becker nachrichtentechnik

RSWM-4X4LR

Wideband Non-Blocking 4X4 Switching Matrix, 100 kHz … 4000 MHz

Features

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

Applications

- RF signal routing
- satellite ground segment IF routing
- infotainment test
- research & development (R&D)
- test and validation equipment

At a Glance

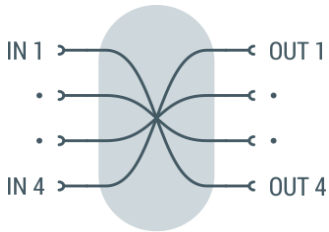
Modern RF signal routing systems need an unrestricted access to different signal sources like antennas or signal generators.

RSWM is an innovative and efficient solution in the laboratory, test or validation environment to give many test setups unrestricted access to a variety of signal sources. The wide frequency bandwidth up to more than 4 GHz covers all commercial broadcast services including GNSS.

The non-blocking architecture enables free access to all signal sources from any of its outputs. The same signal source can be used by multiple outputs simultaneously.

Principal Block Diagram

The RSWM-4X4LR features four equivalent inputs and four equivalent outputs interconnected via a non-blocking matrix. A single input can route to multiple outputs without any loss of signal transmission.



Wear-free Solid-State Switches

The RSWM-4X4LR incorporates modern solid-state switching elements, guaranteeing rapid response to operational inputs and an unlimited number of switching cycles with minimal maintenance requirements.

High Channel Isolation

To prevent unintentional signal coupling between different signal types, the device provides high channel isolation. Strong and weak signals in adjacent radio channels do not affect each other.

Versatile Control

The RSWM-4X4LR is equipped with multiple control options for user convenience. It features a local MMI on the front panel, as well as LAN and USB interfaces. Depending on the customer's needs, the system can be managed using the intuitive web-based graphical user interface or through SCPI-based ASCII commands via its interface ports.

Synchronous Operation

The RSWM-4X4LR offers two switching modes:

- Direct: every switching operation is executed after reception of the command.
- Synchronous: all switching commands are stored until a "SYNC" command executes the switching operation synchronously.

External Triggering

Similar to several other products from Becker Nachrichtentechnik GmbH, the RSWM-4X4LR includes a TRIGGER IO port. This physical interface enables the device to execute switching operations synchronously across multiple matrices, triggered by hardware signals.

RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Impedance	Z_{IN}/Z_{OUT}		50		Ω	
number of inputs	N_{IN}		4			
number of outputs	N_{OUT}		4			
low frequency	f_{MIN}		100	300	kHz	
high frequency	f_{MAX}	4000			MHz	
gain	S_{21}		2		dB	
input return loss	S_{11}		-13		dB	
output return loss	S_{22}		-17		dB	f ≤ 3 GHz
	S_{22}		-14		dB	f > 3 GHz
1 dB compression	P_{1dB}		+7		dBm	500 kHz ≤ f ≤ 1 GHz
	P_{1dB}		+6		dBm	1 GHz < f ≤ 3 GHz
	P_{1dB}		+1		dBm	f > 3 GHz
reverse isolation	S_{12}		-60		dB	
3rd order intercept	OIP3		+23		dBm	500 kHz ≤ f ≤ 1 GHz
			+13			1 GHz < f ≤ 3 GHz
			+11			f > 3 GHz
noise figure	NF		8		dB	f ≥ 5 MHz
channel isolation	S_{32}		-80		dB	f ≤ 3 GHz
output isolation	S_{12}		-35		dB	
RF input power	P_{RF}			+15	dBm	no damage
maximum DC voltage	U_{DC}			15	V	all RF ports
ESD discharge resistor	R_{ESD}		4.7		kΩ	all RF ports
RF connectors	X_{RF}		N female			
trigger input	X_{TRIG}		BNC female			internal 1 kΩ pull up, active high
trigger level	u_{TRIG}		TTL (0 / 5 V)			
trigger offset	t_{O_FALL}		6.5		µs	50% trigger → 50% RF falling edge, note 2
	t_{O_RISE}		1.1		µs	50% trigger → 50% RF rising edge, note 2
switch rise time	t_{RISE}		1		µs	10% → 90% RF
switch fall time	t_{FALL}		2		µs	90% → 10% RF

Note 1: tested at P_{out} 2 x -10dBm; Δf = 2 MHz

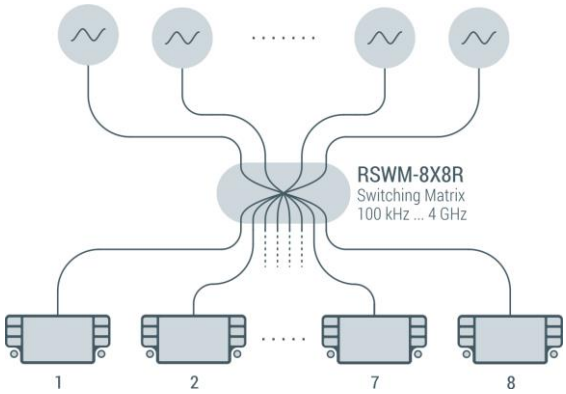
Note 2: capacitive load at 'TRIGGER IO' Port ≤ 100pF, trigger mode "OUT"

Common Specification

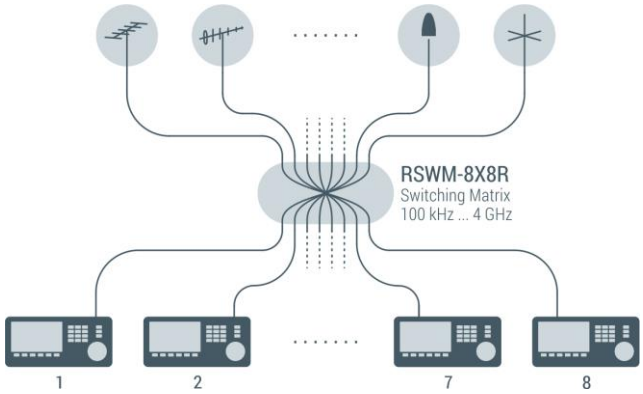
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	U_{AC}	90	230	260	V	50 / 60 Hz AC
power consumption	P_{AC}		100		W	
power socket	X_{AC}	IEC-60320 C14				country specific mains cable
remote ports	LAN	10/100 BaseT		TCP/IP		RJ45 on rear side
	USB	2.0 (high speed)				USB type B
Dimensions and weight						
dimensions	W x H x D	approx. 482 x 44 x 455			mm	19" 1U, without connectors and handles
weight	m		5		kg	
Environment conditions						
operating temp. range	T_o	+5		+45	°C	
storage temp. range	T_s	-40		+70	°C	
Product conformity						
Electromagnetic compatibility	EU: in line with EMC directive (2014/30/EC)					applied harmonized standards: EN61326-2-1, (for use in control and laboratory environments), EN55035, 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
Ordering information	RSWM-4X4LR	1205.4402.1				

Application Examples

The RSWM-4X4LR is versatile, catering to radio monitoring applications and research and development test environments. With the RSWM products, customers can easily route input signals to any device output. As illustrated, the input can be connected to various signal sources or antennas:



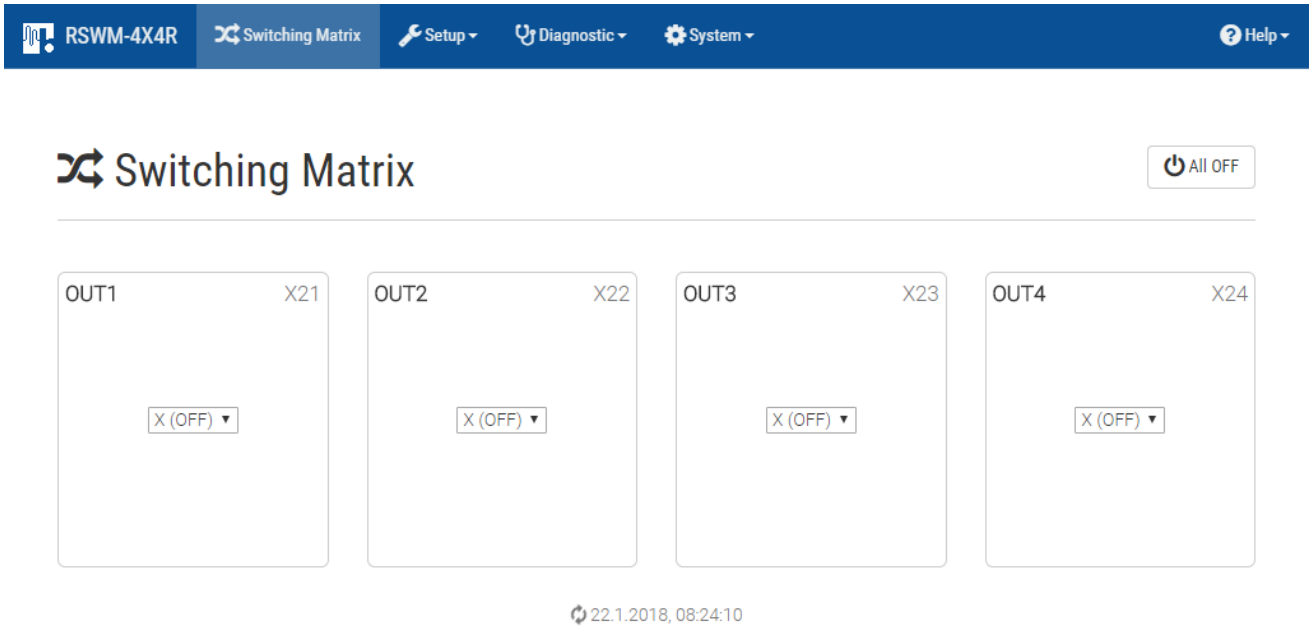
Car Infotainment Test with different GNSS Position Data



Wideband Radio Monitoring

Graphical User Interface

The graphical user interface (GUI) enables users to define custom labels tailored to their specific applications, making input selection more contextually meaningful.

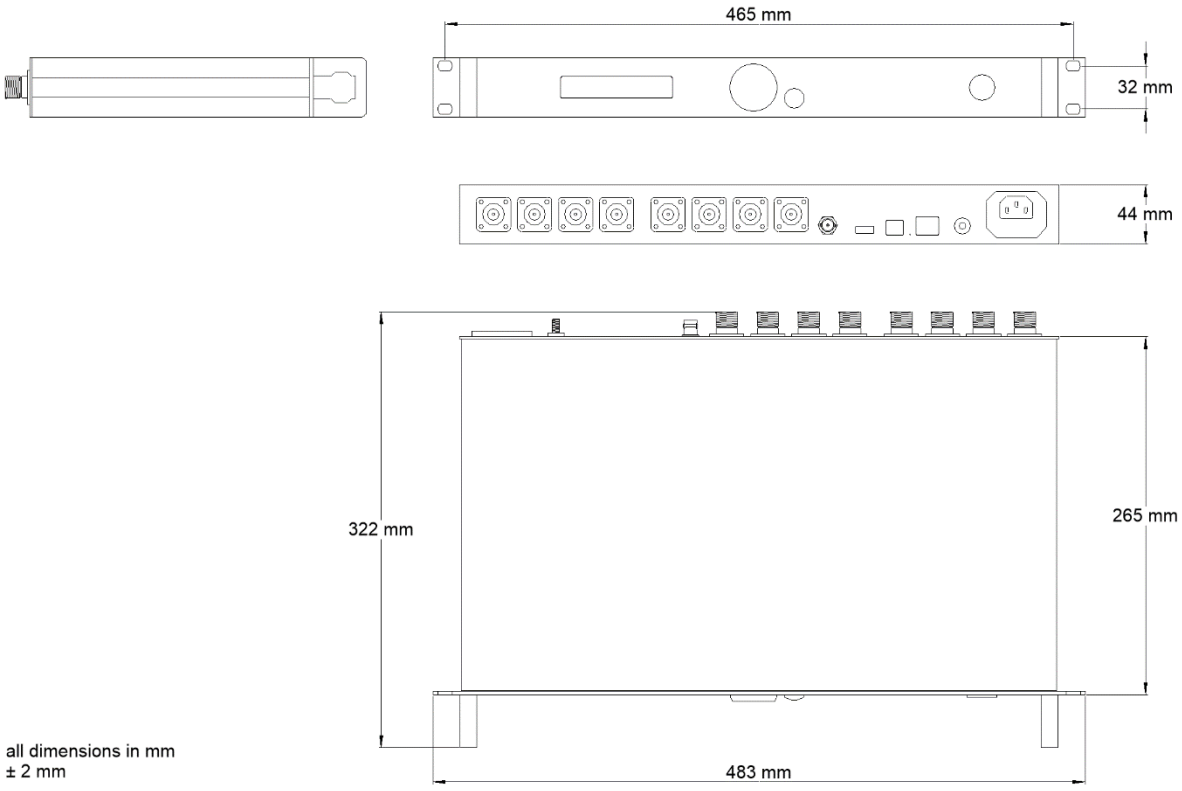


Appearances

Front View

Rear View

Dimensions



all dimensions in mm
± 2 mm

Related Products

Product	P/N	Description
RSWM-4X4LR	1205.4402.X	Wideband Non-Blocking 4X4 Switching Matrix 100 kHz … 4000 MHz LAN remote interface with SNMPv2 trap function
RSWM-4X8LR	2103.4452.X	Wideband Non-Blocking 4X8 Switching Matrix 100 kHz … 4000 MHz LAN remote interface with SNMPv2 trap function
RSWM-8X8LR	2103.4552.X	Wideband Non-Blocking 8X8 Switching Matrix 100 kHz … 4000 MHz LAN remote interface with SNMPv2 trap function
RSWM-4X4R	1205.4102.X	High-Dynamic Non-Blocking 4X4 Switching Matrix 100 kHz … 4000 MHz LAN remote interface with SNMPv2 trap function
RSWM-4X8R	2103.4302.X	High-Dynamic Non-Blocking 4X8 Switching Matrix 100 kHz … 4000 MHz LAN remote interface with SNMPv2 trap function
RSWM-8X8R	2103.4502.X	High-Dynamic Non-Blocking 8X8 Switching Matrix 100 kHz … 4000 MHz LAN remote interface with SNMPv2 trap function
RSWM-4X4ER	1205.4202.X	Extremely Wideband Non-Blocking 4X4 Switching Matrix 20 … 8000 MHz LAN remote interface with SNMPv2 trap function
RSWM-4X8ER	2103.4402.X	Extremely Wideband Non-Blocking 4X8 Switching Matrix 20 … 8000 MHz LAN remote interface with SNMPv2 trap function
RSWM-8X8ER	2103.4602.X	Extremely Wideband Non-Blocking 8X8 Switching Matrix 20 … 8000 MHz LAN remote interface with SNMPv2 trap function
BSWM-4X4ER	1205.4502.X	4X4 Bidirectional Blocking Wideband Switching Matrix 100 kHz … 8000 MHz LAN remote interface with SNMPv2 trap function
BSWM-4X8ER	2103.4702.X	4X8 Bidirectional Blocking Wideband Switching Matrix 100 kHz … 8000 MHz LAN remote interface with SNMPv2 trap function
BSWM-8X8ER	2103.4802.X	8X8 Bidirectional Blocking Wideband Switching Matrix 100 kHz … 8000 MHz LAN remote interface with SNMPv2 trap function