thermokon
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Interface Description
Radio Receiver
SRC-RS485-EVC
STC-RS485-EVC

Version 1.1, 14.04.2009

1 General Notice

The radio receiver module SRC-RS485-EVC, STC-RS485-EVC operates as a gateway between sensors or radio keys based on the EnOcean radio technology as well as controllers or control systems with RS485 interface. All telegrams received flawlessly are output to the RS485 unchanged. Furthermore, Enocean telegrams can be sent.

Various SRC-STC-RS485-EVC can be operated by one RS485 bus segment. In order to avoid data loss by telegram collision, the RS485 wire is monitored by each receiver. The SRC-STC is only allowed to send within a bus silent interval, whereas the telegram is sent event-controlled for two times to have an additional safety (parameter able).

The SRC-STC-RS485-EVC can be operated in two modes: Gateway and with a Filter. In the Gateway mode, all telegrams received are forwarded to the RS485 bus. In the Filter mode up to 32 sensors can be seamlessly connected. Only those sensors taught-in are sent to RS485 bus.

2 Data Format

The output format of the data is adjustable on the device via jumpers and DIP switches.

2.1 Baud Rate

The baud rate is configurable via the DIP switch 7 and 8 and is lying between the values 9,6 kbps and 115,2 kbps. The baud rate chosen mainly determines the number of sensors that can be evaluated by one RS485 bus segment. The higher the baud rate the lower the bus load per radio telegram. In order to minimize the risk of a telegram collision and data loss, the highest possible baud rate should be basically selected.

DIP8	DIP7	Baud Rate	max. Number of Sensors per Bus Segment
OFF	OFF	9,6 kbps	50
OFF	ON	19,2 kbps	100
ON	OFF	38,4 kbps	170
ON	ON	115,2 kbps	250

When arranging for the installation of the radio receivers and sensors within a building, it should be considered, that the sensors are only installed within the receiving range of one receiver, if possible. If a radio telegram is received by several receivers at the same time, this telegram is output to the RS485. This is inevitably leading to an increased bus load and an increased risk of telegram collisions.

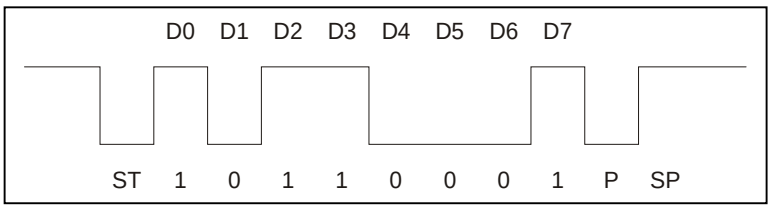
2.2 Parity

The parity is adjustable on the device via jumpers. For transmission of data bytes always 11 bit are needed (Start bit, data bits, parity bit, stop bit).

Jumpers		Parity	Stop Bits
open	open	even	1
open	closed	odd	1
closed	closed	no parity	2

Example:

Parity (P): even
Start bit (ST): 1
Data bits: 8
Stop bits: 1



3 Configuration of Receiver

The receiver can be parameterized with regard to the sensors. As a standard, the device is working as a gateway and transmits all data received. All telegrams are repeated for two times as a standard. The device can be directly parameterized by special telegrams or by the configuration software.

The parameters can be adjusted by the following telegrams.
xx must be replaced by the address of the device
Send all telegrams 3 times:
Activate filter mode: A55AFFFF00FF00000000000000FDxx
Activate gateway mode: A55AFFFFFFFF00000000000000FCxx
Send all telegrams once:
Activate filter mode: A55AFFFF000000000000000000FExx
Activate gateway mode: A55AFFFFFF0000000000000000FDxx

Filter Mode
Up to 32 sensors can be taught-in into 00-31 channels. The seamless connection is done via the learn button or by putting in the sensor ID manually.

Manual connection of sensor:
A55AFFFE + channel + Org-Byte + Sensor ID + 000000 + Checksum + xx
Example:
In the device with address 1, a sensor with the sensor ID 00359745 and Org-Byte 07 is taught-in to channel 00: A55AFFFE000700359745000000E01

Connection of sensor via learn button:
A55AFFFD + channel + Org-Byte + 00000000000000 + Checksum + xx
Example:
In the device with address 1 a sensor is connected via the learn button and Org-Byte 07 to channel 00: A55AFFFD00070000000000000000301

Clear Sensor: A55AFFFC + channel + 0000000000000000 + Checksum + xx

Example:
In the device with address 1 the sensor in channel 00 is cleared:
A55AFFFD00070000000000000000301

4 Telegram Structure

Byte	Bit7		Bit0	Description
0	SYNC_BYTE1 (A5 Hex)			Start Identification
1	SYNC_BYTE0 (5A Hex)			
2	ADDRESS			Address STC (Dip Switch 1-6)
3	TYPE			Telegram Identification
4	DATA_BYTE3			Data bytes 0...3
5	DATA_BYTE2			
6	DATA_BYTE1			
7	DATA_BYTE0			
8	ID_BYTE3			32-Bit Sensor/Key-ID
9	ID_BYTE2			
10	ID_BYTE1			
11	ID_BYTE0			
12	STATUS (4Bit)	T-C (2 Bit)	RP-C (2 Bit)	Status and Counter for Telegram Repeat
13	CHECKSUM			Checksum of Bytes 0 - 12

4.1 Address (2)

The receiver address adjusted on the DIP switch is transmitted in this data byte. The value range is lying between 0 and 63. The address adjusted affects the event-controlled bus access of the receiver. Thus, a receiver address shall only be allocated once per bus segment.

4.2 Data Bytes (4, 5, 6, 7)

The meaning of the data bytes DATA_BYTE0...3 is depending on the respective device type and is thus described in the corresponding product data sheets.

4.3 Telegram Identification and ID-Bytes (3, 8, 9, 10, 11)

Each sensor can be clearly identified via its telegram identification and the 32-Bit-ID. The telegram identification is designed for distinction of several device types, e.g. window contact (Type = 6) or sensors (Type = 7).

4.4 Status and Repeat of Telegram (12)

STATUS:
Like the data bytes, the meaning of the 4 bit field „STATUS“is also depending on the respective device type.

T-C:
A radio telegram is output to the RS485 for three times. The 2bit field „T-C“shows which of the three RS485 telegrams is concerned. (Values: 0, 1, 2)

RP-C:
This field shows whether the radio telegram received is the original telegram of the sensor or whether it was passed on to the receiver via the radio repeater. (Values: 0, 1)

5 Data Output

Each telegram received flawlessly is basically sent to the RS485 three times without any further data processing. As described in chapter 3.1 the meaning of the data bytes DATA_BYTE0…3 is depending on the respective device type and is thus described in the corresponding product data sheets.

Bus Access:

Before a telegram is sent, the receivers examines the RS485 bus for a bus silent interval. If two receivers are trying to send to one bus at the same time, the telegrams get lost. Thus, the telegram is repeatedly sent two times, whereas the bus access is additionally event-controlled. As the address adjusted affects the calculation of the random time, the same is only allowed to be allocated once per bus segment.

Repeater Function:

If radio repeaters are used for an extension of the radio path, theoretically the possibility is given that a receiver gets the original telegram and a few milliseconds later the repeater telegram. If this happens, the telegram of the repeater is rejected and is not output to the RS485.

6 Mailing Function (only STC-RS485-EVC)

The STC-RS485-EVC can send telegrams. An address memory of 127 addresses is available. The data bytes and the Org-Byte can be freely selected and sent.

6.1 Radio-Address of the STC (only STC-RS485-EVC)

The address of the STC-RS485-EVC verifies and can be read out with following commands: 0xAB 0x58

Example
Read EnOcean Radio-address of STC-RS485-EVC with address 00:
A5 5A AB 58 00 00 00 00 00 00 00 00 03 00

Answer of STC-RS485-EVC:
A5 5A 00 98 FF ED 90 80 00 00 00 00 93

The Radio-address of the STC-RS485-EVC is
FF ED 90 80
ID_BYTE0 changeable between 0x80 and 0xFF, therefore it can be sent on 127 addresses.

6.2 Sending Telegrams (only STC-RS485-EVC)

For sending a telegram, the following telegram structure must be used:

Byte	Bit7 Bit0			Beschreibung
0	SYNC_BYTE1 (A5 Hex)			Start Signal
1	SYNC_BYTE0 (5A Hex)			
2	(6B Hex)			Sending-Telegram
3	TYPE			Telegram Signal
4	DATA_BYTE3			Databytes 0...3
5	DATA_BYTE2			
6	DATA_BYTE1			
7	DATA_BYTE0			
8	ID_BYTE3			32-Bit Sensor/Button-ID
9	ID_BYTE2			
10	ID_BYTE1			
11	ID_BYTE0 (+ 0…127 Hex)			
12	STATUS (4Bit)	T-C (2 Bit)	RP-C (2 Bit)	Status und Meter for Telegram Reputation
13	CHECKSUM			Checksum of Bytes 0 - 12
14	ADDRESS			Adress STC (Dip Switch 1-6)

Example: A switching command via STC-RS485-EVC shall be sent with address 00:
A55A6B50000000FFED908530EC00

6.3 Response Telegram (only STC-RS485-EVC)

The STC-RS485-EVC is sending a response telegram if the telegram to be sent was received and sent correctly.

Telegram correctly sent:
A5 5A 00 58 00 00 00 00 00 00 00 00 57
(58 Hex is the confirmation for the telegram sent)

7 Configuration Software

By means of the configuration software, the device can be parameterized and the sensor data can be read out.

Com-Parameter

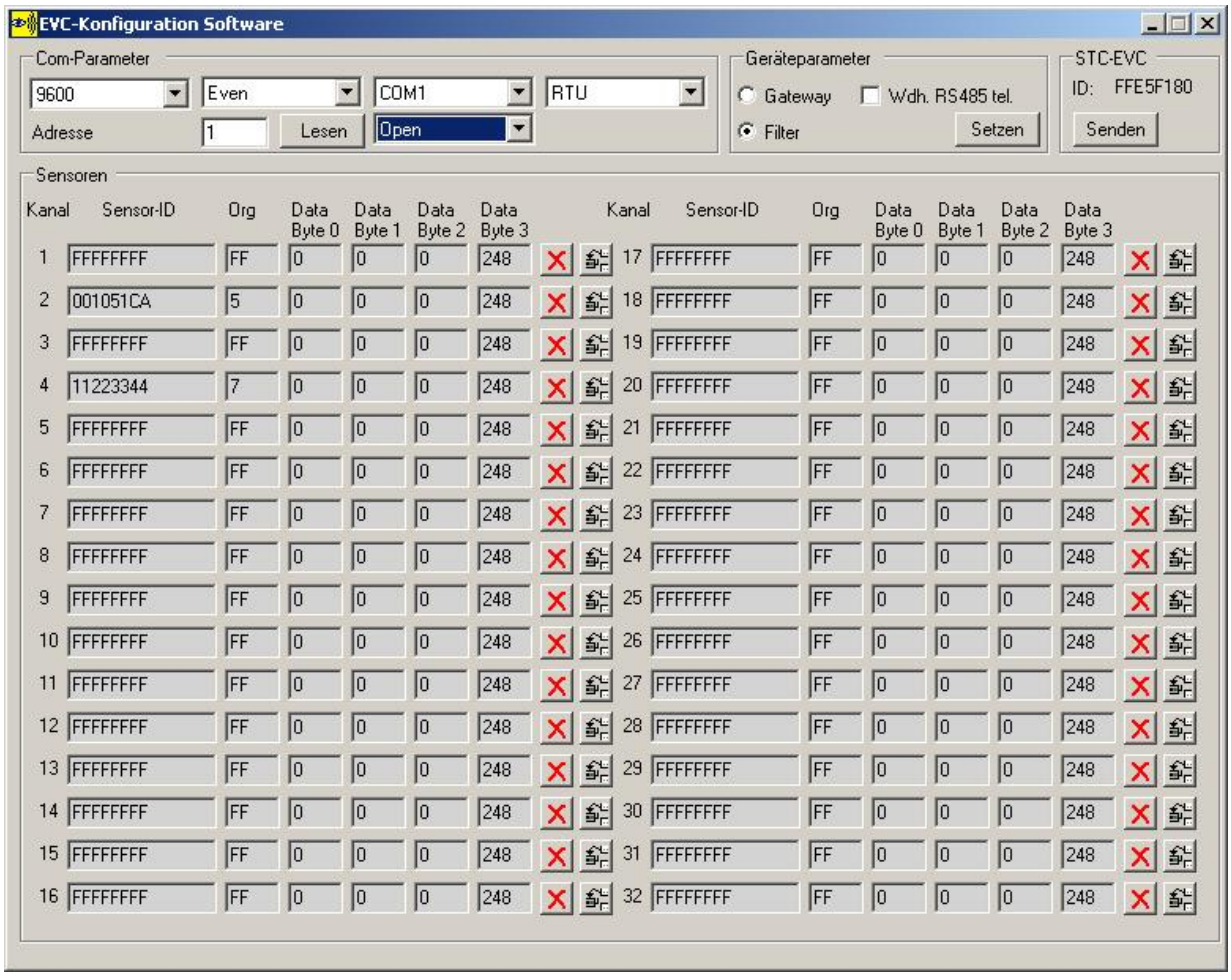
- Setting of communication properties
- “Read“ the device is read out again
- Address -> setting of the device that shall be configured

Device property

- Setting of gateway or filter model
- By means of a hook at “Rea. RS485 tel.“ the telegrams are sent to the bus for 3 times otherwise only once
- “Set“ the device takes over all settings and is read out again

STC-EVC

- “ID” is the wireless address of the STC-EVC. If the field is empty, the read out procedure must be started again or the device cannot send any telegrams.
- “Send“ a new window is opened. In this window telegrams can be sent.



8 Amendment Index

Version	Description
0.1	Advance Documentation
1.0	First Version for Firmware 1.0
1.1	Second Version for Firmware 1.1