Opentherm to RS232 converter

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

Contents

1 Transparent mode

Allow send frame as defined in chapter 4.2 Opentherm™ Protocol Specification v.2.2 (http://www.domoticaforum.eu/uploaded/-Ard%20M/Opentherm%20Protocol%20v2-2.pdf)

In this mode only parity bit is calculated automatically, all other bits are transparently mapped to Opentherm frame.

1.1 Line format:

Line must end with CR (0x0d) or LF (0x0a) or CRLF (0x0d 0x0a). There is waiting time for about 3 chars after CR to test if LF is received. Response from device uses same line ends as found in received lines.

```
<  MSG-TYPE-TX DATA-ID DATA-VALUE-1 DATA-VALUE-2
```

- < - character "<" (value 0x3c)
- MSG-TYPE-TX - decadic number 0-255 interpreted per bit:
  - Bit 7 - is ignored, parity bit is calculated internally
  - Bits 6,5,4 - message type - transparently forwarded to boiler
  - Bits 3..0 - reserved - transparently forwarded to boiler
- DATA-ID - decadic number 0-255
- DATA-VALUE-1 - decadic number 0-255
- DATA-VALUE-2 - decadic number 0-255

These numbers are transparent forwarded to boiler, the number is greater than 255, real value is number modulo 256.

1.2 Response format

```
>  MSG-TYPE-RX  DATA-ID DATA-VALUE-1 DATA-VALUE-2
```

- > - character ">" (value 0x3e)
- MSG-TYPE-RX - decadic number 0-255 interpreted per bit:
  - Bit 7 - 0 no error, 1 error, DATA-VALUE-2 represent error code
  - Bits 6..0 - response from boiler (msg type, reserved)
- DATA-ID - decadic number 0-255
- DATA-VALUE-1 - decadic number 0-255
- DATA-VALUE-2 - decadic number 0-255

2 User mode

In this mode 1st byte of Opentherm frame is filled for TX automatically and response from boiler is checked automatically:

2.1 Line format

Line must end with CR (0x0d) or LF (0x0a) or CRLF (0x0d 0x0a). There is waiting time for about 3 chars after CR to test if LF is received. Response from device uses same line ends as found in received lines.

2.1.1 Read register

```
< r  DATA-ID DATA-VALUE-1 DATA-VALUE-2
```

- *r* - character "r" or "R"
- DATA-ID - decadic number 0-255
- DATA-VALUE-1 - decadic number 0-255
- DATA-VALUE-2 - decadic number 0-255

Device generate 1st byte for Opentherm frame as message type 0,0,0 reserved bites 0,0,0,0, then calculate parity bit and this frame is send to boiler.

Rest of frame (DATA-ID, DATA-VALUE-1, DATA-VALUE-2) are transparently forwarded to boiler.

2.1.2 Write register

```
< w  DATA-ID DATA-VALUE-1 DATA-VALUE-2
```

- *w* - character "w" or "W"
- DATA-ID - decadic number 0-255
- DATA-VALUE-1 - decadic number 0-255
- DATA-VALUE-2 - decadic number 0-255

Device generate 1st byte for Opentherm frame as message type 0,0,1 reserved bites 0,0,0,0, then calculate parity bit and this frame is send to boiler.

Rest of frame (DATA-ID, DATA-VALUE-1, DATA-VALUE-2) are transparently forwarded to boiler.

2.2 Response format

```
> R-CODE DATA-ID DATA-VALUE-1 DATA-VALUE-2
```

- R-CODE - return code
  - 128 - error in response, DATA-VALUE-2 represent error code
  - 0-15 - transparent copy of *reserved* bites from boiler
- DATA-ID - decadic number 0-255
- DATA-VALUE-1 - decadic number 0-255
- DATA-VALUE-2 - decadic number 0-255

3 Error codes

- ERR: 1 missing < on line start
- ERR: 2 wrong character in number
- ERR: 4 wrong separator
- ERR: 5 too many parameter
- ERR: 8 not enough parameters on line
- ERR: 10 response before expected period (< 20ms)
- ERR: 11 response timeout (> 800ms)
- ERR: 20 timeout for bit middle transition
- ERR: 21 transition before window
- ERR: 22 transition outside 0,1 window
- ERR: 23 transition before bit middle
- ERR: 24 parity error

Return codes for user mode:

- ERR: 30 returned register ID does not match transmitted register ID
- ERR: 31 returned data not for slave $\rightarrow$ master direction
- ERR: 32 failed unknown data ID
- ERR: 33 failed invalid data
- ERR: 34 no read ack for read / no write ack for write