Oregon Scientific Wind Sensor
Installed with Solar Panel on the Roof

(Aug. 15, 2014; Karl Wachs-- V1.1)

Purpose of this document

- To share some insides on how to install and optimize the Oregon Scientific wind speed and direction sensor.
- tips on how to install it on a roof top*)
- tips on how to utilize a solar panel to reduce the need to replace batteries. Once installed on a roof top it takes some courage to get it down and put it back up again with new batteries.

*)If you install the wind sensor in an urban area, installation on the ground would likely result in wrong measurements due to houses and trees restricting the wind.

This is a real "do it yourself" project and with learning exposure to some mechanical and electronics tools.

Basic Factory default install:

Assembly of the sensor itself is straightforward; follow the install on page 5 of the attached link.
http://www.oregonscientific.com/wcsstore/IDTStorefrontAssetStore/File/WMR200.pdf

Only point to pay attention to is to push the direction sensor far enough down to make sure the direction-reed relays trigger – otherwise you will only see NORTH as direction. If you turn the direction sensor and you listen carefully you will here the clicking of the reed relays that trigger when the sensor turns.

You then need to configure the senor in the RFXCOM plugin: check the logfile for a new device and add the id listed to the wind sensor RFXCOM device in the device edit screen.

If you like to install the solar panel and put it onto the rooftop here is what you need to buy(*):
The Indigo store sells the Oregon Scientific Wind Sensor kit for the basic install with the straight PVC pipe and sensor to setup on the ground. If you have trees you might need to go higher than ground level, ie roof top.

For the solar panel install you would need:

- Solar panel ~ $15
- 1 diode (eg 1N914 or 1N4148, any small diode works) and 1 resistor (56 Ohm) $1
- !THIN! Isolated copper cable ~ 2x20 cm
- 2 AA NiMH rechargeable batteries ~ $10 for 4

For the roof top install:

- ~ 1 foot PVC pipe & elbow ~ $8
- Some screws and glue ~ $2,

details will depend on your specific situation.

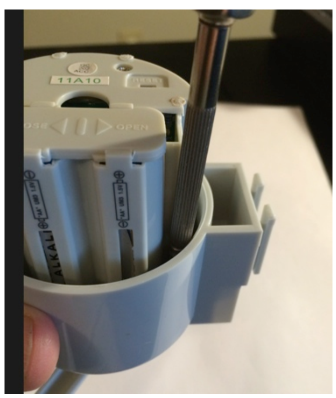
Installation of a solar panel

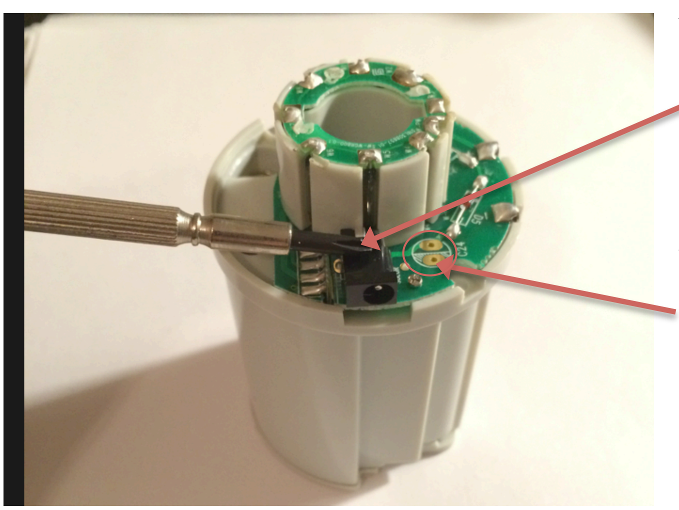
Oregon does not sell the solar panel alone anymore, but there is a cheaper and better solution. You can buy 3.6 V 100mA flexible solar panel at Amazon: http://smile.amazon.com/gp/product/B002MFN7MY/ref=oh_details_o00_s00_i00?ie=UTF8&psc=1.

Glue it with superglue around the sensor. It is pretty simple. It fits exactly – it looks as if it was made for THIS purpose!
(Actually do this part at the very end. It is easier to open and close the senor without the solar panel attached.)

Then to connect the solar panel to the electronics you need to do some soldering of 2 wires to the electronics board.

First you have to open the sensor. After unscrewing the access to the battery compartment 2 screws have to be removed:



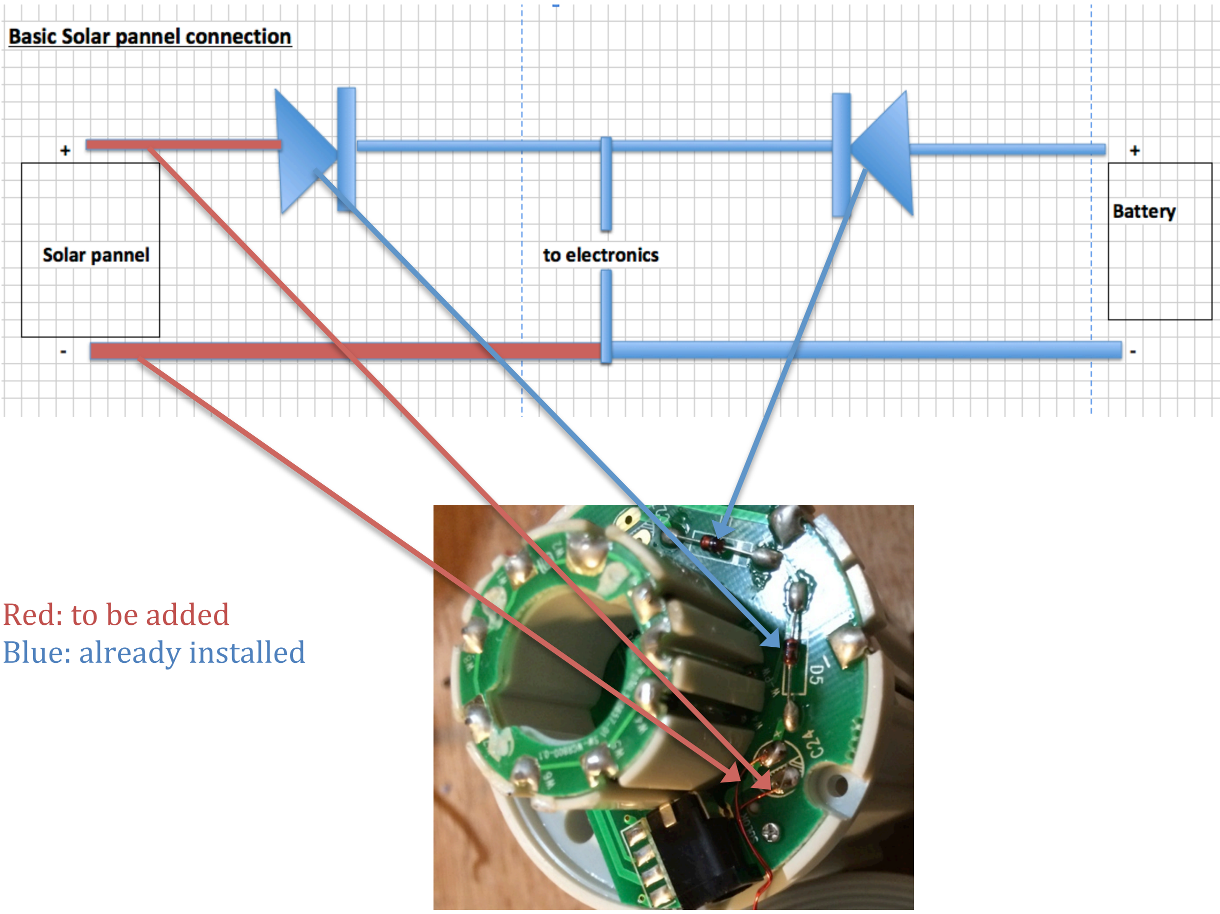


You then get to the "electronics" part.

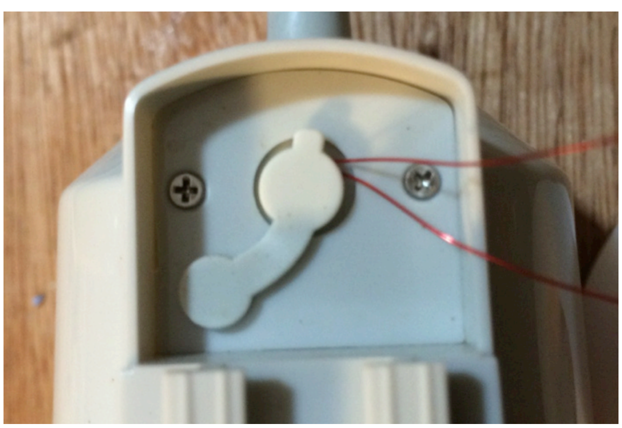
The black connector block is for the standard Solar panel and can be accessed from the outside. As we don't have that part we need to solder some wires directly onto the board. If you have one that fits, you don't need to add the wires inside.

Solder 2 very small isolated wires to the 2 connection points- I used lacquer isolated copper wire (magnet wire) ~ 20 cm each

Here the logic drawing and the physical installation:



The 2 small wires can be feed through the build in solar panel connector hole:



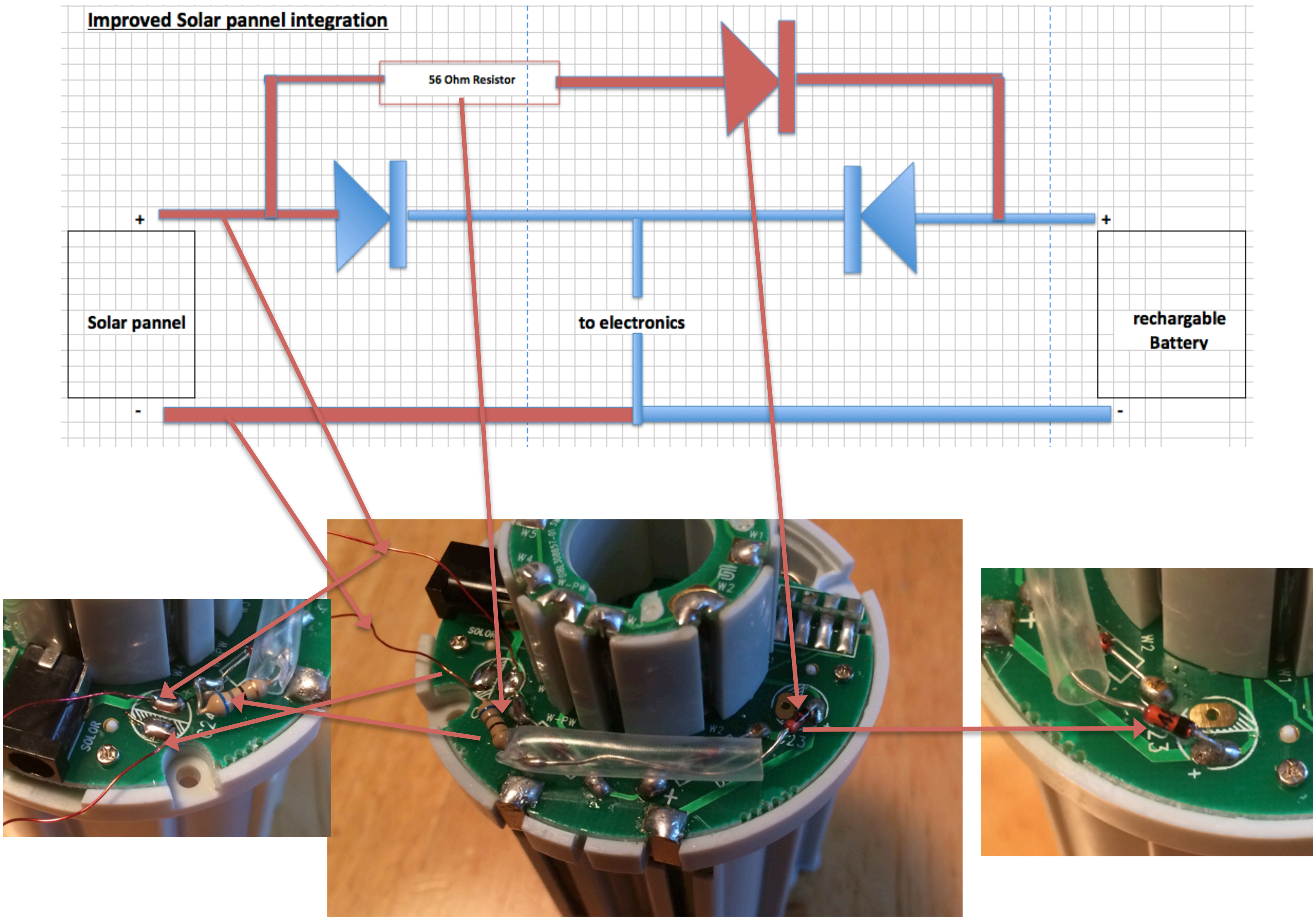
Then solder the wires directly onto the solar panel- remove the old wires that come with the solar panel. You have to connect the wires to the right polarity. If connected with the wrong polarity nothing will happen due to the diode on the board.
The original red cable is connected to the + polarity and the black cable on the solar panel was connected to the "-" polarity. You can naturally also test with a DVM: shine light onto the panel and measure the voltage.

The basic solar panel install does not charge the battery. It just delivers current to the electronics and nothing to the battery. It essentially cuts the battery usage by about 50% (ie during the day). Both the solar panel and the 2 AA batteries are connected via a diode to the electronics. If the solar panel delivers higher voltage than the batteries, it takes over. If the solar panel voltage output is lower (at night) than the battery voltage it does nothing and the battery is used.
Regular AA batteries deliver 1.6Volts(new)…1.3(dead) Volts. NiMH deliver 1.35V-1.2V. With two batteries that gives 0.5 V less than two regular AA batteries. BUT luckily the electronics still works with <2 V without any issues (tested). That is why this works.

The next level:

A better solution is to install 2 rechargeable AA NIMH batteries and add a diode & resistor from the solar panel to the battery to also recharge the 2 batteries. Regular AA batteries deliver 1.6Volts(new)…1.3(dead) Volts. NiMH deliver 1.35V-1.2V. With two batteries that gives 0.5 V less than two regular AA batteries. BUT luckily the electro NiMH cs still works with <2 V without any issues (tested). That is why this works.

The next pictures show the logical and physical layout and the 2 components (diode and resistor) added to the board. The 2 copper cables have already been installed in the previous step and don't need to be changed.



Also: put the diode/resistor into a small heat shrink tube to insulate the blank wires.

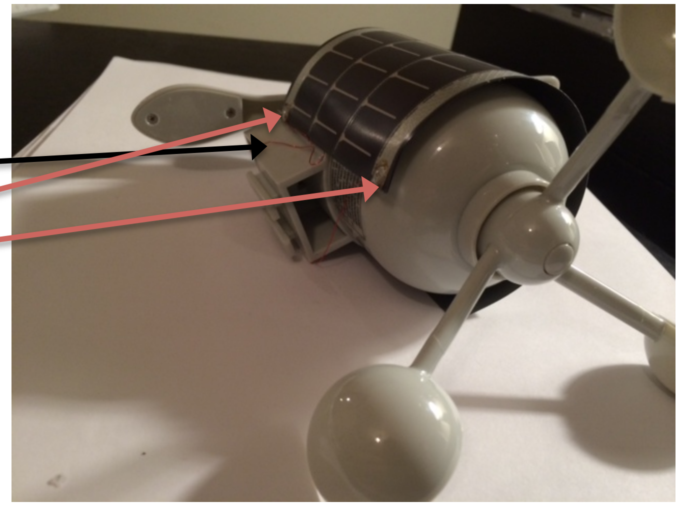
The combination of the resistor and the diode makes sure that the batteries are not overcharged but just enough current is flowing that the batteries stay charged.

Results: The solar panel delivers enough electric power to charge the battery every day. Two months after the install, the rechargeable batteries are still at the same voltage level as they were in the beginning

Here is how the final assembly looks like:

Thin wires from inside to Solar panel

… soldered to the solar panel

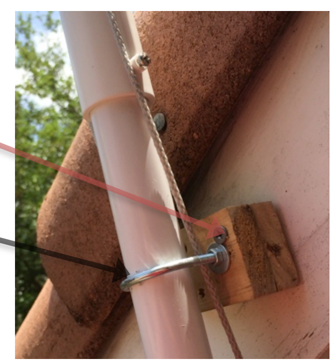


Installation on the roof top:

Included in wind sensor package:
connector L shaped pipe for the wind sensor
3 Long PVC pipes and
2 connector cylinders
U shaped brace
1 Base plate

You will need to buy from HomeDepot:

1. 2 screws with nuts, long enough to fit through the elbow.
2. 1 5/4" PVC elbow
3. 1 5/4" PVC pipe ~ 1' long, depends on your roof design
4. 8 long screws, depending on the specific install
5. PVC glue to glue the pipes into the elbow



The U shaped brace is included in wind sensor package.
It is screwed into the house gable with some wooden spacers and some long screws.

Do a test install without gluing or fixing any screws, to measure length of needed HD pipe etc !

Finish this before you climb up:
Glue the Home Depot pipe into the PVC-elbow. Then ONE of the original PVC type is screwed into the elbow. The elbow is just a tiny bit too wide. With 2 screws the PVC pipe is connected well and does not move. The whole thing is now ONE solid piece. Push the HD pipe into the base plate (it is very tight and needs to force to fit in) Do not glue it in, you still have to adjust the angle when you screw it into the gable.

Then climb up and screw the baseplate and the U-shaped brace into the gable.

And only THEN you attach the upper part (the wind sensor and pipes). You can assemble it on the ground in one piece. Use one of the connector cylinder to connect it to the lower part. It comes with 2 screws for each end to secure that it is not lose.

As the base plate is screwed into the gable perpendicular to the wind-sensor PVC pipe and the U-Brace holds it in the other dimension. The sensor pipe is not just connected at one point but at two. 2 fix points give it good stability.
One could also connect the strings to the gable 1-2 feet to the left or right. Here they are simply knotted to the lower part of the PVC pipe.

Using the INDIGOplotD plugin, here the result of the wind speed and direction at my house for the last 3 days in 5 minute averages and wind gusts: