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COMLI protocol for MORSE

verze 9.0.17.0
1/12/2011

1. Introduction

The COMLI protocol (COMmunication Link) is used in SattCon devices from the Swedish company ALFA LAVAL. Communication in networks with this equipment is always of the Master - Slave variety. The existence of more Masters is possible, which is a speciality of this protocol, also the Slave can be slave to several Masters. Therefore a RADIOMASTER always replies to the address of the Master that sent the request.



Important

The terminology is unified from Setr version 9.0.17.0 according next schedule:

PLC Master - CU RADIOSLAVE ... CU RADIOMASTER - Slave PLC

CU (radiomodem) connected via SCC to PLC Master is called Radioslave (RS),
CU connected to PLC Slave is called Radiomaster (RM).

Changes appear at a new Setr version, the firmware version has not influence.

The older Setr uses the reverse terminology, also:

(PLC Master - CU RADIOMASTER ... CU RADIOSLAVE - Slave PLC)

Physical layer protocol COMLI use RS232 interface.

2. Data format

All types of packets of the COMLI protocol can be characterised with this structure:

| STX/8 | ADR1/8 | ADR2/8 | STAMP/8 | DATA/8xN | ETX/8 | BCC/8 |

where:

STX beginning of packet 0x02

ADR1 first byte of address (destination)

ADR2 second byte of address (destination)

address is in ASCII/HEX format, i.e. it can be in the range 0x0-FF, or individual bytes 0x30-0x39(digits 0-9) and 0x41-0x46 (letters A-F). By converting ADR1 and ADR2 into hex format 1 byte of address O/S is gained.

STAMP distinction whether the packet was sent for the first time or repeatedly. (Value 0x31, or 0x32)

DATA series of N bytes of data, N = 2 or more

ETX end of data 0x03

BCC check byte (XOR through all bytes of the packet except for STX)

3. Implementation of protocol in the Morse network

Addressing:

RADIOSLAVE sends data to the address which is created in such a way that the lowest byte of the actual address (at the relevant Node) is overwritten with the byte created from ADR1 and ADR2.

RADIOMASTER always adds 0x00 to ADR1 and ADR2. In the MORSE network data is always delivered to the address from where the request came from.

a) SattCon -> Radiomodem

1. check whether the first byte in the packet is STX, last but one ETX, size of packet larger than 8 bytes and whether BCC agrees. If any of the conditions are not fulfilled the packet is "silently discarded"
2. if the device is a RM, check whether data is expected. The RM can only send data as a reply to a request. Unexpected packets are "silently discarded"
3. data is sent on the RF channel. Only DATA (see Data format) supplemented on its end with STAMP (STX,ADR1,ADR2,ETX,BCC are not transmitted) is transmitted over the MORSE channel.

Packets are transmitted through the air as USER DATA packet types.

b) Radiomodem -> SattCon

1. in the case that the size of the incoming packet is smaller than 3 bytes (e.g. Type of packet, 1 byte of data (e.g. ACK - 0x06), STAMP) the packet is discarded.
2. STX, ADR1,ADR2, ETX are supplemented to the relevant position of the data received from the RF channel. (STAMP moved from the end of the data to the correct position). BCC calculated.
3. packet sent to port.

From the above it is obvious that only useful data and stamp secured with MORSE system algorithms are transmitted through the MORSE channel. Data on the wire link is protected by COMLI protocol algorithms.

There is no handshake used on the Radiomodem-SattCon - not even SW (via ACK or other characters in the link layer of the protocol) not even HW (only three connections are used - RXD, TXD, GND). In

case of overflow of queues of packets for sending into the MORSE channel (4 packets) there is no way to inform the SattCon, and therefore other possible incoming packets are “silently discarded”.

3.1. Communication example

```

          RS232                \|\....\|/                RS232
MASTER PLC ----- CU RADIOSLAVE |          | CU RADIOMASTER ----- SLAVE PLC
      COMLI                      01                      07                      COMLI

      Master PLC ----> RS 01
0230 3731 3035 3030 3030 3200 0003 02
      RS 01 ----> RM 07
3035 3030 3030 3200 0031
      RM 07 ----> Slave PLC
0230 3731 3035 3030 3030 3200 0003 02

```

Data are sending in format - data + STAMP Protocol COMLI take STAMP from end of the data and place it on the fourth position in the packet.

The delay between request and response from Slave must not be longer than parameter (l)ink timeout. Only one response can be accepted by RADIOMASTER after one request.

```

      Slave PLC ----> RM 07
0230 3032 3235 3031 3030 3203 05
      RM 07 ----> RS 01
3235 3031 3030 3232
      RS 01 ----> Master PLC
0230 3032 3235 3031 3030 3203 05

```

4. Configuration parameters

COMLI parameters:

```

PLC Master - CU RADIOSLAVE ... CU RADIOMASTER - Slave PLC
(m)ode:RADIOMASTER (wired to slave)
intercharacter tx (d)elay:OFF
(l)ink timeout:1000ms
tc (t)imeout:3000ms
(S)erver comli address (4ABB); 0-off:0
Server (P)ing base:0
Server (H)ysteresis base:0
Server (N)um of addresses:0
(q)uit
>>

```

(m) protocol mode

- (S) RADIOSLAVE - CU connected to PLC Master
- (M) RADIOMASTER - CU connected to PLC Slave

ATTENTION - The Setr older than 9.0.17.0 uses the reverse labelling !

- (d) intercharacter tx (d)elay - Some SattCon devices request the sending of packets from the Radiomodem byte by byte. Intercharacter tx delay turn on and off the space inserting between sending individual bytes from Radiomodem.
- ON - trun ON space between bytes
 - OFF – trun OFF space between bytes
- (l) (l)ink timeout - Time, when Slave must send answer to RM. RM sends packet to Slave and Slave answer. When link timeout is 0 ms, Slave send packet but Master wait for nothing. This parameter must be always more then 0 ms.
- (t) tc (t) timeout - Communication is controlled from the Master. If the Master is not able to wait for the reply from the Slave via the MORSE network and keeps sending repeated commands it is possible to set the time (ms), when Radioslave won't react to the other commands. This is a measure taken against overloading the radio network. The RS accepts next packet from PLC Master after expiring of tc (t)imeout.
- (S) This and next parameters belong to special customers menu, all parameters turn off by writing 0 - off in: (S)

5. History

- release 660 - 04/2004 - this description applies from this version
- 9.0.17.0 - 06/2007 - unification of terms RS/RM in the Setr
- 11.0.4.0 - 11/2010 - Check netNo added - more on support@racom.eu