

LAN-RING – Communication with Modbus-RTU Devices

In addition to standard LAN and optical ports, industrial LAN-RING switches series F and G are also equipped with RS485 ports for connecting Modbus-RTU devices and selected types of PZTS and PIDS systems. This document uses examples of Modbus sensors IPSEN-TH2-MOD to describe the possible ways of communicating with Modbus-RTU devices. The LAN-RING switch and Modbus must have the same communication mode set, ie speed, the number of data bits, parity and number of stop bits. If several Modbus slave devices are connected on one bus, it is also necessary to first set a unique Modbus ID address for each in the range 1-255. The table below provides an overview of the communication parameters that can be set on the LAN-RING switches.

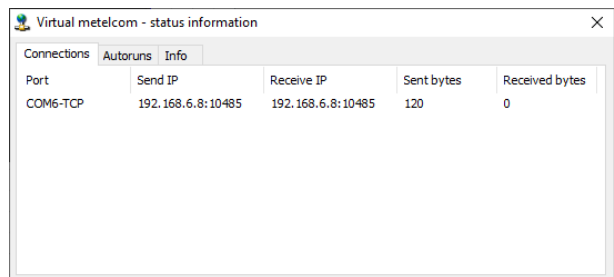
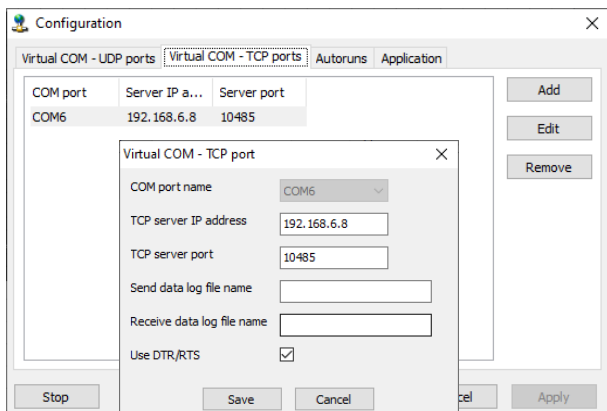
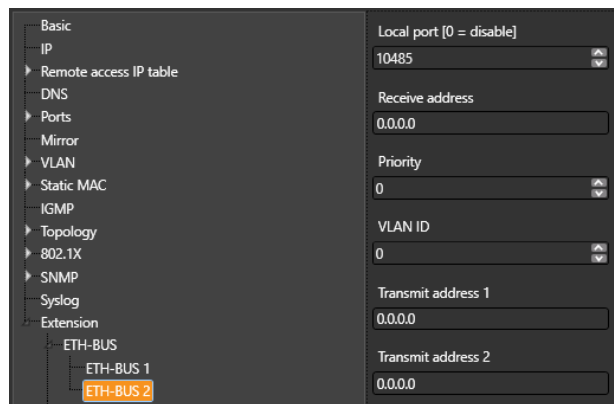
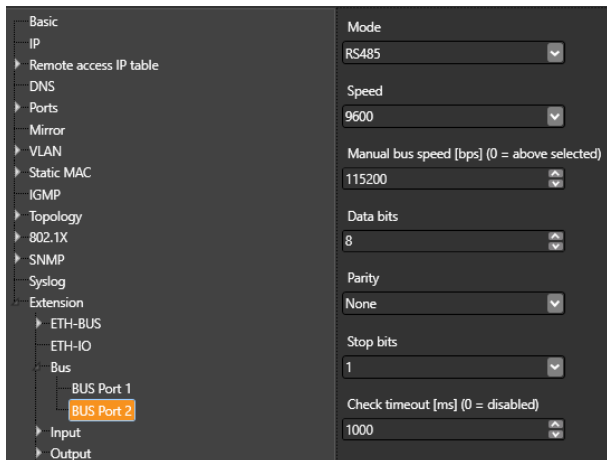
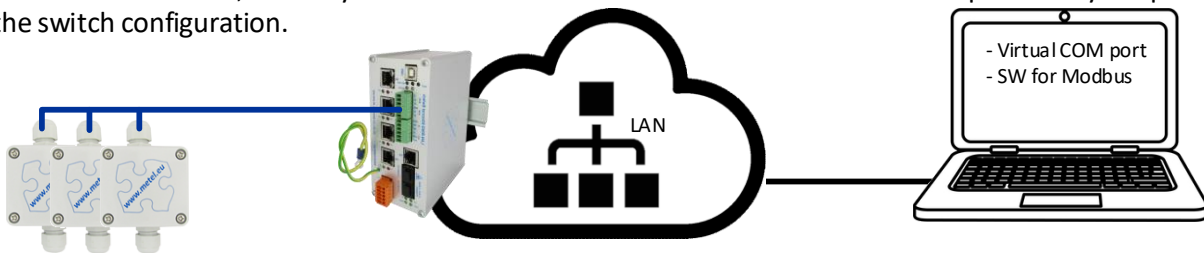
PARAMETERS:	Speed kb/s	Data bits	Parity	Stop bits
VALUES:	1 to 115200	5 to 9	None, even, odd, 1 (mark), 0 (space)	1 - 1,5 - 2

VARIANT 1 – Modbus RTU

The CAS Modbus Scanner software from Chipkin Automation Systems acts as a Modbus RTU Master, which forwards Modbus queries to a configured virtual COM port created by VCOMnet (METEL).

LAN-RING Switch Settings

In the **Extension/BUS/Bus Port X** tab, set the communication configuration on the RS485 bus to match the settings on the Modbus module(s). In the **Extension/ETH-BUS/ETH-BUS X** tab, set the local TCP port that will be used for data transfer from / to the virtual COM port. Install the VCOMnet application and create a new TCP connection, where you enter the IP address of the switch and the TCP port that you specified in the switch configuration.



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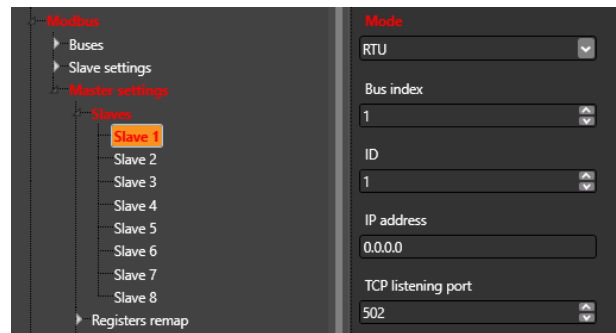
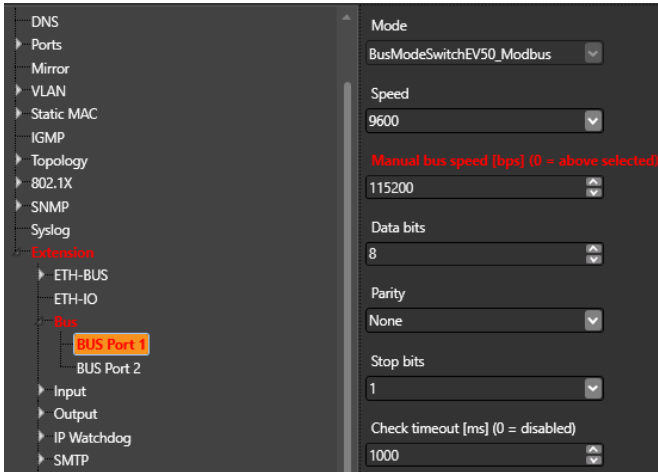
VARIANT 2 - Read / Write via SNMP

LAN-RING switches of the F series can also be set as Modbus-RTU Master with up to 8 Slave devices on the bus. In this case, the user can set the read / write of up to 64 Modbus variables in the table available via SNMP protocol. Any software supporting the SNMPv2c / SNMPv3 protocol (IFTER-EQU, iReasoning, Nagios, Zabbix....) can be used as an SNMP client. The switch functions as an SNMP server and also as a compiler of the Modbus protocol to the SNMP protocol.

Switch Settings

In the **Extension/BUS/Bus Port X** tab, set the communication configuration on the RS485 bus to match the settings on the Modbus module.

In the **Extension/Modbus/Buses/Bus X** tab, set the mode to MASTER-RTU. In the **Extension/Modbus/Master settings/Slaves** tab, set the specification of the Modbus Slave communication parameters of the device connected to the serial line. RTU mode, BUS X index, ID = Modbus ID Slave device on the bus. Setting register parameters in the Register remap. The input is a 1 bit Read-Only register of the Input Register type, register address 5001. Count 1, only this register will be read. Each manufacturer provides datasheets with a table of Modbus address registers assigned to individual inputs, outputs. Modbus Slaves table connection (connection specification) with register settings in the **Register remap**. The first row of the **Slaves** table with **Register remap row 1**.



	Type	Register address	Count	Reverse word order
Register 1	Input (3x)	5001	1	<input type="checkbox"/>
Register 2	Input (3x)	5002	1	<input type="checkbox"/>
Register 3	None		1	<input type="checkbox"/>
Register 4	None		1	<input type="checkbox"/>
Register 5	None		1	<input type="checkbox"/>

	Enable	Slave index	Register remap
Slot 1	<input checked="" type="checkbox"/>	1	1
Slot 2	<input checked="" type="checkbox"/>	1	2
Slot 3	<input type="checkbox"/>	1	1
Slot 4	<input type="checkbox"/>	1	1
Slot 5	<input type="checkbox"/>	1	1
Slot 6	<input type="checkbox"/>	1	1

LAN-RING – Communication with Modbus-RTU Devices

Example of Reading Values via iReasoning MIB Browser

Procedure:

- import MIB files available on www.metel.eu into the browser,
- enter the IP address of the switch and login data

The default setting for SNMP v3 is:

User: master
 Auth Algorithm: SHA
 Auth Password: mastermaster
 Privacy Algorithm: AES
 Privacy Password: mastermaster

From the tree structure iso/dod/internet/private/enterprises/metel/device/services/modbus, select and display a table named modbusSlaveSlotsTable. The table shows the values of the temperature and humidity read from the sensor. After clicking on the value in the table, the OID will be displayed below, under which this separate value can be read.

OID: .1.3.6.1.4.1.38616.1.8.10.25.1.12.0

Value [INTEGER]: 245

Raw Value [INTEGER]: 245

Result Table 192.168.6.8 - modbusSlaveSlotsTable			
	1	2	3
modbusSlaveSlotIndex	0	1	2
modbusSlaveSlotEnable	enable	enable	disable
modbusSlaveSlotSlaveIdx	0	0	0
modbusSlaveSlotRegIdx	0	1	0
modbusSlaveSlotReadValueHex	0x00 00 00 E9	0x00 00 02 27	0x00 00 00 00
modbusSlaveSlotReadValueUnsigned	233	551	0
modbusSlaveSlotReadValueSigned	233	551	0
modbusSlaveSlotConnect	connected	connected	disconnected
modbusSlaveSlotLastRead	08.10.2020 10:2...	08.10.2020 10:2...	
modbusSlaveSlotWriteValueHex	0x00 00 00 00	0x00 00 00 00	0x00 00 00 00
modbusSlaveSlotWriteValueUnsigned	0	0	0
modbusSlaveSlotWriteValueSigned	0	0	0
modbusSlaveSlotWriting	done	done	done
modbusSlaveSlotLastWrite			
modbusSlaveSlotHighLimitValue	0	0	0
modbusSlaveSlotHighLimitState	unsupported	unsupported	unsupported
modbusSlaveSlotLowLimitValue	0	0	0
modbusSlaveSlotLowLimitState	unsupported	unsupported	unsupported

LAN-RING – Communication with Modbus-RTU Devices

VARIANT 3 - Modbus TCP

Software such as CAS Modbus Scanner - Chipkin Automation Systems installed on the computer accesses the registers in which the switch stores the values read from the Modbus-RTU Slave modules. In this case, the switch acts as a Modbus-RTU Master and reads values from the Modbus-RTU Slave modules. It stores these in its registers, available for Modbus Master TCP.

Switch Settings

The setting is similar to VARIANT 2. In addition, automatic actions mapping Modbus Master slots to Modbus Slave registers must be set in the **Extension/Events** table.

Input		Output	
Input MODULE	MODBUS Master	Output MODULE	MODBUS Slave
SLOT	Slot 1 [Slot 1]	REGISTER	INPUT 1 (3x) (16bit)
MODE	Value change	MODE	Write value

Input		Output	
Input MODULE	MODBUS Master	Output MODULE	MODBUS Slave
SLOT	Slot 2 [Slot 2]	REGISTER	INPUT 2 (3x) (16bit)
MODE	Value change	MODE	Write value

Example of read values

CAS Modbus Scanner

File Help

The screenshot shows the CAS Modbus Scanner interface with the Chipkin Automation Systems logo. The main window displays a table of read values for input registers. The table has the following columns: Offset, Standard address, 6 digit address, Hex, char, uint16, int16, uint32, int32, and float32. The data rows are as follows:

Offset	Standard address	6 digit address	Hex	char	uint16	int16	uint32	int32	float32
1	30001	300001	0x00F8	ř	248	248			
2	30002	300002	0x01CE	ĭ	462	462	3027...	3027...	0.000000