

ODROID Forum

Hardkernel ODROID
<http://forum.odroid.com/>

Weather board for SHOW.

<http://forum.odroid.com/viewtopic.php?f=88&t=5359>

Weather board for SHOW.

by **odroid**

Add-on sensor board for ODROID-SHOW !

Page **1** of **2**

Posted: **Tue Jun 24, 2014 3:36 pm**

The Weather board is an easy to use ODROID-SHOW Add-on that grants you access to UV Index, barometric pressure, altitude, relative humidity, illumination and temperature.

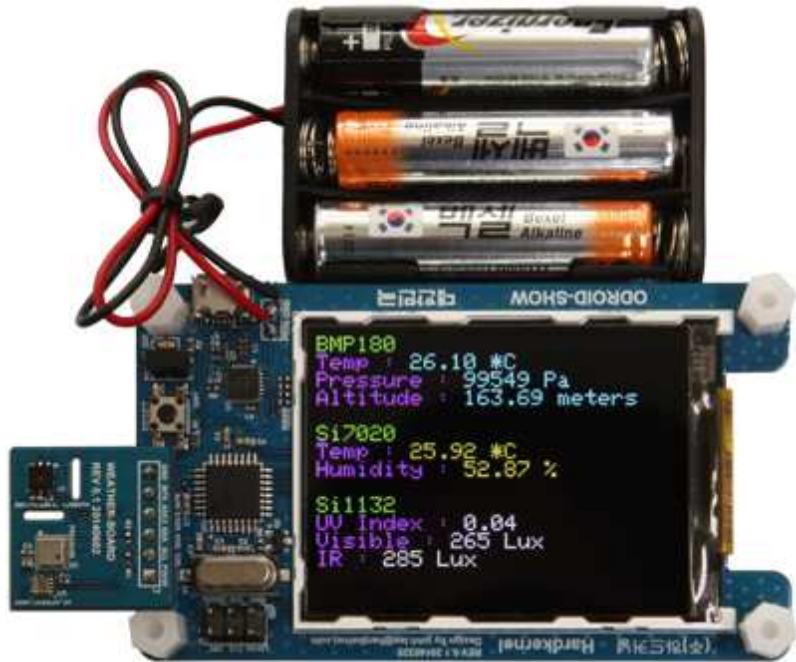
- Dimension is only 20 x 20 mm
- Sensors : Si7020, BMP180, Si1132



You can buy this board now.

<http://www.hardkernel.com/main/products ... 0264897696>

With a few batteries, you can make a portable weather station.



If you connect it to your ODR0ID or PC via USB interface, you can make a weather data logger with a Qt application.



Temperature

29.75 °C

Humidity

54.92 %

Pressure

100244 Pa

Altitude

90.98 meter

UV Index

0.04

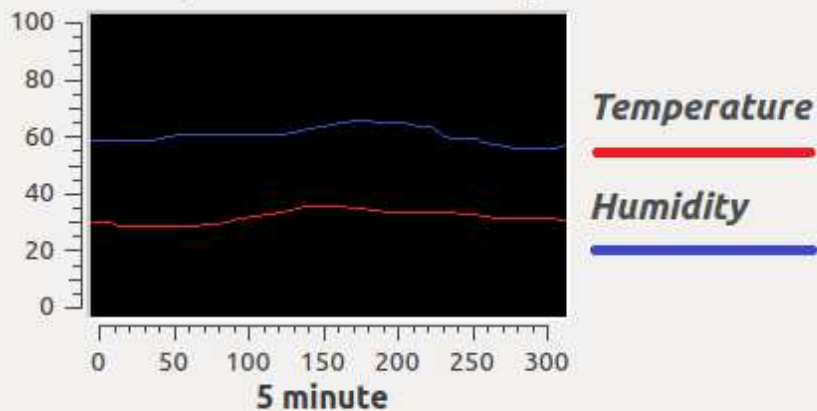
Visible

251 Lux

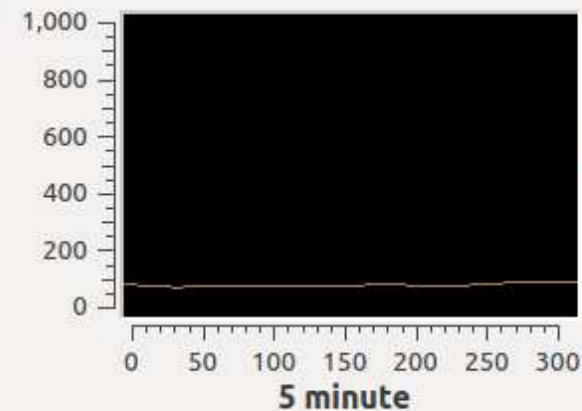
IR

249 Lux

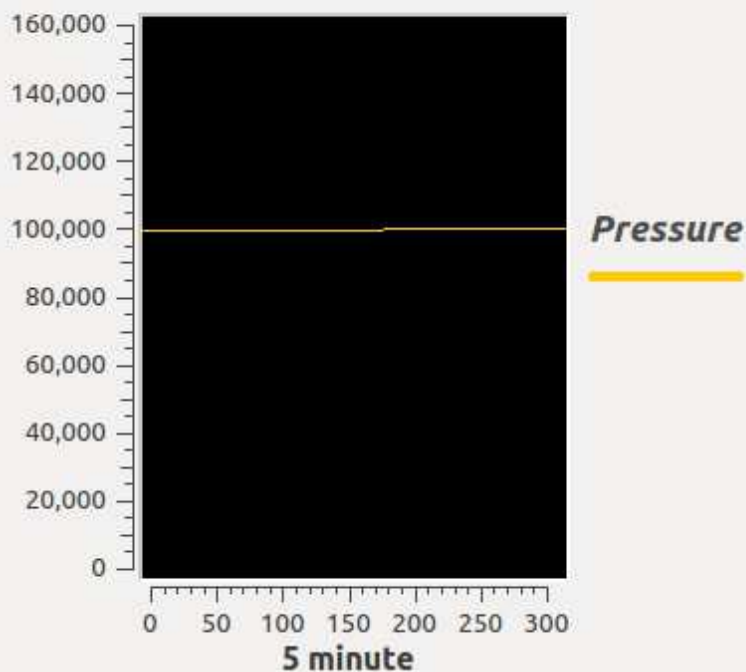
Temperature & Humidity



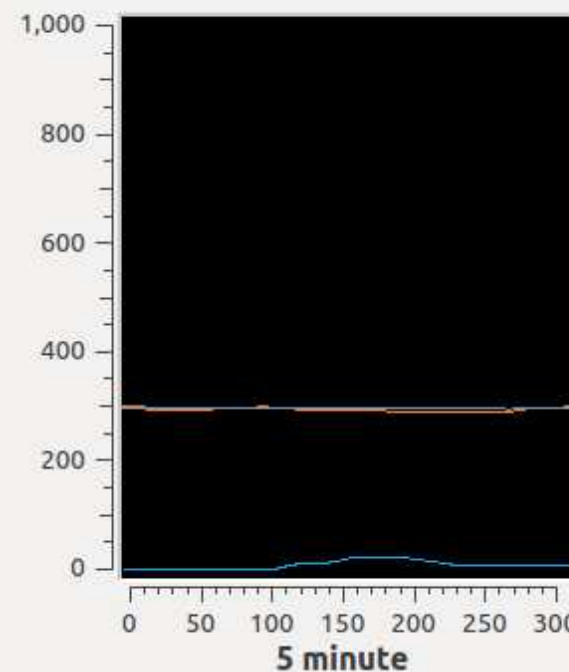
Altitude



Pressure



UV Index & Visible & IR



Full schematics and firmware and host software source code are available.
<http://odroid.com/dokuwiki/doku.php?id=en:weather-board>

Re: Weather board for SHOW.

by **memeka**

Posted: **Tue Jun 24, 2014 4:39 pm**

cool addon!

- * will this work connected to the odroid (u3 + shield, xu) or just Odroid SHOW? (can't see why is just for SHOW...)
 - * does it work with 5V power instead of 3.5V?
-

Re: Weather board for SHOW.

by **odroid**

Posted: **Tue Jun 24, 2014 7:03 pm**

It can be connected to ODROID with a couple of level shifter on the I2C bus.
VCC could be 2.7~3.6Volt.

But we need to develop an example code for each sensors. 🤖

Re: Weather board for SHOW.

by **memeka**

Posted: **Tue Jun 24, 2014 8:44 pm**

i think vcc is the big problem here, that you cannot get it from board 🤖
i would probably go with other sensors that work at 5V (or 1.8V) 🤖

Re: Weather board for SHOW.

by **odroid**

Posted: **Wed Jun 25, 2014 2:20 pm**

Yes.. there should be voltage regulator for 5V to 3.3V.

Re: Weather board for SHOW.

by **sert00**

Posted: **Thu Jun 26, 2014 8:45 pm**

great addon,time to place an order of this,show and ups!love this kind of gadgets! 😊

Re: Weather board for SHOW.

by **magnum_pi**

Posted: **Fri Jun 27, 2014 10:15 am**

Looks nice. I was only very recently looking at similar sensors for use in a poly tunnel. This board looks very nice in comparison. I don't think I'd want to pair it up with the SHOW, though, especially not in a humid environment like a greenhouse or poly tunnel. I think it would work much better with the USB I/O (since it's easier to waterproof and I wouldn't mind so much if it broke), but the voltages are wrong 🙄.

This is not quite right for my application. I would suggest a couple of things, though:

- * supply a cable for connecting between the module and the arduino board so that it's easier to waterproof the board and sensor can be placed where it will give most consistent readings for, eg, light values
- * release a data logger board: even with SHOW, you've still got SPI pins available, so you could turn it into a real weather station (apart from the conflict between measuring light levels, keeping it weatherproof and measuring temperature in the shade).

A data logger module would be great because you could run the entire thing off batteries and solar cells and only occasionally connect up to a PC to download the readings. Both the SHOW and the USB I/O have usb connectors, but it seems that it would be easier to rig up the USB I/O and most of the time the screen on the SHOW would be going to waste in a weather monitoring station...

So anyway, as I said, it's a really nice board (and good value), but just not right for me at the moment.

Re: Weather board for SHOW.

by **odroid**

Posted: **Fri Jun 27, 2014 11:16 am**

Thank you for the feed back.

BTW, you can connect the Weather board to the USB IO board.
USB IO board is 3.3Volt and the Weather board accepts 2.7V~3.6V.
Arduino Sketch and Libs can be ported to USB IO software easily.

Re: Weather board for SHOW.

by **memeka**

Posted: **Fri Jun 27, 2014 1:00 pm**

odroid wrote:

Thank you for the feed back.

BTW, you can connect the Weather board to the USB IO board.
USB IO board is 3.3Volt and the Weather board accepts 2.7V~3.6V.
Arduino Sketch and Libs can be ported to USB IO software easily.

that's good advice 😊

thanks @odroid

Re: Weather board for SHOW.

by **magnum_pi**

Posted: **Fri Jun 27, 2014 1:03 pm**

odroid wrote:

Thank you for the feed back.

BTW, you can connect the Weather board to the USB IO board.
USB IO board is 3.3Volt and the Weather board accepts 2.7V~3.6V.

That's interesting. So I wouldn't need to modify the USB I/O board at all, and both would work at 3v3? That makes it quite a bit more attractive.

Arduino Sketch and Libs can be ported to USB IO software easily.

In theory, yes, but I don't think it's quite as easy as you say it is. I only have the free sdcc PIC compiler, which I think only supports C, whereas most Arduino libraries are C++? Also there's the issue of all the registers being pretty different, even though both of them have relatively similar architectures. I'm sure I can manage the differences, but it strikes me as being more of a reimplementation than a straight port if you take the support libs (like for serial) into account ...

Anyway, thanks for the extra info. Do you have any idea about whether this could be available from a European reseller or would I have to order direct from Korea?

Cheers!

Re: Weather board for SHOW.

by **odroid**

Posted: **Fri Jun 27, 2014 2:18 pm**

It may take 3~4 days to port the Weather board Sketch source to pure C version for the USB IO board.
But we are too busy these days. So we will start it from middle of July.

The resellers don't sell the Weather board now.

If you push them, they might move. 😊

Re: Weather board for SHOW.

by **venkatbo**

Posted: **Fri Jun 27, 2014 2:45 pm**

odroid wrote:

VCC could be 2.7~3.6Volt.

Since this is the case, wouldn't it be possible to use this on say, an Arduino Due (a 3.3v board) ? If so, will any hardware mods to this add-on weather-board be needed to get it to work with a Due ?

Re: Weather board for SHOW.

by **odroid**

Posted: **Fri Jun 27, 2014 8:20 pm**

Just connect VCC/GND/SDA/SCL signals to your Due board.
But you need to modify the sketch file for the Due pinout.

Re: Weather board for SHOW.

by **smitna**

Posted: **Sun Jul 06, 2014 1:23 am**

I have ordered 4 Weather boards and found some issues:

- Temperatures on both sensors (Si7020 and BMP180) are showing wrong values (about 4-5 C higher than compared with 2 thermometers)
- Humidity value differs about 8 % (lower than expected and measured)
- Altitude value differs about 40 meters (lower than expected and measured via gps)

I have checked this with all boards.

Board voltage is in range (3.4 V)

Is there something wrong with the software/firmware? The sensors should be calibrated (data sheeds) and I can't find something wrong in the weather Sketch

Re: Weather board for SHOW.

by **odroid**

Posted: **Sun Jul 06, 2014 12:39 pm**

Yes, most sensors are calibrated in their factory.

I think the wrong Relative-Humidity and Temperature might be caused by PCB temperature.

BTW, what is the tolerance of your thermometers?

As far as I know, GPS altitude might not be accurate.
Refer this link.
<http://www.gpsinformation.net/main/altitude.htm>

Re: Weather board for SHOW.

by **smitna**

Posted: **Sun Jul 06, 2014 10:34 pm**

odroid wrote:

Yes, most sensors are calibrated in their factory.

I think the wrong Relative-Humidity and Temperature might be caused by PCB temperature.
BTW, what is the tolerance of your thermometers?

As far as I know, GPS altitude might not be accurate.
Refer this link.
<http://www.gpsinformation.net/main/altitude.htm>

The tolerance of the thermometers is +1/-1 degree and they show nearly the same temperature.
I agree, it's possible the PCB temperature.
Yes, calculated altitude is slightly different between network/google and GPS, but close enough to the official value for my city.
That's not the reason. I see the altitude from the sensor is calculated in the library from the pressure reading:
$$\text{altitude} = 44330 * (1.0 - \text{pow}(\text{pressure} / \text{sealevelPressure}, 0.1903));$$

So we need a "correction calculation" for both the altitude (or pressure) and the temperature in the libraries.

Re: Weather board for SHOW.

by **odroid**

Posted: **Mon Jul 07, 2014 12:02 am**

This one seems to be the temperature compensated "Pressure to Altitude" conversion library.

[https://github.com/adafruit/Adafruit_BM ... P085_U.cpp](https://github.com/adafruit/Adafruit_BM...P085_U.cpp)

Re: Weather board for SHOW.

by **smitna**

Posted: **Mon Jul 07, 2014 4:59 am**

odroid wrote:

This one seems to be the temperature compensated "Pressure to Altitude" conversion library.

[https://github.com/adafruit/Adafruit_BM ... P085_U.cpp](https://github.com/adafruit/Adafruit_BM...P085_U.cpp)

Thanks!

Yes, this library calculates temperature and pressure with compensation but needs some modification to use it for the ODROID show/weatherboard...

Re: Weather board for SHOW.

by **odroid**

Posted: **Mon Jul 07, 2014 9:54 am**

We will try that ...

Re: Weather board for SHOW.

by **smitna**

Posted: **Mon Jul 28, 2014 12:30 am**

odroid wrote:

This one seems to be the temperature compensated "Pressure to Altitude" conversion library.

[https://github.com/adafruit/Adafruit_BM ... P085_U.cpp](https://github.com/adafruit/Adafruit_BM...P085_U.cpp)

I think there is no big difference to this library.

So I changed only this lines for temp1 (BMP180) and temp2 (Si7020) calculation:

file Adafruit_BMP085.cpp

```
// step 1
```

```
X1 = (UT - (int32_t)ac6) * ((int32_t)ac5) / pow(2,15);
```

```
X2 = ((int32_t)mc * pow(2,11)) / (X1+(int32_t)md);
```

```
B5 = X1 + X2;
```

```
temp = (B5+8)/pow(2,4);
```

```
// original
```

```
//temp /= 10;
```

```
temp /= 12;
```

file ODROID_Si70xx.cpp

```
rawTemp = read16(CMD_MEASURE_TEMPERATURE_HOLD);
```

```
// original
//temp = (rawTemp*175.72/65536) - 46.85;
temp = (rawTemp*175.72/65536) - 50.85;
```

Then the temps are nearly the same compared with 2 other thermometers.

I also wrote a client-server solution for the command line (with help from the qt_weather example)

The first file is the "server". It only writes the values constantly from serial to a fifo (formatted to JSON) and must be running before executing the reader. The second file is the reader. It reads the values from the fifo. First stop a possibly running "Qt based GUI application", it will be blocked because only one application is allowed to read from the serial port at the same time.

The third file is a PHP example for outputting the data to a web page (for example an available web server on the connected ODROID U3). It should be possible to use this also for an Ajax solution.

Sorry, I am an absolute C rookie. So feel free to report bugs...