Data Protocol SPO4025c

Version 2004-11-23

Parameters serial interface: 57600 Baud, 8n1. This is a packet oriented, secure protocol, comparable to Kermit.

CADT

Dipl.-Phys. D. Teuchert
Software und Systeme

Rommelstr. 6
D-76571 Gaggenau
Tel. +49 7225 989253
Fax. +49 7225 989254
EMail info@cadt.de

Control characters:

0xFF	MarkChar	Begin of packet
0xFE	QuoteChar	Quote character
0xFD	AckChar	Acknowledge character
0xFC	NAKChar	Not acknowledge character
0xFB	EventChar	End of Record (event character)

These characters are forbidden inside the data section of a packet. In order to transmit such character, it is preceded with a quote character, followed by a data byte with 0 leading bit.

Packet composition:

1	MarkChar	
1	Sequence number	cyclic 0,1..126,127,0,1..126,127,0...
1	Packet type	#18 for plethysmogram packets, #36 für extended packets
1	Packet size	in bytes, number of data bytes
n	Data bytes	34 for short packet, 50 für long packet
1	Check byte	The check sum sChecksum is calculated as sumof the unquoted data bytes. The check byte is then: cChecksum=0x7F & (sChecksum ^ (sChecksum >> 7) ^ (sChecksum >> 14));
1	Event char	as event character (EOR)

ACK- und NAK-Pakete can be used later for error correction mechanisms. The SPO4025c curerntly does not evaluate those response messages.

Data in packet:

Short packet "Plethysmogram" (every 20 msec):

Offset	Typ	Bedeutung
0	short	Sample number (300 Hz counter, cyclic), counts in steps of 6 (300 Hz sampling rate / 50 Hz packet rate)
2	short	IR ADC photo diode value

4	short	IR ADC photo diode tolerance
6	short	IR ADC LED current measured value
8	short	Rot ADC photo diode value
10	short	Rot ADC photo diode tolerance
12	short	Rot ADC LED current measured value
14	short	Orange ADC photo diode value
16	short	Orange ADC photo diode tolerance
18	short	Orange ADC LED current measured value
20	short	ADC resistor sensor encoding
22	short	ADC ambient light level
24	short	ADC reference voltage LED current regulator
26	short	ADC processor temperature
28	char	LED IR current setting
29	char	LED Rot current setting
30	char	LED Orange current setting
31	char	Preamplifier gain factor setting
32	char	RTOS signature
33	char	Flags

16-Bit quantities are transmitted with the lower byte first.

Long packet "Oximetry results"

At low/normal heart beat rates extended packets are sent normally a short time after each heart beat, i.e. about once per second. Without finger or with low perfusion the (error) messages are repeated every 3 seconds.

like short packet +

34	char	Info byte
35	char	Dummy (alignment byte)
36	short	Probability for oximetric model 0..100
38	short	Perfusion / 0.01 %
40	short	Pulse / 0.1 bpm
42	short	Pulse rise time / msec
44	short	RMS Jitter / msec
46	short	SPO2 / 0.1 %
48	short	HBCO / 0.1

We have available a more detailed description with example data. It comes with source codes, that demonstrates schematically how to process the protocol. This descript is available on request.