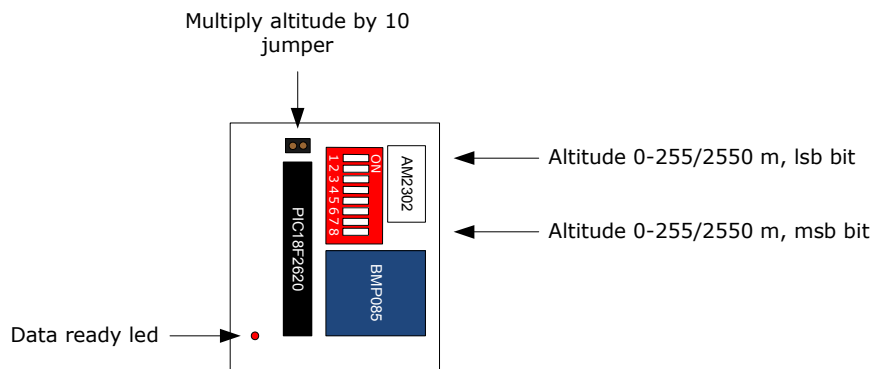


Temperature – Pressure – Humidity add on board

BK Software
Version 7



This board can be used for measuring temperature, pressure and relative humidity. It measures the temperature via both sensors. The pressure is measured via the BMP085 sensor and the relative humidity is measured via the AM2302 sensor. Every 2. second a measurement is performed.

PIC data protocol

The measurements can be read as serial data from the PIC. When the data ready signal is on data can be read. The following example shows how to read the data (see PIC Basic Pro Reference Manual for further information regarding the serial communication).

```
VAR    data_in          as BYTE[30]
VAR    humitidy         as WORD
VAR    temperature      as LONG (signed!)
VAR    pressure         as WORD
VAR    weather_type     as BYTE[10]
VAR    selected_altitude as WORD
VAR    addon_firmware_version as BYTE
VAR    addon_firmware_day as BYTE
VAR    addon_firmware_month as BYTE
VAR    addon_firmware_year as BYTE
```

```
DEFINE I2C_SLOW 1      '100KHz clock
DEFINE I2C_HOLD 1      'Transfer on the bus is paused by the receiving device by its holding the clock
                        line low
```

```
I2CREAD sda_pin,scl_pin,$02,[STR data_in\30]
```

Measured by AM2302:

```
humitidy.byte1 = data_in[0]
humitidy.byte0 = data_in[1]
temperature.byte3 = data_in[2]
temperature.byte2 = data_in[3]
temperature.byte1 = data_in[4]
temperature.byte0 = data_in[5]
```

Measured by BMP085:

```
pressure.byte3 = data_in[6]
pressure.byte2 = data_in[7]
pressure.byte1 = data_in[8]
pressure.byte0 = data_in[9]
temperature.byte3 = data_in[10]
temperature.byte2 = data_in[11]
temperature.byte1 = data_in[12]
temperature.byte0 = data_in[13]
```

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Other usefull information:

```
weather_type[0] = data_in[14]
weather_type[1] = data_in[15]
weather_type[2] = data_in[16]
weather_type[3] = data_in[17]
weather_type[4] = data_in[18]
weather_type[5] = data_in[19]
weather_type[6] = data_in[20]
weather_type[7] = data_in[21]
weather_type[8] = data_in[22]
weather_type[9] = data_in[23]
selected_altitude.byte1 = data_in[24]
selected_altitude.byte0 = data_in[25]
addon_firmware_version = data_in[26]
addon_firmware_day = data_in[27]
addon_firmware_month = data_in[28]
addon_firmware_year = data_in[29]
```

Weather type

The pressure measurements is used to predict the weather. The change in preasure over time, dP/dT , is calculated every half hour over a periode of three hours. The following criteria are used to determine the weather type:

$dP/dT \geq 250$ Pa/hour	: Unstable weather, value 1
$dP/dT > 50$ Pa/hour and $dP/dT < 250$ Pa/hour	: Good weather, value 2
$dP/dT \geq -50$ Pa/hour and $dP/dT \leq 50$ Pa/hour	: Stable weather, value 3
$dP/dT > -250$ Pa/hour and $dP/dT < -50$ Pa/hour	: Rainy weather, value 4
$dP/dT \leq -250$ Pa/hour	: Stormy weather, value 5

NB! The first half hour after the power has been switch on the weather type is set to no weather, value 0. Until 3 hours after the power has been switched on the dP/dT calculation is based on shorter timeintervals.

The values `weather_type[0]` to `weather_type[9]` can be used for trend purpose. `Weather_type[9]` contains the current weather type, `weather_type[8]` contains the previous weather type and so on down to `weather_type[0]`. Everytime a new measurement is done (each half hour) all the values shifts on place, `weather_type[0] = weather_type[1]`, `weather_type[1] = weather_type[2]` and so on. The new measurement is stored in `weather_type[9]`.

Data format

Temperature measurements has the following format: (-)XXX °C eg. -10.0 °C or 25.8 °C

Pressure measurements has the following format: XXXXXX Pa eg. 101300 Pa

Relative humidity measurements has the following format: XXX %RH eg. 42.5 %RH

Altitude dip switch/Multipy altitude by 10 jumper

The altitude is set via the dip switch and the jumper. If the jumper is not set it is possible to select an altitude between 0 and 255 meters in steps of 1 meter via the dip switch. If the jumper is set it is possible to select an altitude between 0 and 2550 meters in steps of 10 meters via the dip switch.

Data ready led

When the led is on data is ready to bo read. When the led is off a measurement is in progress. The led will turn off after data has been read from the PIC.