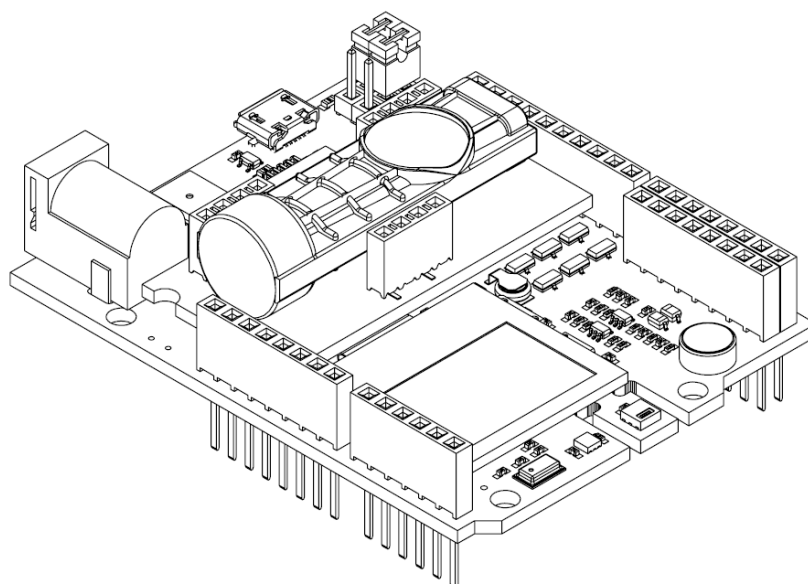


MeteoShield Manual



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1 DOCUMENT REVISION HISTORY

Table 1.

REVISION	DATE	DESCRIPTION
V0.01	2014.05.18	First incomplete revision
V0.02	2014.07.31	In progress

2. INTRODUCTION

3. ELECTRICAL SPECIFICATIONS

			Min	Type	Max	units
Storage temerature			-20	-	-85	°C
Usage Temperature						

SENSOR PERFORMANCE

Temperature Sensor

Table 1. Temperature sensor parameters¹

Parameter	Symbole	Test Condition	Min	Type	Max	Unit
Operatio Range		I and Y Grade	-40	-	+125	°C
		G Grade	-40	-	+85	
Accuracy ²		$-10^{\circ}\text{C} \leq t_A \leq 85^{\circ}\text{C}$	-	± 0.3	± 0.4	
		$-40^{\circ}\text{C} \leq t_A \leq 125^{\circ}\text{C}$	-	-	± 0.6	
Repetability/Noise		14-bit resolution	-	0.01	-	°C RM
Response Time ³	T _{63%}	On MS board	-	> 6	-	s
Long Term Stability			-	≤ 0.01	-	°C/Yr
Notes: <ol style="list-style-type: none"> Values are given for Si7020 temperature sensor, not for all MeteoShield board; 14b measurement resolution (default). Time to reach 63% of final value in response to a step change in temperature. Actual response time will vary dependent on system thermal mass and air-flow. 						

Humidity

Table 2. Humidity sensor parameters¹

Parameter	Symbole	Test Condition	Min	Typ	Max	Unit
Operating Range ²		Non-condensing	0	-	100	%RH
Accuracy ^{3,4}		0-80% RH	-	± 3	± 4	%RH
		80-100% RH		± 3	± 6.5	
Repeatability/Noise		12-bit resolution	-	0.025	-	%RH RMS
Response Time ⁵	T _{63%}	1m/s airflow	-	18	-	S
Drift vs. Temperature			-	0.05	-	%RH/°C
Hysteresis			-	± 1	-	% RH
Long Term Stability			-	≤ 0.25	-	%RH/yr
Notes: <ol style="list-style-type: none"> Values are given for Si7020 temperature sensor, not for all MeteoShield board; Recommended humidity operating range is 20% to 80% RH (non-condensing) over -10 °C to 60 °C. Prolonged operation beyond these ranges may result in a shift of sensor reading, with slow recovery time. Excludes hysteresis, long term drift, and certain other factors and is applicable to non-condensing environments only. See section “4.1. Relative Humidity Sensor Accuracy” for more details. Drift due to aging effects at typical room conditions of 30 °C and 30% to 50% RH. May be impacted by dust, vaporized solvents or other contaminants, e.g., out-gassing tapes, adhesives, packaging materials, etc. See section “4.7. Long Term Drift/Aging” . Response time to a step change in RH. Time for the RH output to change by 63% of the total RH change. 						

Light

Table 3. Light sensor parameters

CO2

Table 4. CO2 sensor parameters[illegible]

Pressure

Table 5. Pressure sensor parameters[illegible]

Sound Level

Table 6. Pressure sensor parameters

Parameter	Symbole	Test Condition	Min	Typ	Max	Unit
Operating Range			30	-	120	SLdB
Accuracy			-	± 5	-	SLdB
Time-weightening				1		s
Notes:						
1.						

General Purpose Outputs (GPO)

MeteoShield has additional one connector X3. Pins from 1 to 6 are open collector (NPN transistor) outputs, four of them are related to physical measuring parameters (table 7.), two of them are user controllable and two are power supply +5 VDC.

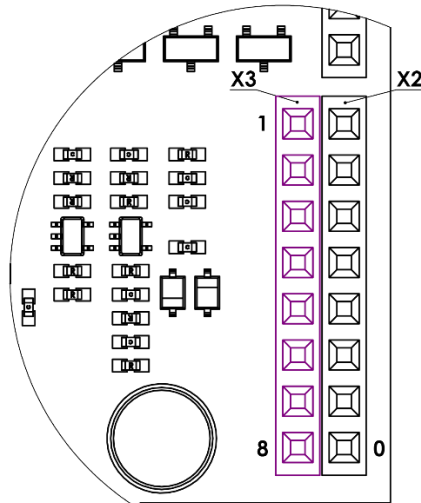


Image TODO

Table 7. Connector X3 pinout

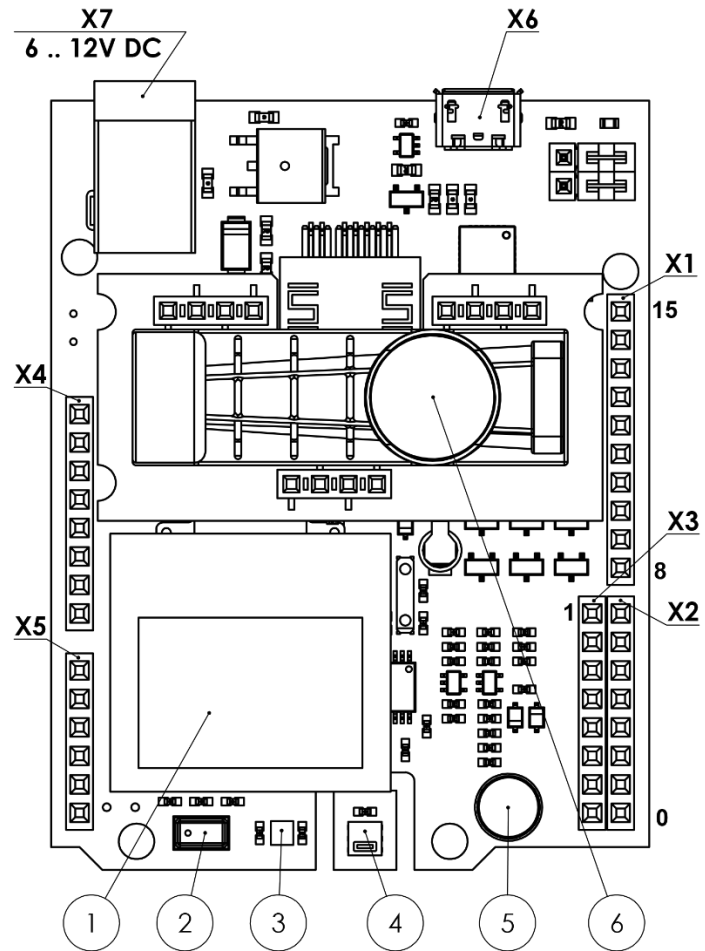
Pin Nr.	Description	Related to
1	OC ¹	Temperature
2	OC ¹	Humidity
3	OC ¹	Light
4	OC ¹	CO2
5	OC ¹	User
6	OC ¹	User
7	+5 VDC	Supply
8	+5 VDC	Supply
Note:		
1. NPN Open Collector type outputs.		

Example GPO

OLED

Example OLED

4. PIN DESCRIPTION



5. SERIAL HOST PROGRAMMING

5.1 Communication Interface

A host communicating to MeteoShield is done via a serial port (UART), it must use the following settings.

Table. TODO

Parameter	Value
Baud rate	115200 bits/s
Parity	No
Data bits	8
Stop bits	1

All transferred bytes are in ASCII. The least significant bit (LSB) of each byte must be transmitted first on the physical interface.

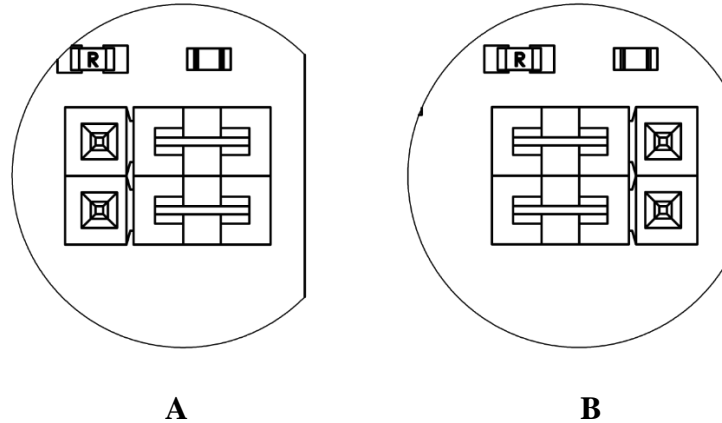


Image . TODO

Data flow from/to MeteoShield is switched with two jumpers. Image [TODO] figure **A** show configuration MeteoShield is connected to **X2** connector pins **0** (RX) and **1** (TX) – arduino boards compatible. Figure **B** shows configuration MeteoShield is connected to USB-UART bridge (CP210X)[A](#).

5.2 Frame Layout

The host and the MeteoShield communicates via simple protocol with one frame type. Each frame contains *Start* {#} character, command (CMD), variable (VAR), code (CODE), value (VAL), separators {.} {:} and end of frame {\r} {\n} characters.

Note:

Curly brackets-> {} is used for visual separation of ONE parameter, ONE character. Physically they do not appear in the frame.

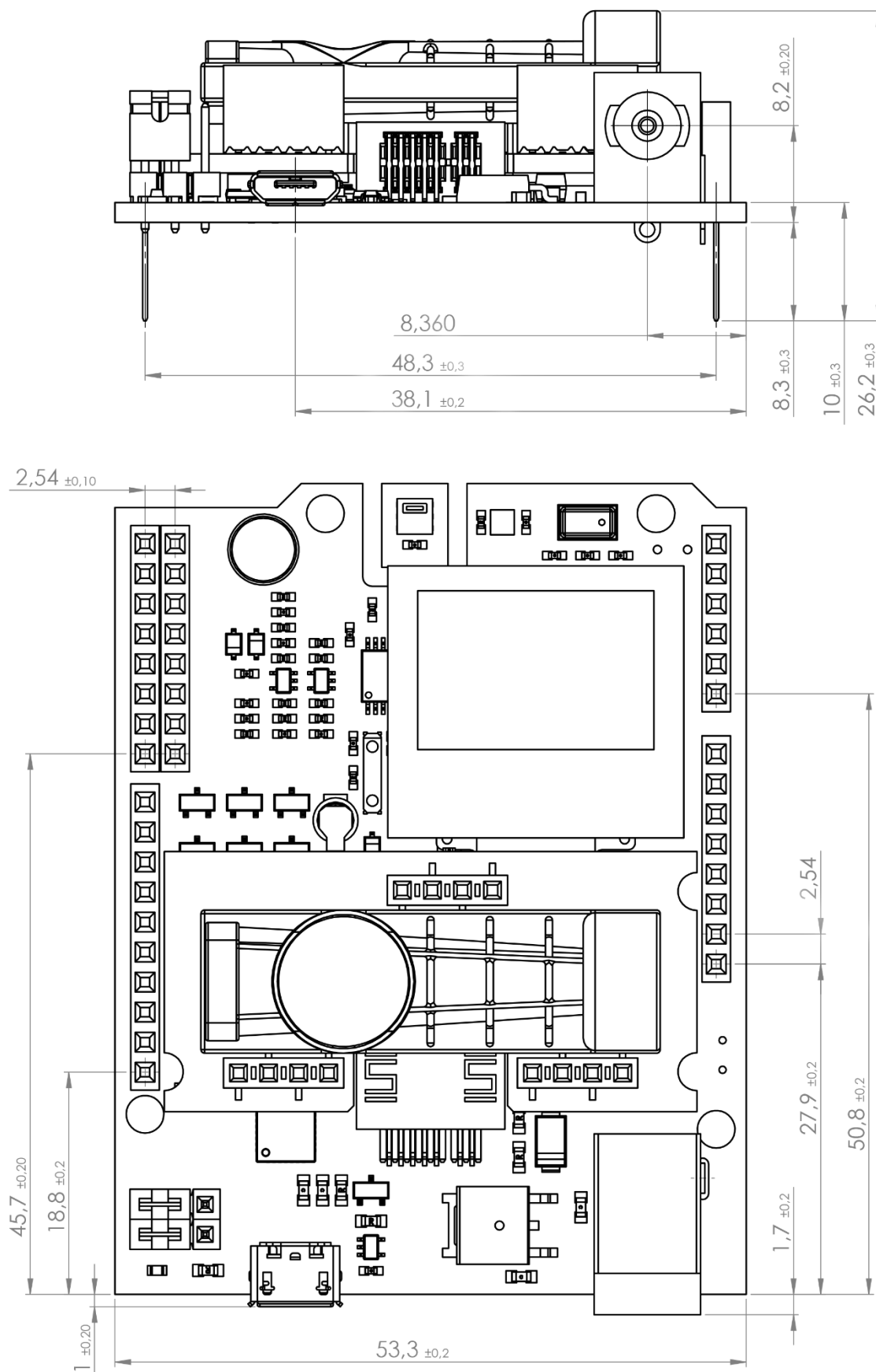
Example:

{**CMD**} it means that there is only one character – for example ‘S’ – ASCII character with decimal value **83** which means *SET* something.

#.{CMD}.{VAR}.{CODE}:{VAL}\r\n

5.3 Commands

DIMENSIONS



All dimensions in [mm]

IMPORTANT NOTICES

Warning, Personal Injury

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury.

ESD Precautions

Warranty

REFERENCES

- [A] – MeteoShield uses SiliconLabs USB-to-UART bridge CP210x. Drivers can be found: [link](#).