

# SWEDISH MICROWAVE

# Manual

---

Alarm and Monitoring & Control  
General Guidelines

# Table of Content

1. Description .....	3
2. Safety warnings.....	3
3. Installation instructions .....	3
4. Alarm, Monitoring & Control.....	6
5. Troubleshooting.....	10
6. Maintenance and Repair .....	10
7. Technical specifications .....	11
8. Warranty and Legal .....	11
9. Contact details .....	11



Scan the QR-code to access our website. Explore our product range, request a quote, read recent news, discover useful resources, and get in touch with our sales team.



All technical specifications are typical, for specific part number specifications, please contact us. Specifications are subject to change without prior notice. Products from Swedish Microwave AB are made for commercial use.

Swedish Microwave AB | Dynamovagen 5 | S-591 61 Motala  
Sweden | Contact: +46 141 21 61 35 | sales@smw.se | smw.se

Thank you for choosing products from Swedish Microwave

## 1. Description

Swedish Microwave products are a vital component in land, maritime and earth stations in the ground infrastructure for satellite systems.

Our professional LNB, BDC, LNA and RF over Fiber products are designed for outdoor use to enable reliable communications even under the toughest conditions worldwide.

## 2. Safety warnings



### CAUTION!

Power the device with the recommended DC voltage. Too high voltage can damage the device. Connect everything properly before switching on DC voltage. Please consider the voltage drop in a long coaxial cable as too low voltage can affect the functionality. Make sure that the antenna system is grounded to earth to avoid potential voltage that can be discharged through the device.

## 3. Installation instructions

### Quick Start and Prerequisites:

- Monitoring & Control – function enabled only on select SMW products.
- Hardware – connects host/RTU with M8 cable and USB Transceiver (SMW Startkit).
- Register Map – for available (R/W) parameters, specific to each product type and model, download free on website.
- Software or driver. For purposes of testing or troubleshooting the SMW M&C Evaluation Tool is available on request.

**A)** Connect the host (PC)/RTU to the M8 connector on the device (LNB/BDC).

**B)** Power on the device (LNB or BDC) through the RF output connector or separate DC input connector.

**C)** Start the modbus protocol software or driver and make sure that the device is connected to the host (PC). If connection is not opened, make sure that the correct COM port is set. If applicable, import/apply correct Register Map for R/W parameters.

**D)** If more than one device will be used in the installation/modbus network, each device must have a unique device ID. The device address (ID) can be chosen between 1 and 247. In the HOLDING REGISTER, PDU address 0000 you can Read and/or Write the device ID to the device. Default factory setting for SMW devices ID is "60".

**E)** When switching LO band via Modbus you must first change from Legacy mode (Voltage/Tone switching) to Modbus mode. This is made in the COILS REGISTER, PDU address 0002. Legacy mode = 1 and Modbus mode = 0.



**CAUTION!** Protect against water penetration. The components are designed for operation in temperatures between -40 to +80°C. However waveguide input is not waterproof and **MUST BE** protected from moisture and water. In extreme environments such as close to corrosive sea water or installation in antenna towers where IP67 class protection can be deemed insufficient, it is recommended that appropriate action is taken to ensure reliable operation and longevity.



### Connector for Alarm, Monitoring & Control

Type: RS485, M8 (f), 4 pin, A-key coded  
Functions: Alarm, Monitoring & Control, power input  
Pin 1 = Alarm open collector (max. 200 mA)  
Pin 2 = A pos+ RS485  
Pin 3 = B neg- RS485  
Pin 4 = Common (GND)  
5 = Shield



*Illustration of connectors,  
actual product may differ*



Swedish Microwave's labeling for products that support Alarm, Monitoring & Control functionality.



More information about the Modbus standard can be found at <https://modbus.org>

### SMW M&C Hardware Startkit

This Startkit contains one USB to RS485 transceiver with a 0.2 meter cable (M8 female) and a 2 meter M8 cable (male to male). For indoor use only. This is used for connection between PC and the LNB (or BDC), then you will be able to monitor and control the device. Accessories are available for different combinations of cables and transceivers.



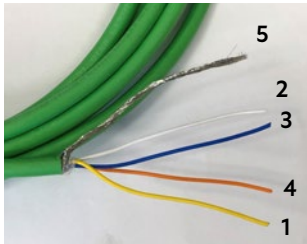
USB transceiver

Download WIN driver for USB-transceiver from <https://www.ftdichip.com>.

The M8 connectors are "keyed" for rotation orientation by the asymmetric pin placement, please make sure to line up the connectors correctly prior to inserting the cable connector. Tighten the M8 connector with max. 0.2 Nm, only use fingers to tighten.

CAUTION! The shield shall not be connected to the Host/Master (PC) as it's connected to the LNB/BDC. Shielded cables min CAT 5 is recommended.

The pigtail end of the modbus cable shall be connected according to the schematic below.



- 1 = Alarm. open coll.
- 2 = A pos+, RS485
- 3 = B neg-, RS485
- 4 = Common (GND)
- 5 = Shield

M8 cable legend for SMW cables

### SMW M&C Evaluation Tool

This freeware is a simple and easy user interface to read/write Monitoring and Control parameters and an easy way to setup and getting started with M&C functions. This software is provided for the purpose of testing and evaluating M&C enabled SMW products.



Contact [support@smw.se](mailto:support@smw.se) for more information about this tool or request download at: <https://smw.se/support/evaluation-tool/>

# 4. Alarm, Monitoring & Control (M&C)

## Monitoring & Control (M&C)

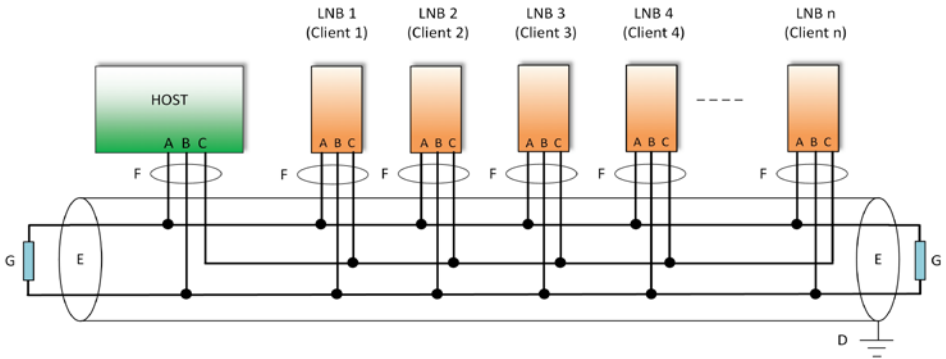
With remote monitoring and control features, operators can access real-time diagnostics, performance metrics from a central location, significantly reducing maintenance costs and downtime, making them superior to traditional troubleshooting. Enabling SATCOM operators to install, configure, and monitor with extreme ease and confidence. Standard Fieldbus RS-485 electrical and MODBUS RTU interface

### Control examples

Band switching, Gain offset, Alarm trigger, Persistent alarm, Alarm output, Temp °C or F, GPO output, Modbus RTU parity mode

### Monitor examples

Alarm, Persistent alarm, Selected band, IF out level, LNA current, Total current, Input voltage, Temperature, LO locked, ext. 10MHz detected, Ext 10MHz locked, Active reference: (internal/10MHz), 22kHz detect, Days of operation, Serial number, Software version



### Modbus schematic

A & B = RS 485, Tx + Rx

C = Common

D = Cable shielded to ground. NOTE! Only grounded at one point!

E = TP Cable shielded, min cat 5, max 600 meter

F = TP Cable shielded, min cat 5, max 20 meter

G = 120 ohm resistor. Needed if cable E is longer than 30 meter

## Modbus registers

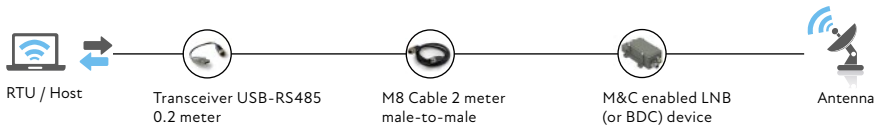
### Default communication settings

All Swedish Microwave Monitoring & Control (RS-485/MODBUS RTU) enabled products are delivered with 19200 baud, 8 data bits, even parity, 1 stop bit (19200 8E1) serial configuration as factory default unless otherwise is specified. For TCP/IP connection, port 502 is enabled. Read (R) / Write (W) parameters are specified in a Modbus Register Map. The Register Maps are specific to the each product model and provided in the universal fileformat .csv (comma-separated-values). Download the latest Register Map in the Document section on the product page.

Address	Type of register	Name	PDU Address	Valid values	Value map	Size	Notes
0xNNNN	Coils	Name of register	Min 0 Max FFFF	Mathematic notation eg [1,3], 1,2,3.	Describes unit of value and/ or scaling. For registers containing discrete options, each different setting is described.	The size of the return value formatted in # of registers.	Description of register, purpose etc.
1xNNNN	[R/W]						
3xNNNN	Discrete						
4xNNNN	[R/] Input [R/] Holding [R/W]		<b>Datatype</b> Int UInt Bitmap Bool				

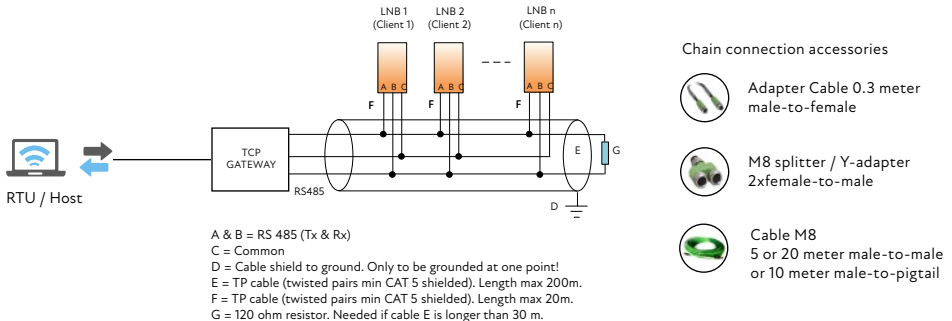
## Direct connection

Schematic showing a direct connection using the M&C Startkit with USB transceiver.



## Chain connection

Schematic showing a chain connection using a gateway to ethernet.



## Alarm description

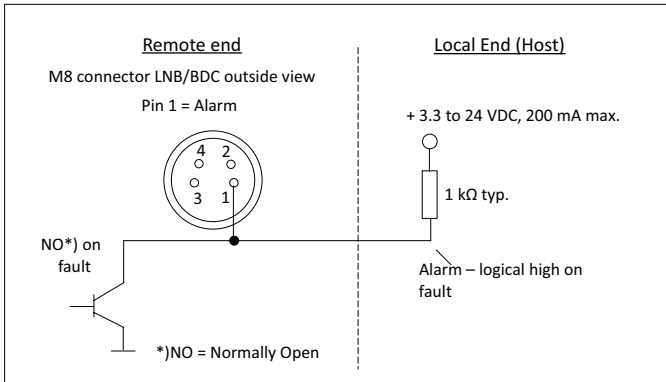
The Sum alarm output in the M8 connector is available on pin 1 and it is configured in the hardware as an open collector for connection to an external device for monitoring of the Sum alarm or as a trigger for a redundancy switch, see schematic Alarm wiring.

The Sum alarm is activated (ON/OFF) via the Register "Discrete inputs". Setting for pin 1 is Normally Open (NO) or Normally Closed (NC). Default setting is Normally Open (NO)

Alarm output:

The Alarm output connector J3 pin 1 is an Open collector, Open on fault. 3.3V to 24V max. 200mA. Factory setting is NC (Normally Closed). The alarm output is a sum alarm that by default trigger on the listed items below, this can be changed in modbus registers related to the sum alarm, see below:

- LO; Locked, External LO reference detected, External LO reference lock
- Total current consumption (>600 mA)
- LNA (built in) failure
- RF power (IF) detector limit (outside -57 dBm to -5 dBm)



Alarm wiring

## Alarm register description

To be able to see what has triggered the Sum Alarm, you can read value via Monitoring & Control to find out the reason for one or more alarms as described. In the Holding register, "Alarm triggers" it's possible to apply settings for Alarm sources, see in "Alarm register bit mapping" table below, for included Sum alarms.

If an Alarm is active you can read from Input registers, "Alarm register" according to the table below, what type of Alarm that is active. If an Alarm have been activated in past time, you can read in the Input registers, "Persistant Alarm" which alarm was triggered. Reset of the "Persistant alarm" is done in the Coils register, "Persistant alarm reset".



Alarm sources if set as triggers for Sum alarm  
 Default from factory, all Alarm registers are set as triggers, value 0x00FF in the Holding register, "Alarm triggers". To inactivate all triggers, this value shall be set as "0" (0x0000).

- Bit 0 = If LO is not locked
- Bit 1 = If Ext. ref. is not locked (10 MHz missing or signal bad)
- Bit 2 = If Ext. ref. is not detected (10 MHz signal missing or bad)
- Bit 3 = If LNA failure i.e. first amplifier stage failed
- Bit 4 = If the RF power (IF out) is too low. (limit is broken RF chain)
- Bit 5 = If the RF power (IF out) is too high (limit is saturation)
- Bit 6 = The total current of unit is too Low (limit 100 mA)
- Bit 7 = The total current of unit is too High (limit 600 mA)

Alarm register bit mapping				
Alarm source	Bit no	Hex	Dec	Binary
LO lock detect	0	1	1	0000 0001
Ext ref lock	1	2	2	0000 0010
Ext ref detected	2	4	4	0000 0100
LNA failure	3	8	8	0000 1000
RF power low	4	10	16	0001 0000
RF power high	5	20	32	0010 0000
Total current low	6	40	64	0100 0000
Total current high	7	80	128	1000 0000
Both Ext. Ref unlocked and undetected				
	1 & 2	6	6	0000 0110

Alarm trigger settings in Holding register (4x0002), Modbus PDU adress 0001

Modbus Mode: RTU Slave Addr: 60 Scan Rate (ms): 1000

Function Code: Read Holding Registers (0x03) Start Address: 1 Dec

Number of Registers: 1 Data Format: Bin

0000000011111111

Bit "7" Bit "0"

Alarm register reading after getting a sum alarm, Input register (3x0001), Modbus PDU register 0000

Modbus Mode: RTU Slave Addr: 60 Scan Rate (ms): 1000

Function Code: Read Input Registers (0x04) Start Address: 0 Dec

Number of Registers: 1 Data Format: Bin

0000000000001000

Bit "3" active = Alarm for LNA failure

Alarm bitmapping examples

## 5. Troubleshooting

Ensure that the DC voltage of the power input aligns with the specifications provided in the product sheet. If there is a very long cable feeding the device with power, this may cause DC to drop below critical value, and cause the device to be unstable or not work at all.

Check that the device is powered up via the RF connector or separately DC in connector. Make sure that the host (PC) has the appropriate connection settings for the device address in the LNB/BDC. If a USB to RS485 transceiver is used, make sure that the correct COM port (USB port) has been chosen in the host (PC) program settings. Default settings for the serial port is: Baud rate 19200, 8 databits, 1 stop bit, even parity. If TCP/IP is used the default port is 502.

Secondly check the wiring regarding correct connection in between cables if more than the factory cable are installed and that 120 ohm resistors are terminated if the total cable length exceeds 30 meter. For very long cable distances we recommend to use a RS485 transceiver for galvanic isolation to the host (PC).

Continue by checking that the correct device ID is chosen for the device. Default factory set Device ID for all LNBs and BDCs is "60". If multiple devices are installed in the same Modbus RS485 network, each device must have a unique Device ID.

Install WIN Driver for USB-transceiver: Download the latest from [www.ftdichip.com](http://www.ftdichip.com)

NOTE! In the SMW M&C Evaluation tool there is a "Search" button to use if a device settings is by mistake changed to unknown setting, regarding Parity and Device address (ID).

For troubleshooting of the Alarm and Monitoring & Control functionality we refer to the QnA, please visit the Knowledge base at [www.smw.se](http://www.smw.se) or contact us on [support@smw.se](mailto:support@smw.se) for further assistance.

## 6. Maintenance and Repair

The device does not contain any parts that can be serviced by the user. For any inquiries related to maintenance, warranty, or service, please request a Return Material Authorization (RMA) at [www.smw.se](http://www.smw.se) or by sending an email to [support@smw.se](mailto:support@smw.se).

When submitting your request, please include your name, email address, and company details. Also specify the product, part number, or serial number in question and attach a photo of the device. Provide a detailed explanation of the issue and any other information that could be helpful.



### NOTICE!

Any device returned without an RMA number will be refused.

## 7. Technical specifications

Technical specifications are typical, specific part number specifications are available. Specifications are subject to change without prior notice.



For further details about each products technical specifications, please scan QR-code link to access website for complete **Documentation, Technical Specifications, Manuals** and **Register Maps**. Find your product at <https://smw.se/findproduct>



## 8. Warranty and Legal

General Terms & Conditions: ORGALIME S 2012 and Appendices.  
Standard Warranty 36 Months. Read more at <https://smw.se/terms/>  
Products from Swedish Microwave AB are made for commercial satcom use only.  
Country of Origin: SWEDEN

All products from Swedish Microwave are CE compliant with the following EU directives as applicable, depending on when placed on the market. Declaration of Conformity is available on request.

- Low Voltage Directive (LVD) 2014/35/EU
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Radio Equipment Directive (RED) Directive 2014/53/EC
- Reduction of Hazardous Substances (RoHS 2) Directive 2011/65/EC
- Regulation (EC) No 1907/2006 (REACH Regulation)

Swedish Microwave is Assessed and Certified for:

- SS-EN ISO 9001:2015 Quality management
- SS-EN ISO 14001:2015 Environmental management
- SS-EN ISO 45001:2018 Occupational health and safety management



## 9. Contact details

Address: Swedish Microwave AB, Dynamovägen 5, 591 61 MOTALA, SWEDEN  
Main Phone: +46 141 21 61 35. Email: [info@smw.se](mailto:info@smw.se).  
Contact the Sales Team: [sales@smw.se](mailto:sales@smw.se).  
Contact information is available on the company website at [www.smw.se](http://www.smw.se).



## Feedback

Your opinion is important to us! Use the contact link at [www.smw.se](http://www.smw.se).





Welcome to contact the  
Sales Team at [sales@smw.se](mailto:sales@smw.se) or  
call us at +46 (0) 141 21 61 35



High throughput products  
for Broadcast, Teleports  
and Satellite Operators



Reliable solutions for  
Earth Observation



Robust and weatherproof  
product range for Mobile  
and Marine Satcom

**SWEDISH**   
**MICROWAVE**

Swedish Microwave AB | Dynamovagen 5 | S-591 61 Motala  
Sweden | Contact: +46 141 21 61 35 | [sales@smw.se](mailto:sales@smw.se) | [smw.se](http://smw.se)