

# PC TEMPERATURE MEASURING SYSTEM

## DESCRIPTION OF SERIAL INTERFACE



### Format of Data transfer

The interface works at a data rate of 4800 Bd, 8 data-bits, no parity and one stop bit (8N1).

The transfer of useful data takes place in lines. All characters are ASCII coded. All information is sent continuously without separation characters. In a line, only information of one channel is transferred. At the end of the line, the last two ASCII characters are sent for the check sum (8 bit CRC) of the current line. Each line closes with the character 'Carriage return' '<CR>'. Several lines form a data-block. A data-block can have the following contents, for example:

```
@<CR>
I010110E0223C000000B1<CR>
V0108DA7D<CR>
I02011050013C00000021<CR>
V0208C276<CR>
I030110B0093C00000017<CR>
V0308CCF9<CR>
$<CR>
```

The data block has following structure:

- A synchronization pattern for the beginning of a Data block. For synchronization, the sequence '@ <CR>' is used.
- The configuration data ('Identifier') of a channel. The data line begins with the character 'I', followed by the logical channel number, and then followed by configuration data and the Sensor serial number. The line is closed with the check sum and the character <CR>.
- The measurements of a channel. The data line begins with the character 'V', followed by the logical channel number, followed by useful data. Only numerical measurement values and the check sum (CRC), at the end of the line, are transferred. All other information like number format, number of characters, physical unit, etc. are contained in the configuration data (sensor coding).
- The configuration data and measurement values follow the same scheme for all other channels.
- The continuation character '\$' <CR>' is sent at the end of a data-block

### Structure of Configuration Dataline

The configuration data line contains all information of the sensor working on the corresponding channel. The line has following structure:

- Identification character 'I' at the beginning of the line.
- 8 bits (two ASCII characters) logical channel number. The logical channel number is used to co-relate configuration data with the measured values. The channel number is generated in the device. The first channel has the number 01. A maximum of 16 channels are transferred. The numbers are given continuously.

- 8 bits (two ASCII characters) physical sensor coding. Based on sensor coding, the number format, scale, physical unit and allowable range of values are specified. The sensor coding is 01 for the described device.
- 8 bits (two ASCII characters) Hardware coding (type of the measurement sensor). The Dallas sensors have the code number 10.
- 48 bits (twelve ASCII characters) serial number of the sensor: Here, the serial number of Dallas-sensor is mentioned.
- 8 bits (two ASCII characters) CRC (check sum)
- ' <CR>' as line termination

### Structure of Measured value Datalines

The measurement value data line contains the current measurements of the sensor operating on the corresponding channel. All information are represented in binary and is transferred ASCII coded format without separation characters. For the sensor marking 01, the line has following structure:

- Identification character 'V' at the beginning of the line
- 8 bits (two ASCII characters) logical channel number
- 2 Bytes (4 ASCII characters) measurement data with 0.01°C resolution. The hexadecimal value is to be converted into a decimal number and to be divided by 100. With this, the temperature value is obtained in °C with two decimals.
- 8 bits (two ASCII characters) check sum (CRC)
- ' <CR>' as line termination

### Checksum

As the distance to the PC is rather short validation of checksum is regularly not necessary. A detailed description of the algorithm and a sample software written in C can be downloaded from our homepage.