤ 7500 MHz
	S_{11}		-10		dB	f ≥ 7500 MHz
output return loss	S_{22}		-10		dB	f ≤ 1 MHz
	S_{22}		-15		dB	1 MHz < f ≤ 5000 MHz
	S_{22}		-13		dB	f ≥ 5000 MHz

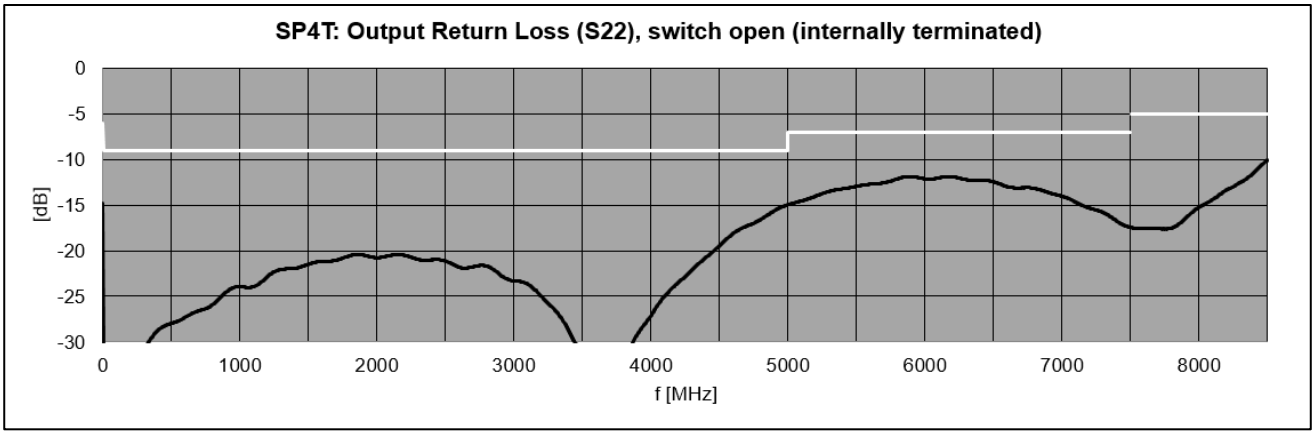
Common Specification

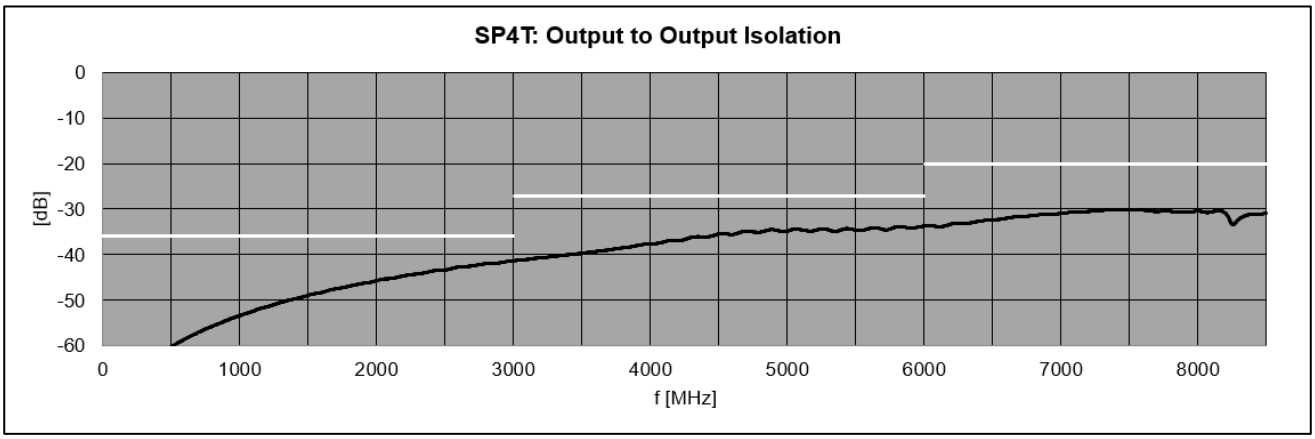
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	U_{DC}	23.5	24.0	24.5	V	via SR6-11C
power consumption	P_{DC}		1		W	
dimensions	WxHxD	approx.30 x 262 x 197			mm	6 U, 6 HP
weight	m		1.3		kg	
operating temp. range	To	+5		+60	°C	
storage temp. range	Ts	-40		+70	°C	
ordering information	RSWU-2SP4TS+		P/N: 1408.4040.1			

S-Parameters SP4T Channels (typical responses)

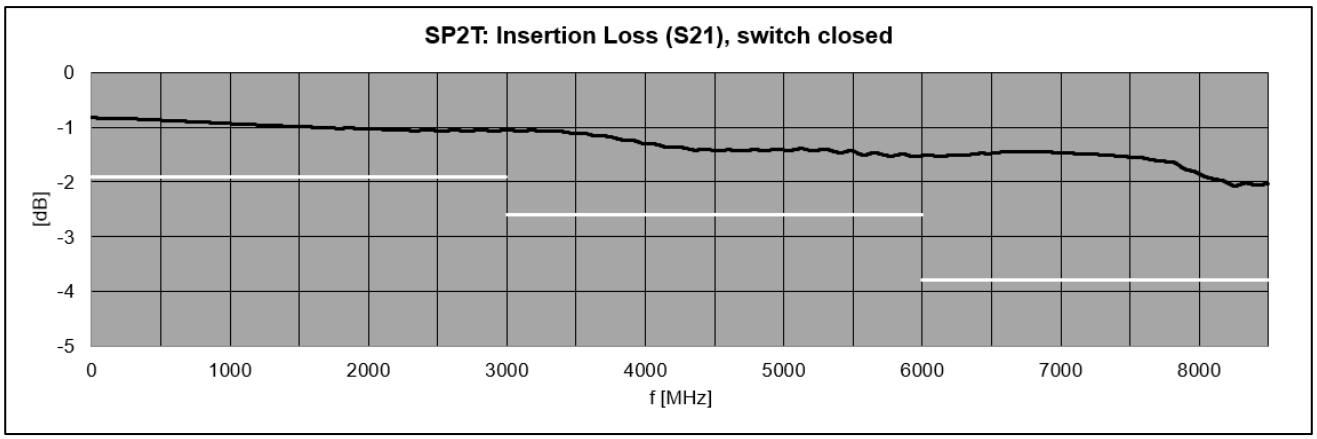


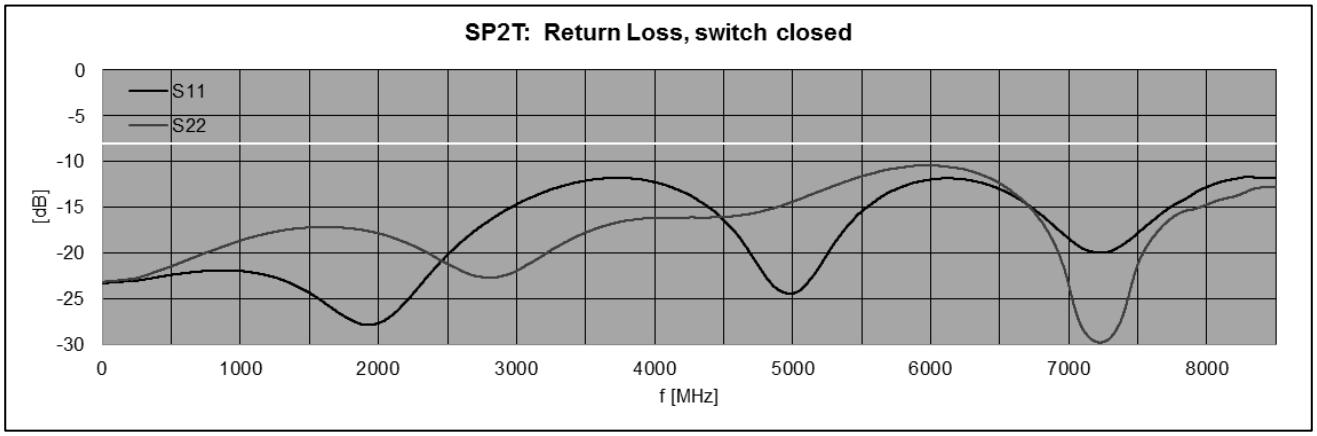


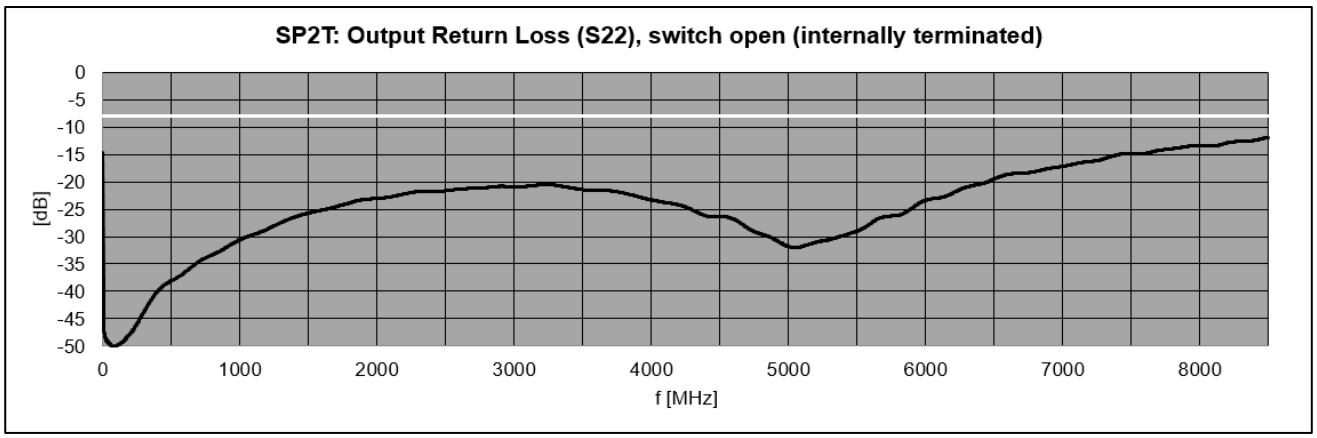


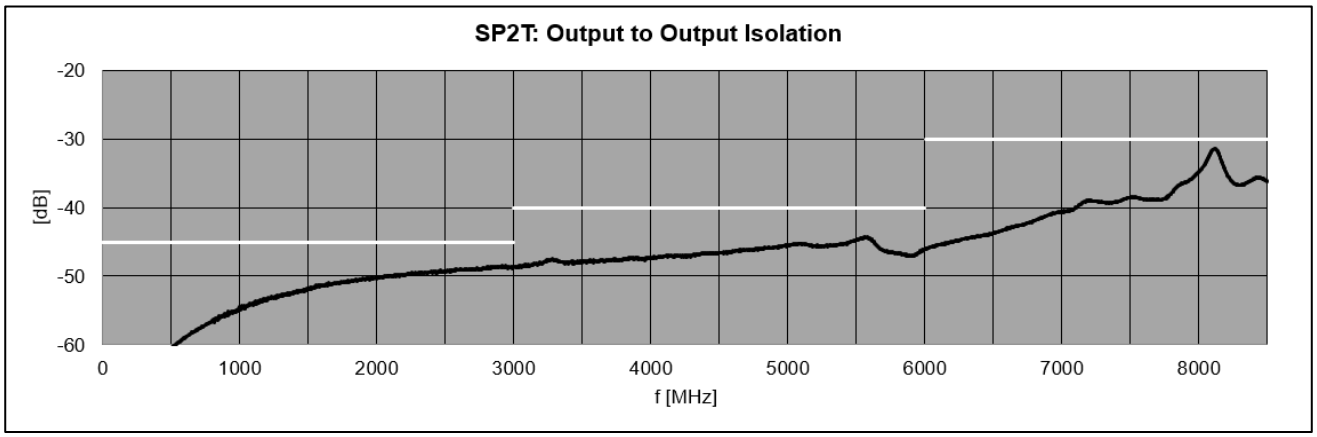


S-Parameters SPDT (typical responses)

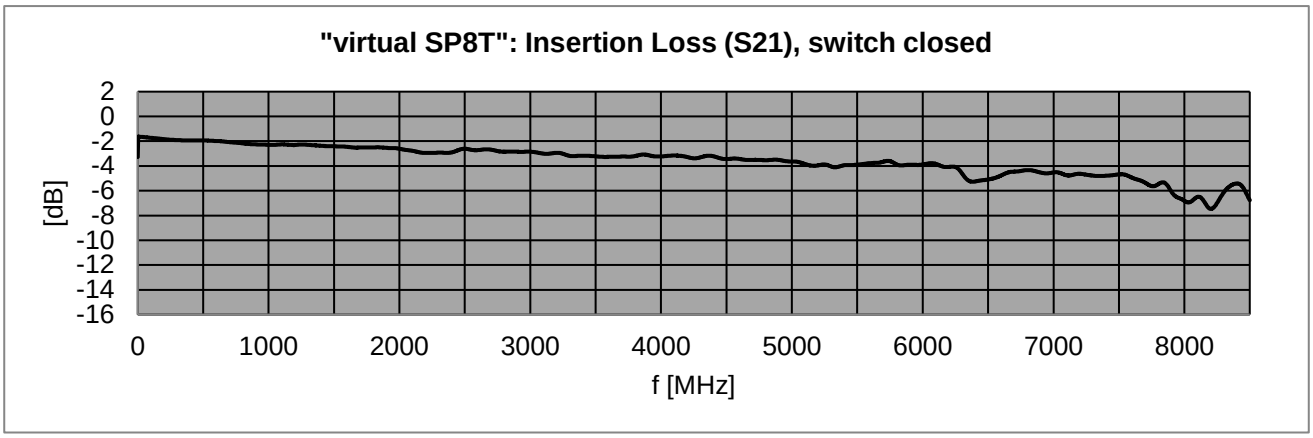


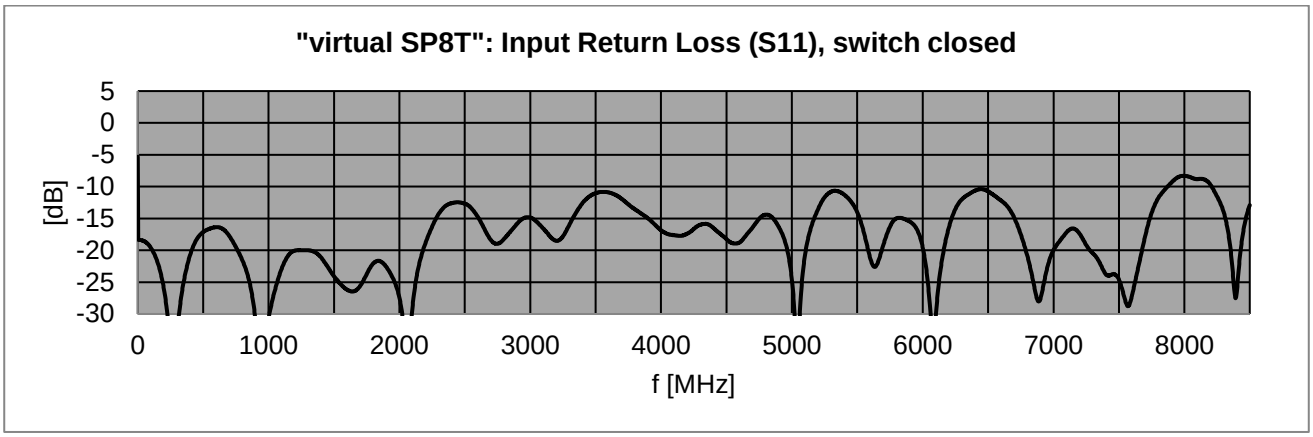


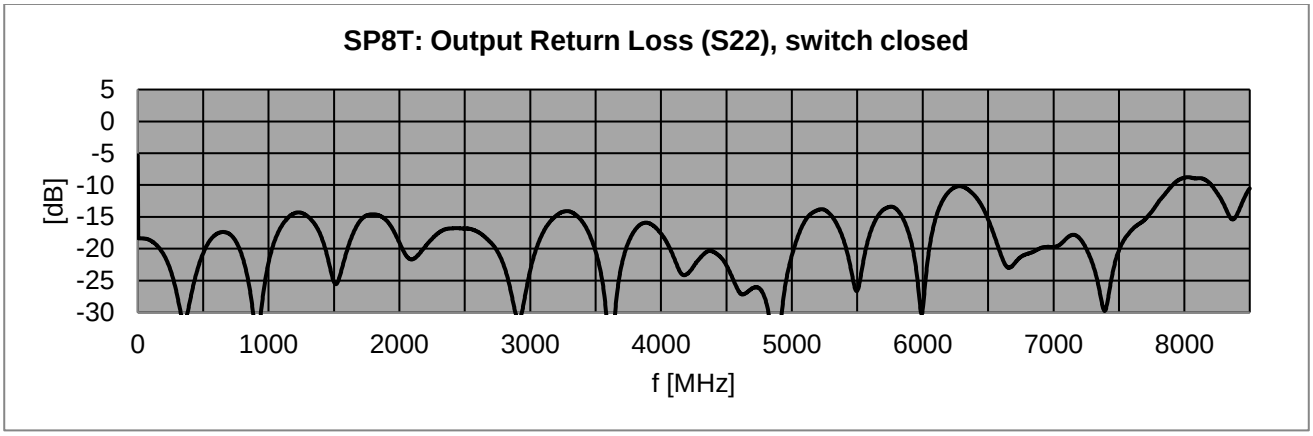




S-Parameters SP8T configuration (typical responses)

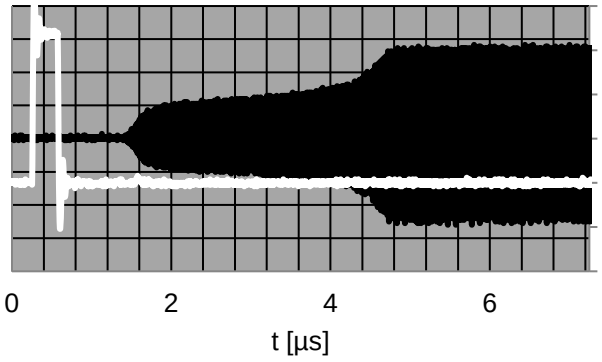




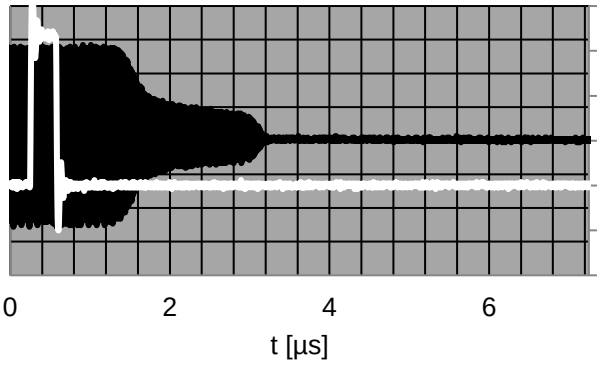


Switching Characteristics (typical responses)

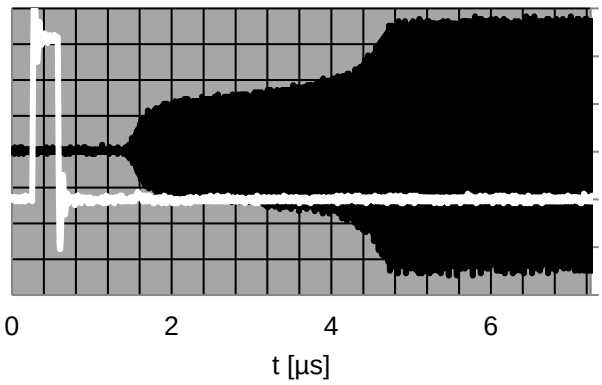
Switching from Open to Closed (SP4T)



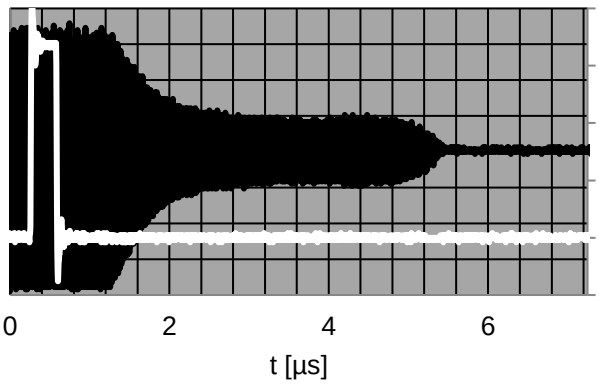
Switching from Closed to Open (SP4T)



Switching from Open to Closed (SP2T)



Switching from Closed to Open (SP2T)



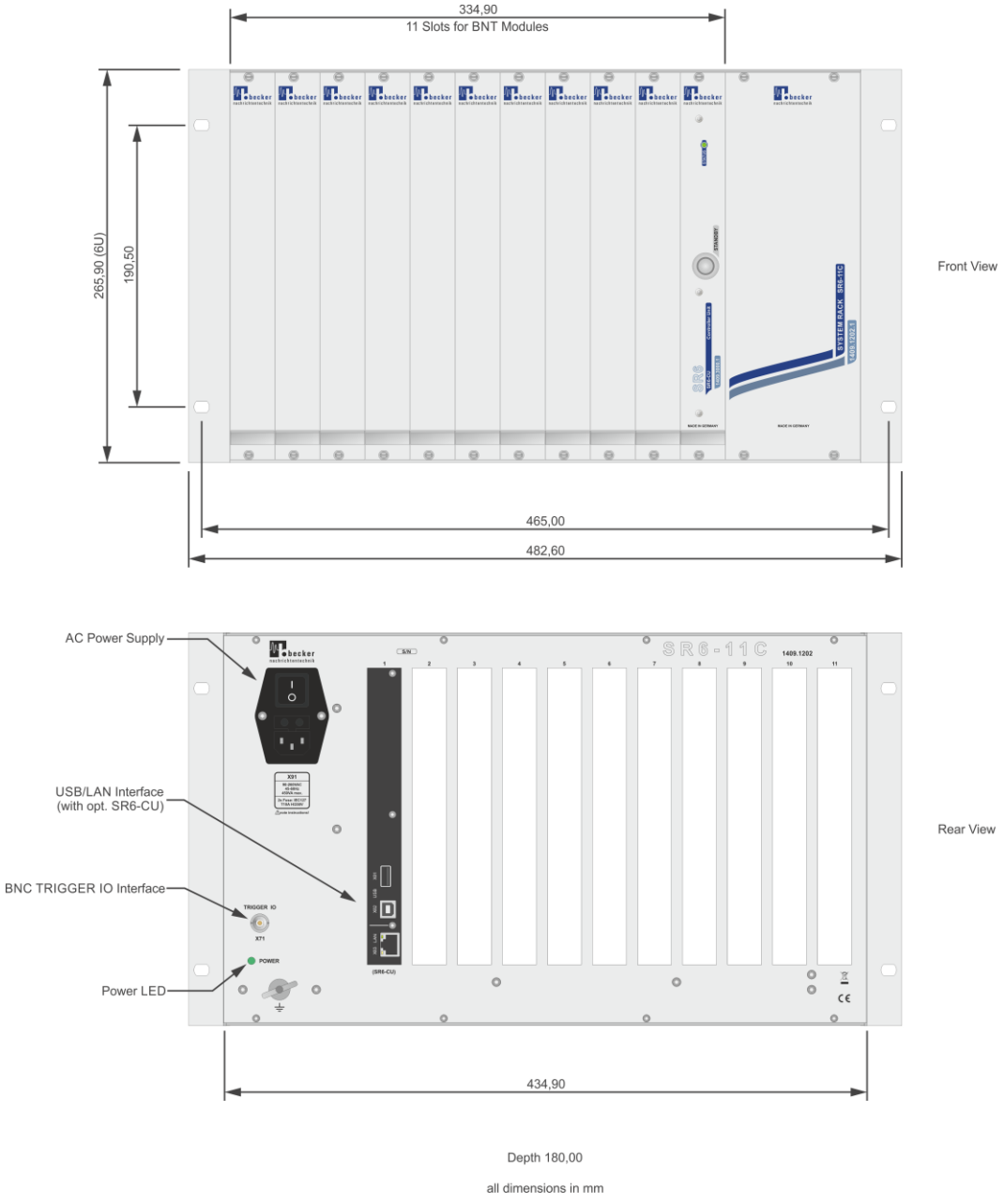
Appearances

SR6-11C System Platform

The RSWU-2SP4TS+ module is foreseen for the integration into the SR6-11C system platform. 11 slots in the SR6-11C can be used for modules like RF switches, matrices, multicouplers, attenuators, BIAS-Ts, level detectors, bi-directional splitters/combiners for signal conditioning and a controller unit. For the control of RSWU-2SP4TS+ module the SR6-CU controller unit is required.

Via the Trigger-IO interface at the rear side of the SR6-11C System Platform a synchronous operation in a device network of SR6-11C can be realized. After a positive TTL pulse slope at the trigger input, the preloaded configurations are executed only by hardware in micro seconds. In applications with very fast execution demands the hardware can be directly controlled via the binary interface on the rear side.

Dimensions of SR6-11C System Platform



Front View

Rear View

SR6-11C System Platform

Related Products

Product	Description	P/N
SR6-11C	System Platform with 11 Slots for Modules	1409.1202.1
SR6-CU	Controller Unit with LAN and USB Remote Interface	1409.3000.1
Unidirectional Products: Active Multicouplers, Matrices, Level Detectors		
WSDU-1X8L	8 Way Multicoupler Module, 100 kHz … 4000 MHz	1807.6100.1
WSDU-2X4L	2 Section Hi Dynamic 4 Way Multicoupler Module, 100 kHz … 4000 MHz	1807.6200.1
WSDU-2X4E+	2 Section 1x4 plus 1x2 Multicoupler Module, 20 … 8000 MHz	1501.6200.1
WSDU-1X8U	Ultra-Wideband 8-Way Multicoupler Module, 100 kHz … 18000 MHz	2109.6000.1
WSDU-1X8S	High Dynamic 1x8 Shortwave Multicoupler Module, 300 kHz … 30 MHz	1502.6100.1
WSDU-1X8A	8 Way High Dynamic Signal Conditioning Multicoupler, 100 kHz … 4000 MHz	1807.6300.1
WSDU-2X4A	2 Section 4 Way High Dynamic Signal Conditioning Multicoupler, 100 kHz … 4000 MHz	1807.6400.1
WSDU-1X2PM	2 Channel, 5 W Multicoupler with ALC Capability, 20 MHz…3000 MHz	1606.6000.1
RSWM-4X4	4x4 Switching Matrix -Non-blocking-, 100 kHz … 4000 MHz or 20 MHz … 4000 MHz	1205.4100.1
RSWM-4X4E	4x4 Ultra-Wideband Switching Matrix -Non-blocking-, 20 MHz … 8000 MHz	2001.4100.1
RFLD-8RE	8 Channel True Power RF Level Detector, 1 MHz … 8000 MHz	1505.8000.1
Bi-Directional Products: Switches, Matrices, Attenuators, Delay Lines, BIAS-Ts, Splitters/Combiners, Filters		
BSDU-1X8A	8 Way Bi-directional Signal Conditioning Splitter Module, 500 … 9000 MHz	2109.6200.1
BSDU-2X4A	2 Section 4 Way Bi-directional Signal Conditioning Splitter Module, 500 … 9000 MHz	2109.6250.1
RSWU-2SP4TS+	2 Channel Non-reflective SP4T Switches plus 1 Channel SPDT Switch, 100 kHz … 8500 MHz	1408.4010.1
RSWU-8SPSTS	8 Channel Non-reflective SPST Switch, 100 kHz … 8500 MHz	1408.4000.1
RSWU-4SPDTS	4 Channel Non-reflective SPDT Switch, 100 kHz … 8500 MHz	1408.4020.1
RSWU-8SPST-CS	8 Channel High Isolation SPST with DC Load Simulation, 100 kHz … 7500 MHz	1811.4100.1
BSWM-4X4E	4x4 High Isolation Bi-Directional Switching Matrix –Blocking-, 100 kHz … 7500 MHz	1205.4600.1
ATT-8E	8 Channel Digital Step Attenuator 0 … 31.75 dB, 100 kHz … 8000 MHz	1503.4000.1
DLL-4	4 Channel Programmable Delay Line 0 …1700 ps, 250 MHz … 4000 MHz	1303.4200.1
PT-4CS	4 Channel Programmable DC Sink 0 … 400 mA, 100 kHz … 8500 MHz	1605.2020.1
PT-4CL	4 Channel Wideband DC Load, 100 kHz … 8500 MHz	1605.2040.1
FBS-1590	L1 Band GNSS Notch Filter	1511.5100.1