Industrial Managed LAN-RING Switches
Package Contents

PRODUCT PAGE

The product page contains datasheets, application notes, links to software downloads, videos, case studies, and other documentation.

https://www.metel.eu/l/en/switchef

SIMULand v.4 CONFIGURATION SOFTWARE

SIMULand v.4 is a configuration software for installing and IP system diagnostics. Advantages include:
- The configuration software for all METEL IP devices,
- Automatic detection and interpretation of topology; and many more

https://www.metel.eu/l/en/simuland

This document contains installation instructions for the switches of the following versions:

MINI BOX SERIES	CODE	COMBO	SFP	SFP+	GE	FE	PoE max./port	RS485/422	DI/AI	RELAY
2G-2S.0.2.F-BOX-PoE-PP	1-989-220	0	2	0	0	2	95W	2/1	2	1
2G-2S.0.3.F-BOX-PoE	1-988-220	0	2	0	0	3	30W	2/1	2	1
2G-2S.0.3.FC-BOX	1-871-220	0	2	0	0	3	-	-	-	-
200M-0.0.5.FC-BOX	1-780-220	0	0	0	0	5	-	-	-	-
2G-2S.3.0.F-BOX	1-874-220	0	2	0	3	0	-	2/1	2	1
2G-2S.1.4.F-BOX-PoE-PP	1-883-200	0	2	0	1	4	95W	2/1	2	1
10" SERIES										
2G-1C.0.8.FC-BOX-PoE-PP	1-886-220	1	0	0	0	8	95W	-	-	-
2G-2C.0.8.F-BOX-PoE-PP	1-885-220	2	0	0	0	8	95W	2/1	2	1
2G-2C.8S.0.0.F-BOX	1-878-220	2	8	0	0	0	-	2/1	2	1
20G-2X.8.0.F-BOX	1-981-220	0	0	2	8	0	-	2/1	2	1
19" SERIES										
2G-6S.1.16.F-UNIT/1U	1-860-426	4	2	0	1	16	15W	1/0	2	1
2G-10S.F-UNIT/1U	1-898-111	10	0	0	0	0	-	2/1	2	1
20G-2X.8C.0.F-UNIT/1U	1-984-410	8	0	2	0	0	-	2/1	2	1

The package contains

mini BOX series
- Swich
- DIN Rail mounting kit
- Mounting kit for wall placement
- Installation Manual

10" series
- Switch
- DIN Rail mounting kit
- Mounting kit for wall placement
- Holders to 10" Cabinets
- Installation Manual

19" series
- Switch
- One pair of SFP modules (1x BX-1000-W4, 1x BX-1000-W5)
- External Supply with Power 280W (2G-6S.1.16.F-UNIT/1U only)
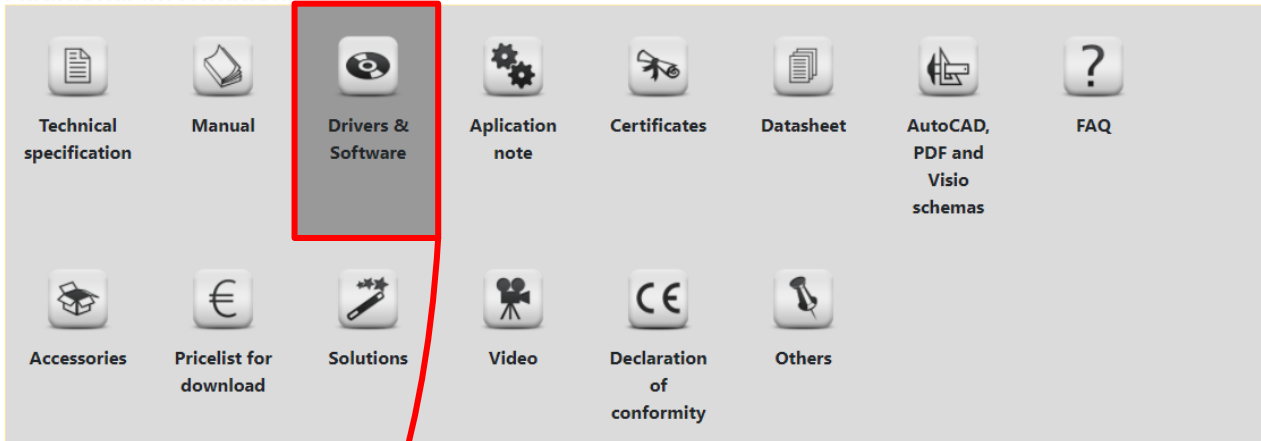- EURO Power Cable
- Installation Manual

Software

The following freeware applications are available for download from www.metel.eu.

• Freeware configuration software **SIMULand.v4**
• USB drivers

Software is compatible with OS Windows 7, Windows 8.1 and Windows 10 (32 and 64b).

Additional information:

Technical specification Manual Drivers & Software Aplication note Certificates Datasheet AutoCAD, PDF and Visio schemas FAQ

Accessories Pricelist for download Solutions Video Declaration of conformity Others

Drivers & Software

- SIMULand.v4_21.5.21.4869_RC
- SIMULand.v4_20.07.17.4649
- MIB file
- USB drivers

Mounting and Installation

Mini BOX series

The package contains two screws for a flat surface placement and a DIN holder with bolts for mounting to the DIN35 rail.

Vertical Mounting on DIN35　　　**Mounting to DIN35**　　　**Mounting to a Flat Surface**

10" series

The 10" series switches can be mounted as mini BOX devices, and also in 10" cabinets or in a 19" cabinets with an RE-19/10 reduction.

19" series

Switches of the 19" series can be mounted only in a RACK 19" cabinet.

📖　**When using switches in alarm systems acc. to EN 50131-1 ed.2 it is necessary to place the switch into a distribution box meeting the requirements of this standard.**

Power Connection

For **non-PoE** application it is recommended to use one of the following power supplies.

TYPE	MAXIMAL POWER	INPUT RANGE	OPERATIONAL TEMPERATURE	OUTPUT VOLTAGE	NOTE
M-MDR-40-48	40 W	85-264 VAC	-20℃...+70℃	48-55VDC	
M-MDR-100-48	100 W	85-264 VAC	-10℃...+60℃	48-55VDC	
M-SDR-120-48	120 W	88-264 VAC	-25℃...+70℃	48-55VDC	
M-SDR-240-48	240 W	88-264 VAC	-25℃...+70℃	48-55VDC	
M-PS110.H 12480802	110 W	207-253 VAC	-25℃...+60℃	48VDC (max. 2 A)	BACK-UP PSE
TRF-24100T	100 W	207-253 VAC	-40℃...+70℃	24VAC	

Power connection is shown in the figures below.
Use two 1 - 1.5 mm² wires between the power supply and the switch. It is recommended to tin the wires or to use a compression joint before the connection.
If redundant power is required use redundant power input.

For **PoE** application it is recommended to use one of the following power supplies.

TYPE	MAXIMAL POWER	INPUT RANGE	OPERATIONAL TEMPERATURE	OUTPUT VOLTAGE	NOTE
M-MDR-40-48	40 W	85-264 VAC	-20℃...+70℃	48-55VDC	
M-MDR-100-48	100 W	85-264 VAC	-10℃...+60℃	48-55VDC	
M-SDR-120-48	120 W	88-264 VAC	-25℃...+70℃	48-55VDC	
M-SDR-240-48	240 W	88-264 VAC	-25℃...+70℃	48-55VDC	
M-PS110.H 12480802	110 W	207-253 VAC	-25℃...+60℃	48VDC (max. 2 A)	BACK-UP PSE

📖 **Recommend power supply for using PoE:**
   PoE up to 15,4W -> 48 - 57 VDC
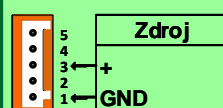   **PoE up to 30W-> 52 - 57 VDC**
   PoE up to 95W-> 53 - 57 VDC
Power connection is explained in the figures below.
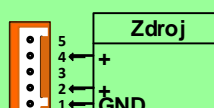If redundant power is required use redundant power input.

Redundant DC Power Supply:
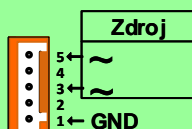**Main Input +10 up to +60V DC**   **Redundant Input +10 p to +60V DC**

Note:
- Terminals 2 and 4 are connected.
- both power inputs can be used simultaneously only on grounded systems (-) power supply pole

AC Power:
Input 10 up to 30V AC

⚡ The switch cover is galvanically separated from the electronics on the PCB, which allows its use in systems with a grounded (+) or (-) pole. A lightning arrester is connected between the GND terminal and the cover.

📖 **When using a redundant power supply it is necessary to ensure a difference of a min. 1V between the main and redundant power supply. The switch always takes current from a higher voltage, and when it is disconnected the switch without interruption automatically switches to a lower (redundant) power supply.**

Industrial Managed LAN-RING Switches
## Power Connection & Safety Measures

> **The transmission of PoE power supply via data cables falls within the scope of standards ČSN EN 62368-1 and 3. These define, among other things, the basic requirements for minimizing the risk of injury, fire or property damage and divide electricity sources into categories ES1 to ES3. PoE PSE circuits in switches fall into the safest category ES1 with a maximum delivered power <100 VA per 1 port. This and the following pages describe the security features of switches and installation rules to minimize these risks.**

Isolated Connection

The switch is grounded via an internal lightning arrester, which ensures galvanic separation from PE and elimination of ground loops. PoE PD devices are also separated from PE in accordance with PoE standards.

- The 30mA protector (RCD) protects especially when touching a live part with 230V (AC currents).
- When the live part comes into contact with 48VDC, the current goes through the body into the PE and is negligible.
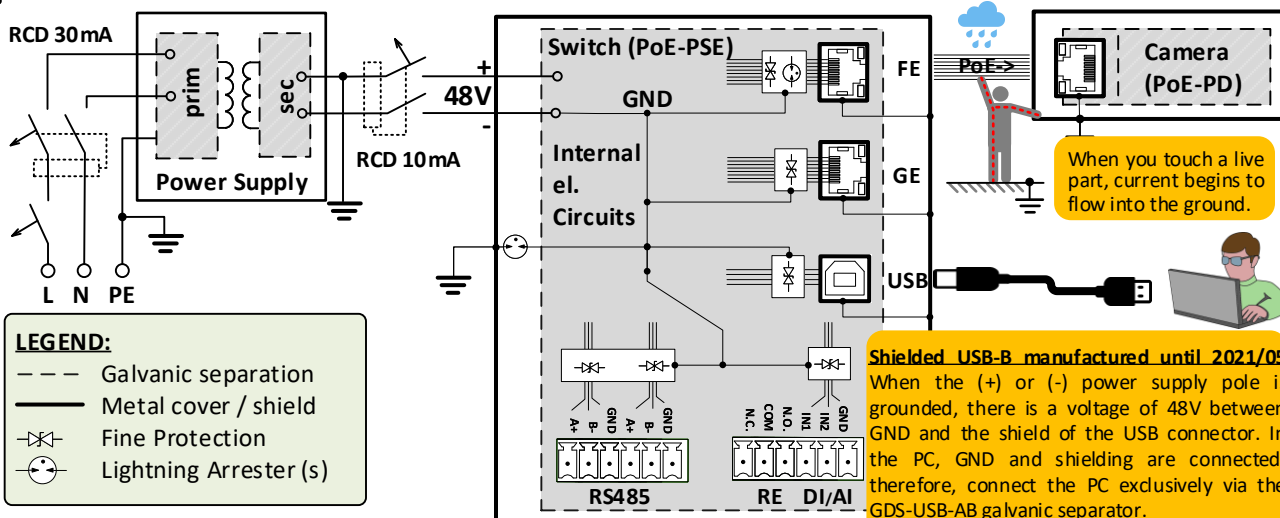

LEGEND:
- – – – Galvanic separation
- ───── Metal cover / shield
- ▷◁ Fine Protection
- ⏚ Lightning Arrester (s)
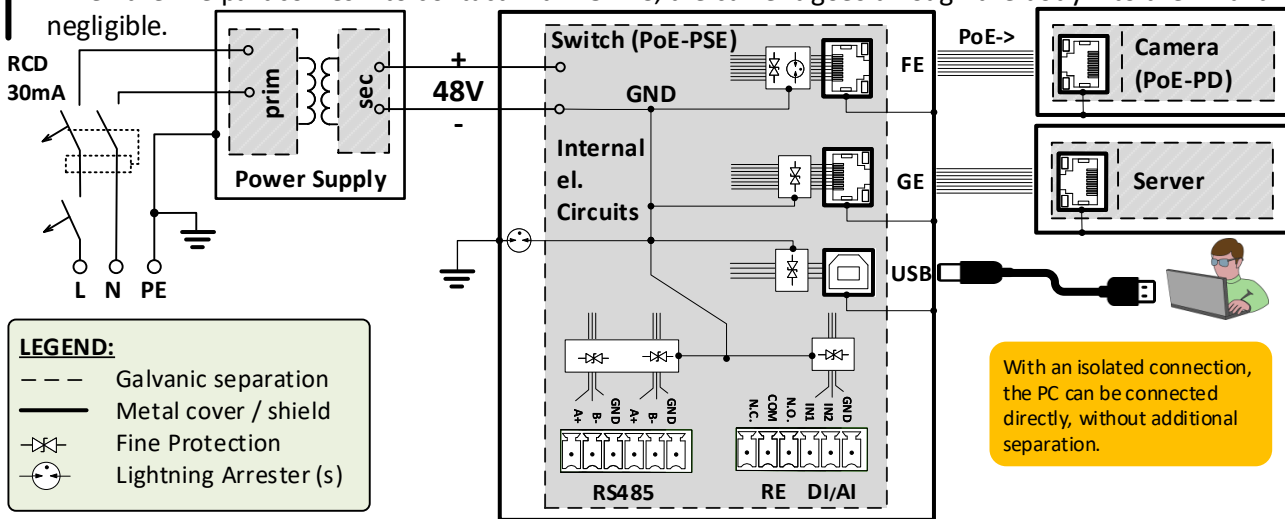
With an isolated connection, the PC can be connected directly, without additional separation.

Connection with Grounded (+) or (-) Power Pole

In PoE systems with a directly grounded (+) or (-) pole, it is necessary to place increased emphasis on el. safety. Especially in cases where PoE cables interfere with outdoor or humid environments, contact of live parts with a potential against the ground can cause dangerous residual current to flow through the human body into the PE. A suitable protection in such a case is a 10mA type A circuit breaker capable of switching off even escaping direct current.

- The 30mA protector (RCD) protects especially when touching a live part with 230V (AC currents).
- When touching a live part with 48VDC, the leakage current is interrupted by a 10mA circuit breaker.

LEGEND:
- – – – Galvanic separation
- ───── Metal cover / shield
- ▷◁ Fine Protection
- ⏚ Lightning Arrester (s)

When you touch a live part, current begins to flow into the ground.

Shielded USB-B manufactured until 2021/05
When the (+) or (-) power supply pole is grounded, there is a voltage of 48V between GND and the shield of the USB connector. In the PC, GND and shielding are connected, therefore, connect the PC exclusively via the GDS-USB-AB galvanic separator.

Unshielded USB-B manufactured from 2021/05
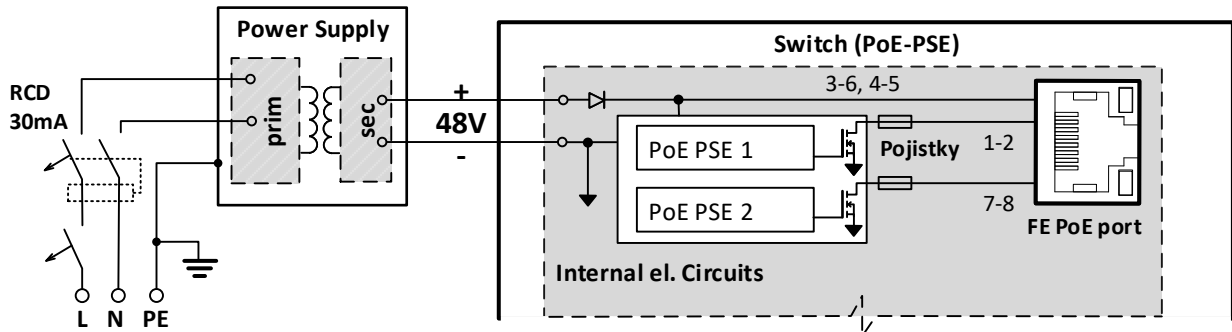The PC can be connected directly, without the use of a separator.

## Overload and Short Circuit Protection

Each PoE PP port (design 2021) is connected to two independent PoE-PSE with automatic overload protection (from overheating) and short circuit protection. In addition, each output transistor is protected by a non-return fuse in the event of a fault.

Ensuring Maximum Effectiveness of Surge Protectors

Insulated Connection (Earthed PE Terminal Only) - the entire power system "floats" around the earth's potential. In the event of an overvoltage, the potential is limited by a lightning arrester inside the switch connected between GND and PE (DC ignition voltage 90V).

Connection with Grounded (+) or (-) Power Pole - overvoltage protection against negative pulses is limited to a maximum of hundreds of A (affects the output short-circuit protection of the power supply). The reason is the load of the overvoltage protection by short-circuit current from the power supply.
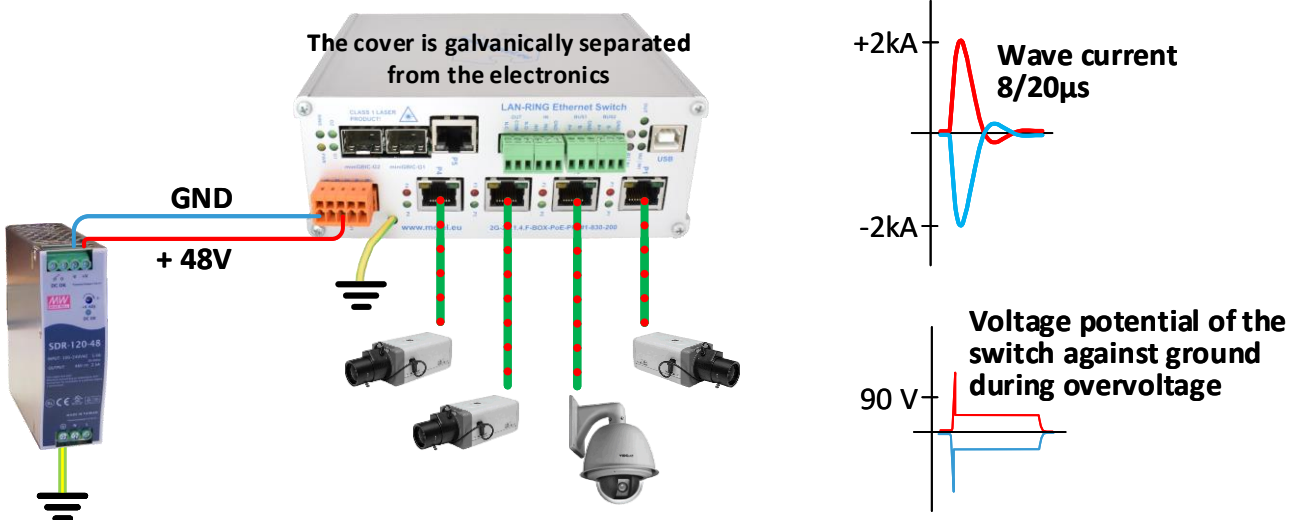
SFP Modules Connection

Insert the SFP module into the free SFP slot in the switch.

For correct functioning of the LAN-RING.v1 and .v2 systems it is essential to maintain proper connection of the GBIC modules. The module marked W4 is always inserted into the lower miniGBIC slot (e.g. G1) and the module marked W5 into the higher miniGBIC slot (e.g. G2). The same rule applies to switches that allow multiple rings to be connected.

W5
Tx:1550nm
Rx:1310nm

W4
Tx:1310nm
Rx:1550nm

W4
Tx:1310nm
Rx:1550nm

W5
Tx:1550nm
Rx:1310nm
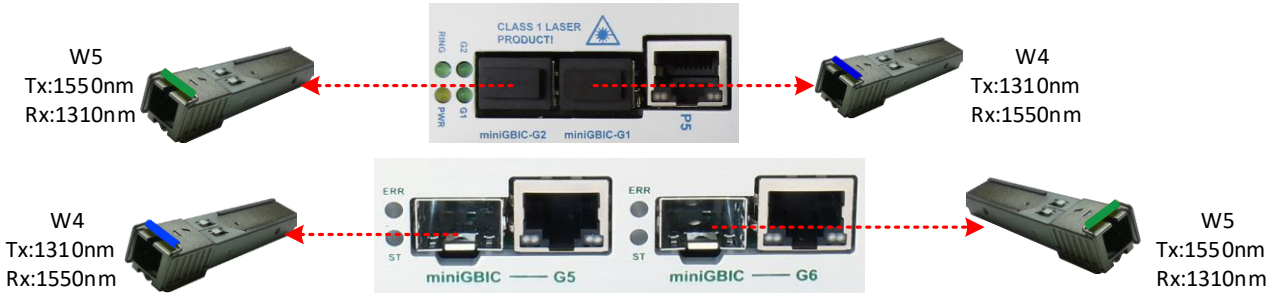
Switches supporting multi-ring connections and their default LAN-RING protocol settings.

SWITCH	RING 1/LAN-RING	RING 2/LAN-RING	RING 3/LAN-RING	RING 4/LAN-RING	RING 5/LAN-RING
2G-10S.F-UNIT/1U	G1-G2/DISABLE	G3-G4/DISABLE	G5-G6/DISABLE	G7-G8/DISABLE	G9-G10/LAN-RING.v2:ID0
2G-6S.1.16.F-UNIT/1U	G1-G2/DISABLE	G3-G4/DISABLE	G5-G6/LAN-RING.v2:ID:0	-	-
2G-2C.8S.0.0.F-BOX	*P1-P2/DISABLE	*P3-P4/DISABLE	*P5-P6/DISABLE	*P7-P8/DISABLE	G1-G2/LAN-RING.v2:ID0

* SFP slots can only be used for optical modules with a speed of 100Mbps.

📖 Enabling / disabling the LAN-RING protocol can be changed in the switch configuration.

SFP modules are equipped with lasers class 1 and 1310 and 1550 nm.

⚠️ **Lasers can damage your sight! For this reason do not under any circumstances look into the SFP modules that are inserted into the switch under voltage. SFP modules contain laser sources CLASS 1 according to EN60825-1-1**

Due to the wavelength multiplex apply "interconnection", i.e. interconnect W4 to W5 (see table).

SFP MODULE	FIBER	POWER [dBm]	SENSITIVITY [dBm]	DISTANCE [km]	CONNECTOR
BX-100-20-xxx	MM (50-62.5/125 µm)	−14…−8	-32	5	SC/PC
	SM (9/125 µm)	−14…−8	-32	20	SC/PC
BX-1000-20-xxx	MM (50-62.5/125 µm)	−9…−3	-22	2	SC/PC
	SM (9/125 µm)	−9…−3	-22	20	SC/PC
BX-1000-60-xxx	MM (50-62.5/125 µm)	−3…+2	-22	2	SC/PC
	SM (9/125 µm)	−3…+2	-22	60	SC/PC
BX-10G-20-xxx	SM (9/125 µm)	−2…+2	<-14	20	LC/PC

The producer retains the right to change any technical parameters without previous written or published notification.

SFP MODULE	WAVELENGTH [nm]	NOTE
BX-100/1000-xx-W4	Tx 1310 / Rx 1550	
BX-100/1000-xx-W5	Tx 1550 / Rx 1310	WARNING: converters contain laser sources CLASS 1 according to EN60825-1-1
BX-10G-20-W4	Tx 1270 / Rx 1330	
BX-10G-20-W5	Tx 1270 / Rx 1330	

The producer retains the right to change any technical parameters without previous written or published notification.

Proper interconnection is indicated by the GREEN LED of a port switching on.

Port activity is indicated by a blinking LED ACT.

Max. distances between ports are limited to the following table.

📖 **SFP slots are 100% compatible with MSA standard. Eventual malfunction in other manufacturers devices can be caused by the fact that each SFP module, regardless of manufacturer, contains EEPROM with a whole range of module data and some switches are not able to recognize modern WDM standards 100 and 1000 BASE-BX or ignore SFP modules from other manufacturers (the name is stored in EEPROM), etc.**

Topology

Topology Point-to-point, Bus, Star

Switches support connection in topology point-to-point, bus or star including systems where our switches are combined with switches from the other vendors.

Topology Optical Ring

Switches support topology optical ring. Before the ring is closed it is necessary to set a Ring ID for all switches and one switch must be in MASTER mode. In networks with multiple rings each ring must have a unique Ring ID. For detailed settings see the following chapters or consult the Help for SIMULand.v4 software. For switches which support LAN-RING.v2 it is not necessary to set the priority of the MASTER. LAN-RING.v2 automatically selects one switch as MASTER.

Topology MESH

Switch 3rd generation (with optical SFP slots) and with the FW54 and higher, support RSTP-M (M = Metel), which is 100% compatible with RSTP / STP. In networks with features that support RSTP-M the acceleration time of reconfiguration is tens to hundreds of milliseconds.

Switch Configuration

LAN Management - IP Address, Mask and Gateway

Every switch has a pre-set default configuration with a mask 255.0.0.0 and IP addresses which start 10.x.x.x. Default IP addresses and MAC addresses are written on the label.
Change the IP address if required.
Run application SIMULand.v4 (available on www.metel.eu).
Create the new project and open it. Click on the icon Search(LAN). Your computer must have a valid IP address which is in the range used by the switches (default: 10.xxx.xxx.xxx and mask 255.0.0.0). Please check firewall settings if no devices were found. A new rule must be created for SIMULand.v4 or the Firewall must be turned off.
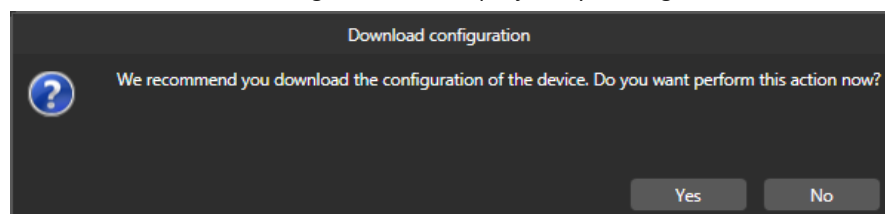Select icon „**Search(LAN)**" (Remote management).
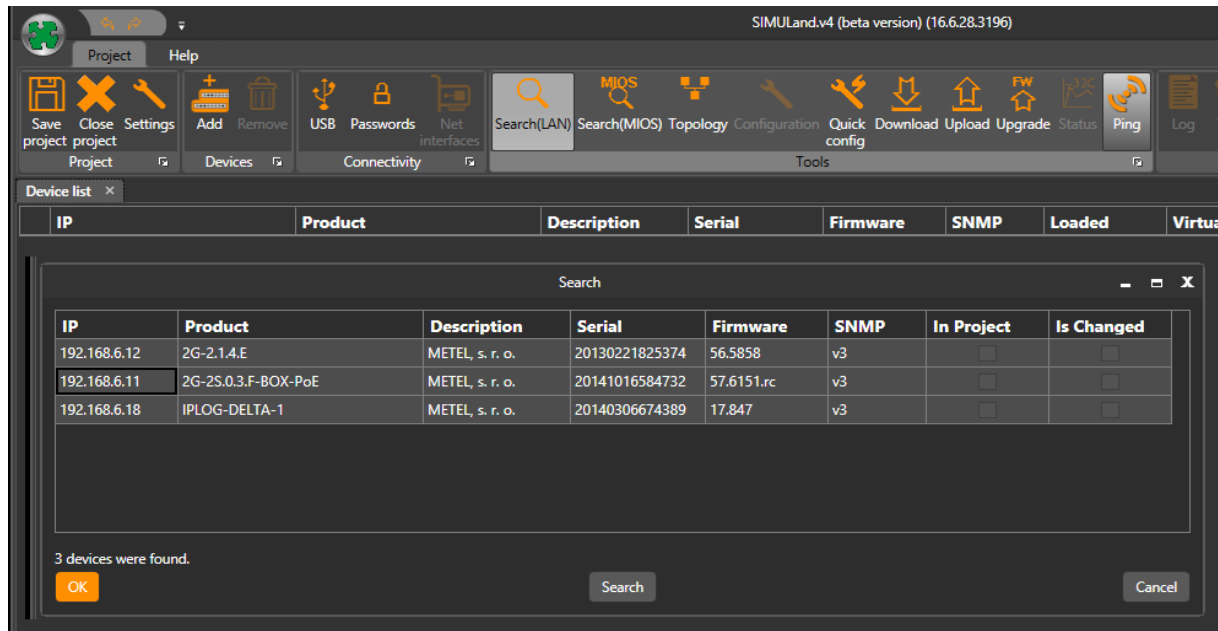
Select devices for configuration and add to the device list.
It will now offer to download the configurations of all added devices.
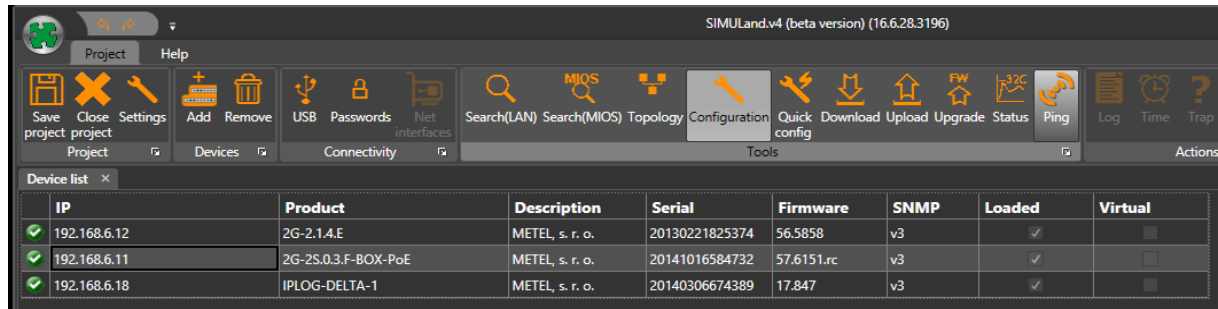Confirm the download configuration to the project by clicking on **"YES"**.

After the configuration download is complete, click on "OK". You'll see a list of devices that you have added to your project. From the device list, select the switch which you want to configure and click "**Configuration**".

📖   **You can also use double-click on a switch in the device list, which takes you directly to the device configuration.**

In the menu "**IP**" set the IP address, subnet mask and gateway.
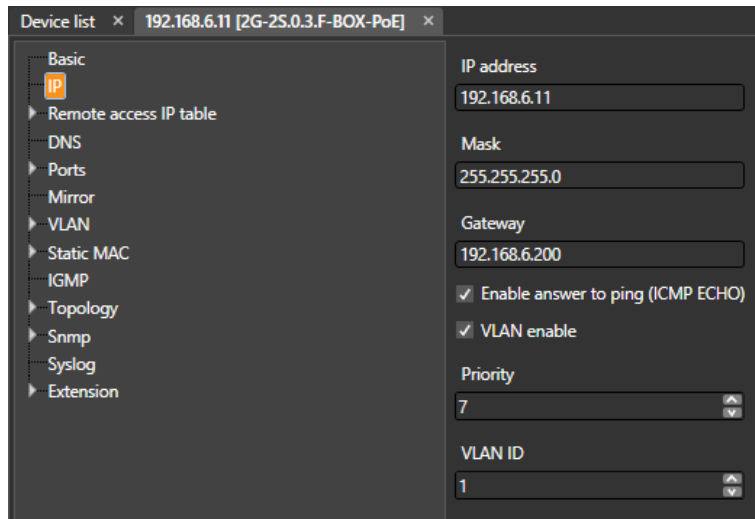
📖 **In the quick configuration, it is possible to change the IP address, subnet mask and gateway for all devices at one moment. More information is explained in the manual for SIMULand.v4.**

Local Management

Connect the device to a computer using USB-A-B cable (not included).
Install driver – for download from www.metel.eu
Verify correct port assignment in the Device manager.
Run SIMULand.v4 - download at www.metel.eu and create a new project.
Click on the "USB" icon.
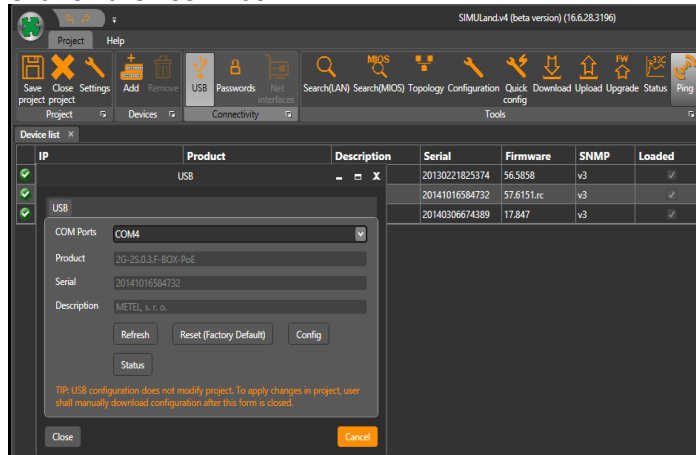
LAN-RING.v1

📖 **Configuration required for properly working RING - before the optical RING is closed!**

For the proper functioning of the ring all switches must be connected to the ring enabled in LAN-RING protocol.
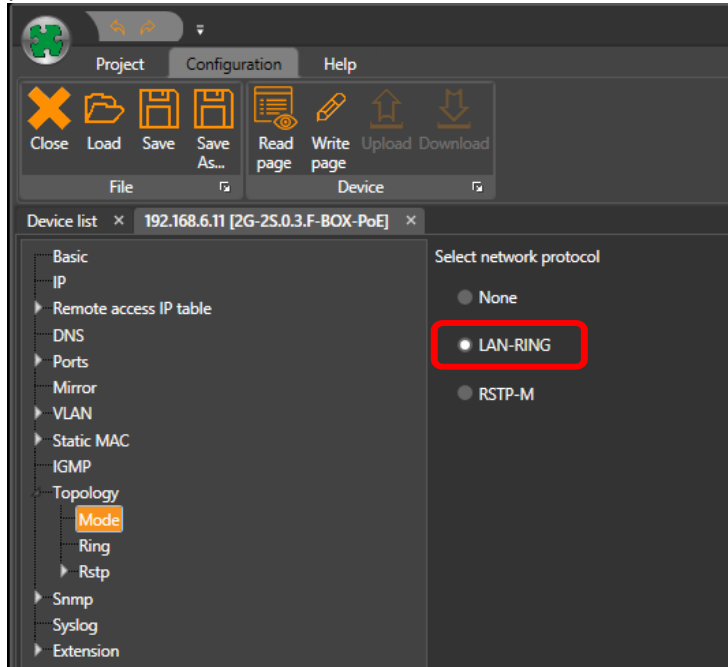
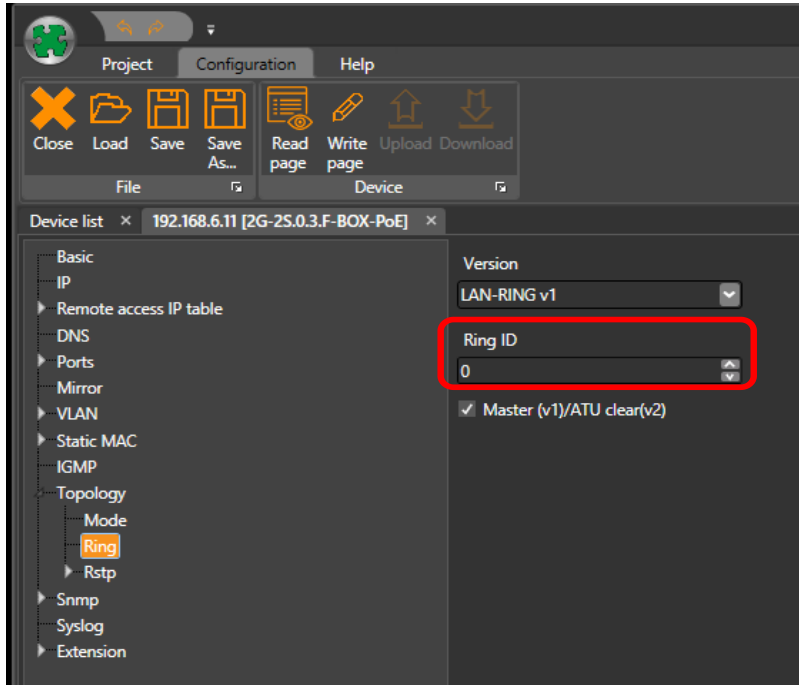One of the switches connected to the ring must be set as "**Master**".
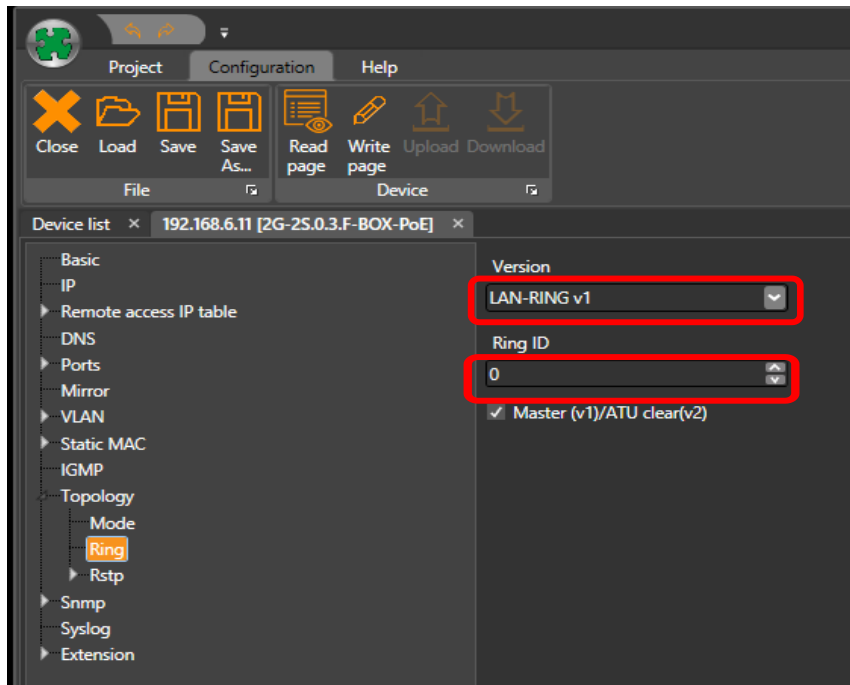
📖 **All switches in the ring must be allowed the same protocol. LAN-RING.v1 and v2 protocol can not be used in one ring together.**

In applications with multiple optical rings, all the switches in the ring set to a unique RING ID – Ring Identifier (see menu RING).

LAN-RING.v2

For the proper functioning of the ring, all switches must be connected to the ring enabled LAN-RING.v2 protocol.
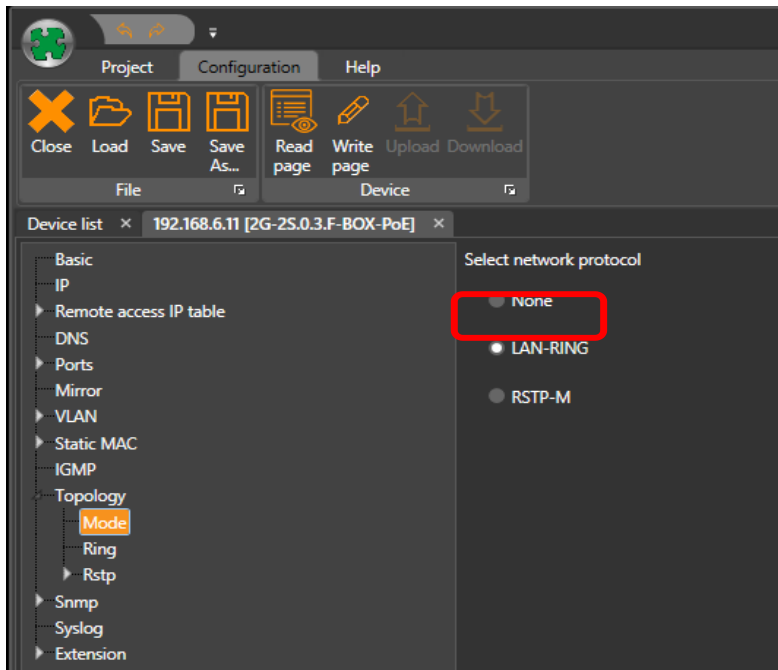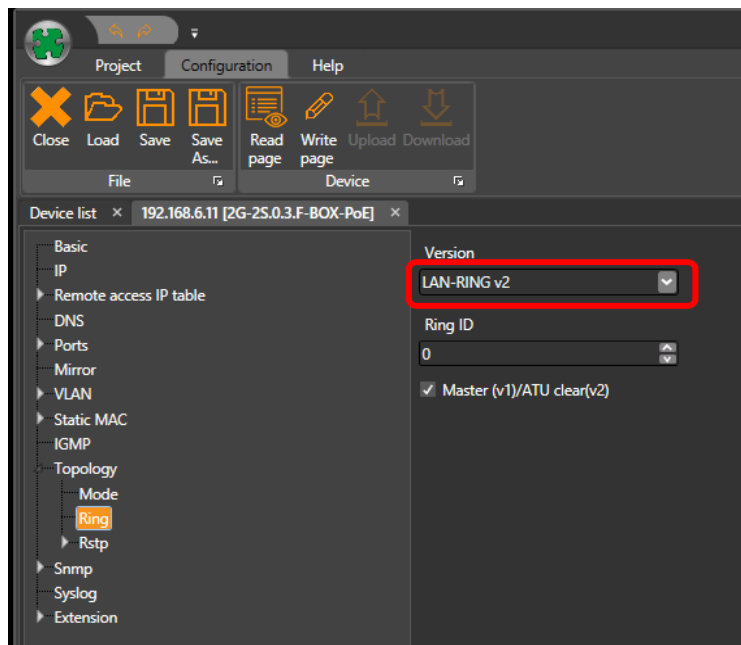

📖 **All switches in the ring must be allowed the same protocol. LAN-RING.v1 and v2 can not be used in a one ring protocol together.**
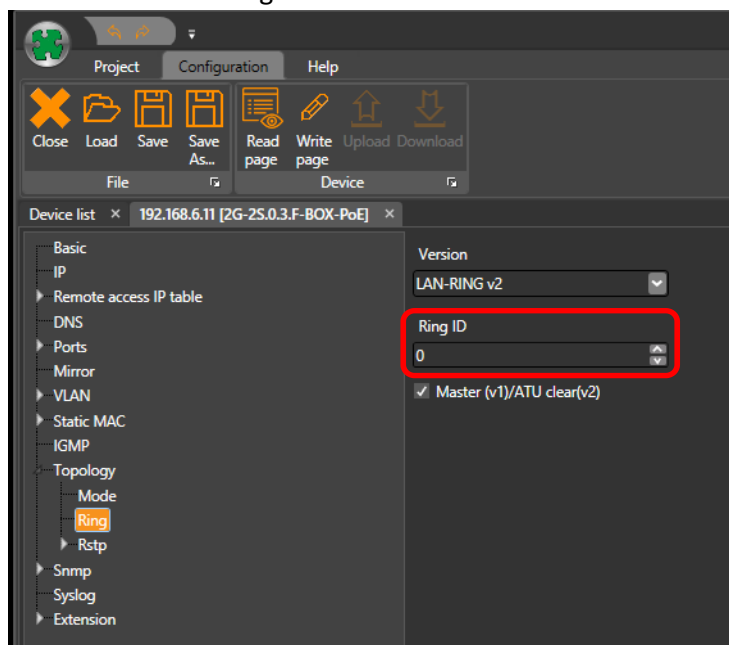
All switches in the ring must be set to the same "**RING ID**".

In applications with multiple optical rings, all the switches in the ring set to a unique RING ID – Ring Identifier (see menu RING).
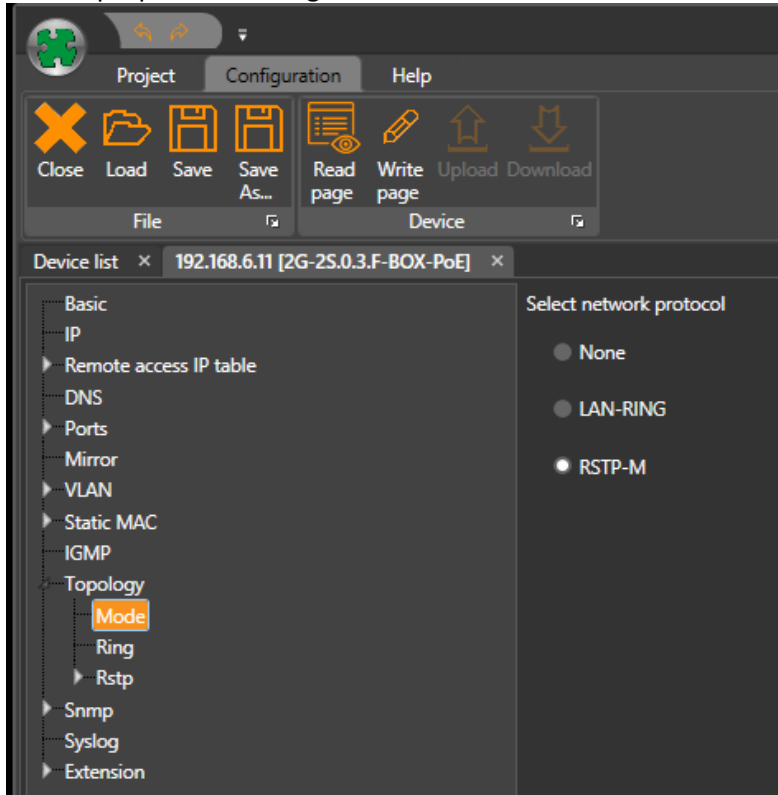
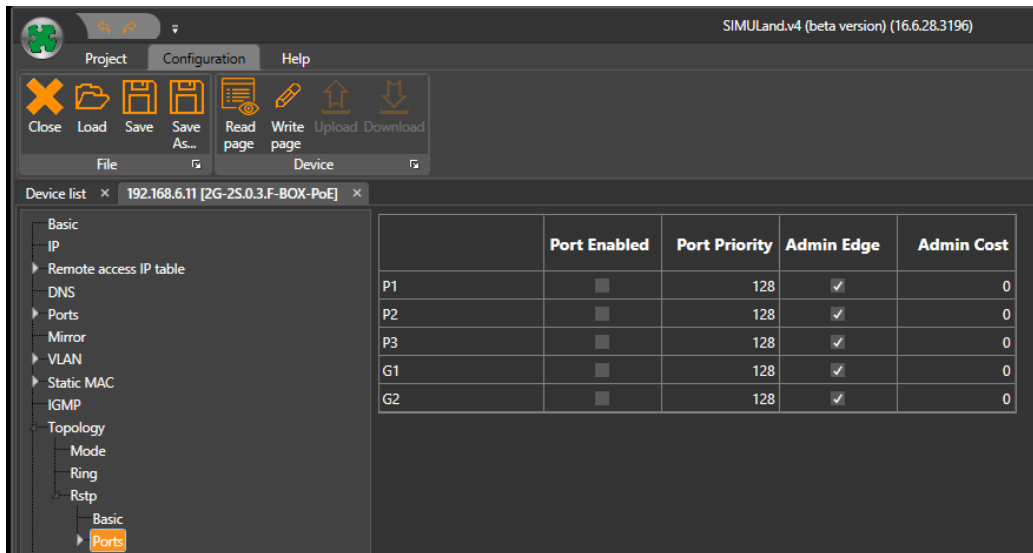## RSTP

For the proper functioning of the RSTP enabled on the switches RSTP-M protocol.

If it's necessary to set detailed parameters of RSTP prototocol, go to the menu Topology/RSTP/Basic and Ports.

Setting of Indication of Optical Ring Failure or Sabotage

In the case of a ring interruption in topology LAN-RING.v1 or v2 (failure or sabotage) the communication is redirected in 30ms. The change of ring state (from 'loop' to 'backup') can be mapped to:

• relay output on every switch,
• send SNMP trap,
• send an e-mail

📖 **For more information, see the Help in SIMULand.v4 software.**