Promo®, Fidas®, UF-CPC and Charme®

Serial Protocol

Protocol Description

Master-Slave operation: computer - master, Palas® device - slave

The RS232 port setting are: 57600,8,N,1

There are only two commands:
   getVal: asks for data
   sendVal: sends data

Each parameter has an ID. Thus also other data can be transmitted without changing the protocol. One or more parameters can be asked for. Data records are separated by semicolon. A missing value is shown by value -9999. Decimal separator is the full stop.
In order to assure the transmission reliability, each transmission starts with < and ends with > and an optional checksum. The checksum is optional only for tests so that one can test easier. The device always transmits the checksum.
The checksum is calculated according to the BayernHessen protocol:
The BCC (Block Check Character) is calculated by calculating byte-by-byte across all characters (including < and >) the exclusive OR sum based on 0. The result byte calculated that way is transmitted hexadecimal-coded with two transmission bytes, the MSB first.

Our routine for the checksum:

```
void  addBCC(char * buffer)
{
  int i = 0, bcc = 0;

  while(buffer[i] != 0)
    bcc ^= (unsigned char) buffer[i++];
  sprintf(buffer + i, "%02X", bcc);
}
```

Examples:

master asks for the values of ID 1, 3 and 1011 (e.g. UF-CPC):

<getVal 1; 3; 1011>37
answer Palas® device:
<sendVal 1=12.3; 3=-4.123; 1011=-9999>54

master sends e.g. pressure, temperature and humidity:

<sendVal 123=986.2; 124=20.2; 124=84.2>4D
answer Palas® device:
<ok>06 or <fail>00 in case a failure occurred

Data channels for Promo®, Fidas® and UF-CPC

Palas® devices can interpret received channel data as follows	
123	temperature [°C]
124	pressure [hPa]
125	rel. humidity [%]
200	writing "1" to this value will restart the device
201	1=switch to auto modus, 3=switch to idle modus, 4=switch to calib modus
202	averaging interval for PM-values [s]

Palas® devices provide the following data channels by request	
0	status bit sensor flow
1	status bit coincidence
2	status bit suction pumps
3	status bit weather station
4	status bit IADS
5	status bit estimated raw channel deviation
6	status bit LED temperature
7	status bit operating modus
20	velocity [m/s]
21	coincidence [%]
22	modus
23	suction pump output [%]
24	IADS temperature (Fidas) evaporartion unit (UF-CPC), sensor #1 (Promo) [°C]
25	estimated raw channel deviation [channels]
26	LED temperature [°C]
27	flow rate [l/min]
28	Cn for UF-CPC [P/cm³] (count and nephelometer modus)
29	x50 droplet diameter (UF-CPC) [µm]
30	temperature of condensation unit (UF-CPC), sensor #2 (Promo) [°C]
40	temperature [°C]
41	relative humidity [%]
42	wind speed [km/h]
43	wind direction [°]
44	precipitation intensity [l/m²/h]
45	precipitation type?
46	temperature dew point [°C]
47	air pressure [hPa]

48	wind signal quality [%]
60	Cn [P/cm³]
61	PM1 [µg/m³]
62	PM2.5 [µg/m³]
63	PM4 [µg/m³]
64	PM10 [µg/m³]
65	PMtotal [µg/m³]
66-99	further PM values [µg/m³] (different algorithms)
100-150	ΔCn[P/cm³] size distribution with size intervals as shown by the device (1 s average)

Data channels for C h a r m e ®

Charme® can interpret received channel data as follows	
1	low pass filter frequency [Hz]
2	current offset [fA]
3	setpoint flow rate [l/min]
4	particle mean charge [e]

Charme® provides the following data channels by request	
0	current [fA]
1	current filtered [fA]
2	suction flow rate [l/min]
3	suction pump output [%]
4	concentration Cn [P/cm³]
5	current offset [fA]
6	setpoint flow rate [l/min]
7	low pass filter frequency [Hz]
8	particle mean charge [e]
9	particle flow rate dN/dt [particles/s]