

# BSWM-4X8ER

Bidirectional Blocking Wideband 4X8 Switching Matrix, 100 kHz ... 8500 MHz

## Features

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

## Applications

- MIMO test
- network investigation
- signal routing
- research & development (R&D)
- test equipment

## At a Glance

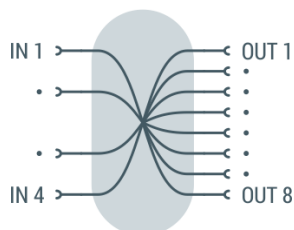
Modern communication standards, including cellular Wi-Fi, ISM, and Bluetooth, require bidirectional signal transmissions regardless of the multiplexing method, whether TDD (Time Domain Division) or FDD (Frequency Domain Division). The BSWM-4X8ER offers an innovative and efficient routing solution for these communication systems, covering frequencies of over 8 GHz and providing four full parallel bidirectional signal paths.

## AC or DC Power Supply Options

The BSWM-4X8ER 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.

## Principal Block Diagram

The BSWM-4X8ER 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 BSWM-4X8ER 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 BSWM-4X8ER 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 BSWM-4X8ER 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 BSWM-4X8ER 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		$\Omega$	
number of inputs	$N_{IN}$		4			bi-directional, blocking
number of outputs	$N_{OUT}$		8			bi-directional, blocking
low frequency	$f_{MIN}$		100	200	kHz	
high frequency	$f_{MAX}$	8000	8300		MHz	
insertion loss	$S_{21}$		-4		dB	$f \leq 4000$ MHz
			-6		dB	$f > 4000$ MHz
return loss	$S_{11}/S_{22}$		-14	-11	dB	$f \leq 4000$ MHz
			-10	-8		$f > 4000$ MHz
OFF isolation	$S_{21}$		-90	-80	dB	$f \leq 4000$ MHz, SPDT switch open
			-85	-70		$f > 4000$ MHz
channel isolation	$S_{23}$		-90	-80	dB	$f \leq 4000$ MHz, SPDT switch closed
			-85	-70		$f > 4000$ MHz
3 <sup>rd</sup> order intercept	OIP3		+47		dBm	
2 <sup>nd</sup> order intercept	OIP2		+85		dBm	
DC voltage	$U_{DC}$			20	V	RF ports
ESD discharge resistor	$R_{ESD}$		4.7		k $\Omega$	RF ports
RF power	$P_{ON\_MAX}$			+30	dBm	CW, "ON", $f > 10$ MHz
	$P_{OFF\_MAX}$			+20	dBm	CW, "OFF", $f > 10$ MHz
RF connectors	$X_{RF}$	SMA female				rear side
processing time	$t_{SW}$		15		ms	between two switching commands
trigger input	$X_{TRIG}$	BNC female				internal 1 k $\Omega$ pull up, active high
trigger level	$U_{TRIG}$	TTL (0 / 5 V)				
trigger offset	$t_{O\_FALL}$		6.5		$\mu$ s	50% trigger $\rightarrow$ 50% RF falling edge, note 1
	$t_{O\_RISE}$		1.1		$\mu$ s	50% trigger $\rightarrow$ 50% RF rising edge, note 1
switch rise time	$t_{RISE}$		1		$\mu$ s	10% $\rightarrow$ 90% RF
switch fall time	$t_{FALL}$		2		$\mu$ s	90% $\rightarrow$ 10% RF

Note 1: capacitive load at 'TRIGGER IO' Port  $\leq 100$ pF, trigger mode "OUT"

**Common Specification**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply		90	230	260	V	50 / 60 Hz AC
power consumption			35		W	
power socket	X <sub>AC</sub>	IEC-60320 C14				country specific mains cable
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		4.5		kg	
Environment conditions						
operating temp. range	T <sub>o</sub>	+5		+45	°C	
storage temp. range	T <sub>s</sub>	-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	BSWM-4X8ER		2103.4702.1		Variant with AC Supply	
	BSWM-4X8ER		2103.4702.2		Variant with DC Supply	

## 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

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

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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## Appearances

### Front View



### Rear View

Variant with AC-Supply

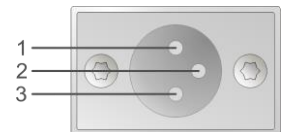


Variant with DC-Supply



### DC Variant Pin Assignment

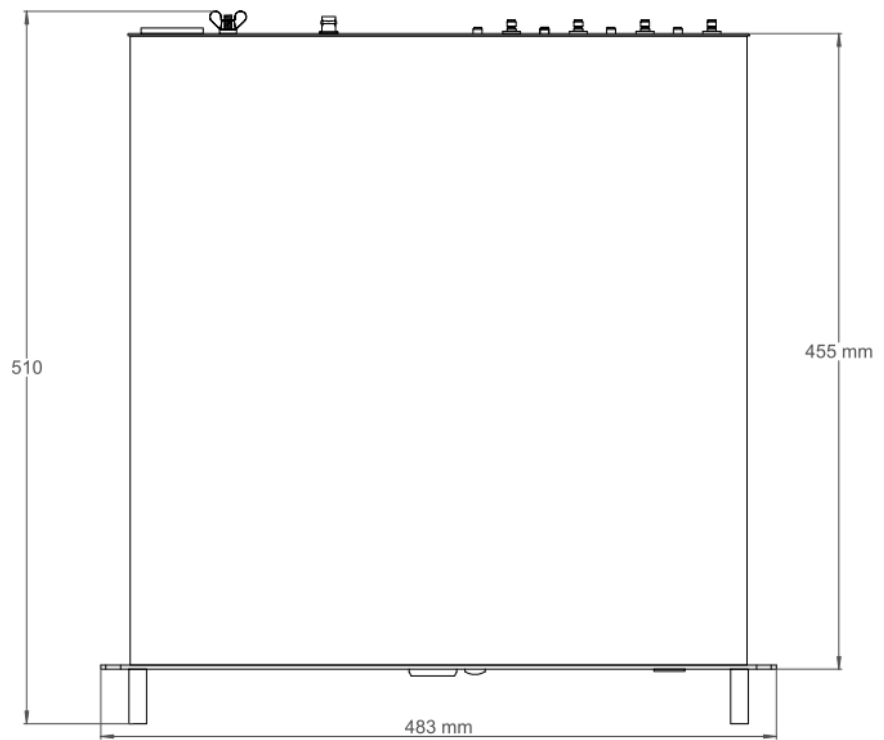
Pin	Assignment
1	DC -
2	not connected
3	DC +(12...27 V), 1 A typ., 4 A max.



## Dimensions



all dimensions in mm  
 $\pm 2$  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