

## RSWM-4X4

Non-blocking 4X4 Switching Matrix 100 kHz ... 4000 MHz / 20 MHz ... 4000 MHz

### Features

- wideband
- high dynamic
- non-blocking
- 2 frequency variants

### Applications

- radio monitoring
- infotainment test
- research & development (R&D)
- test equipment

### At a Glance

Modern signal routing systems need a fast and free access to different signal sources like antennas or signal generators.

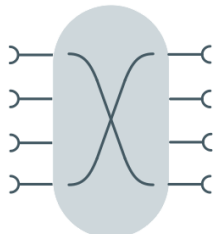
In receiving systems the large amount different analog and digital modulated signals like broadcast, cellular, Wi-Fi, ISM and Bluetooth need high linearity for a low distortion transmission. Additional a low noise figure is very important in receiving systems for a transmission with high dynamic.

The RSWM-4X4 slot-in module is right solution for modern radio monitoring and signal routing systems that must cover the frequency range up to 4000 MHz.

The RSWM-4X4 matrix is foreseen for the integration into the SR6-11C system platform.

### Principal Block Diagram

The RSWM-4X4 has 4 equivalent inputs and 4 equivalent outputs. The matrix is a non-blocking type. Each output port can be connected to any input also one input can be route to more outputs without drop in transmission.



### Wear-free Solid State Switches

The switching elements in the RSWM-4X4 are solid state types. This ensures a short switching time and a huge number of switching cycles with a minimum of maintenance.



### High Channel Isolation

To avoid unwanted signal coupling between the channels, RSWM-4X4 has high channel isolation. Adjacent channels with strong and weak signals have no influence to each other.

### Two Frequency Variants

The RSWM-4X4 is available in two frequency variants:

- 20 MHz ... 4000 MHz for V/UHF applications and
  - 100 kHz ... 4000 MHz for broadcast applications
- The variant 20 MHz ... 4000 MHz is equipped with high pass filters in each input for an effective suppression of LF and HF signals from e.g. local AM radio stations.

The variant 100 kHz ... 4000 MHz covers the whole frequency range including AM range for a full transmission of broadcast signals including GNSS in signal routing applications.

### Remote Control

In combination with the SR6-CU controller module, the RSWM-4X4 is remote controllable via standard interfaces USB and LAN with simple SCPI orientated ASCII strings.

The RSWM-4X4 has a standby function for energy saving.

### Built-In Test Function

Total current consumption, operating points of amplifier stages and internal temperature of RSWM-4X4 are monitored. The module status can be read out via remote interface.

## RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Impedance	$Z_{IN}/Z_{OUT}$		50		$\Omega$	
low frequency	$f_{MIN}$		100	300	kHz	variant without VLF HF suppression
high frequency	$f_{MAX}$	4000	4500		MHz	
low frequency	$f_{MIN}$			20	MHz	variant with VLF HF suppression
high frequency	$f_{MAX}$	4000	4500		MHz	
VLF / HF suppression	$S_{21}$		-25	-15	dB	@ 5 MHz rel. 100 MHz
gain	$S_{21}$	-2	2	3	dB	$f < 1000$ MHz
	$S_{21}$	-2	0	2	dB	$f \geq 1000$ MHz
input return loss	$S_{11}$		-13	-8	dB	$f \leq 2000$ MHz
	$S_{11}$		-10	-5	dB	$f > 2000$ MHz
output return loss	$S_{22}$		-17	-12	dB	$f \leq 2000$ MHz
	$S_{22}$		-15	-10	dB	$f > 2000$ MHz
1 dB compression	$P_{1dB}$	+5	+8		dBm	$500 \text{ kHz} \leq f \leq 1000$ MHz
	$P_{1dB}$	+3	+7		dBm	$1000 \text{ MHz} < f \leq 3000$ MHz
	$P_{1dB}$	-2	+3		dBm	$f > 3000$ MHz
reverse isolation	$S_{12}$		-60	-50	dB	
3 <sup>rd</sup> order intercept	OIP3	+18	+26		dBm	$1 \text{ MHz} \leq f \leq 2000$ MHz, note 1
2 <sup>nd</sup> order intercept	OIP2	+30	+48		dBm	$1 \text{ MHz} \leq f \leq 1000$ MHz, note 1
noise figure	NF		7	10	dB	$f \geq 5$ MHz
channel isolation	$S_{32}$		-80	-45	dB	
output isolation	$S_{12}$		-35	-30	dB	
RF input power	$P_{RF}$			+15	dBm	no damage
maximum DC voltage	$U_{DC}$			20	V	all RF ports
ESD discharge resistor	$R_{ESD}$		4.7		k $\Omega$	all RF ports
RF connectors	$X_{RF}$	SMA female				
processing time	$t_{SW}$		15		ms	between two switching commands

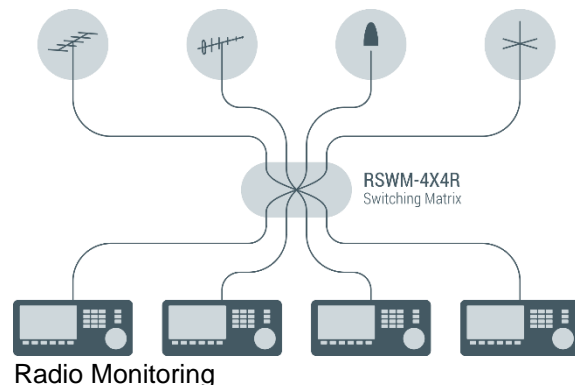
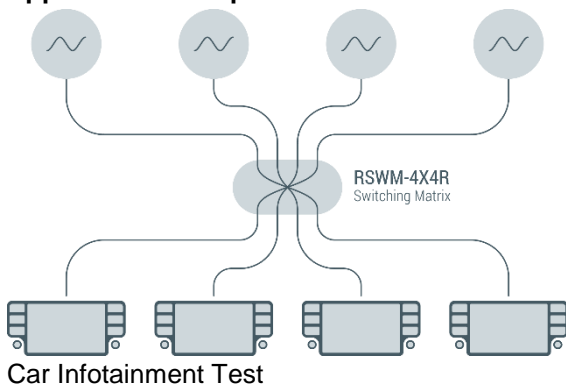
Note 1: tested at  $P_{out} 2 \times -10\text{dBm}$ ;  $\Delta f = 2$  MHz

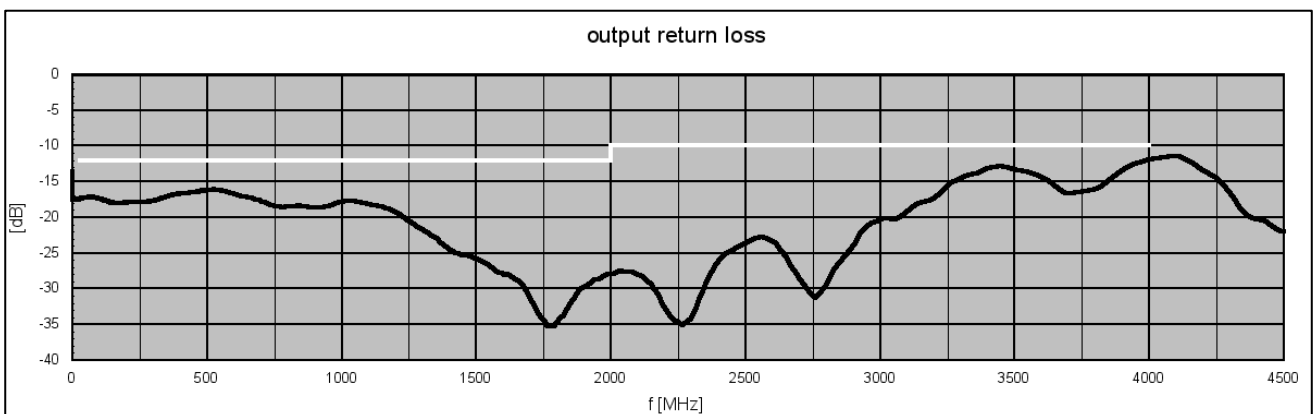
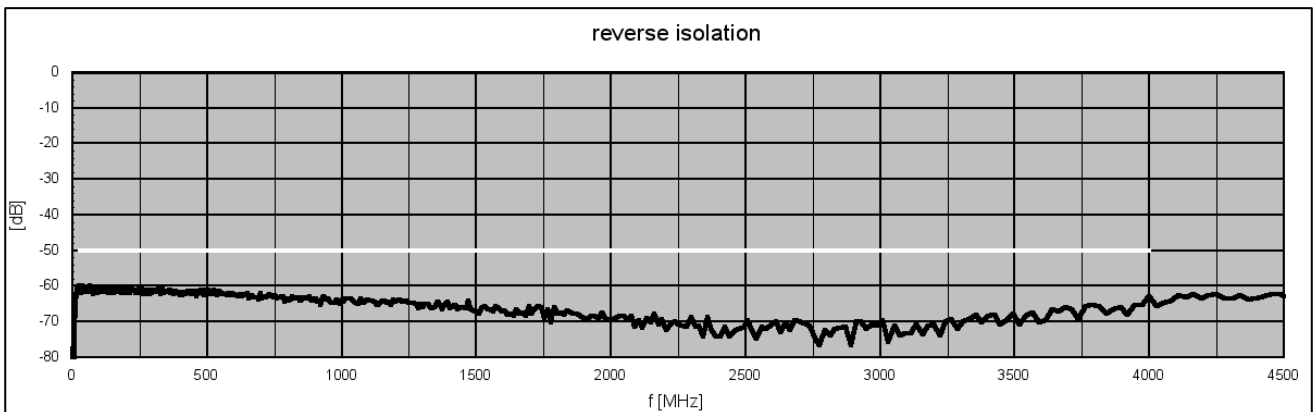
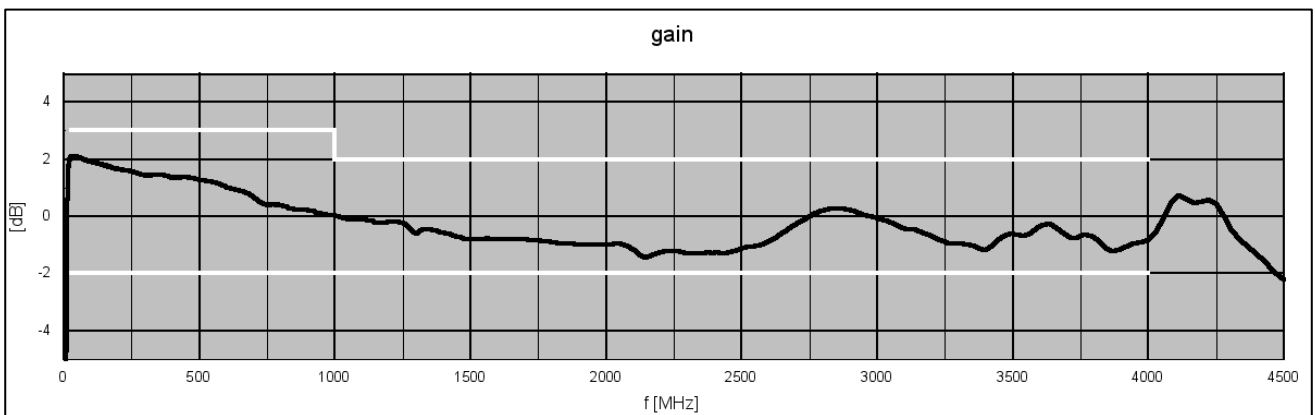
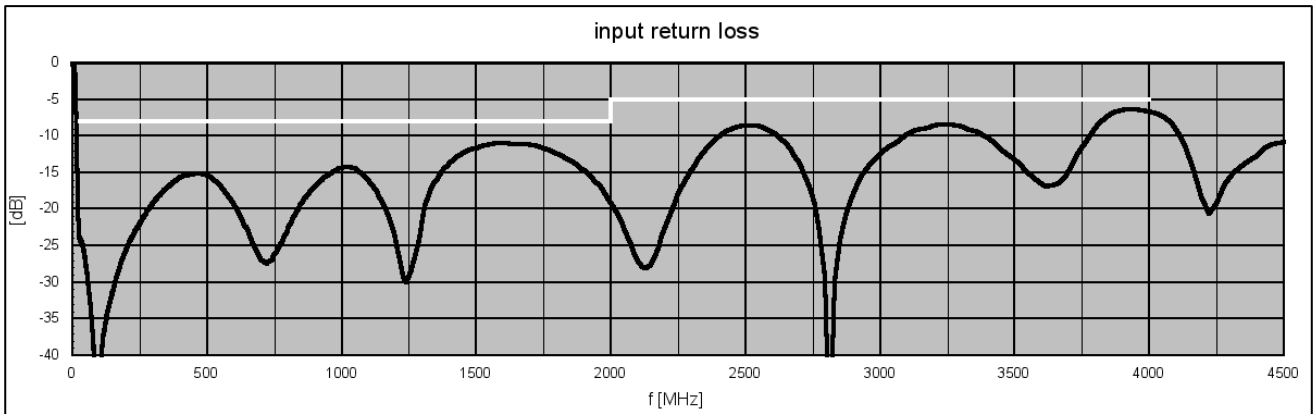
Note 2: capacitive load at 'TRIGGER IO' Port  $\leq 100\text{pF}$ , trigger mode "OUT"

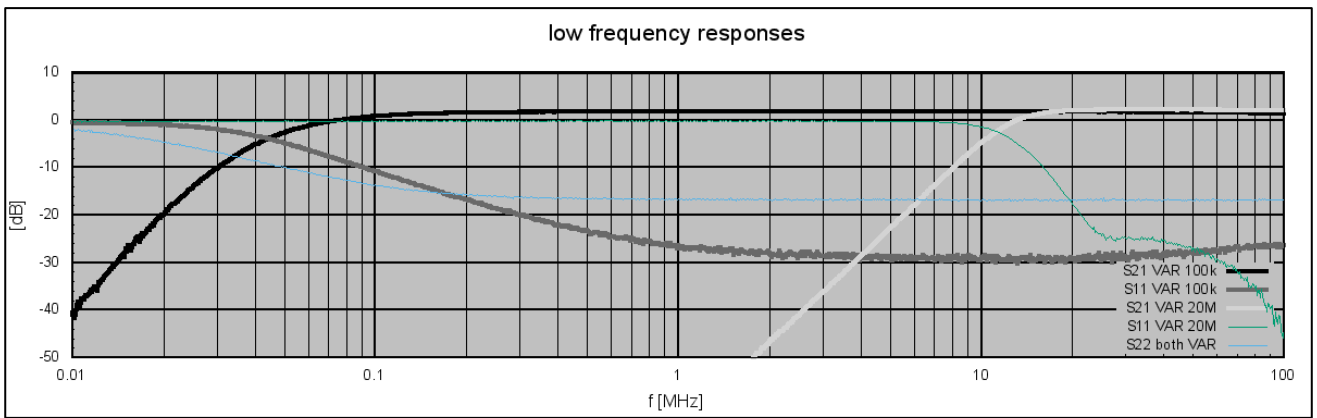
## Common Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	$U_{DC}$	23.5	24.0	24.5	V	via SR6-11C
power consumption	$P_{OPR}$		10		W	operation
	$P_{STB}$		1		W	standby
dimensions	WxHxD	approx. 30 x 262 x 197			mm	6 U, 6 HP
weight	m		1.3		kg	
operating temp. range	$T_o$	+5		+60	$^{\circ}\text{C}$	
storage temp. range	$T_s$	-40		+70	$^{\circ}\text{C}$	
ordering information	RSWM-4X4	P/N: 1205.4100.1		20 MHz...4000 MHz		
	RSWM-4X4	P/N: 1205.4100.2		100 kHz...4000 MHz		

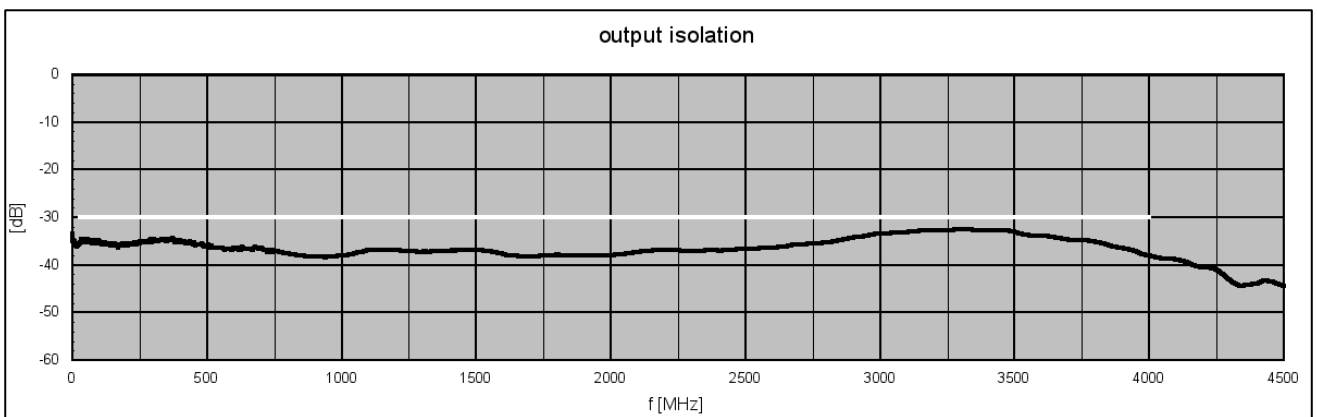
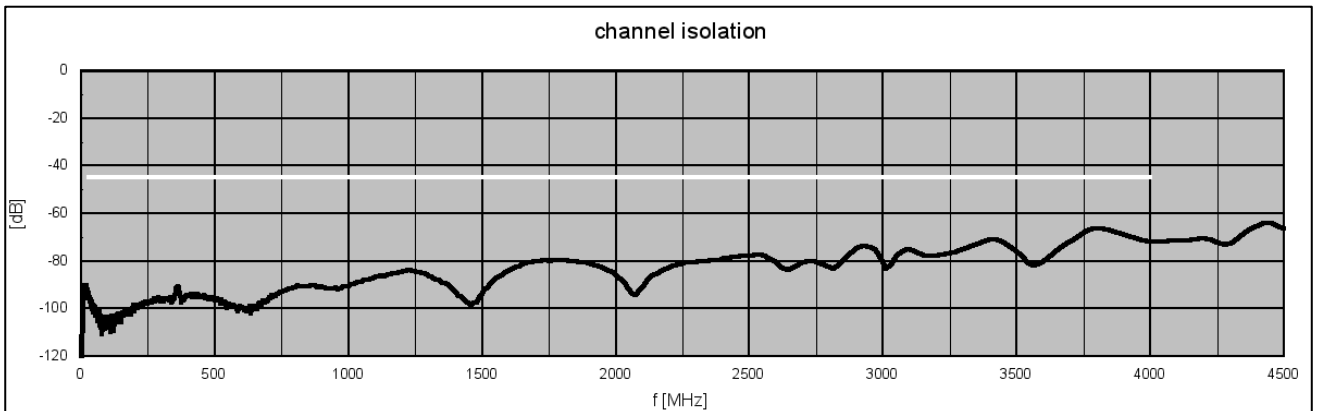
## Application Examples



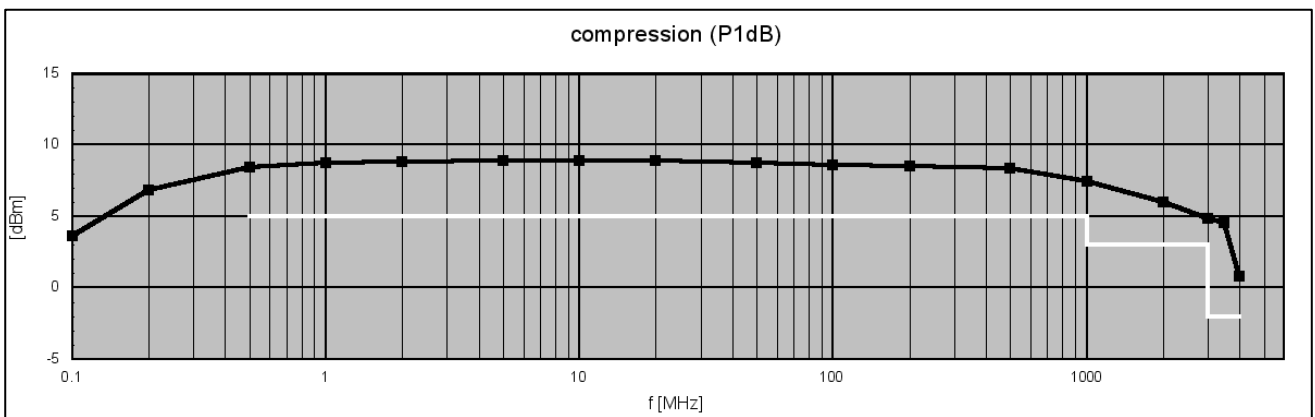
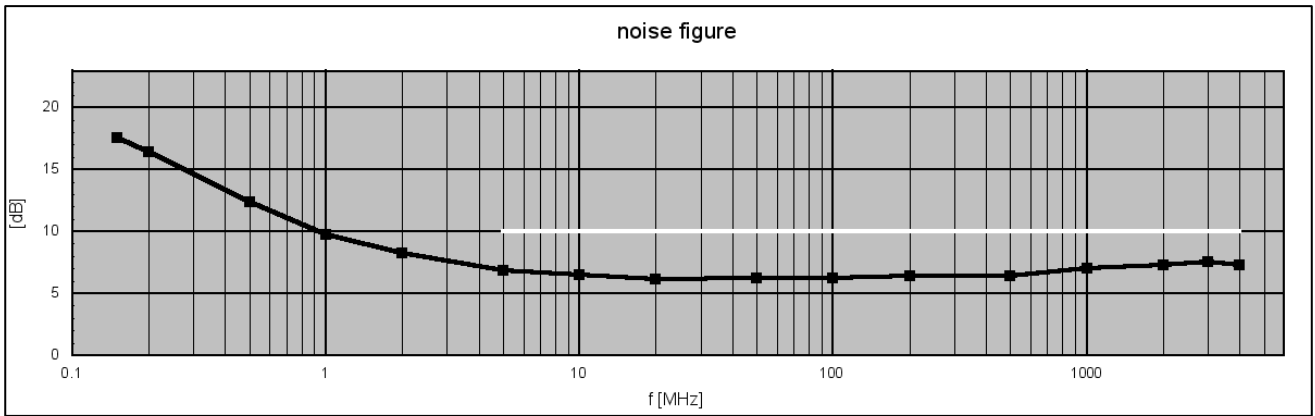
**S-Parameters** (typical responses)



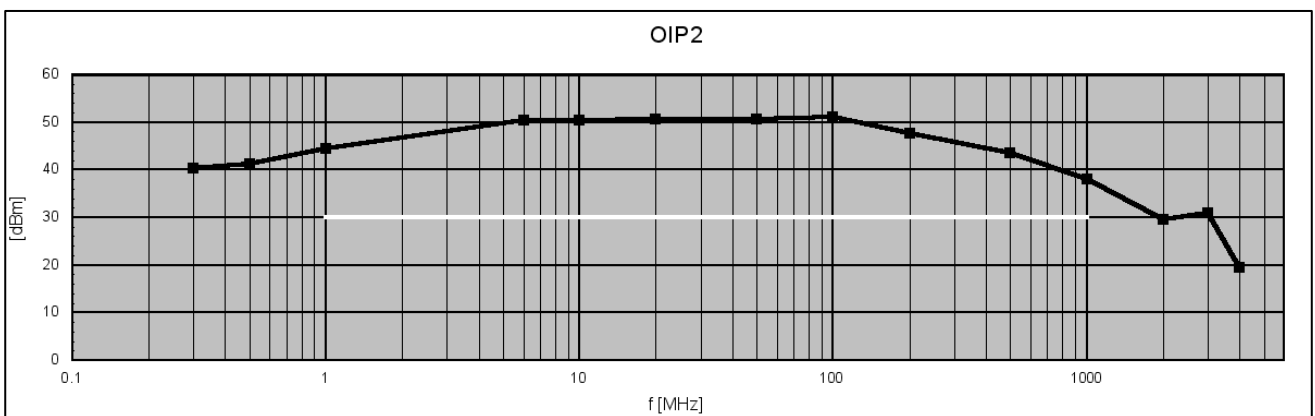
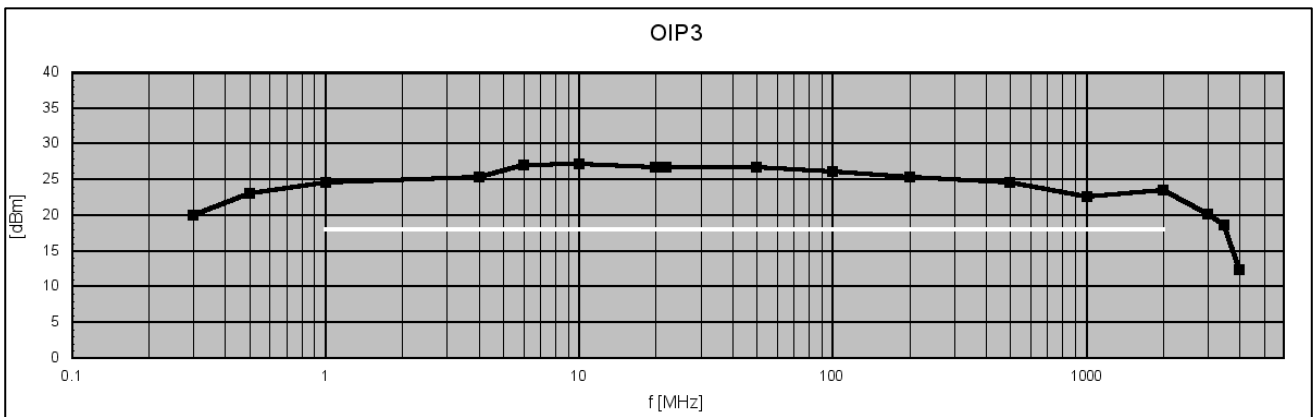
**Isolations (typical responses)**



**Dynamic Range (typical responses)**



**Linearity (typical responses)**



## SR6-11C System Platform

The RSWM-4X4 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.

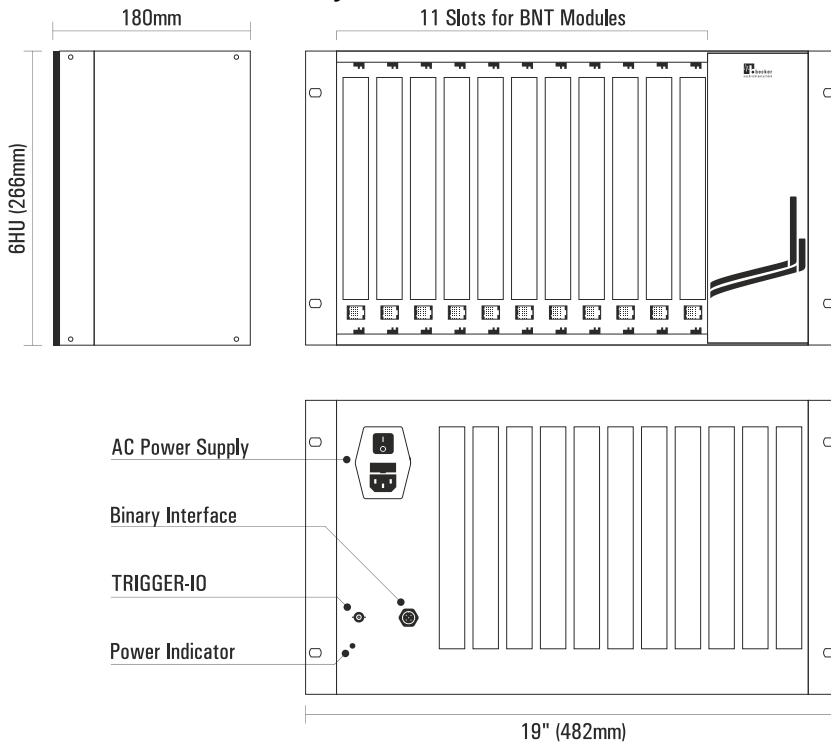
For the control of RSWM-4X4 module, the SR6-CU controller unit is required.

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



## Appearances



RSWM-4X4 front view



RSWM-4X4 rear view



SR6-11C front view

**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
<b>Unidirectional Products: Active Multicouplers, Matrices, Level Detectors</b>		
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-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-1X8S	High Dynamic 1x8 Shortwave Multicoupler Module 300 kHz ... 30 MHz	1502.6100.1
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
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
<b>Bi-Directional Products: Switches, Matrices, Attenuators, Delay Lines, BIAS-Ts, Splitters/Combiners, Filters</b>		
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
BSDU-2X4A+	2 Section 4 Way, Bi-Directional Signal Conditioning plus 2 Way Splitter/Combiner, 500 MHz ... 7500 MHz	1903.6100.1
BSDU-2X4+	2 Section 4 Way Wideband Bi-Directional plus 2 Way Splitter/Combiner, 500 MHz ... 7500 MHz	1903.6200.1
FBS-1590	L1 Band GNSS Notch Filter	1511.5100.1

