SOLAR POWERED ARDUINO WEATHER STATION

by Open Green Energy

[Play Video]

In a country like India, most of the people are dependent on agriculture. For effective planning in agriculture, the weather forecast is of utmost importance. So farmers are always interested in the Weather Forecasts. As farmers stay in remote areas, they have to wait for the news updates on TV, Radio or News Papers. Unfortunately, this weather information is not the accurate data of their local environment rather it gives data of the nearest weather forecasting station.
Being the son of a farmer, I decided to monitor the local weather and inform to my father earlier. So that he can take an early decision for his farm.

You can find all of my projects on https://www.opengreenenergy.com/

My weather stations typically consist of two major parts:

1. The sensors that sit outside and measure temperature, humidity, rainfall, and barometric pressure. This data is sent wirelessly through an RF transmitter module to the display unit. I named the entire module as Transmitter module. (Tx).

2. The display unit that lives inside in a convenient place so anyone can read the external temperature, humidity, etc. It equipped with an RF receiver to receive data from the transmitter module. I named it as Receiver module (Rx).

Both the modules are run by the Arduino microcontrollers.

As the transmitter module is deployed in the field, we have to deal with power management. It is impractical to run a long cable to provide power to the sensor's location. This leaves relatively few practical options.

1. Connecting directly an Arduino board to a battery. Though it sounds good and obviously it would work, but your battery would be depleted in a matter of days because some components like voltage regulators, power led and USB interfacing chip in the Arduino board are always drawing power.
But nowadays high capacity battery packs are readily available in the market. Solar panels are getting more efficient and cheaper. Adding a boost converter in the circuits extract every last drop of juice out of battery.

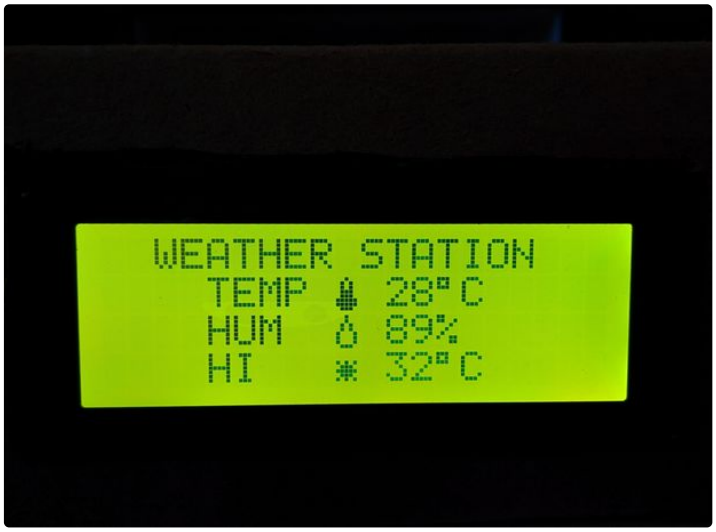
2. Putting the Arduino to "**sleep mode**" to consume even less power.

You can see it in the step-11 and 12.

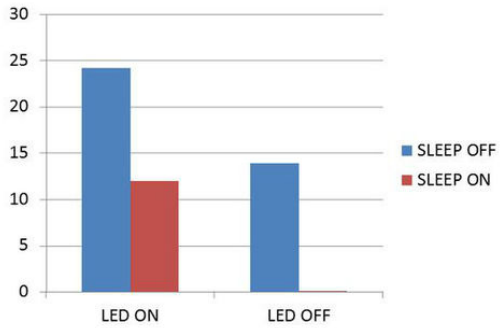
In this guide, I will teach new skills on how you can make a solar powered battery pack for your Arduino and how Arduino power consumption can be optimized by putting it into sleep mode.

By using the above technique you can run your sensor related or any other stand-alone Arduino project for a long time.

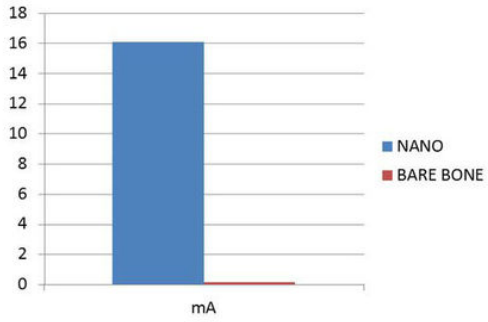

SOLAR POWERED ARDUINO
WEATHER STATION
ARDUINO


WEATHER STATION
TEMP 28°C
HUM 89%
HI 32°C


WEATHER STATION
TEMP 28°C
HUM 89%
HI 32°C



BARE BONE ARDUINO



Current Consumption

http://youtu.be/vQ7SPvfb3cY

Step 1: PARTS AND TOOLS REQUIRED :

PARTS :

1.Arduino Uno (Amazon / eBay)

2.Arduino Nano (Amazon / eBay)

3. DHT11 (Amazon / eBay)

4.RF transmitter-Receiver pair (Amazon / eBay)

5.20x4 LCD display (Amazon / eBay)

6.LCD I2C module (Amazon / eBay)

7. 3.7 V Li Ion Battery /2 AA Ni Mh rechargable Battery (Amazon / eBay)

8.Boost Converter (Amazon / eBay)

9.Li Ion Battery charging board (Amazon / eBay)

10. Battery Holder (Amazon / eBay)

11.Solar Panel (Amazon / eBay)

12.Resistor 10K (Amazon)

13.Diode -IN4007 (Amazon)

14.Jumper wires/Wires (Amazon)

15.Bread Board (Amazon)

16.22 AWG solid core wire (for making antenna) (Amazon)

17.Scotch mounting pad and tap (Amazon)

TOOLS :

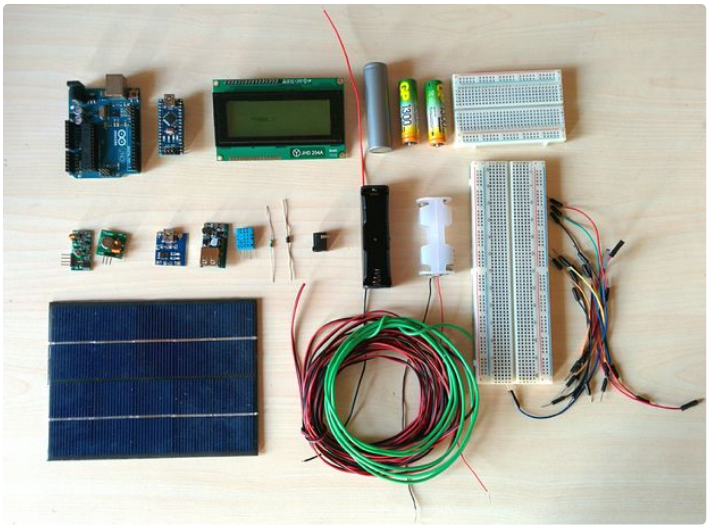
1.Soldering Iron and solder (Amazon)

2.Glue gun (Amazon)

3.Hobby Knife (Amazon)

4.Drill (Amazon)

5.Wire cutter/Stripper (Amazon)



Step 2: SOLAR POWER

Why Solar Power?

The main drawback of battery operated device is that it will be depleted after a certain time. This drawback can be eliminated by using natural resources like solar, wind or hydro energy. The most obvious free source of energy to recharge the battery is solar energy. It is a relatively simple, cheap and requires very less skill.

Among the rechargeable battery, nickel metal hydride (NiMH) and Li-Ion battery are widely used for battery operated device.

Facts on Battery Charging :

The thumb rule for charging Ni Mh batteries is 1/10th (commonly known as C/10). To charge the battery pack at 1/10th its rated current requires 16 hours of charge time(You can see the picture). The solar panel receives optimal sunlight for only four hours per day, from 10 a.m. to 2 p.m. Thus, a totally ideal system would require four days to fully charge the battery pack.

What is C/10?

For example, we have a 2xAA–sized 1300mAh battery pack that is rated at 1.2 volts per cell. With cells in series, our pack outputs 2.4 volts and 1300mAh.

Here capacity C =1300mAh

C/10 means 1300/10 =130mAh

So to charge the above battery pack we need a higher voltage (2.4 to 3 V) with a maximum current of 130mAh.

As per C/10 rule, it requires 16 hours to fully charge the battery pack.

You must be asked, what will happen if we increase the current (>130mAh)? No doubt your battery will charge faster. But the life of the battery will be reduced.So my advice is to keep the current below the C/10 value.

Step 3: How to Choose the Right Solar Panel

The main source for powering the sensor module is a solar panel. So it must be able to provide current for powering the Arduino as well as current to charge the battery pack during the day. As per my experience, it is the most challenging part for a novice user.

Don't worry these are the following tricks which can help you to buy the right solar panel.

1. Voltage: Choose 1.5 times the battery pack voltage

2.Current: Current taken by the Arduino + current for charging (should be

Example :

A battery pack is made of 2 AA Ni Mh battery.

Battery voltage = 1.2 x 2= 2.4V

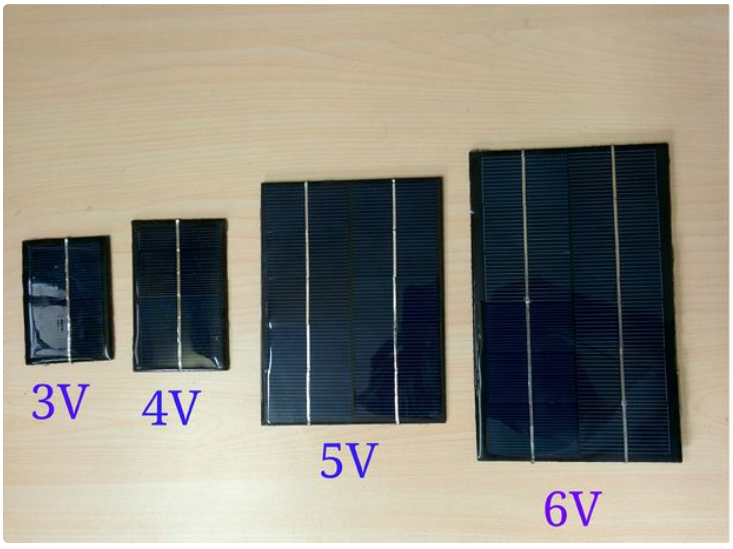
So required voltage for solar panel =2.4 x 1.5 = 3.6V

By taking some margin we can choose a 4V solar panel for it.

The sensor module along with Arduino taking 100mAh current.

Battery capacity is 1300mAh

C/10 = 130mAh



The solar panel has to provide current 100mAh for Arduino along with a current not more than 130mAh.

Lets take 100 mAh for charging the battery
Total current required = 100+100=200mAh

From the above calculation, it is clear that we need a solar panel of 4V and 200mAh.

The following table shows the solar system configuration relationship between storage batteries and mini solar panels.

Battery ---->Solar Panel

1.2V ------> 2V ~ 2.5V

2.4V ------> 3.5V ~ 4V

3.6V ------> 5V ~ 6V

6V ------> 7.5V ~ 9V

12V ------>15V ~ 18V

Note : It is not the strict rule for choosing the exact rating solar panel,rather it is approximate rating .I write as per my experience.

Step 4: Ni Mh Battery Charger :

To power an Arduino we need 5v. There are two options

1. Use a 4 AA battery pack :

Total voltage =1.2V x4=4.8V (nominal) but when it is fully charged,voltage is more than 5V.
This is not efficient.

2.Use 2 AA battery pack :

Total voltage =1.2Vx2 =2.4 V

In this case, we have to raise the voltage level to 5V by using a voltage booster circuit.

I recommend using this pack. It is reliable and efficient.

Charging Circuit :

Standard sized nickel metal hydride (NiMH) cells need simple charge circuit.

You only need a solar panel, diode, the batteries, and a battery case and wires.

4 AA battery pack

Solder the positive terminal of the solar panel to the positive terminal of a diode.

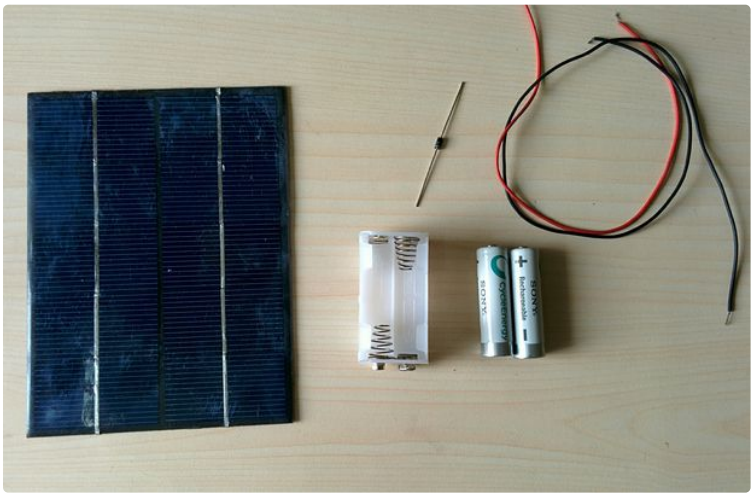
Solder the negative terminal of the diode to the positive terminal of the battery pack.

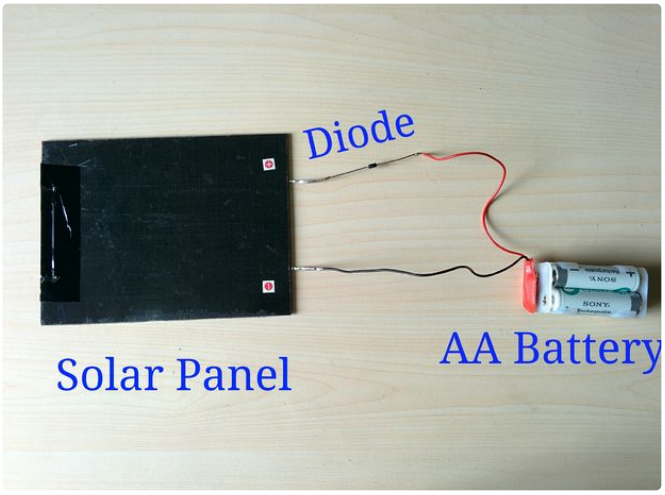
solder the negative terminal of the solar panel to the negative terminal of the battery pack.

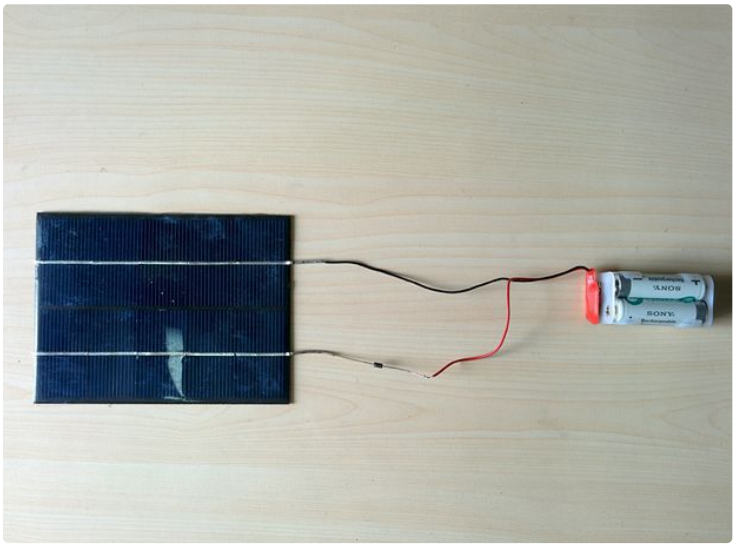
See the above picture for soldering.

2 AA battery pack

As the battery pack voltage is not sufficient in this case, we have to use a booster circuit to make 5V for Arduino.







Step 5: Boost Converter

A boost converter is a DC-to-DC power converter (like a step up transformer in AC) with an output voltage greater than its input voltage.

Boost converter used in this project has the following specification :

>>Input voltage: 0.9V-5V DC

>>Transfer efficiency:96%(max)

>>With USB port

>>With working indicator light

>>with one AA battery power supply output current can up to 200~300mA,

>>two AA batteries to the output current of 500~600mA

You can buy it from eBay

Adafruit has also designed a boost converter known asMinityboost for USB charging. You can also use it.

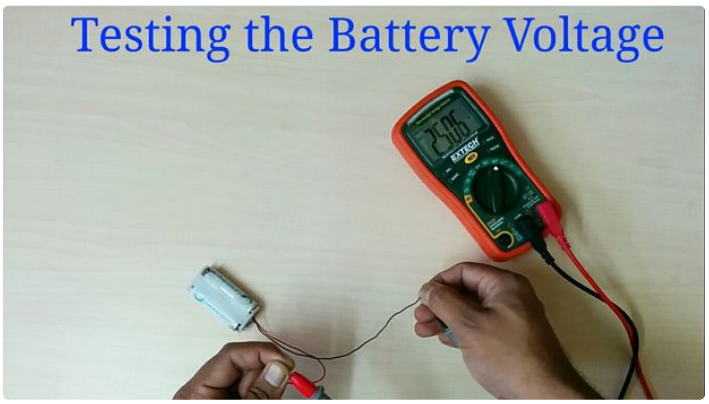
In our case, the input to the boost converter is 2.4V and output is 5V which is sufficient to power an Arduino.

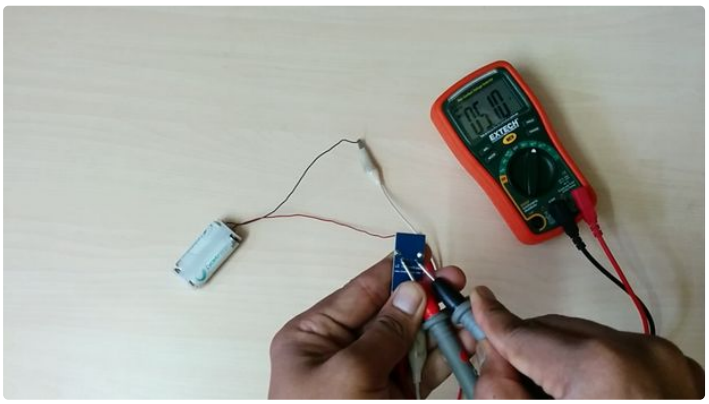
Solder the '+' terminal of boost converter to the battery positive terminal.

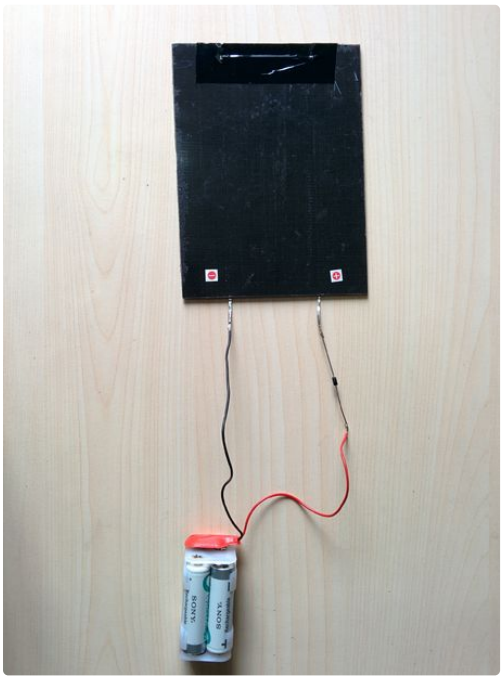
Solder the '-' terminal of the boost converter to the battery negative terminal.

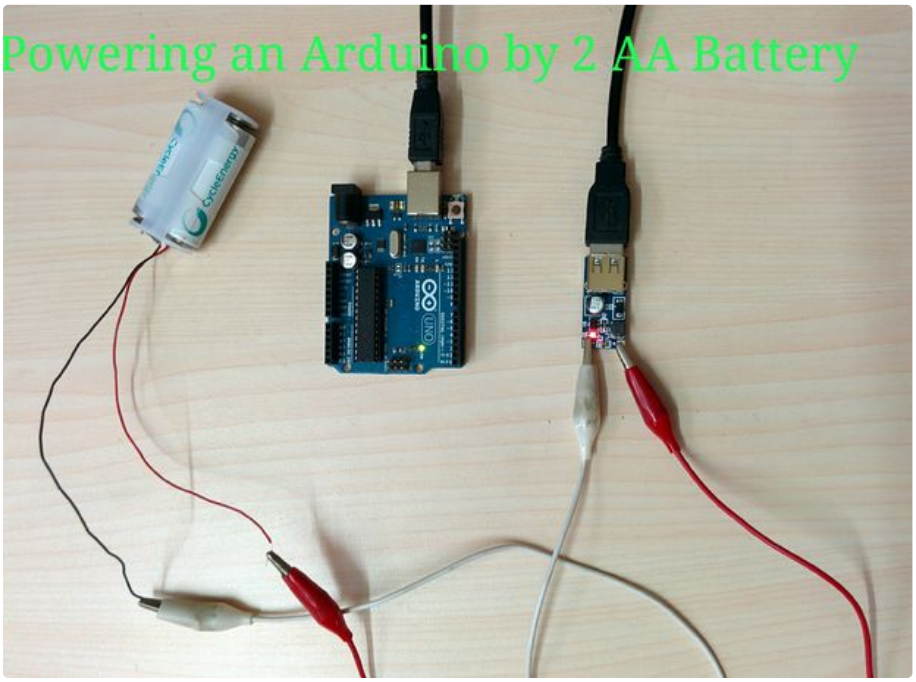

BOOST CONVERTER


5V
D-
D+
GND
LC Technology
www.lctech-inc.com


Testing the Battery Voltage






Powering an Arduino by 2 AA Battery

Step 6: Li Ion Battery Charger

Among all the charger what I have discussed earlier, I like it most. This is the most powerful and efficient battery pack. The interesting thing is that you can use this for charging any USB powered gadget like a smartphone, tablet, MP3, etc.

If you look at the Periodic Table, you will find that Lithium is on the far left in the first column, where all the most reactive elements live.

Caution :

You must take certain precautions when dealing with Lithium Ion Batteries. In order to maintain a very precise voltage when charging. The 3.7V batteries we're using in this guide need to have a charging voltage of 4.2V. A volt high or a volt low can mean an out of control chemical reaction which can lead to danger.

Don't worry, a suitable Li-Ion battery charge controller will solve the above problem.

converter(red wire) and battery holder positive terminal(red wire) to the charging board's BAT +.

Solder the Input negative terminal of boost converter(black wire) and battery holder negative terminal(black wire) to the charging board's BAT-.

The boost converter output is a USB terminal. For powering a breadboard circuit we need two wires for connection. So we have to modify something according to our requirement.

Lithium Battery Charging Board used in this project have following specification :

>> Current- 1A adjustable.

>> Charge precision- 1.5%.

>> Input voltage- 4.5V-5.5V.

>> Full charge voltage- 4.2V.

>> Led indicator- red is charging blue is full charged.

>>Input interface- mini USB.

>> Work temperature- -10 to +85 .

You can buy it from eBay

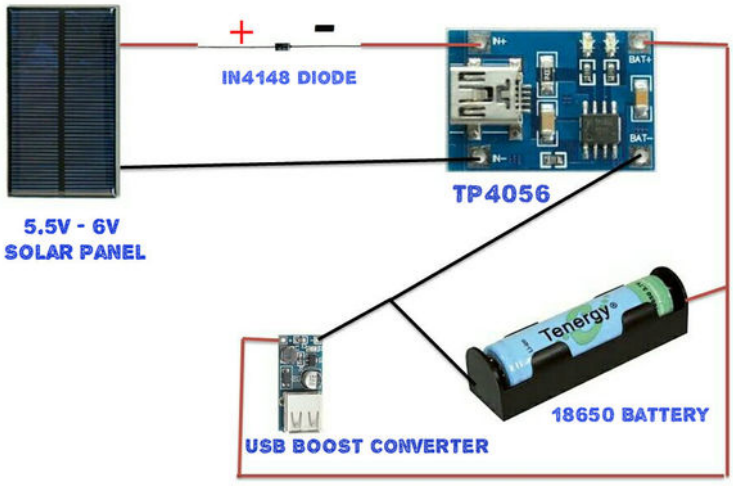
Circuit Connection :

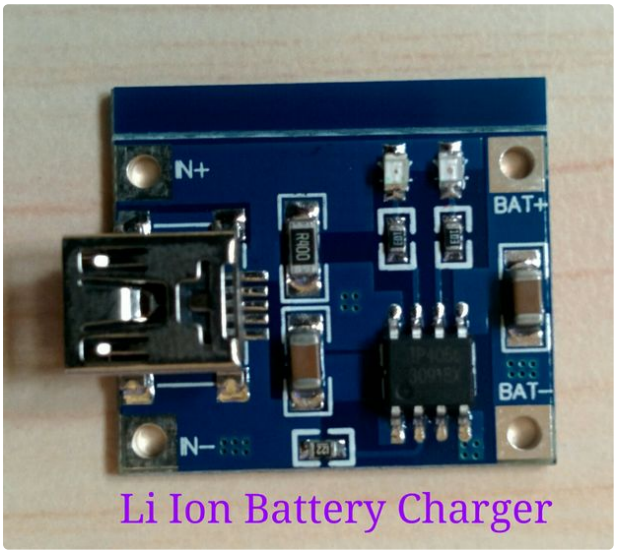
Solder the Input positive terminal of boost

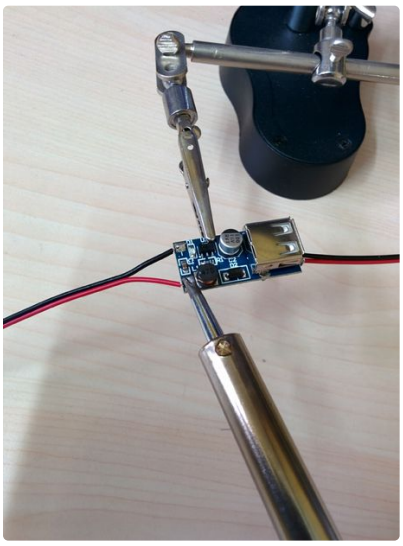
The USB has four terminals (5V, D-, D+and GND).

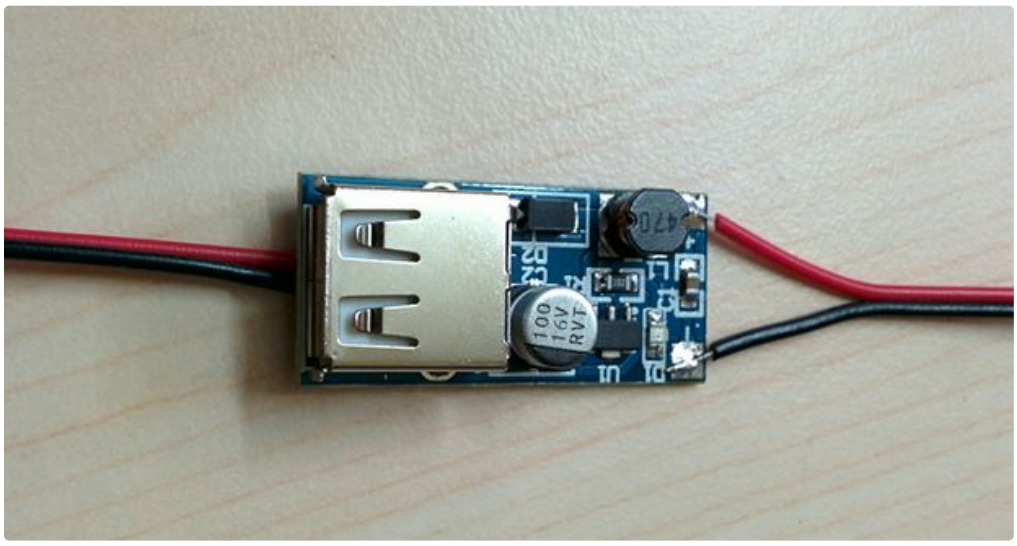
Solder the red and black wire to the + and - respectively as shown in the back side of the boost converter.

Note: The boost converter does not have any marking. So use my picture during soldering.

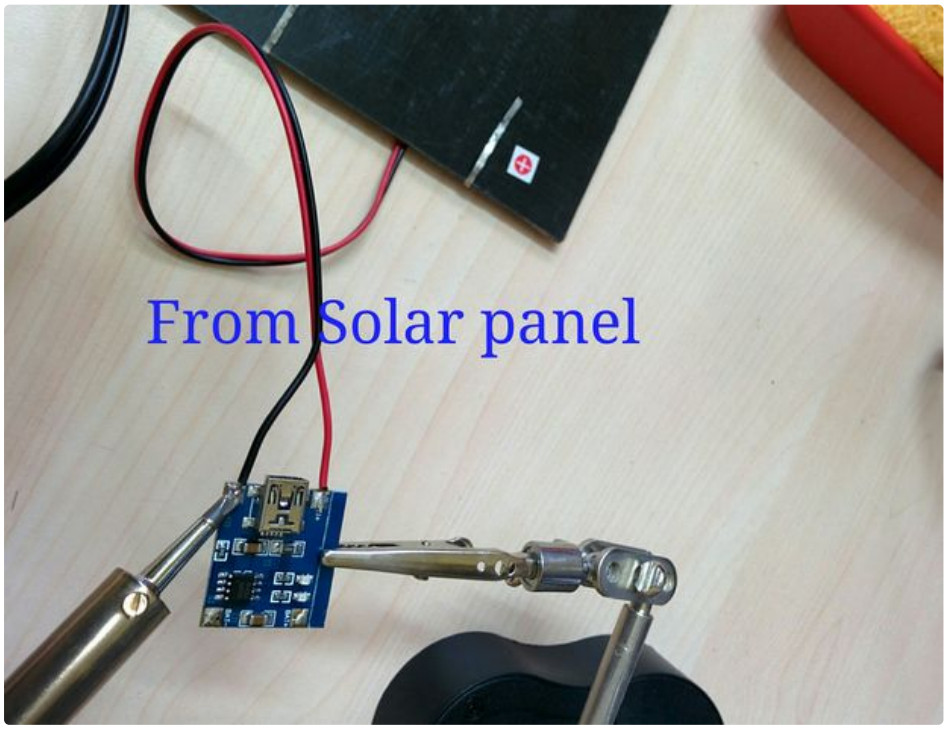

+
-
IN4148 DIODE
TP4056
5.5V - 6V
SOLAR PANEL
18650 BATTERY
USB BOOST CONVERTER

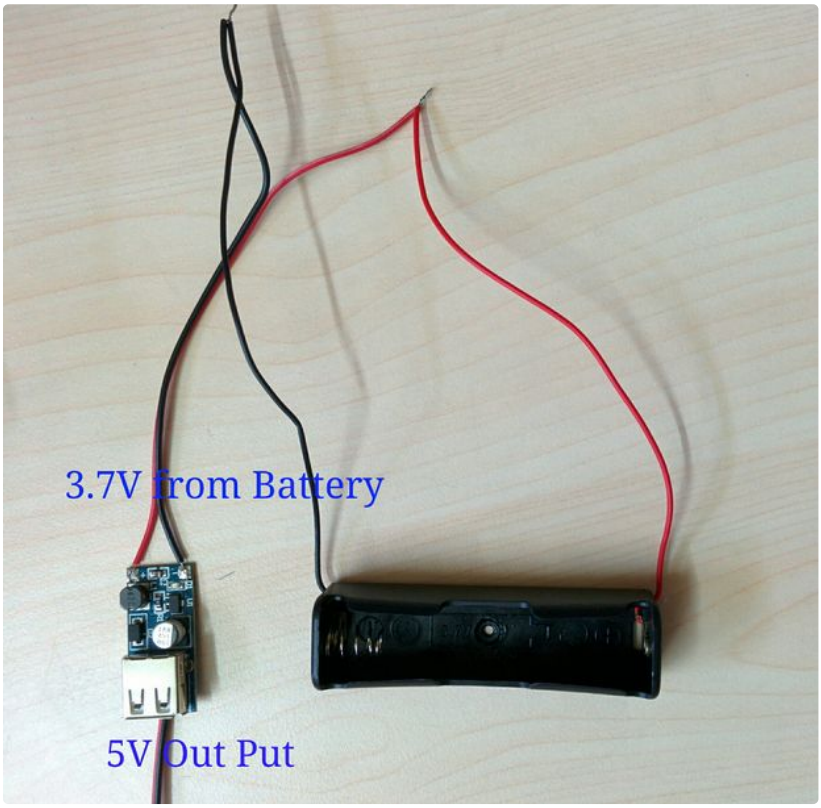

N+
BAT+
BAT-
N-
Li Ion Battery Charger

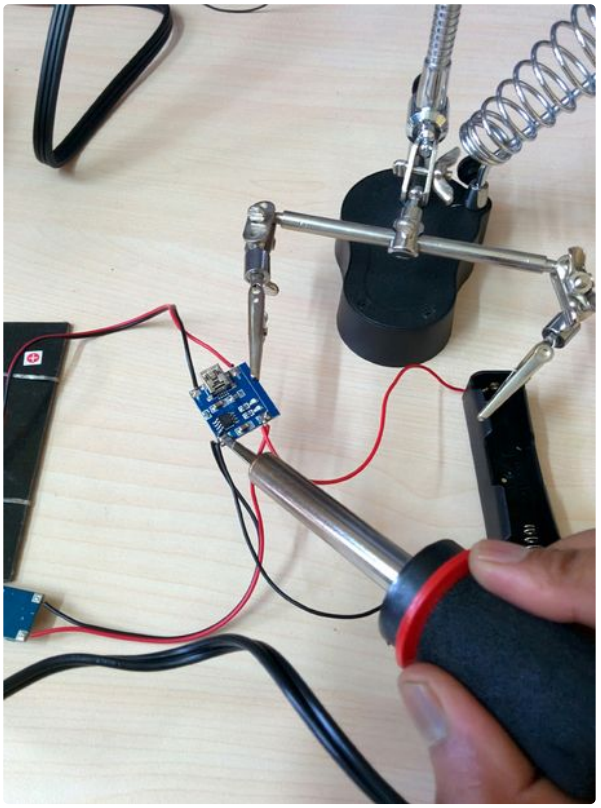


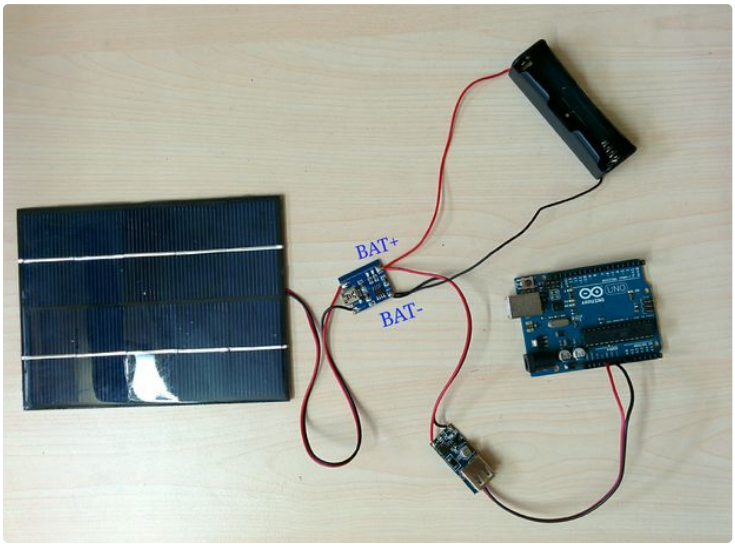



5V Out Put
+
-
LC Technology
www.lctech-inc.com
In Put


From Solar panel


3.7V from Battery
5V Out Put




BAT+
BAT-

Step 7: TRANSMITTER

The transmitter module contains the DHT11 sensor which is a relatively cheap sensor for measuring temperature and humidity of the environment. It is good for 20-80% humidity readings with 5% accuracy and for 0-50°C temperature readings with ±2°C accuracy.

I ordered the Barometric Pressure Sensor(BMP085) and rainfall sensor from eBay to forecast more weather data. For the time being, I am happy with only temperature and humidity.

The weather data is measured by DHT11, processed by an Arduino nano/breadboard Arduino and transmit it wirelessly through an RF transmitter.

DHT11 Connection :

DHT11 sensor have 4 pins : 1->Vcc ,2->Data ,3->NC ,4 ->GND

DHT11 -->ARDUINO

Vcc-->5V
Data-->D8
NC --> No connection
GND-->GND
Connect a 10K resistor between VCC and Data pin of DHT11

RF Transmitter Connection :

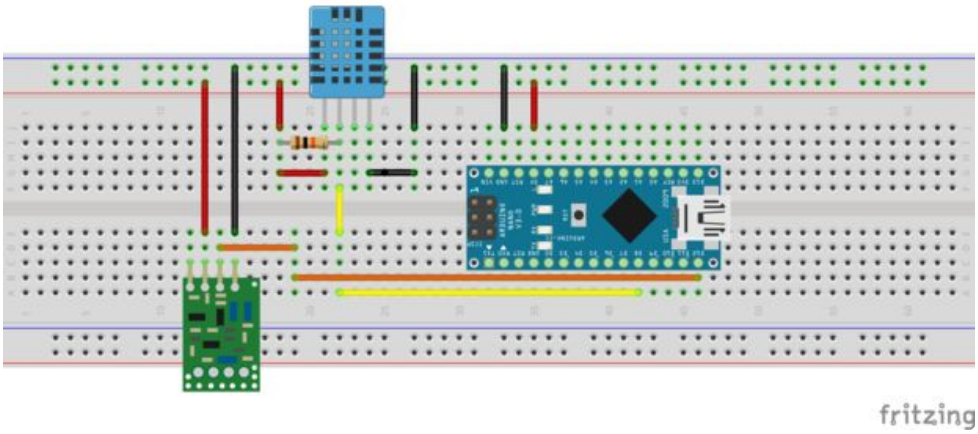
The RF transmitter has 3 pins (VCC, Data, and GND).

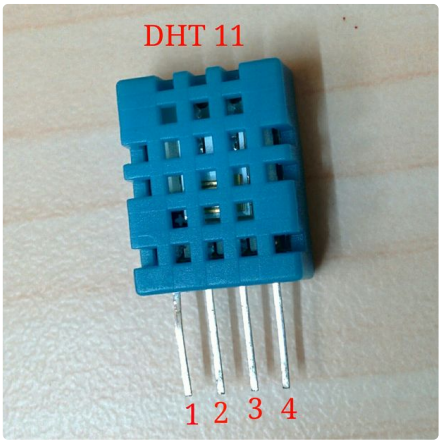
RF Transmitter -->ARDUINO

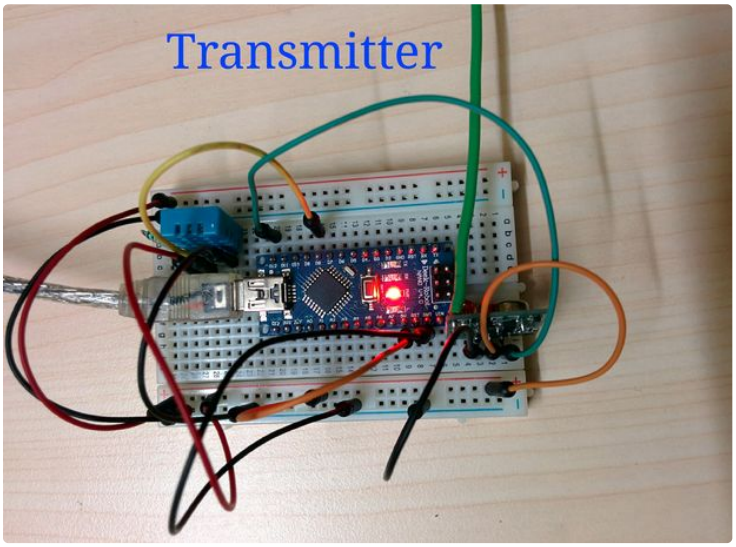
VCC --> 5V
Data-->D11
GND-->GND

Note: Add an antenna in the RF transmitter to increase the range, click here

After connecting everything, upload the Tx_code attached bellow







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Step 8: MAKE a ENCLOSURE FOR Tx MODULE

I used a plastic box for the transmitter module enclosure.

Make a hole in the top side of the plastic box for inserting the wire from the solar panel.

Make small holes in the side wall (opposite face) for ingress of fresh air (to measure the accurate data).see the pics.

Place the charging circuit (made earlier) inside the box.

Take out the wires from the li-ion battery charger (IN+ and IN-)

Solder the positive terminal of the solar panel to the positive terminal of diode and negative terminal of the diode to the red wire from the charger.

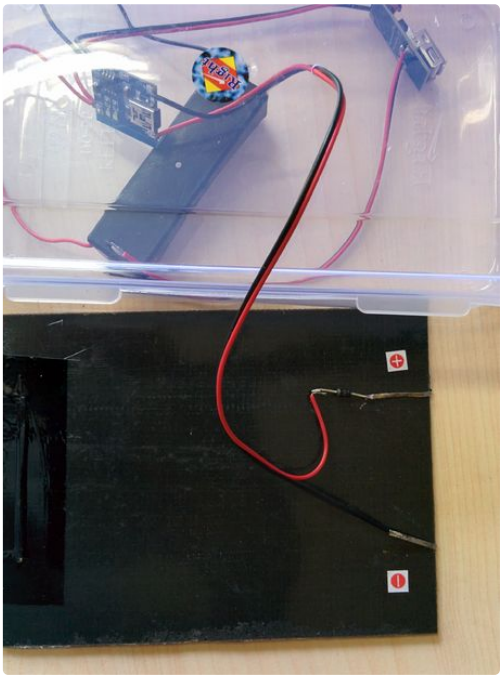
Solder the black wire to the solar panel negative terminal.

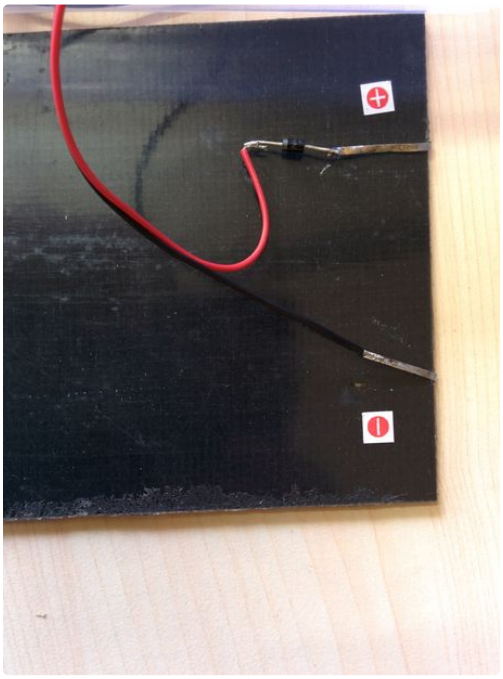
For mounting the solar panel and battery holder I used a skotch mounting pad. The mini breadboard has an inbuilt pad to stick.

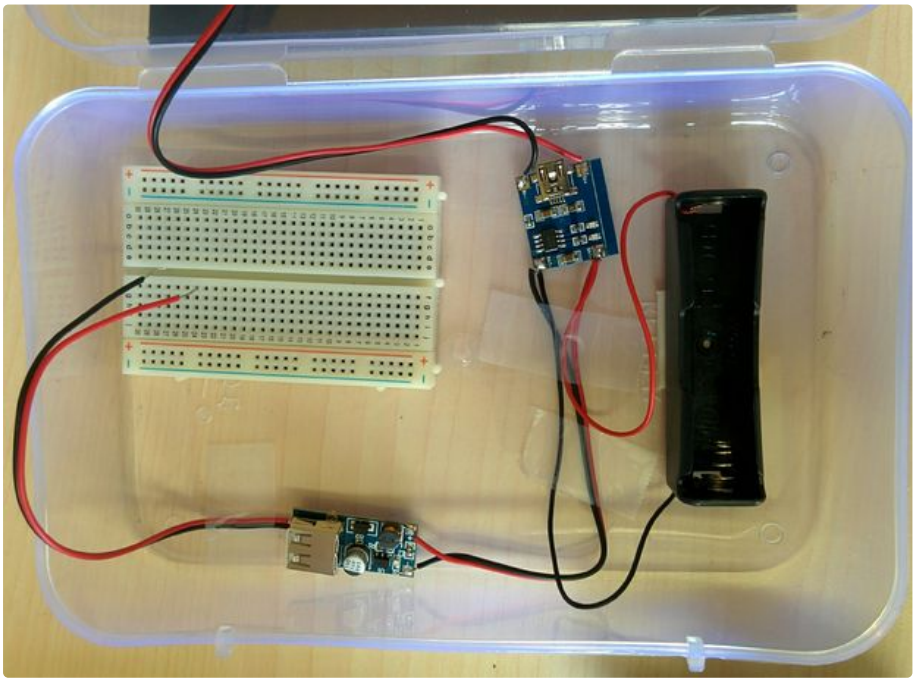
Use tap to stick the wire firmly.

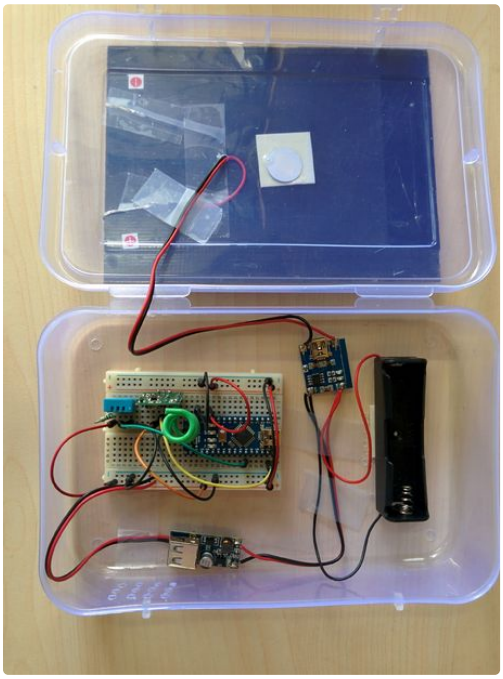
Connect the 5V (+) and GND (-) terminals of boost converter to the breadboard red rail(+) and blue rail (-) respectively.

To test it expose to sunlight, you will see the red led in all (Arduino, boost converter, charging) the boards will glow.









Step 9: RECEIVER

The receiver module receives the weather data by an RF receiver and it is processed by Arduino UNO. The processed data is displayed through a 20x4 char LCD display. You can also choose a 16x2 LCD also. The main reason for using a 20x4 char LCD is display is that I can display a large number of weather parameters.

I add an I2C module to the LCD for reducing the number of connection with Arduino (requires only 4 wires).

If you don't have an I2C module go to my tutorial on LCD tutorial for connection and example code.

LCD connection :

The I2C LCD has only 4 pins (GND, VCC, SDA, SCL)

LCD-->ARDUINO

GND-->GND
VCC-->5V
SDA-->A4
SCL-->A5

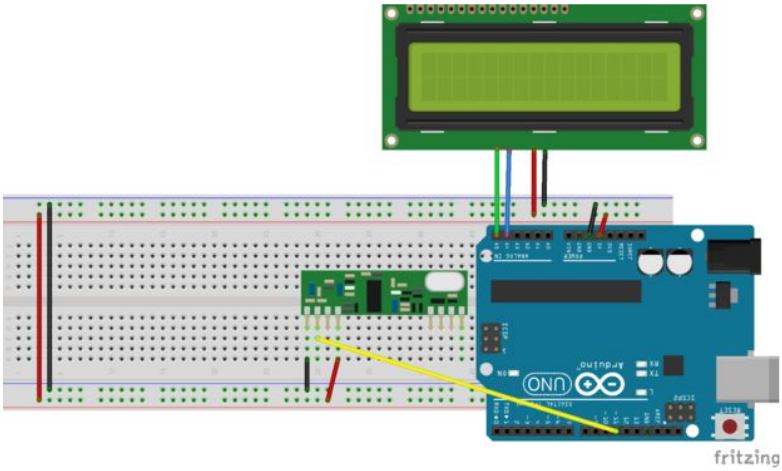
RF receiver Connection:

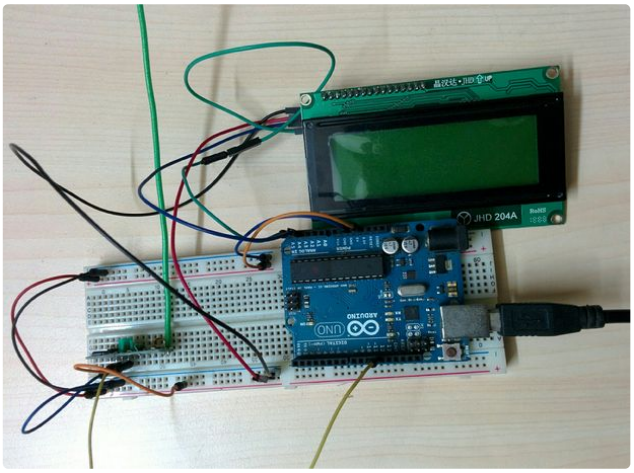
The RF receiver has 3 pins (VCC, Data, and GND).
RF Receiver -->ARDUINO

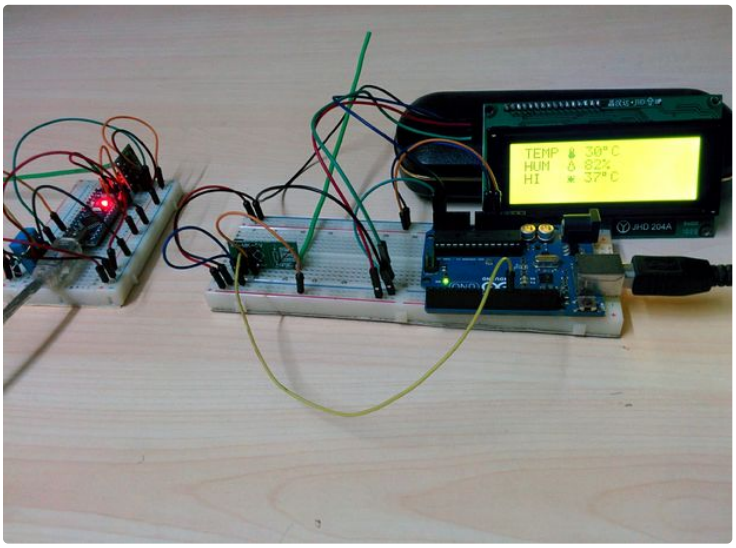
VCC --> 5V
Data-->D11
GND-->GND

Note: Add an antenna in the RF receiver to increase the range, click here

After connecting everything upload the Rx_code attached bellow







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Step 10: MAKE a ENCLOSURE FOR Rx MODULE

The receiver enclosure is a card board box.

Mark the outline of LCD by using a pencil or marker.

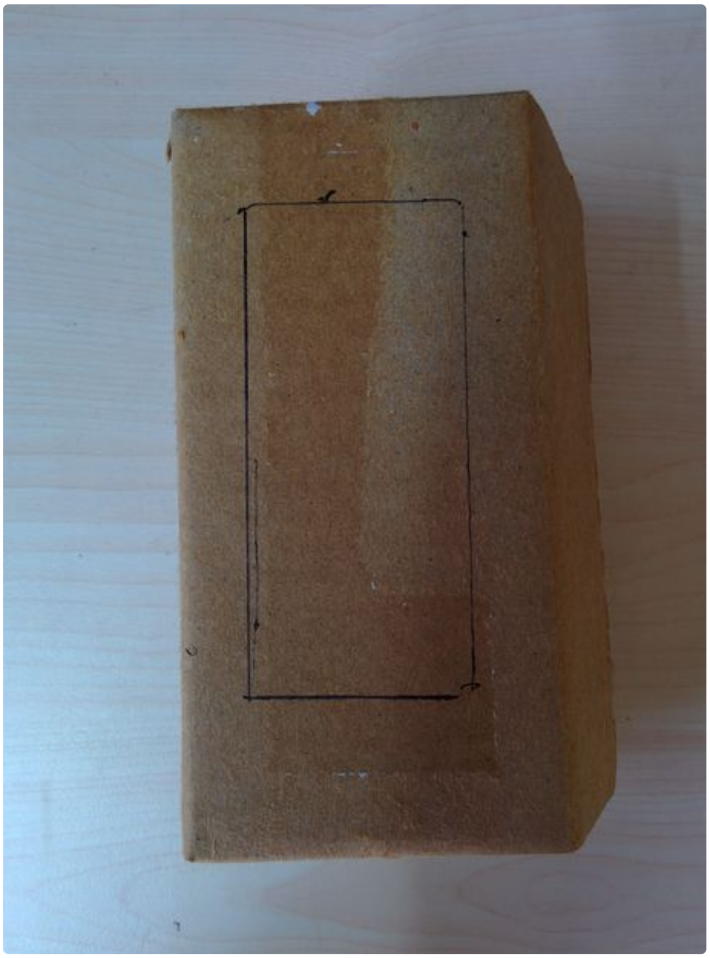
Cut the marking portion by using a hobby knife.

Insert the LCD into the cutting portion of the box.

Hard gue on the back side of the LCD to hold it firmly

Place the breadboard receiver module prepared in the previous step.

I use a 12V dc adapter for powering the Arduino UNO. Make a hole in the back side of the cardboard box for inserting the dc adapter cable.

Step 11: POWER OPTIMIZATION BY USING SLEEP MODE

The weather data does not change frequently. So we can take a reading at an interval of 5mins. As we are taking readings at regular intervals, it is a fantastic way to save lots of power. A system with appropriate sleep schedules can run for several months on just two AA batteries. We are so lucky that Arduino has several sleep modes that can be used to reduce power consumption.

This is most useful for any sensor networks. You can use this trick in any of your stand alone sensor project.

After searching through the internet for using the sleep modes, I found a simple but powerful library by Rocket Scream has a Lightweight Low Power library supports all AVR power down modes. Each mode has an associated library method that lets you control sleep duration using the watchdog timer. For a novice programmer like me, it is very simple and easy to use.

How to use LowPower Library :

1. Download the library from GitHub
2. Extract the zip file to the Arduino library in your computer.
3. Import the library in your code.
4. Write the following one line code for power saving. "LowPower.powerDown(SLEEP_1S, ADC_OFF, BOD_OFF) ; "

You can also pass different arguments to shut off individual peripherals. For different argument and sleep time refer to the table provided by Lightweight Low Power Arduino Library.

example code :

```
#include "LowPower.h"
void setup()
{
// No setup is required for this library
}
void loop()
{
// Sleep for 8 s with ADC module and BOD module
off
LowPower.powerDown(SLEEP_8S, ADC_OFF,
BOD_OFF);
// Do something here
// Example: read sensor, log data, transmit data
}
```

Let's use it in the blink code of Arduino IDE example

Apply "LowPower library" in Blink code

```
#include "LowPower.h" // import the lowpoer library
int led = 13;
void setup()
{
pinMode(led, OUTPUT);
}
void loop()
{
digitalWrite(led, HIGH);
LowPower.powerDown(SLEEP_1S, ADC_OFF,
BOD_OFF); // instead of delay(1000) ;
digitalWrite(led, LOW);
LowPower.powerDown(SLEEP_1S, ADC_OFF,
BOD_OFF); // instead of delay(1000) ;
}
```

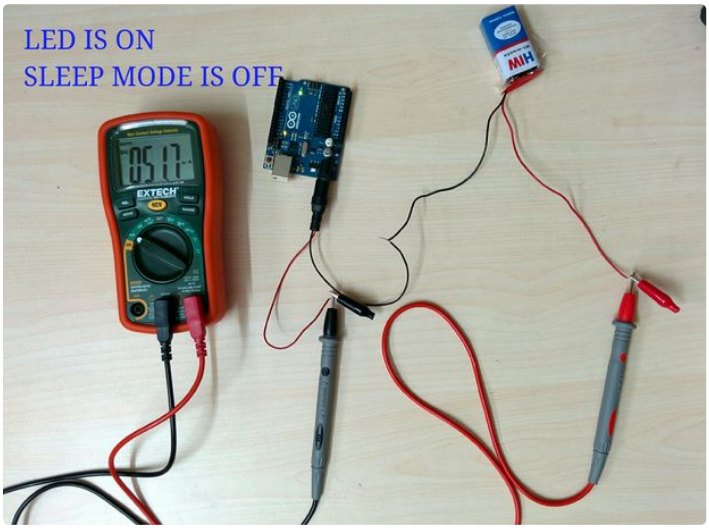
Before using the Lowpower library current taken by arduino

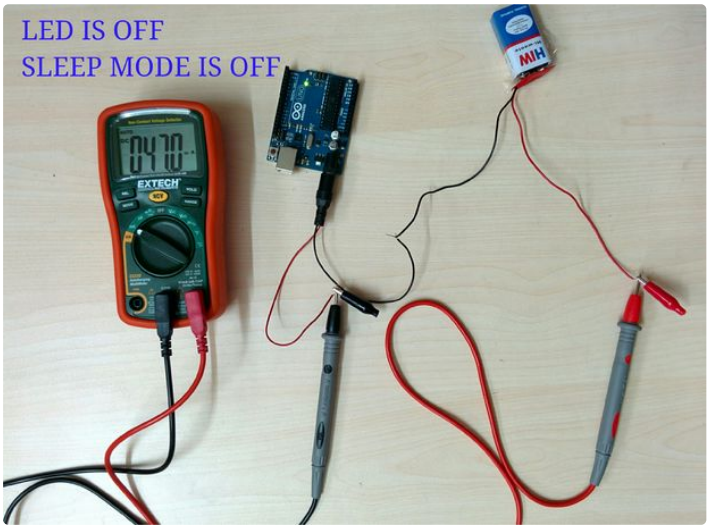
51.7mA, when led, is ON
47mA, when led, is OFF

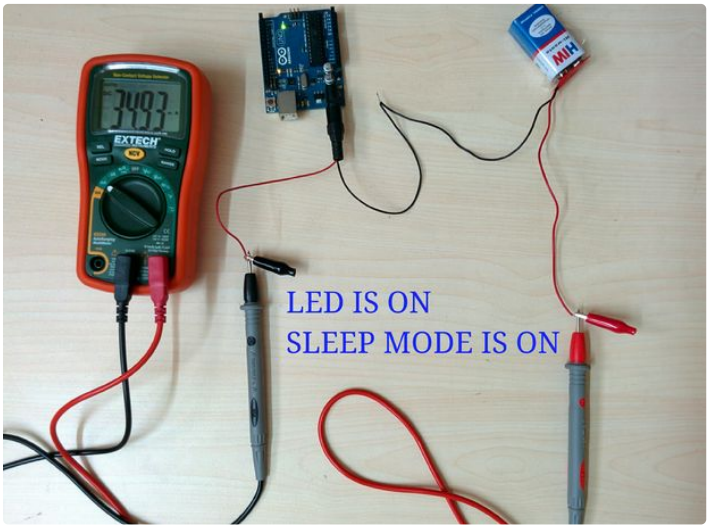
After using the Low-power library current taken by Arduino

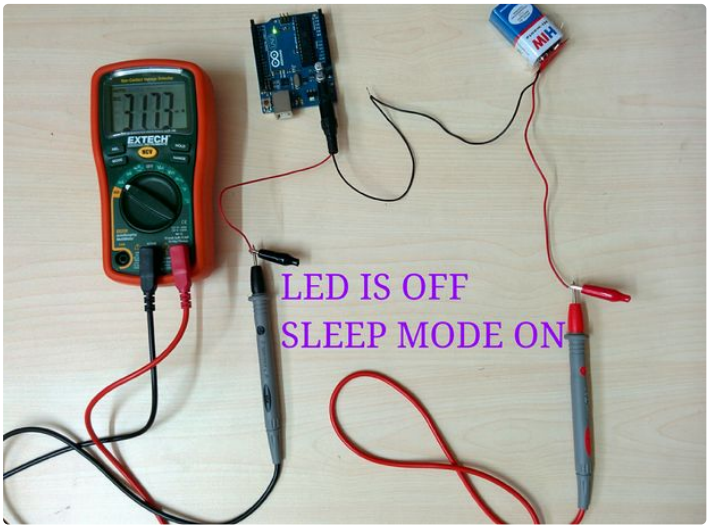
34.93mA, when led, is ON
31.73mA, when led, is OFF

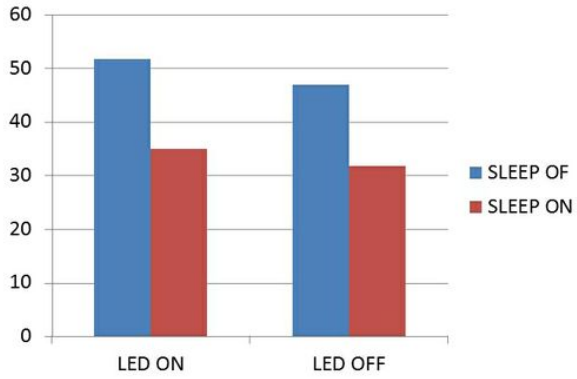
Are you happy to reduce 32.43 % power ?? Hey, there is still room to reduce the power consumption. Your Arduino board have different power sucking components like power led, voltage regulator and USB interface chip which takes most of the power even when it is idle. For other alternatives see the next step.


LED IS ON
SLEEP MODE IS OFF


LED IS OFF
SLEEP MODE IS OFF


LED IS ON
SLEEP MODE IS ON


LED IS OFF
SLEEP MODE ON


60
50
40
30
20
10
0
LED ON
LED OFF
SLEEP OF
SLEEP ON

Step 12: Alternatives for Power Saving

>> The simplest method to reduce the power consumption is bypassing the voltage regulator in the Arduino board.

Buy a separate boost regulator circuit and connect its output to the 5-volt pin on the Arduino board, which bypasses the 5-volt regulator on board. This procedure is used in our project.

>> using a "**bare bones**" board instead of Arduino board.
>> Disable the unnecessary led
>> If you do not need time accuracy, then use the Atmega 328 internal 8MHz crystal instead of an external 16Mhz crystal.

>> Operate Atmega 328 at 3.3V instead of 5V

>>Turn off the sensor as soon as possible

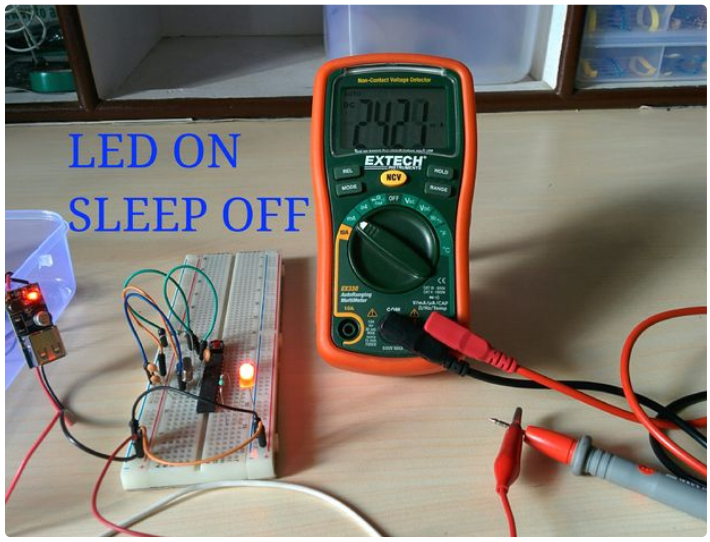
To know more details on Arduino power saving techniques click here

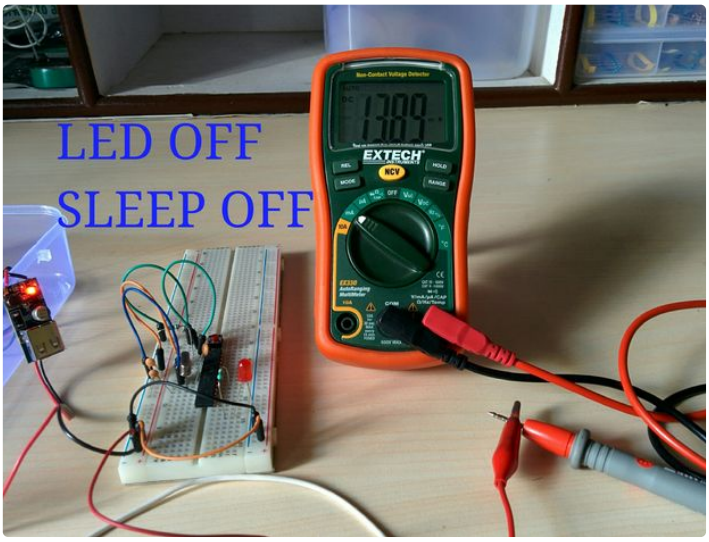
The maximum power saving is done by using a **Barebones board.** By using a barebone board the power consumption can be reduced to microamps level during the sleep period. You can see the above figure.

You can easily make this on a breadboard by following the links below :

1.Arduino on a Breadboard

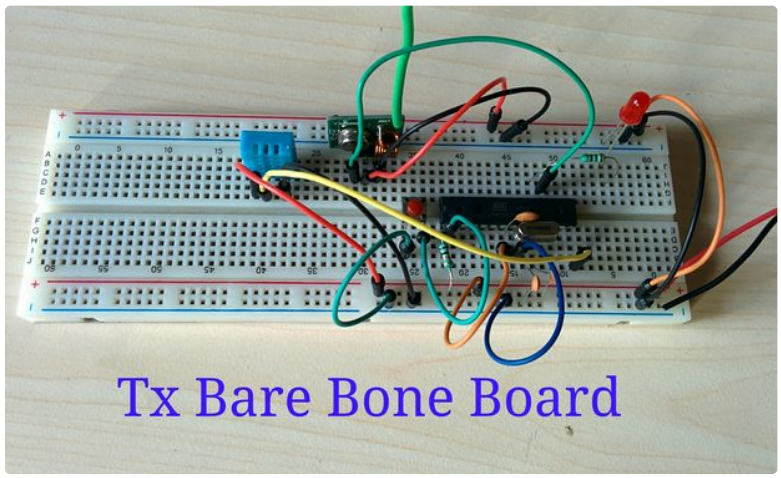
2.Arduino to a Microcontroller on a Breadboard
Make bare bone PCB board by following the links below :
Single Sided Really Bare Bones Board Arduino in EAGLE
I will highly recommend for the bare bone board for any battery driven projects (like sensors).

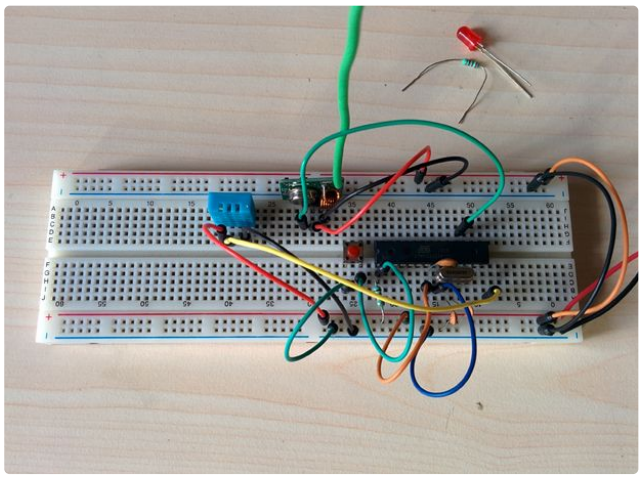


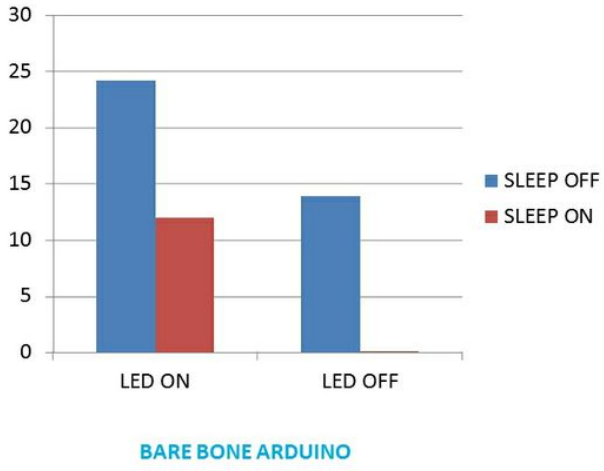



LED ON
SLEEP ON


LED OFF
SLEEP ON


Tx Bare Bone Board




30
25
20
15
10
5
0
LED ON
LED OFF
SLEEP OFF
SLEEP ON
BARE BONE ARDUINO

Step 13: Battery Life Estimation

The battery life can be calculated by determining the average current for the circuit.

Use the following general equation to calculate the average current.

Iavg = (Ton*Ion + Tsleep*Isleep) / (Ton +Tsleep)

Ton (arduino is active) = 250 ms =0.25s and Ion = 16mA

Tsleep = 5min =300s and Isleep = 200 uA (approx)

It is very difficult measure the current during the sleep period .Some time I got zero reading.

Iavg = 0.205 mA

Operating Voltage =5 V

Pavg=VxIavg =5x.205=1.026 mW

Li-Ion battery capacity =3000 mAh

Battery voltage =3.7V

Power =3.7x3000=11100 mWh

Battery life = 11100/1.026 =10,818.7 hours = **15 months approximately**

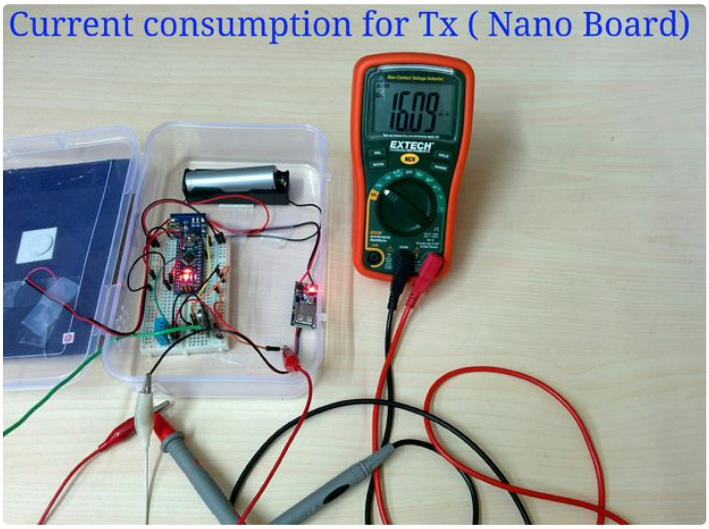
From the above calculation, it is clear that theoretically by using a fully charged 3000 mAh Li-Ion battery we can run the Arduino for 15 months. In practical due to battery self-discharge, this figure may be different.

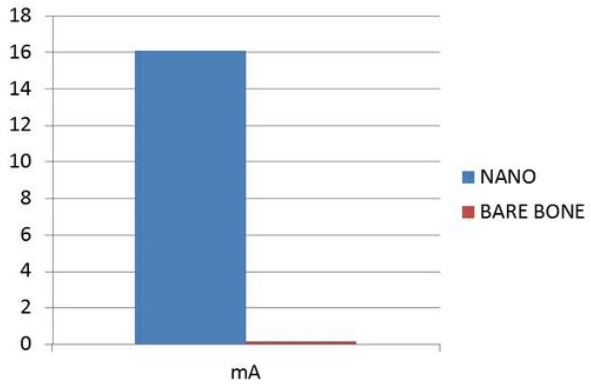
As the system is equipped with a solar charging system, we can run for a few years without any interruption.

I hope you enjoyed reading my tutorial. Please, comments if any mistake found.

This project is entered in 3 competitions, please vote for me.

Thank you so much.





Current Consumption

bonjours, j'aimerais que l'on me dise pourquoi j'ais cette notification : erreur de compilation pour la carte Arduino/Genuino Mega or Mega 2560 , uniquement avec le code qui transmet ; merci pour votre aide .

Bonjour,
Votre travail très instructif, j'ais donc décidé de me fabriquer une petite station météo. Je trouve que votre station correspond parfaitement à ce que j'aimerais fabriquer.Donc me voilà partie dans cette fabrication, si j'ais bien compris, il faut 2 piles AA et une batterie ion de 3.7v. il faut que je vous dise quand même, que je n'y connais rien en programmation et en électronique. J'ais donc téléchargé les codes que vous partagez avec une grande générosité car aujourd'hui, il est rare de trouver quelque chose de gratuit ! en ce qui concerne le code,il me renvoie une erreur que je vous nome :VirtualWire.h et LiquidCrystal_I2C.h : no such file or directory voilà. serait-il possible de vous donner un coup de main pour régler ce problème ? merci beaucoup @+

Hello

I made this project on the BME280
sensor.

Temperature and humidity are working
properly.

However, the pressure
reading on the LCD is bad.

I spent a few days
trying to solve the pressure problem, but it's still bad.

I can not deal with it.

I will add that I am
weak in computer science and programming.

Please help.

If you can, I would ask for the
transmitter and receiver program code for the BME280 sensor

.

Regards

Zygmunt

Thank you so much! Its very useful! Keep it up!

Hi guys I ve got a problem it says this what I can do?

In file included from C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\DHT_U.cpp:22:

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:35: error: expected class-name before '{' token

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:38: error: 'sensors_event_t' has not been declared

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:39: error: 'sensor_t' has not been declared

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:47: error: expected class-name before '{' token

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:50: error: 'sensors_event_t' has not been declared

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:51: error: 'sensor_t' has not been declared

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:73: error: 'sensor_t' has not been declared

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\/DHT_U.h:74: error: 'sensor_t' has not been declared

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\DHT_U.cpp:35: error: variable or field 'setName' declared void

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\DHT_U.cpp:35: error: 'sensor_t' was not declared in this scope

C:\Users\uzivatel\Documents\Arduino\libraries\DHT-sensor-library-master\DHT_U.cpp:35: error: 'sensor' was not declared in this scope

Hello!

I have something similiar in mind where a sensor detects if there is wind and sends it back to your smartphone so that you can prevent damage to your sunshade.

Do you think the solar panel can sustain an arduino with wifi shield?

check out the new Arduino MKRFOX1200. Probably Sigfox is available in your region.

when using nimh's.. how do I connect users? Parallel?

Hello sir. Can i use 1s 3.7v li-po instead of 18650 li-ion?

Hello,

thanks for the work.
Could you please precise how many Wats photovoltaic cell is most suitable for this project?

Many thanks.

I have a problem!!!

This report would have more information with

"Show verbose output during compilation"

enabled in File > Preferences.

Arduino: 1.0.6 (Windows 7), Board: "Arduino Uno"

sketch_sep15a:39: error: 'POSITIVE' was not declared in this scope

sketch_sep15a.ino: In function 'void setup()':

sketch_sep15a:49: error: no matching function for call to 'LiquidCrystal_I2C::begin(int, int)'

C:\Users\ADMIN\libraries\Arduino-LiquidCrystal-I2C-library-master/LiquidCrystal_I2C.h:76: note: candidates are: void LiquidCrystal_I2C::begin()

sketch_sep15a:61: error: no matching function for call to 'LiquidCrystal_I2C::begin(int, int)'

C:\Users\ADMIN\libraries\Arduino-LiquidCrystal-I2C-library-master/LiquidCrystal_I2C.h:76: note: candidates are: void LiquidCrystal_I2C::begin()

I need a help!!!

It looks like you're missing the LiquidCrystal-I2C library from your files. Get it from here: https://github.com/fdebrabander/Arduino-LiquidCrys..

I have same problem too(sorry, I can't speak English well)

exit status 1

'POSITIVE' was not declared in this scope

I just followed the system you gave.

Setup librarys...

but... Why did I get error?

reeplace this code line by LiquidCrystal_I2C lcd(0x27, 20, 4);

Hello, I am new to these Arduino things and I think this instructable is perfect to help me learn. First thank you for posting this. I am fully following your instructions letter for letter. I do have a question (besides the fact that I am having some problems with the sketches). My question is about the accuracy of the completed solar powered transmitter. Where is it placed outdoors, in the sun or in the shade? My concern is the whole transmitter circuit is enclosed in a plastic box, wouldn't there be excessive heat build up? Would this project be accurate if I placed the box in the shade and ran a power wire to the solar panel located somewhere close but in the sunlight?

Again thank you for this great instructable.

Hello, Can i have some practical electronics question ? Can you explain me why you use Diode - IN4007 in this circuit ? Is it mandatory ?

Yes, it essentially makes a one-way connection between the solar panel and the battery. Current can flow from the solar panel to the battery but cannot flow from the battery to the solar panel.

Hi. This diode is necessary to place, because if it is not placed and there is a shadow on the panel, this consumes energy. That is, if there is a stain on the panel, that part of the panel will consume energy. With the diode we get that it can not consume.

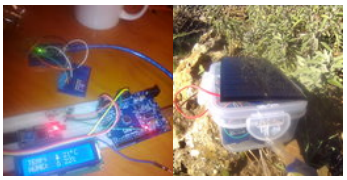
Hello . I did this project, but I used DHT22 and much more accurately measured. Tell me what it is "HI" on the display, because the project has no other sensor than DHT and it shows some strange values.

I liked your project, you can also upload to a cloud server and monitor wirelessly by using iot application platform such as thingspeak.com

I have used the DHT22 which can measure negative temperatures as well.

But with this code I have a missing datapoint for temperature when it's in minus. I don't manipulate anything with the input on the receiver end so the problem must be in the sender code.

Hello:
Thank you for all the project information.
Got it!



nice project

Hi! Can i have the schematic diagram for this project?
Thanks a lot!

what about Li on battery ? if -20C outside.

Hi Deba

Thank you
for this very nice instructable. I would like to build a solar powered weather station under this model. But I live in Switzerland where sunlight can be scarce especially during autumn and winter. Do you know how much sunlight the system needs? Would you recommend increasing the solar panel voltage, current, or battery capacity, or the three things?

Also, a 4V
– 200 mAh panel is no longer available on e-bay. Any replacement option?

Thank you
very much for your support

Sebastien

http://www.ebay.co.uk/itm/201679046412?_trksid=p2057872.m2749.l2649&ssPageName=STRK%3AMEBIDX%3AIT

i want make it for my final year projects.

Hi, can I make a similar connection to power an arduino plus a servo motor? Can I make it so that I don't need to disconnect the solar power ever? Can I simply keep it running?

You did a really good job documenting and explaining your project, good pictures, details, links - really useful.

The pro nano can be replaced by a atmega 328

Thank you

I think if you remove all the LEDs you will already reduce energy consumption a lot.

The only other thing that's different from a barebones chip is the extra 5V regulator on the Pro Mini.

Yes you can replaced.

This board might be a good option if you're looking for low power consumption: https://bitbucket.org/talk2/whisper-node-avr/overview it can be used with standard AA batteries

Instead of advertising your product here which is:

Release Date:
TBD

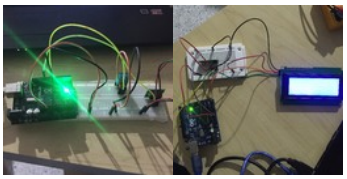
You should be focusing on the same goal to fix this project for free. His design is obviously faulty. Anyone who builds this I give your station 3-4 weeks tops with a 6000mAh battery before it goes down and then the battery will never recharge again to power the station.

I have built this setup just like him with bare bone atmega 326P (although using external crystal oscillator, it doesn't change much). My station is using the lowpower library just like his and sends data in every 5 minutes.

https://www.instructables.com/id/RF-315433-MHz-Tran...

By this article the RF transmitter modul works from 3-12V so I will take out the voltage booster (which I believe drains off all the energy here) and let you know the results in 2 months.

I had a problem that the display shows no information, I hope 5 min and nothing, I have everything connected like this on the page, like the Tx and Rx codes



Solved. Used an older version of arduino ide, all working fine now!

Congratulations !!!

good morning , you can work with Arduino UNO R3 ?

Yest it will work with Arduino UNO R3.

I made the circuits, but the LCD shows me wrong numbers, and when I open the serial monitor to verify that the receiver is working i cant find anything there

help?!!

I think you have problem in software.Though not sure.

Or you may check the Arduino Vcc.Is it sufficient ?

Beautiful project! I'm stuck with the receiver :(I just see a blank screen and don't know what to do. Everything looks ok, but I can't even show the icons! On the other hand, how can I be sure the transmitter is transmitting?

Thanks!

You can confirm it by checking your receiver arduino serial monitor.

connect your receiver arduino to the PC through a USB cable,open arduino IDE and see the serial monitor.If you receive the data then it confirm transmitter is transmitting.

Hey deba168, I was running into a similar issue. After some debugging, I determined that the vw_get_message call never returns true so I'm pretty sure the receiver is not getting any data. The circuit appears to be complete and I verified that the transmitter and sensor are working, what do you think would be the most likely cause of that?

Thanks for the advice, but the problem was that lcd doesn't show anything until it receives data from transmiter. So if I power the transmiter first, I would have to wait 5 minutes until getting data (or press reset). Once I have discovered it, everything is ok ;)

Hi can someone help me please. I have made this and having trouble. If i use a different transmitter and code i can get the details on the display but making this project nothing no serial data for transmitter or reciever. I'm a beginner and please correct me if I'm wrong. When the transmitter data pin is connected to D11 in the instructions but in the sketch it is set as D12 ???? can someone explain this please and maybe why I'm getting no serial data from either module. Thanks.

Using 2x AA NiMh batteries with a dc-dc booster you say to

"Solder the '+' terminal of boost converter to the battery positive terminal.

Solder the '-' terminal of the boost converter to the battery negative terminal."

But
where do i solder on the solar panel? in parallell to the battery? if
my solar panel can produce 6v in peak conditions how will the booster
that can take 0.9v-5v handle that?

Or should i skipp the booster
and use a arduino pro mini (3.3v) version and connect the solar/battery
to the vin pin (the one with the built-in voltage regulator)?

Another note: i'm planning on using the solar powerd arduino to run a waterpump to water the flowers rather than for sensors.

It will be in sleep and waking up about every 3 hours and checking if its light or dark out, if it's dark it will check for soil moisture and then if needed start the pump for ~10 seconds.

do you think this rig will be able to run like this or will i need to add more batteries and solar panels for it?

Where the code of this project? (Programation)

thx

The code is attached in step-7 and step-9.

https://www.instructables.com/files/orig/FQS/YAB6/H...

https://www.instructables.com/files/orig/F3S/72IM/H...