# BSWM-8X8ER

Bidirectional Blocking Wideband 8X8 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

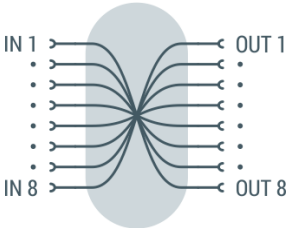
Modern communication standards, including cellular Wi-Fi, ISM, and Bluetooth, require bidirectional signal transmissions regardless of the multiplexing method, whether TDD (Time Domain Division) or FDD (Frequency Domain Division). The BSWM-8X8ER offers an innovative and efficient routing solution for 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-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.

## Principal Block Diagram

The BSWM-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 BSWM-8X8ER 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-8X8ER 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-8X8ER 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-8X8ER 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 | $n_{IN}$ | | 8 | | | bi-directional, blocking |
| number of outputs | $n_{OUT}$ | | 8 | | | bi-directional, blocking |
| low frequency | $f_{MIN}$ | | 100 | 200 | kHz | |
| high frequency | $f_{MAX}$ | 8000 | 8500 | | MHz | |
| insertion loss | $S_{21}$ | | -5 | | dB | f ≤ 4000 MHz |
| | $S_{21}$ | | -7 | | dB | f > 4000 MHz |
| return loss | $S_{11}/S_{22}$ | | -14 | | dB | f ≤ 4000 MHz |
| | $S_{11}/S_{22}$ | | -10 | | | f > 4000 MHz |
| OFF isolation | $S_{21}$ | | -90 | | dB | f ≤ 4000 MHz, SPDT switch open |
| | $S_{21}$ | | -85 | | | f > 4000 MHz |
| channel isolation | $S_{23}$ | | -90 | | dB | f ≤ 4000 MHz |
| | $S_{23}$ | | -85 | | | f > 4000 MHz |
| 3rd order intercept | OIP3 | | +47 | | dBm | |
| 2rd order intercept | OIP2 | | +85 | | dBm | |
| DC voltage | $U_{DC}$ | | | 20 | V | RF ports |
| ESD discharge resistor | $R_{ESD}$ | | 4.7 | | kΩ | 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 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 1 |
| | $t_{O\_RISE}$ | | 1.1 | | µs | 50% trigger → 50% RF rising edge, note 1 |
| switch rise time | $t_{RISE}$ | | 1 | | µs | 10% → 90% RF |
| switch fall time | $t_{FALL}$ | | 2 | | µs | 90% → 10% RF |

Note 1: capacitive load at ‘TRIGGER IO’ Port ≤ 100pF, trigger mode “OUT”

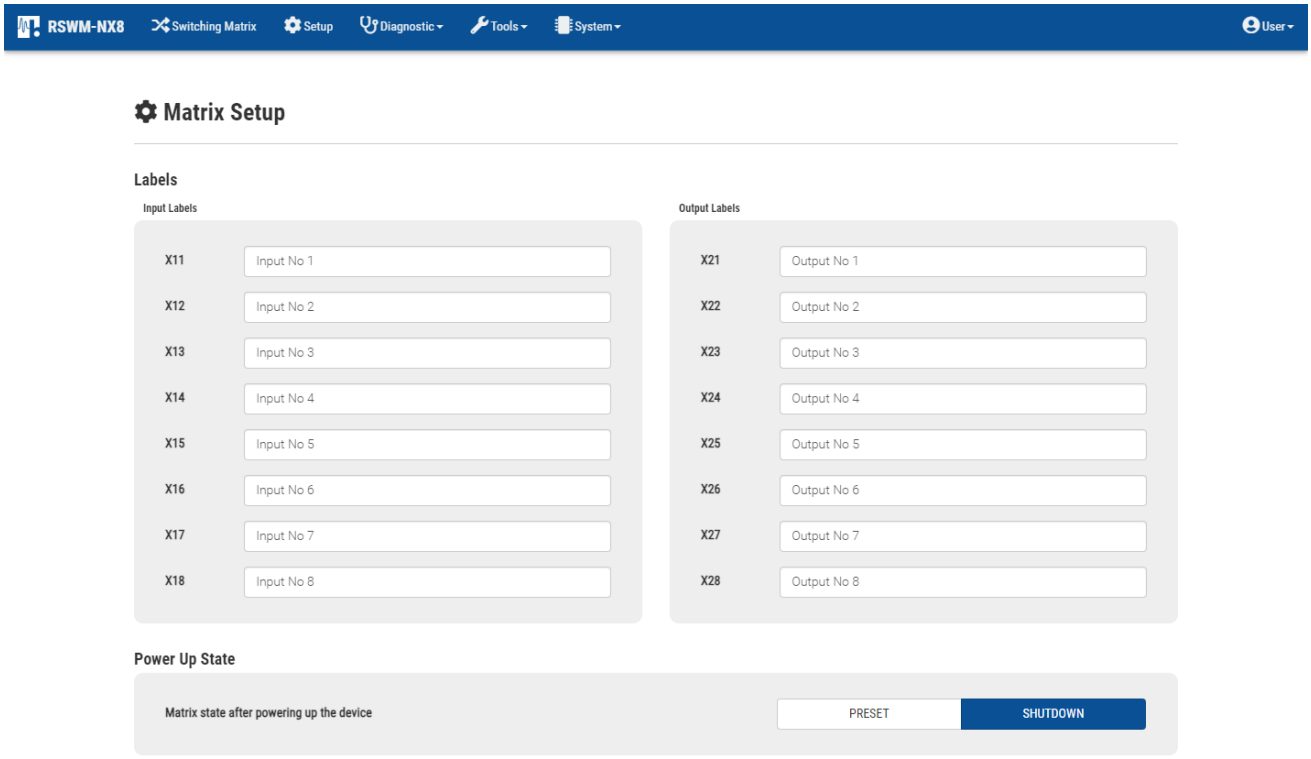
**Common Specification**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| power supply | | 90 | 230 | 260 | V | 50 / 60 Hz AC |
| power consumption | | | 30 | | W | |
| power socket | $X_{AC}$ | 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 | | 3 | | 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** | BSWM-8X8ER | 2005.4802.1 | | | | Variant with AC Supply |
| | BSWM-8X8ER | 2005.4802.2 | | | | Variant with DC Supply |

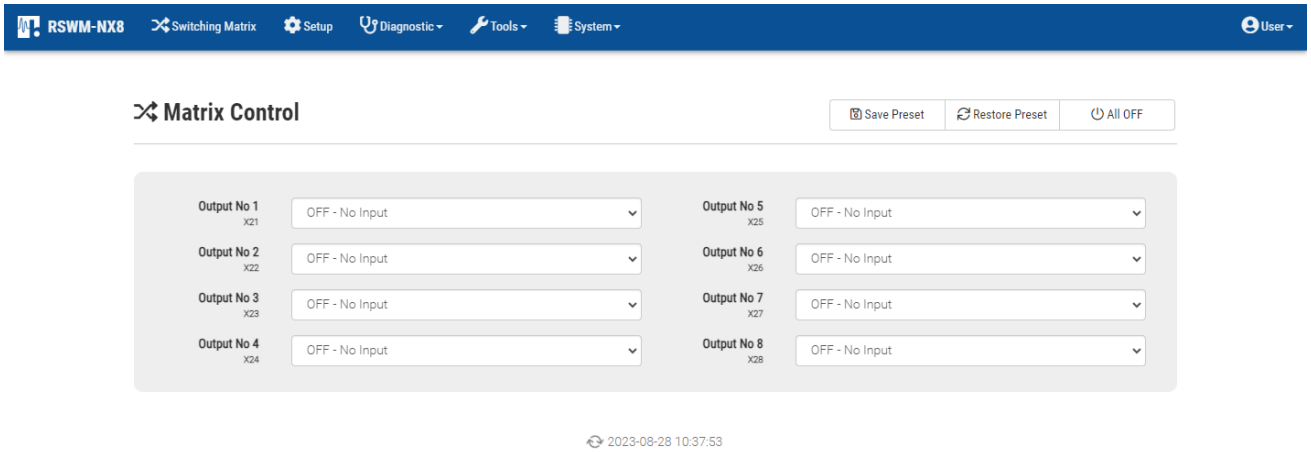
## Graphical User Interface

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




### Matrix Control Interface



## Appearances

### Front View

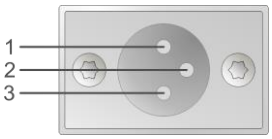

### Rear View

*Variant with AC-Supply*

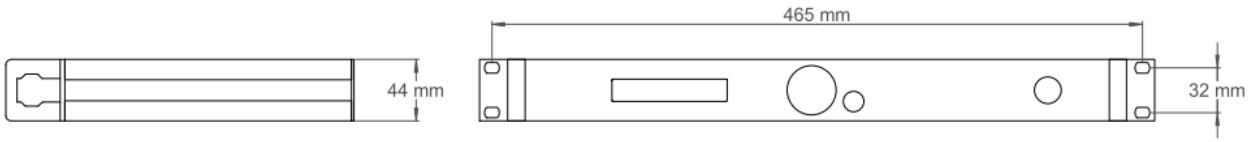

*Variant with DC-Supply*


### DC Variant Pin Assignment

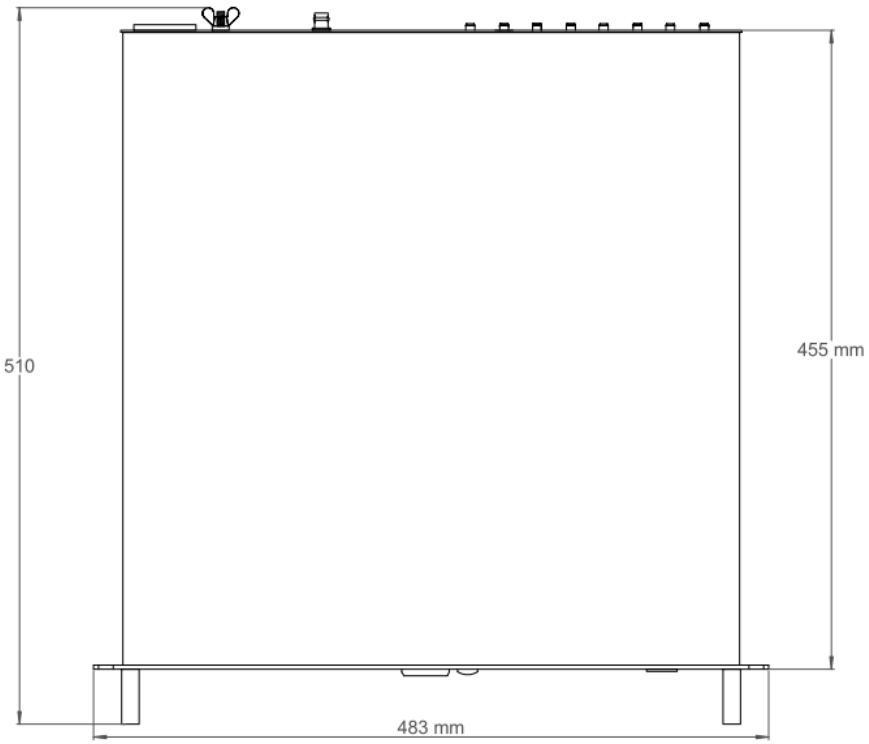
| Pin | Assignment |
|---|---|
| 1 | DC - |
| 2 | not connected |
| 3 | DC +(12…27 V), 1 A typ., 4 A max. |



## Dimensions




all dimensions in mm
± 2 mm



**Related Products**

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