

RSWM-8X8ER

Extremely Wideband Non-Blocking 8X8 Switching Matrix, 20 MHz ... 8000 MHz

Features

- high dynamic
- high isolation
- non-reflective
- compact 19" 1U design
- graphical user interface
- variants for AC or DC power supply



Applications

- radio monitoring
- spectrum monitoring
- COMINT / SIGINT
- signal routing
- research & development (R&D)
- test equipment

At a Glance

Modern radio monitoring systems need an unrestricted access to many antennas from a variety of receivers. By using the non-blocking architecture of RSWM, specialized and general-purpose receivers can be used alongside each other and choose any of the available antennas without interference between the receivers.

The high linearity and low noise figure of the device ensure the best signal integrity on the way from antenna to receiver. Low cross-talk allows to listen to small signals on one antenna in the presence of strong signals on a different antenna.

The very large bandwidth covers all commercial cellular and ISM communication bands up to and including WiFi7.

AC or DC Power Supply Options

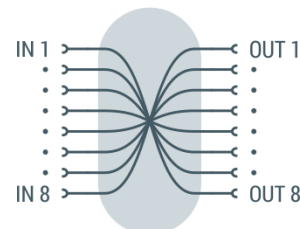
The RSWM-8X8ER comes in variants designed for either DC or AC mains power supply, catering to both stationary and mobile applications. Both variants support a broad input voltage range, whether AC or DC.

Automatic Energy Saving

Unused RF paths are automatically switched off, effectively reducing the device's power consumption and saving on energy costs.

Principal Block Diagram

The RSWM-8X8ER features four equivalent inputs and eight 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-8X8ER integrates modern solid state switching elements. 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 a negligible influence to each other.

Versatile Control

RSWM-8X8ER is equipped with a local MMI on the front panel as well as LAN and USB interfaces. Depending on the customer's application a remote user can operate the system either through the associated and intuitive web-based user interface or with SCPI-based ASCII-commands from a local SW application.

Synchronous Operation

The RSWM-8X8ER offers two switching modes:

- Direct command execution after receiving single commands.
- Common synchronous switching after executing a dedicated SYNC command. In synchronous mode all upcoming switching operations are delayed until a SYNC command is received.

External Triggering

Like many other products of Becker Nachrichtentechnik GmbH, the RSWM-8X8ER offers a TRIGGER I/O port. By using this physical interface every RSWM device within a compound of many matrices can operate completely synchronous in response to a HW trigger signal.

RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{IN}/Z_{OUT}		50		Ω	
number of inputs	N_{IN}		8			
number of outputs	N_{OUT}		8			
low frequency	f_{MIN}		10	20	MHz	
high frequency	f_{MAX}	8000	8500		MHz	
gain	S_{21}	0.5	4	7.5	dB	$f \leq 6$ GHz
	S_{21}	-4.0	0		dB	$f = 8$ GHz
input return loss	S_{11}		-15	-10	dB	
output return loss	S_{22}		-11	-7	dB	
1 dB compression	P_{1dB}	-1	+5		dBm	$f \leq 3$ GHz
	P_{1dB}	-1	+2		dBm	$f > 3$ GHz
3 rd order intercept	$OIP3^1$	+12	+16		dBm	$f \leq 3$ GHz
	$OIP3^1$	+6	+11		dBm	$f > 3$ GHz
2 nd order intercept	$OIP2^2$		+32		dBm	
noise figure	NF		11	13	dB	$f < 100$ MHz
	NF		9	11	dB	$100 \text{ MHz} \leq f \leq 6 \text{ GHz}$
	NF		11	13	dB	$f > 6 \text{ GHz}$
channel isolation	S_{21}		-80	-70	dB	$f \leq 3$ GHz
	S_{21}		-70	-45	dB	$3 \text{ GHz} < f \leq 6 \text{ GHz}$
	S_{21}		-60	-45	dB	$f > 6 \text{ GHz}$
output isolation	S_{32}		-21		dB	Output 1 to 2 or 3 to 4
	S_{32}		-40		dB	Output 1 or 2 to 3 or 4
reverse isolation	S_{12}		-95		dB	
input power	P_{IN}			+10	dBm	CW, no damage
maximum DC voltage	U_{DC}			20	V	all RF ports
ESD discharge resistor	R_{ESD}		4.7		k Ω	all RF ports
RF connectors	X_{RF}		SMA female			
trigger input	X_{TRIG}		BNC female			internal 1 k Ω pull up, active high
trigger level	U_{TRIG}		TTL (0 / 5 V)			
trigger offset (note 3)	t_{O_FALL}		2		μs	50% trigger → 50% RF falling edge
	t_{O_RISE}		60		μs	50% trigger → 50% RF rising edge, RF IN previously inactive
	t_{O_RISE}		5		μs	50% trigger → 50% RF rising edge, RF IN previously active
switch rise time	t_{RISE}		4		μs	10% → 90% RF
switch fall time	t_{FALL}		2		μs	90% → 10% RF

Note 1: $P_{IN} = 2 \times -10$ dBm, specified and tested for $\Delta f = 2$ MHz

Note 2: $P_{IN} = 2 \times -10$ dBm, $\Delta f = 20$ MHz

OIP2 & OIP3 values are the average of the upper and lower intermodulation distortion, in band spurs only

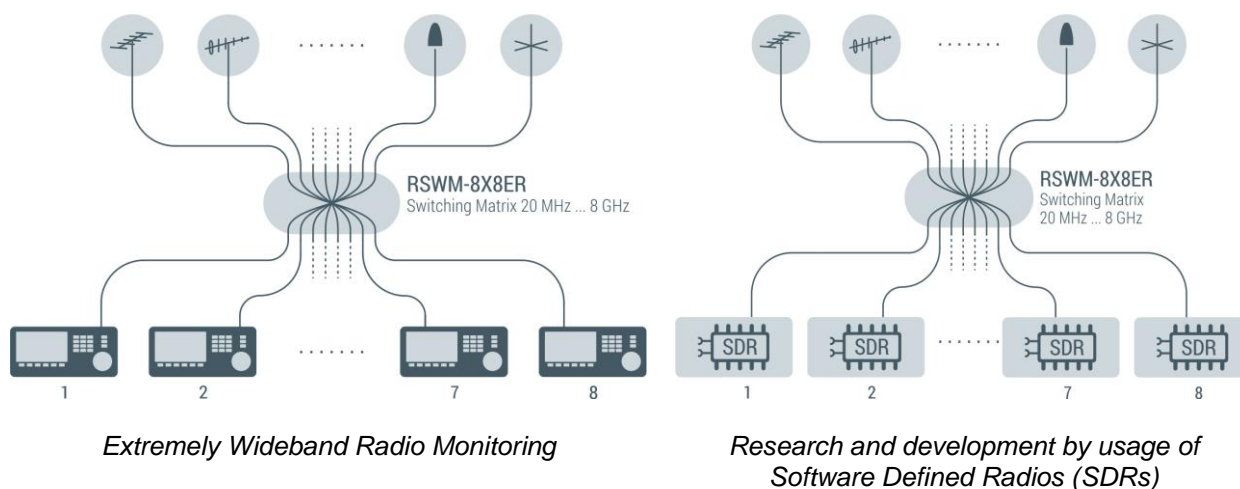
Note 3: capacitive load at 'TRIGGER IO' Port ≤ 100 pF, trigger mode "OUT"

Common Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Variant with AC power supply						
mains input voltage	U _{AC}	90	230	260	V	50 / 60 Hz AC
power consumption	P _{AC}		28		W	all inputs active
power socket	X _{AC}	IEC-60320 C14				country specific mains cable
Variant with DC power supply						
input voltage	U _{DC}	12		27	V	DC
current consumption	I _{DC}		1		A	@ 24 V, all inputs active
power socket	X _{AC}	3 pole XLR male				
Remote interfaces						
	LAN	10/100 BaseT		TCP/IP		RJ45
	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		8		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-8X8ER	2103.4602.1			Variant with AC supply	
	RSWM-8X8ER	2103.4602.2			Variant with DC supply	

Application Example


The RSWM-8X8ER is suitable for both radio monitoring applications as well as test environments for research and development. Aided by the RSWM-8X8ER 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:



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.

Matrix Setup Interface


RSWM-NX8
Switching Matrix
Setup
Diagnostic
Tools
System
User

Matrix Setup

Labels

Input Labels

X11	Input No 1
X12	Input No 2
X13	Input No 3
X14	Input No 4
X15	Input No 5
X16	Input No 6
X17	Input No 7
X18	Input No 8

Output Labels


X21	Output No 1
X22	Output No 2
X23	Output No 3
X24	Output No 4
X25	Output No 5
X26	Output No 6
X27	Output No 7
X28	Output No 8

Power Up State

Matrix state after powering up the device

PRESET
SHUTDOWN

Matrix Control Interface

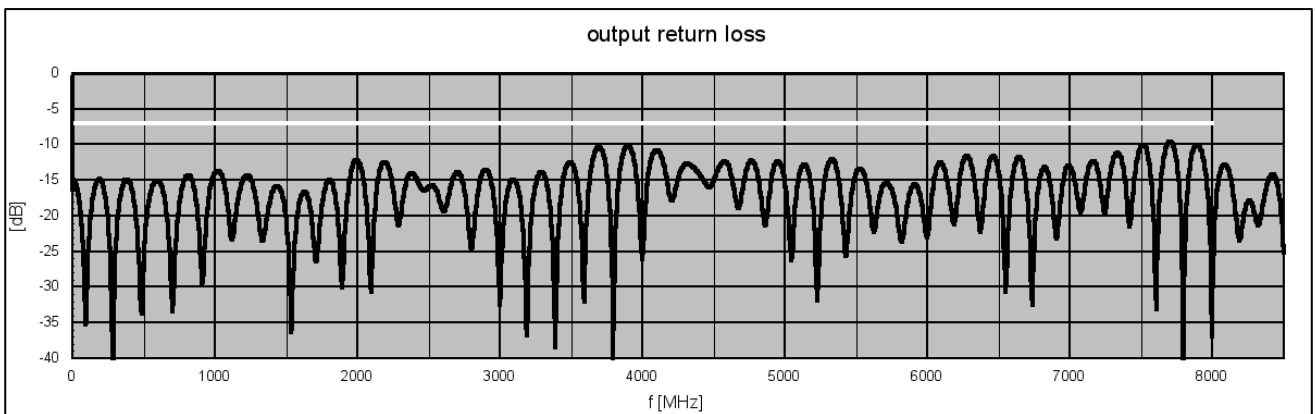
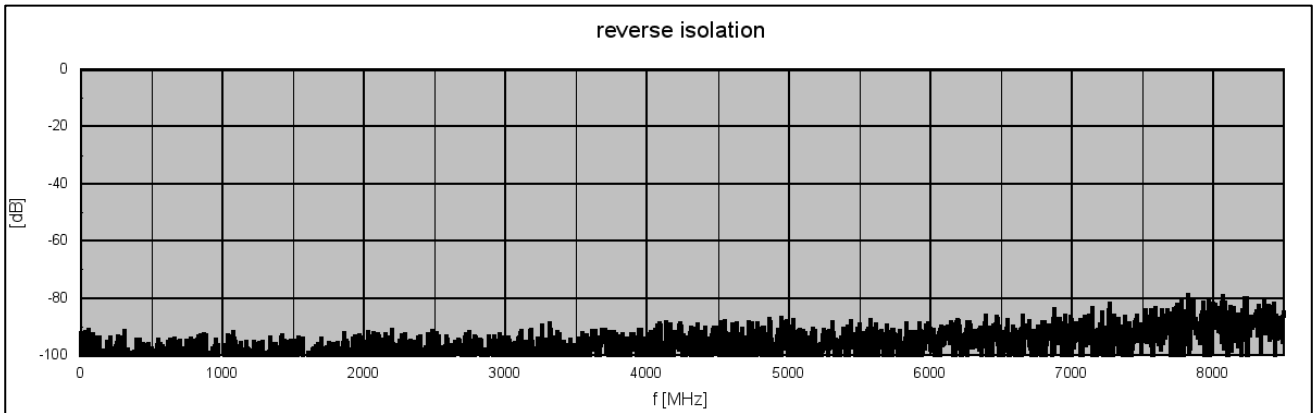
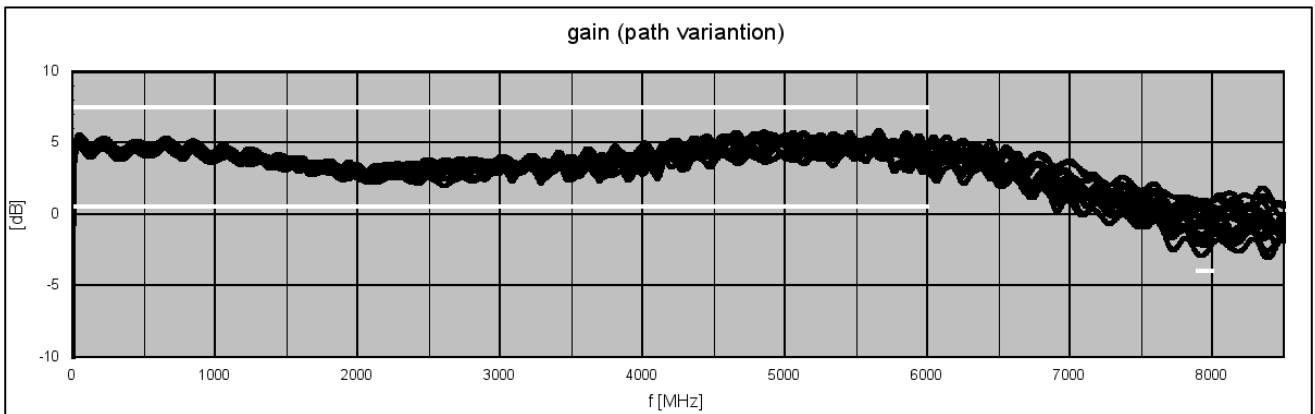
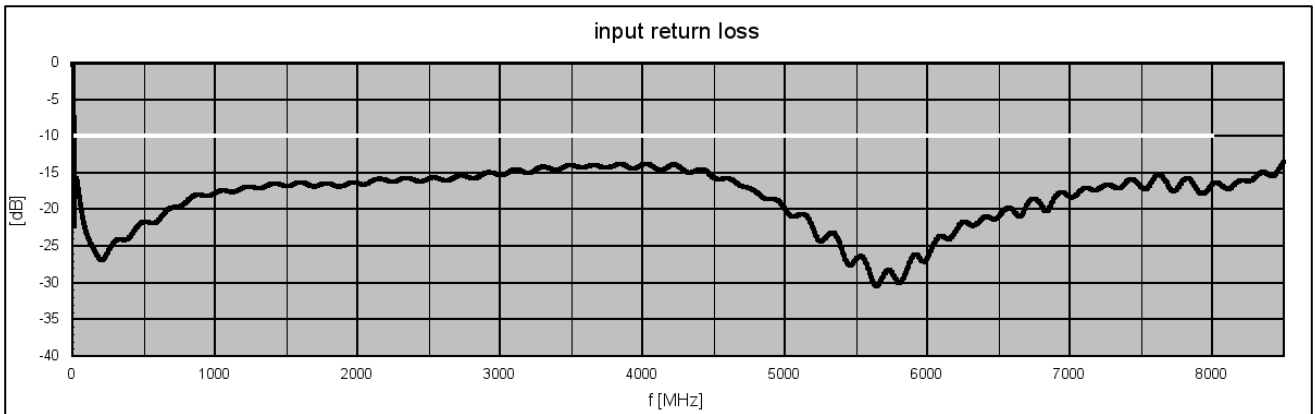

RSWM-NX8
Switching Matrix
Setup
Diagnostic
Tools
System
User

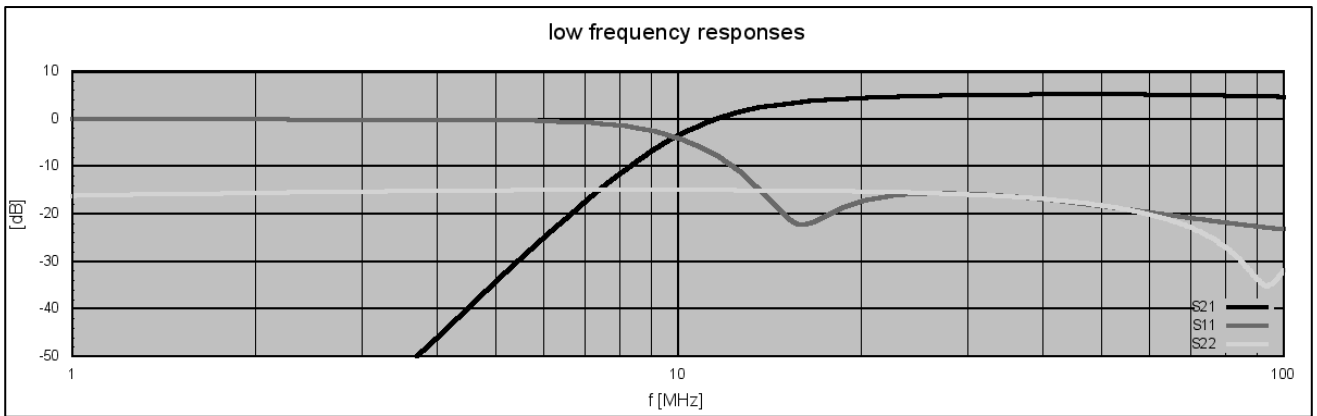
Matrix Control

Save Preset
Restore Preset
All OFF

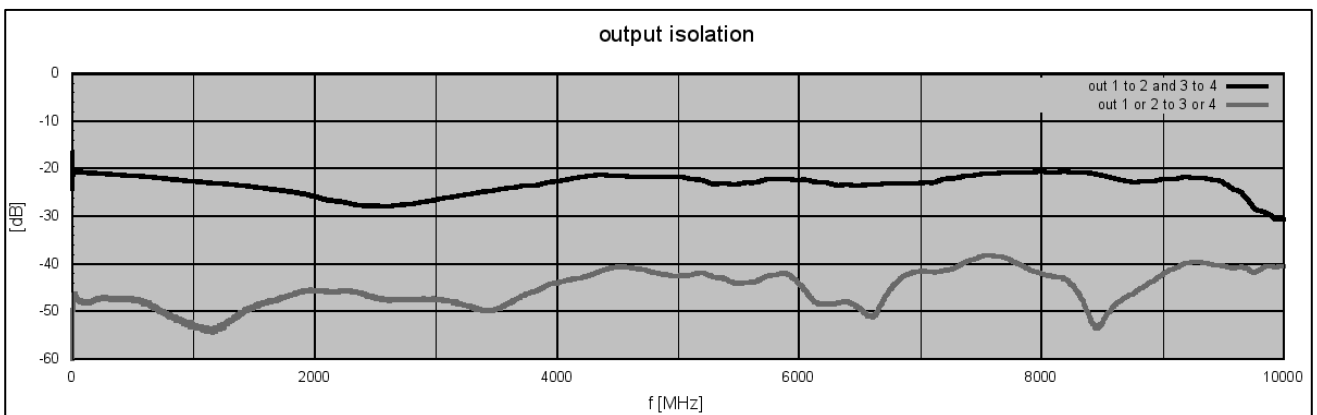
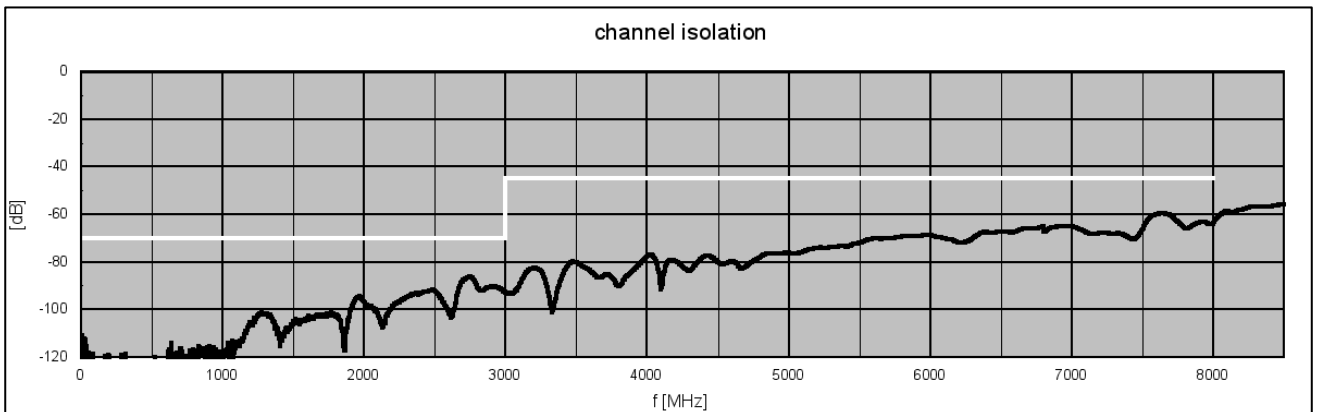
Output No 1 X21	OFF - No Input	Output No 5 X25	OFF - No Input
Output No 2 X22	OFF - No Input	Output No 6 X26	OFF - No Input
Output No 3 X23	OFF - No Input	Output No 7 X27	OFF - No Input
Output No 4 X24	OFF - No Input	Output No 8 X28	OFF - No Input

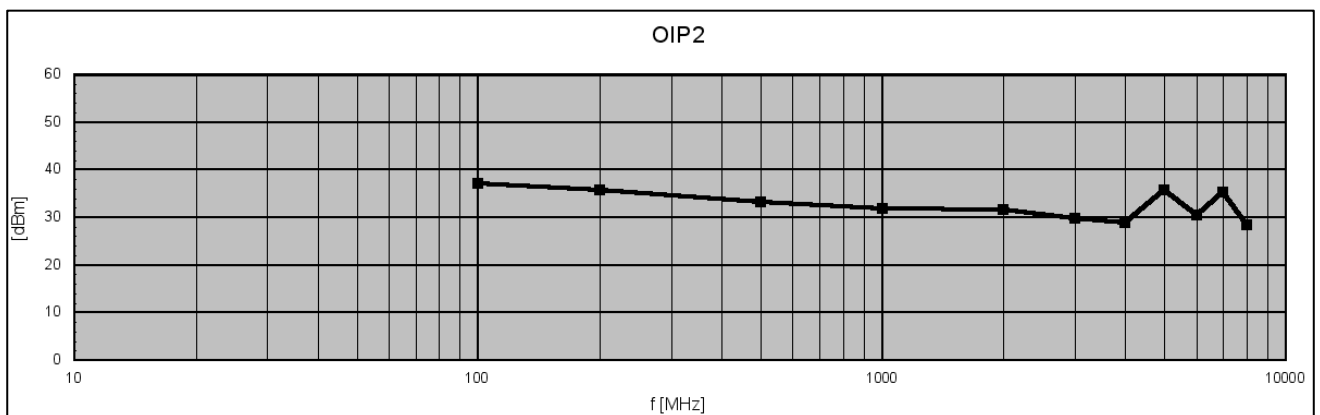
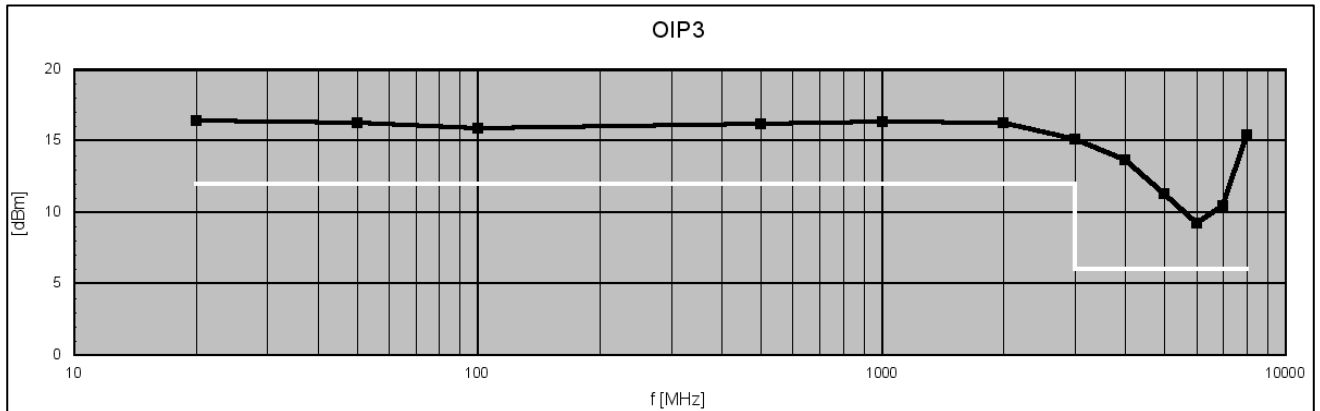
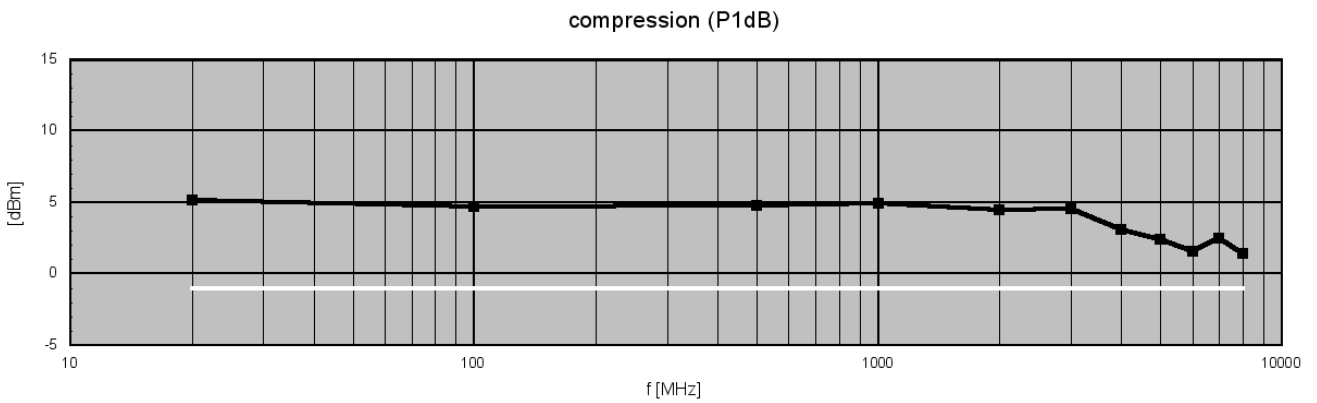
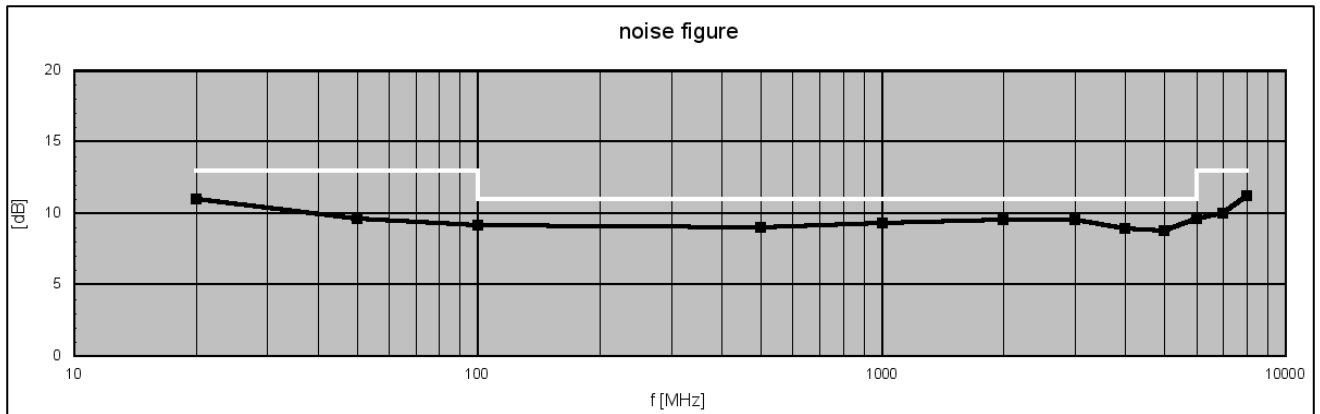
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S-Parameters*typical responses*



Isolations (typical responses)



Dynamic Range*typical responses*

Appearances

Front View



Rear View

Variant with AC-Supply

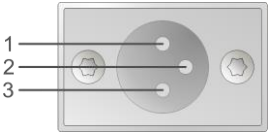


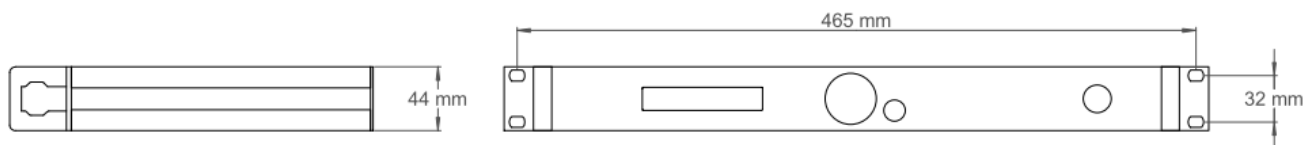
Variant with DC-Supply



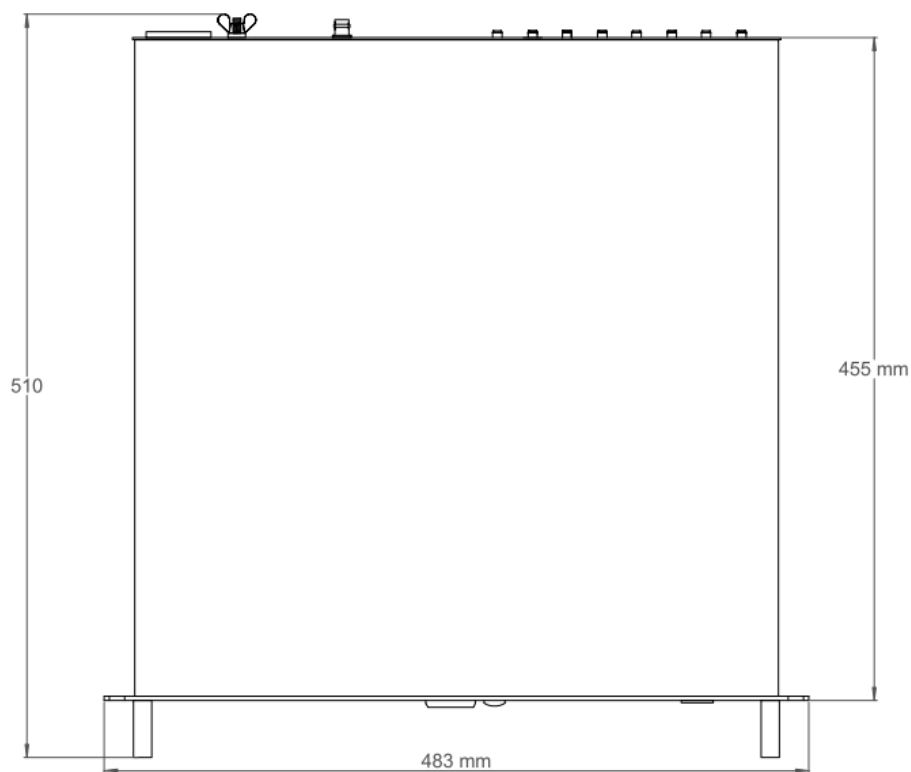
DC Option Pin Assignment

Pin	Assignment
1	DC -
2	not connected
3	DC +(12...27 V), 1 A typ., 4 A max.



Dimensions

all dimensions in mm
± 2 mm



Related Products*Further switching matrices*

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