

# RSWM-4X8R

## Wideband Non-Blocking 4X8 Switching Matrix 20 MHz ... 4000 MHz

### Features

- high dynamic
- high isolation
- non-reflective
- compact 19", 1 U design
- graphical user interface

### Applications

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

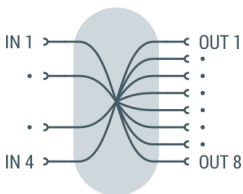
### At a Glance

Modern signal routing systems need an unrestricted access to different signal sources like antennas or signal generators. In receiving systems the large amount different analogue and digital modulated signals like broadcast, cellular, Wi-Fi, ISM and Bluetooth need high linearity for a low distorted transmission. Additionally, a low noise figure is very important for a high dynamic range.

The RSWM-4X8R is an innovative and efficient solution for modern radio monitoring and signal routing systems that must cover the frequency range up to more than 4 GHz. To enable a free access to many signal sources like antennas or signal generators it offers a non-blocking switch system which allows the combination of any input with every output in a flexible and easy way.

### Principal Block Diagram

The RSWM-4X8R has 4 equivalent inputs and 8 equivalent outputs interconnected with a non-blocking matrix. Furthermore one input can route to several outputs without any loss of transmission.



### Wear-free Solid State Switches

Inside the RSWM-4X8R modern solid state switching elements are integrated. This ensures a quick response to operating inputs and a huge number of switching cycles with a minimum of maintenance.



### High Channel Isolation

To avoid unintended coupling between different types of signals the device offers a high channel isolation. Adjacent radio channels with strong and weak signals have no influence to each other.

### Versatile Control

To control and operate with RSWM-4X8R the device is equipped with a local MMI on the front panel as well as LAN and USB interfaces. Suitable to the customer's application the user is able to manage the system either through the associated and intuitive web-based user interface or with SCPI-based ASCII-commands via its interface ports.

### Synchronous Operation

The RSWM-4X8R offers two switching modes:

- Direct switch execution after receiving single commands.
- Common synchronous switching after executed by a SYNC command.

In synchronous mode all upcoming switching operations are done only after receiving a SYNC command.

### External Triggering

Like many other products of Becker Nachrichtentechnik GmbH, the RSWM-4X8R offers a TRIGGER IO port. Due to the physical interface the device features a synchronous execution of switching operations in a compound of many matrices, triggered by hardware.

**RF Specification**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Impedance	Z <sub>IN</sub> /Z <sub>OUT</sub>		50		Ω	
number of inputs	N <sub>IN</sub>		4			
number of outputs	N <sub>OUT</sub>		8			
low frequency	f <sub>MIN</sub>			20	MHz	
high frequency	f <sub>MAX</sub>	4000	4500		MHz	
VLF / HF suppression	S <sub>21</sub>		-25	-15	dB	@ 5 MHz rel. 100 MHz
gain	S <sub>21</sub>		4		dB	f < 1 GHz
	S <sub>21</sub>		2		dB	f ≥ 1 GHz
input return loss	S <sub>11</sub>		-13	-8	dB	f ≤ 2 GHz
	S <sub>11</sub>		-10	-5	dB	f > 2 GHz
output return loss	S <sub>22</sub>		-17	-12	dB	f ≤ 2 GHz
	S <sub>22</sub>		-15	-10	dB	f > 2 GHz
1 dB compression	P <sub>1dB</sub>		+6		dBm	500 kHz ≤ f ≤ 1 GHz
	P <sub>1dB</sub>		+5		dBm	1 GHz < f ≤ 3 GHz
	P <sub>1dB</sub>		+1		dBm	f > 3 GHz
reverse isolation	S <sub>12</sub>		-70		dB	
3 <sup>rd</sup> order intercept	OIP3		+23		dBm	1 MHz ≤ f ≤ 2 GHz, note 1
2 <sup>nd</sup> order intercept	OIP2		+45		dBm	1 MHz ≤ f ≤ 1 GHz, note 1
noise figure	NF		9		dB	f ≥ 5 MHz
channel isolation	S <sub>32</sub>		-80	-45	dB	
output isolation	S <sub>12</sub>		-35	-30	dB	
RF input power	P <sub>RF</sub>			+15	dBm	no damage
maximum DC voltage	U <sub>DC</sub>			20	V	all RF ports
ESD discharge resistor	R <sub>ESD</sub>		4.7		kΩ	all RF ports
RF connectors	X <sub>RF</sub>		SMA female			
processing time	t <sub>SW</sub>		15		ms	between two switching commands
trigger input	X <sub>TRIG</sub>		BNC female			internal 1 kΩ pull up, active high
trigger level	U <sub>TRIG</sub>		TTL (0 / 5 V)			
trigger offset	t <sub>O_FALL</sub>		6.5		μs	50% trigger → 50% RF falling edge, note 2
	t <sub>O_RISE</sub>		1.1		μs	50% trigger → 50% RF rising edge, note 2
switch rise time	t <sub>RISE</sub>		1		μs	10% → 90% RF
switch fall time	t <sub>FALL</sub>		2		μs	90% → 10% RF

Note 1: tested at P<sub>out</sub> 2 x -10dBm; Δf = 2 MHz

Note 2: capacitive load at 'TRIGGER IO' Port ≤ 100pF, trigger mode "OUT"



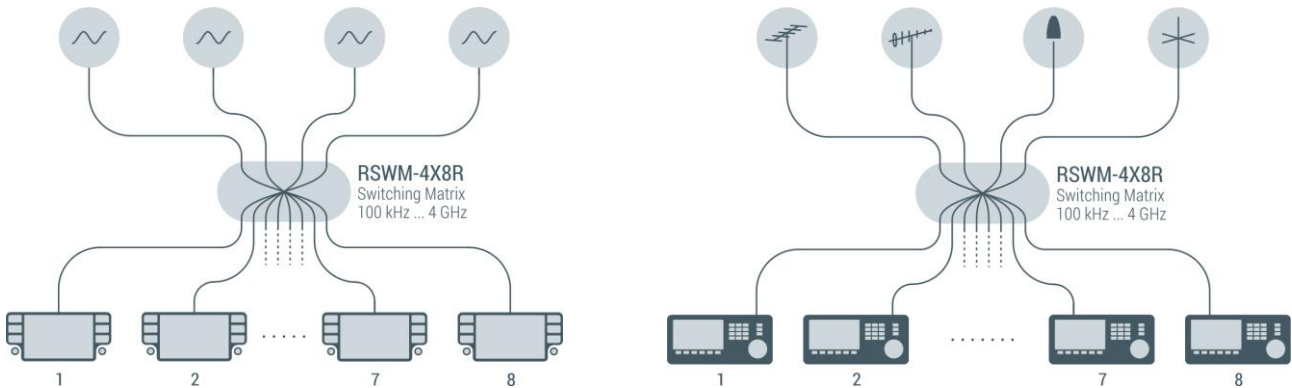
**Common Specification**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	$U_{AC}$	90	230	260	V	50 / 60 Hz AC
power consumption	$P_{AC}$		45		W	
power socket	$X_{AC}$	IEC-60320 C14				country specific mains cable
remote ports	LAN	10/100 BaseT		TCP/IP		RJ45 on rear side
	USB	2.0 (high speed)				USB type B
<b>Dimensions and weight</b>						
dimensions	W x H x D	approx. 482 x 44 x 455			mm	19" 1 U, without connectors and handles
weight	m		4,5		kg	
<b>Environment conditions</b>						
operating temp. range	$T_o$	+5		+45	°C	
storage temp. range	$T_s$	-40		+70	°C	
<b>Product conformity</b>						
Electromagnetic compatibility	EU: in line with EMC directive (2014/30/EC)				applied harmonized standards: EN61326-2-1, (for use in control and laboratory environments), EN55024, EN55032, EN61000-3-2, EN61000-3-3	
Electrical safety	EU: in line with low voltage directive (2014/35/EC)				applied harmonized standard: EN 61010-1	
<b>Ordering information</b>	RSWM-4X8R	2103.4302.1				



### Application Examples

The RSWM-4X8R is suitable for both radio monitoring applications as well as test environments for research and development. Aided by the RSWM-4X8R the customer is able to route input signals to any output of the device. As the illustration shows the input can either be equipped with different signal sources or antennas:

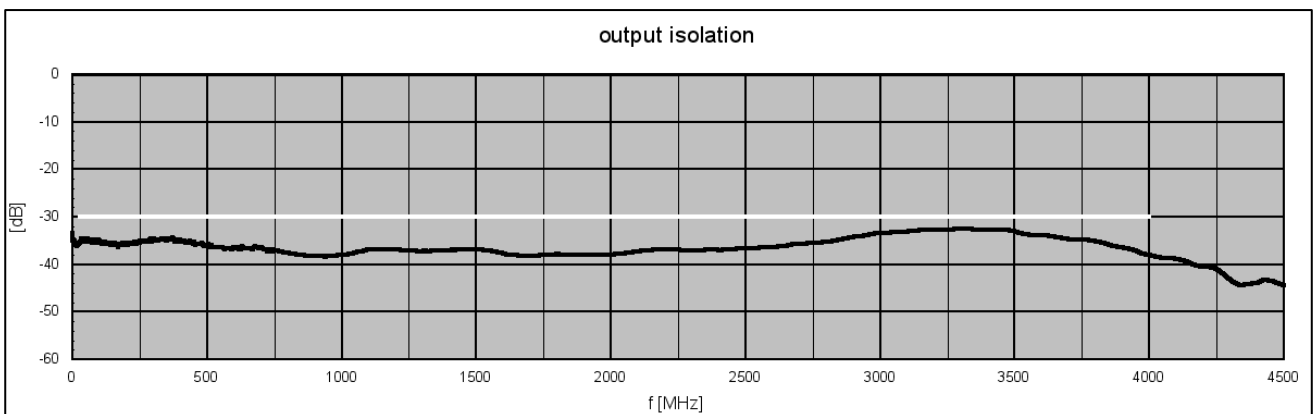
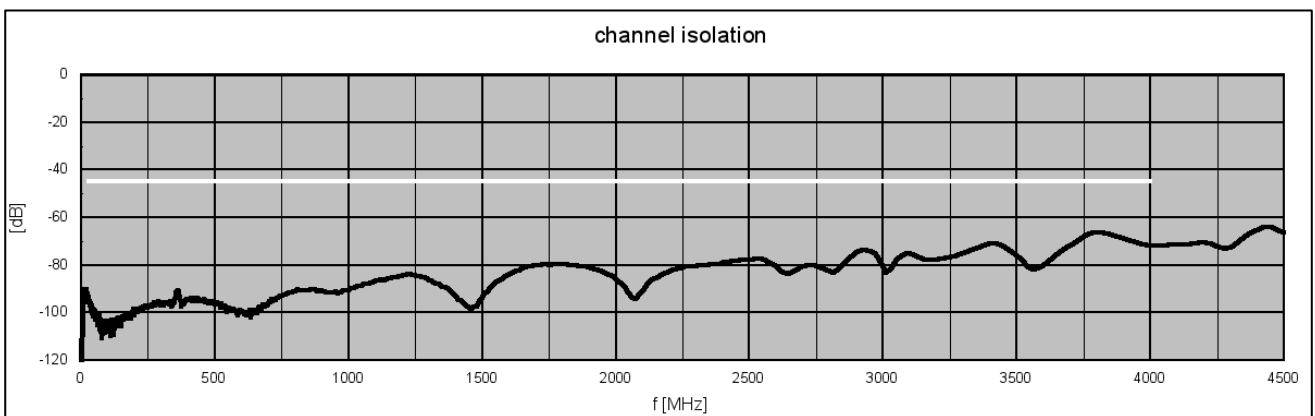
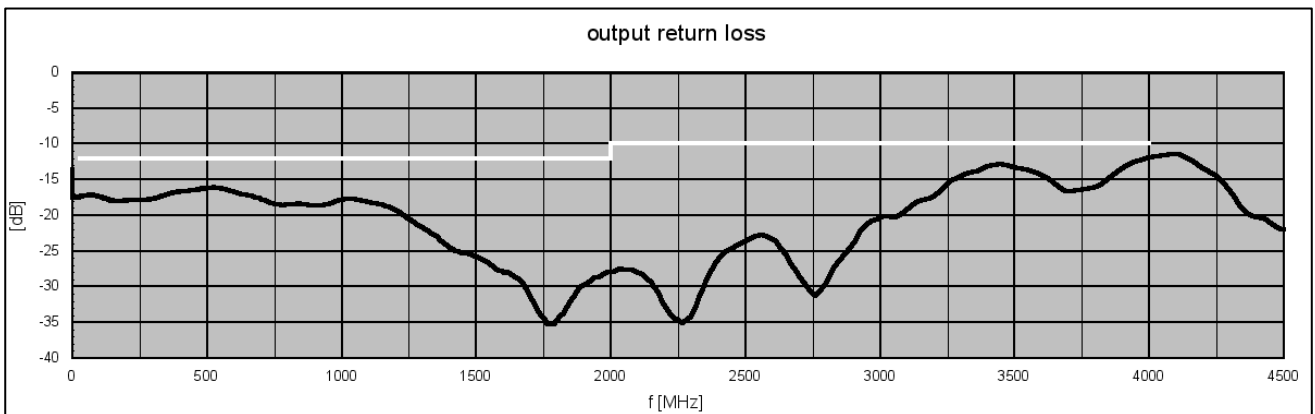
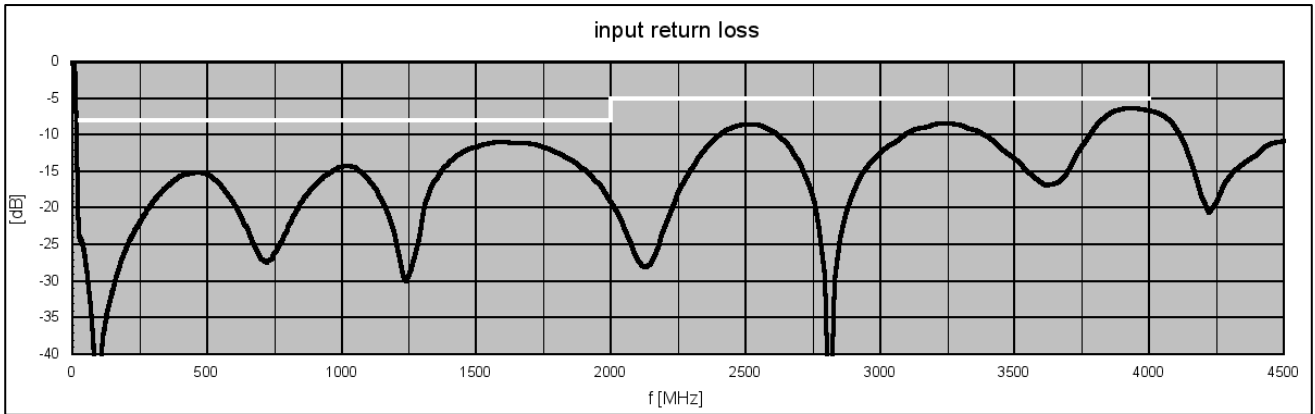


Car Infotainment Test with different GNSS Position Data      Wideband Radio Monitoring

### Screenshot of Graphic User Interface

The GUI allows the definition of application-specific labels to make the selection of inputs more meaningful.



**S-Parameters** (typical responses)

# Appearances

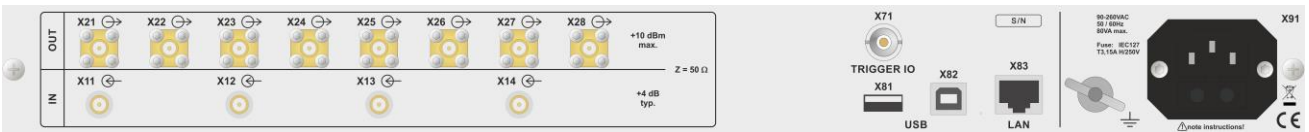
Front

View



Rear

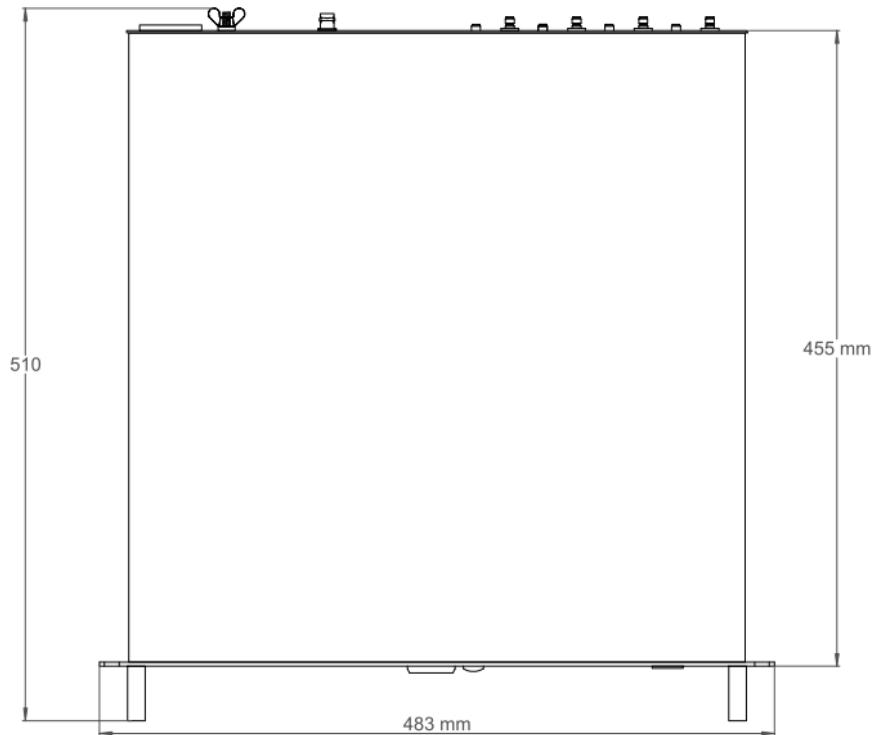
View



## Dimensions



all dimensions in mm  
± 2 mm



**Related Products**

Product	P/N	Description
RSWM-4X4R	1205.4102.x	Wideband Non-Blocking 4X4 Switching Matrix 2 variants: 100 kHz ... 4000 MHz and 20 MHz ... 4000 MHz, LAN remote interface with SNMPv2 trap function.
RSWM-4X8R	2103.4302.1	Wideband Non-Blocking 4X8 Switching Matrix 20 MHz ... 4000 MHz, LAN remote interface with SNMPv2 trap function.
RSWM-8X8R	2103.4502.1	Wideband Non-Blocking 8X8 Switching Matrix 20 MHz ... 4000 MHz, LAN remote interface with SNMPv2 trap function.
RSWM-4X4ER	1205.4202.1	Extremely Wideband Non-Blocking 4X4 Switching Matrix 20 ... 8000 MHz, LAN remote interface with SNMPv2 trap function.
RSWM-4X8ER	2103.4402.1	Extremely Wideband Non-Blocking 4X8 Switching Matrix 20 ... 8000 MHz, LAN remote interface with SNMPv2 trap function.
RSWM-8X8ER	2103.4602.1	Extremely Wideband Non-Blocking 8X8 Switching Matrix 20 ... 8000 MHz, LAN remote interface with SNMPv2 trap function.
BSWM-4X4ER	1205.4502.1	4X4 Bidirectional Blocking Wideband Switching Matrix 100 kHz ... 8000 MHz, LAN remote interface with SNMPv2 trap function.
BSWM-4X8ER	2103.4702.1	4X8 Bidirectional Blocking Wideband Switching Matrix 100 kHz ... 8000 MHz, LAN remote interface with SNMPv2 trap function.
BSWM-8X8ER	2103.4802.1	8X8 Bidirectional Blocking Wideband Switching Matrix 100 kHz ... 8000 MHz, LAN remote interface with SNMPv2 trap function.

