Build Your Own Light-Phone

Using Open Source Modules, you can build a perpetually upgradeable Light-Phone. Here are some of the instructions for base chassis creation for your project.

The Light Phone Team is working on additional modules to constantly expand the features and performance of your device. You can use Arduino, Raspberry Pi, ARM, Cyanogen Mod, Ubuntu Phone and other existing resources to get you going.

One Great Chassis for your Build-It-Yourself version is the Arduino-based chassis. Here is one set of plans for it. There are many other chassis plans available.

More than 2 years ago I had made an instructable - [ArduinoPhone](#).

ArduinoPhone was big and it's difficult for the beginner to make one. As there's a step to make the charge circuit.

And I had heard so many voice that when will you make ArudinoPhone 2.0 for this 2 years. I think I really should make it someday.

It's lucky that I have got some free time for the past month, so I spend about 3 weekend to design it. And now it's done. Before you read about the steps, let's view some featured of ArduinoPhone2.0.

- Even more thinner, about 20 mm

- Support of solar and DC adopt charge
- Much more easy to install
- A longer standby time, more that 50 hours
- On board MIC and Speaker, say goodbye to the earphone
- 3D print sheel

Step 1: What do we need
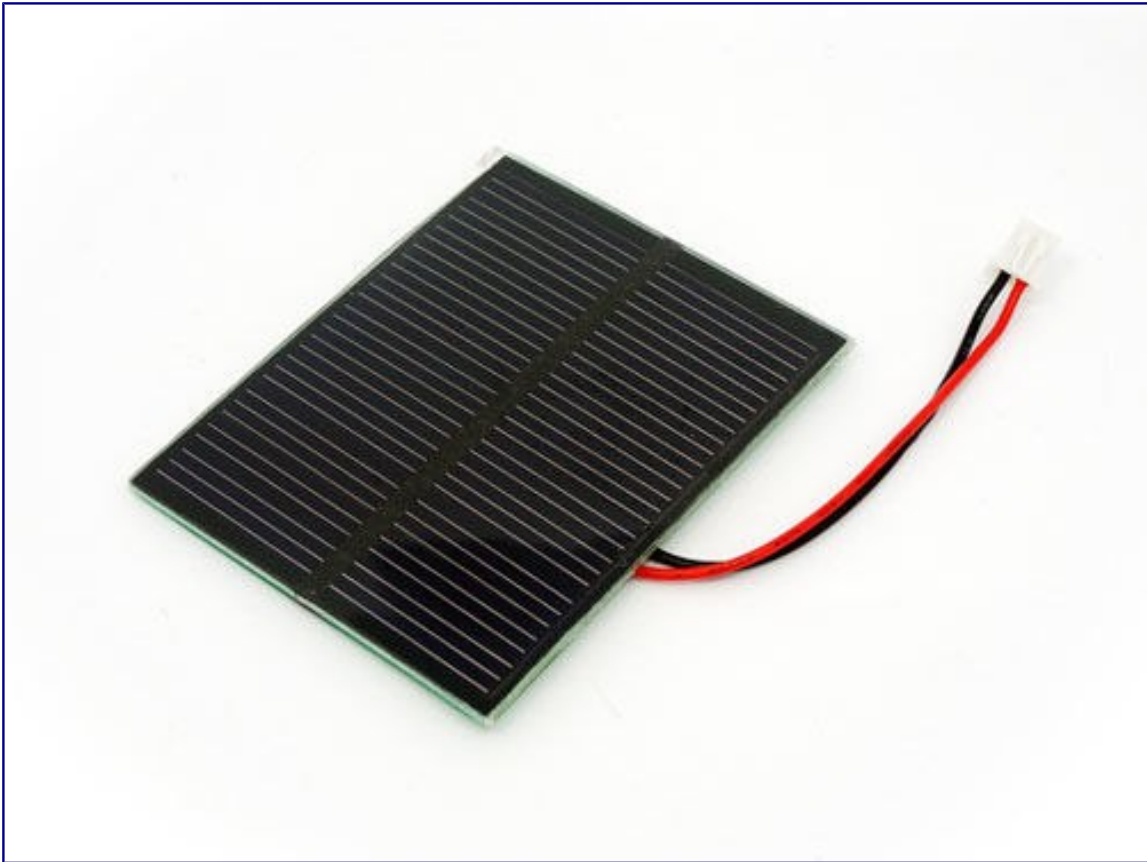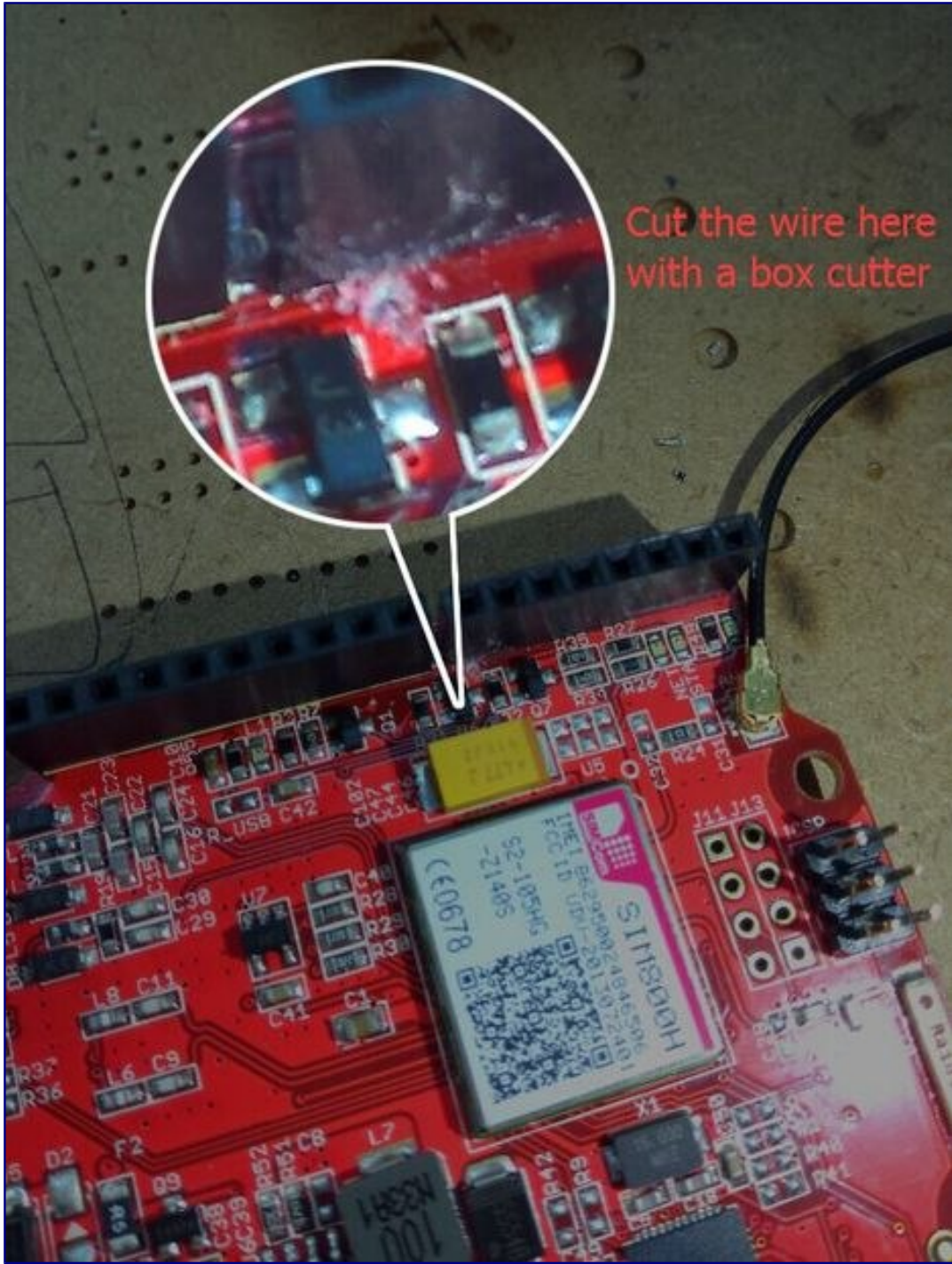
Let's prepare some stuff first.

Electronic modules:

- [Seeeduino GPRS](#)
- [TFT Touch Shiele V2](#)
- [Lipo rider](#)
- [Xadow GSM Breakout](#)
- [Xadow Audio](#)
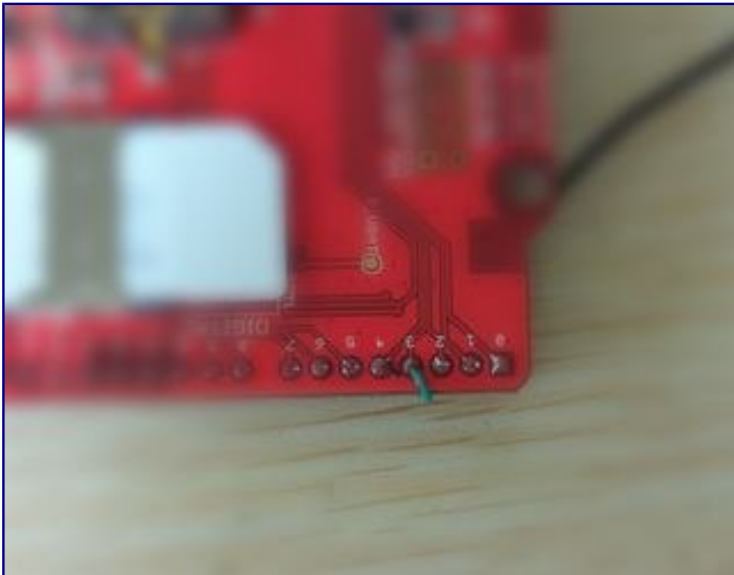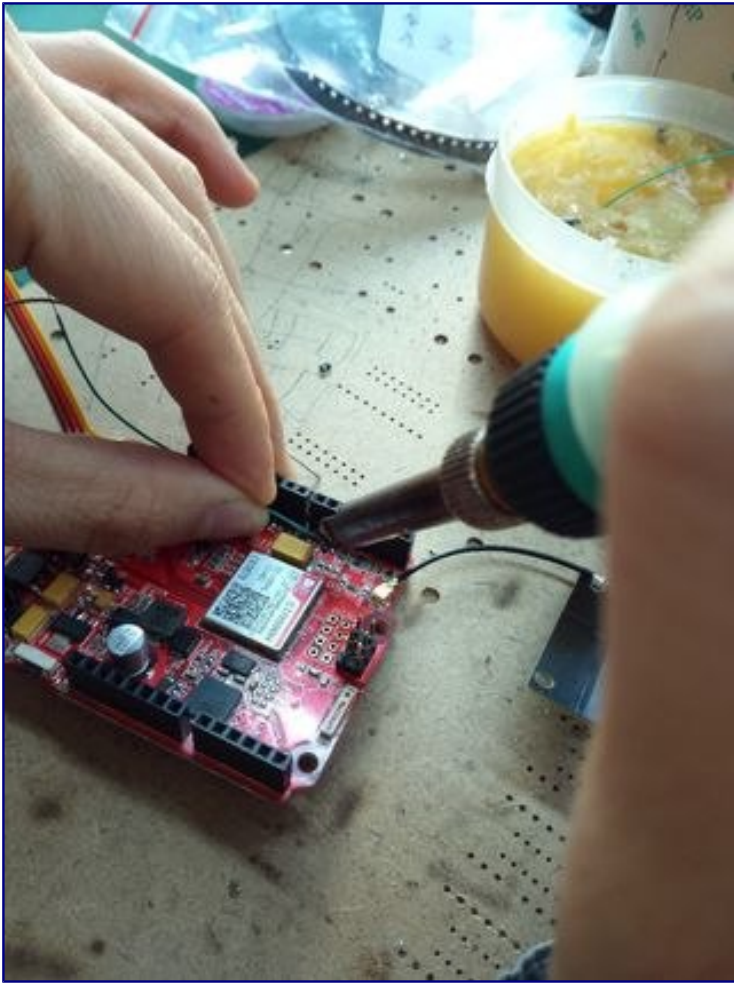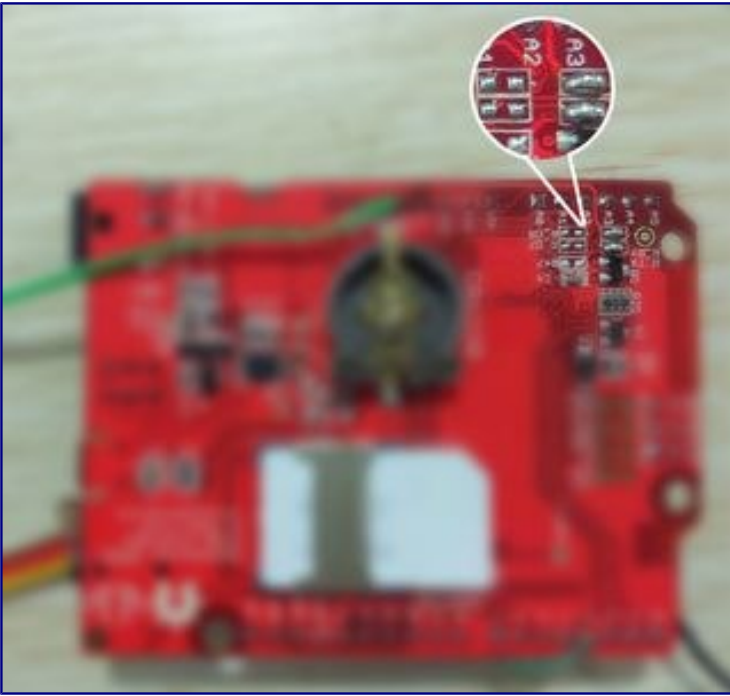- [0.5W Solar Panel 55x70](#)

Others:

- [Switch](#)
- [Button](#)
- [DC Jack input connector](#)
- 3D printer and the material

Step 2: Hack in Seeeduino GPRS

Cut the wire here with a box cutter

There's some pins on **Seeeduino GPRS** conflict with TFT Touch Shield.

Here we need to cut a line on the PCB of Seeeduino GPRS, as shown in the Image.

And do some soldering, connect the pin to D3 of Seeeduino GPRS.

Remove R_D7 and R_D8(On the back of the board), and connect R_RX, R_TX together.

Step 3: Connect the Audio board

3.5mm Audio	Breakout
MIC_P	4E
GND	5E/6E
SPK_P	2C
SPK_N	2D
GND	3A
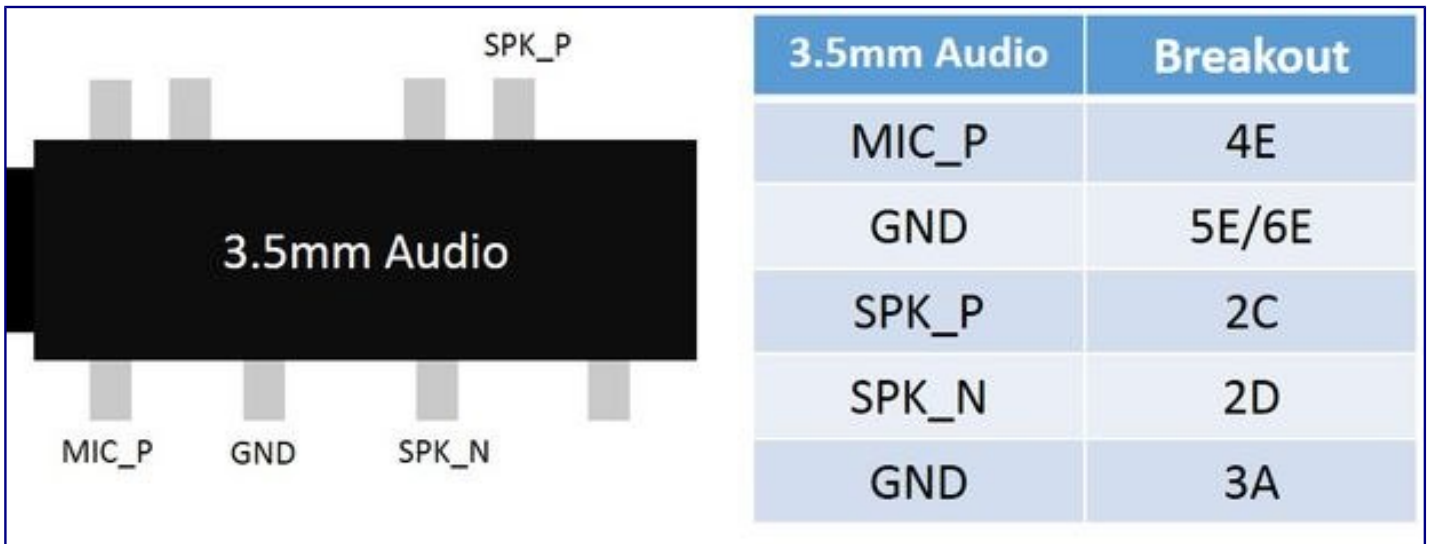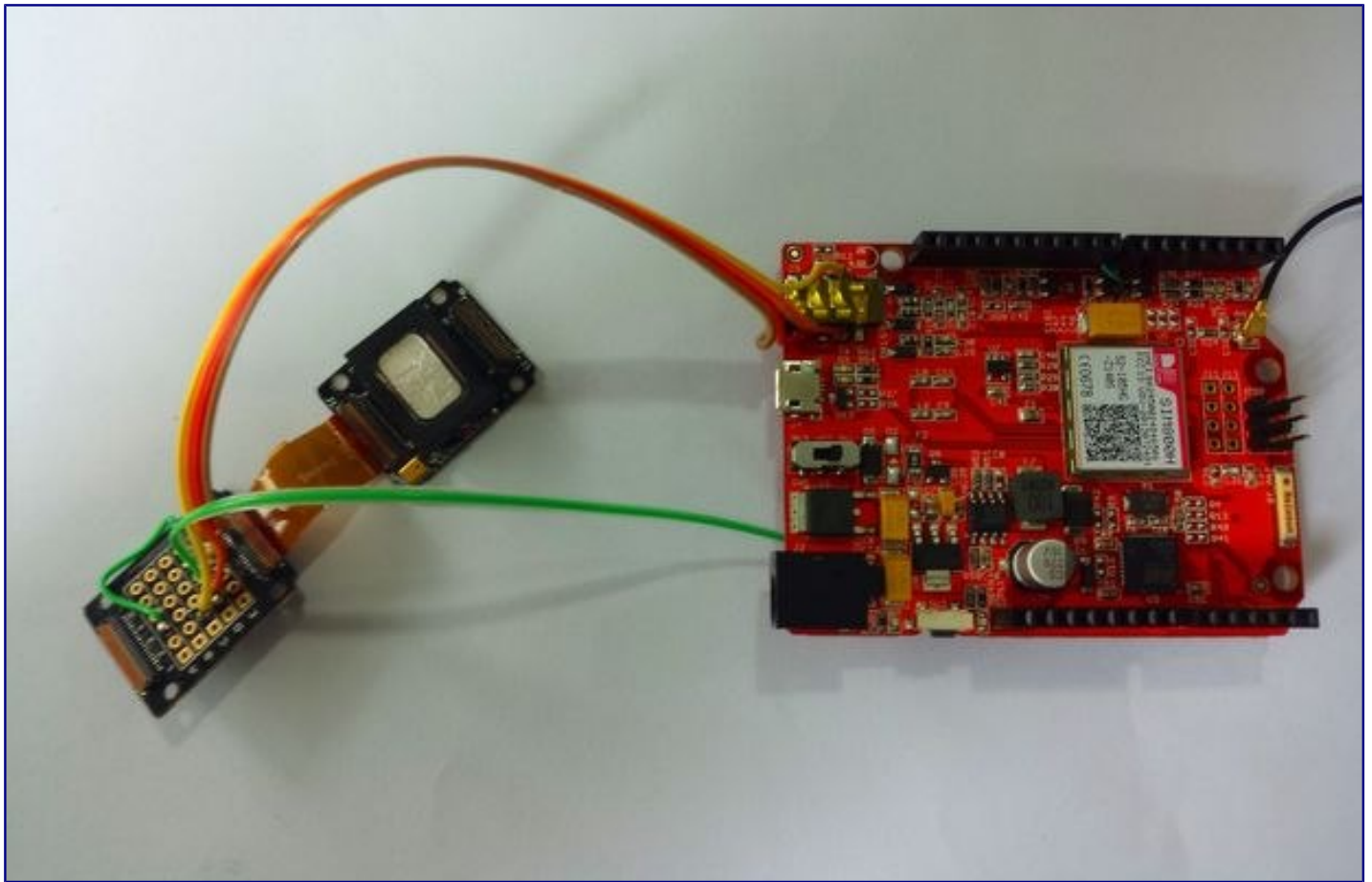
We need a MIC and a speaker to make a call.

Here we will use **Xadow Audio** to act as mic and speaker.

You need to do some soldering here. As shown at the above image

Step 4: Hardware connection

There's a button, to power on/off the screen. Connect it to D2 and GND.

As the power supply, we need to do some solder as well, we will connect 5V and GND to Seeeduino GPRS, and 5V will cross a switch to shut down all the system.

To charge the Li-battery, there's a barrel jack input, connect it to the input port of Lipo Rider, then we can use a 5V adopt to charge the system.

Step 5: Software works
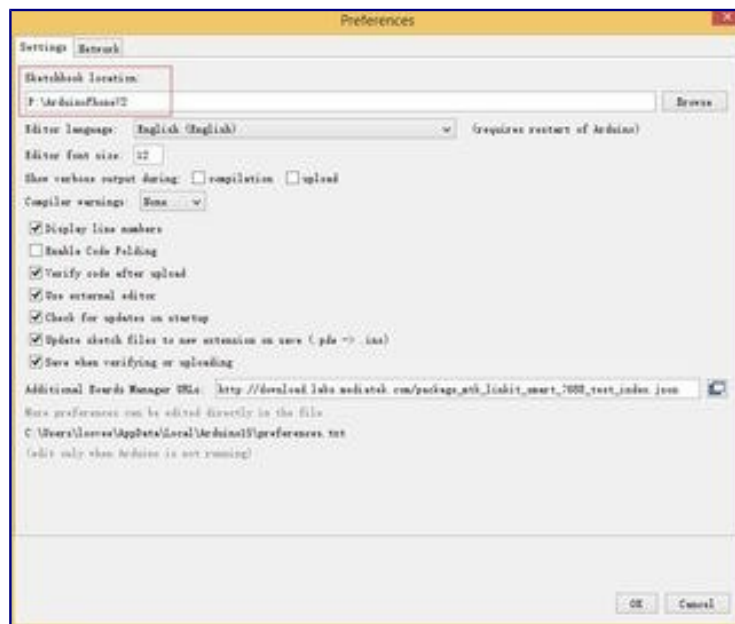
Seeeduino GPRS was in **Arudino Leonardo** bootloader. So if you had ever used Arudino, it's easy for you to make this step. If not please put hand on www.arduino.cc to getting started.
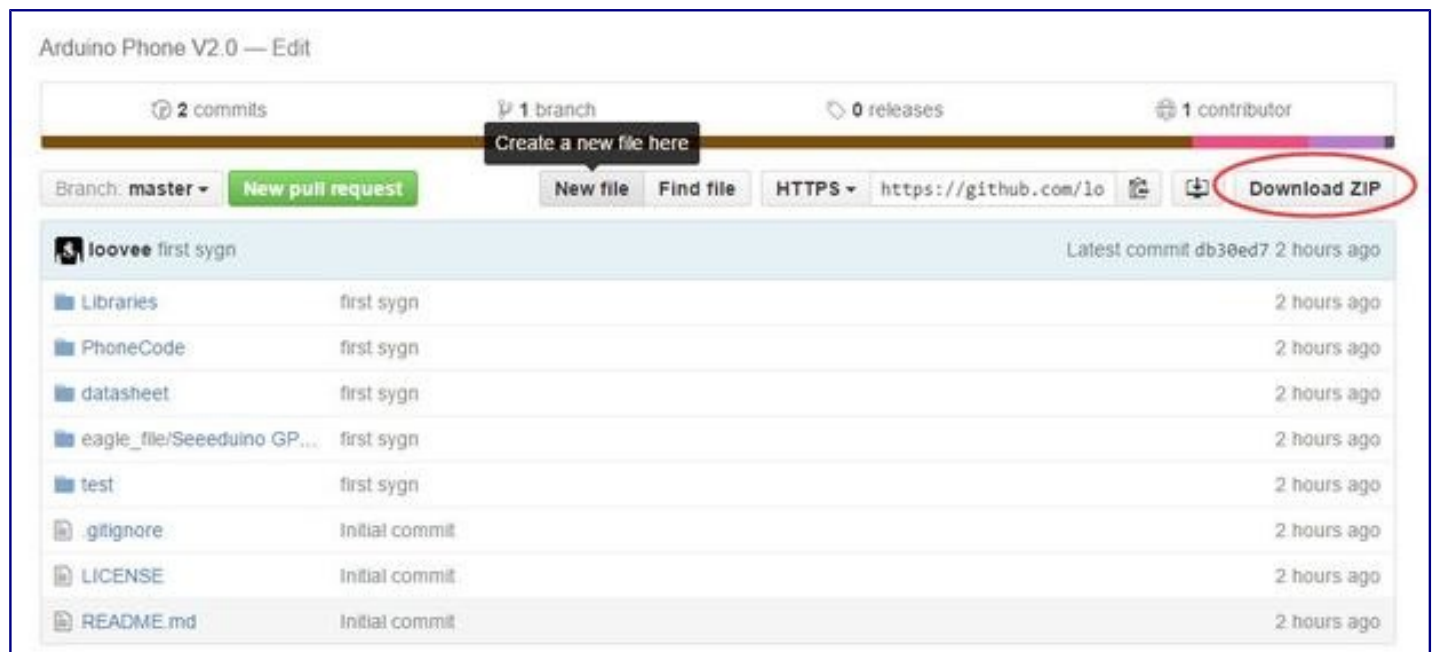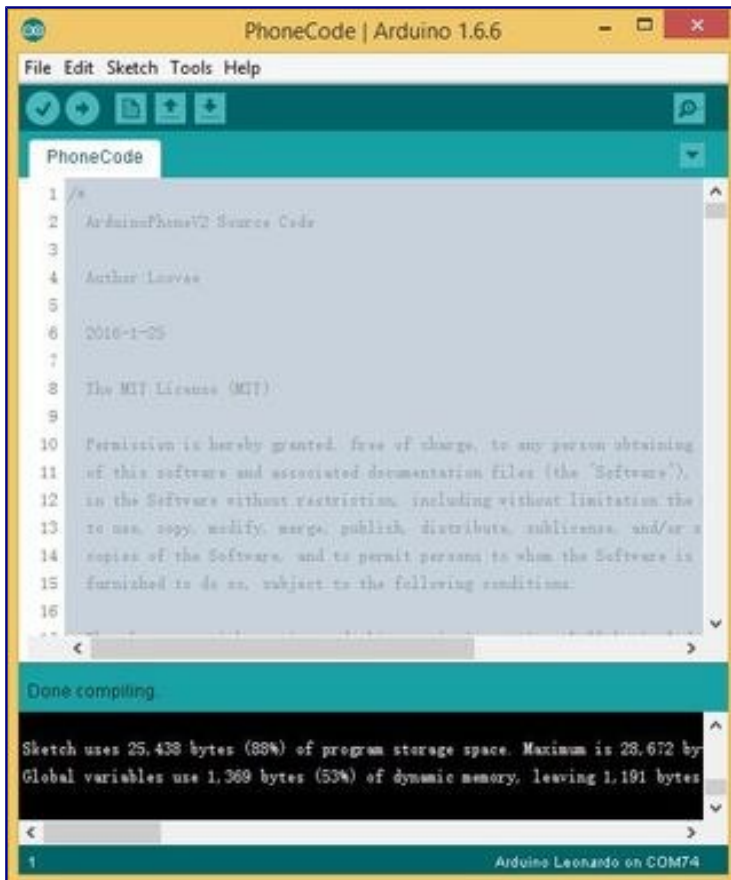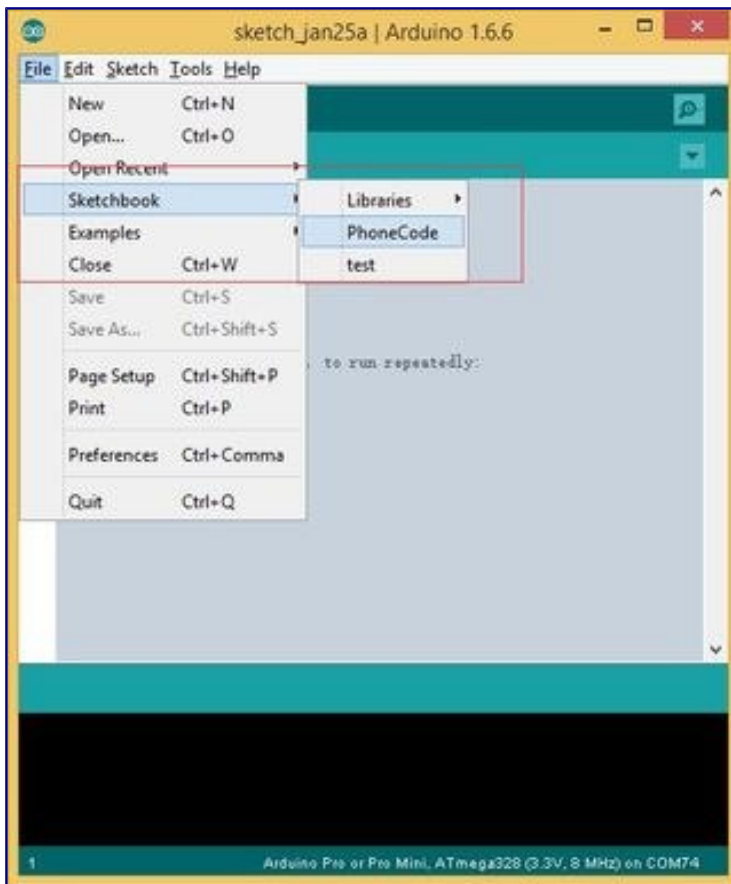
Click here to get more info about the board.

Click hereto download the code.

1. When you get to the github page, find a Download ZIP button, click to download the code.
2. The code you downloaded is not an Arduino library, it's a sketchbook, which is include all the library the project need.

3. Unzip the file you had downloaded from github, you will get a folder namedArduinoPhone-master.

4. Open your Arduino IDE, click File > Preferences > Sketchbook Location, browse to the folder we had mentioned above - ArduinoPhone-master. Then click OK to save it.

5. Close and re-open Arduino IDE, click File > Sketchbook > PhoneCode, then the main code of Arduino Phone is open.

6. Choose the right board(Arduino Leonardo) and port to upload the code. Refer to the image above.

After finished this step, you should get the UI of ArduinoPhone 2.0. If not please make sure if the code had been uploaded well.

Step 6: Test it
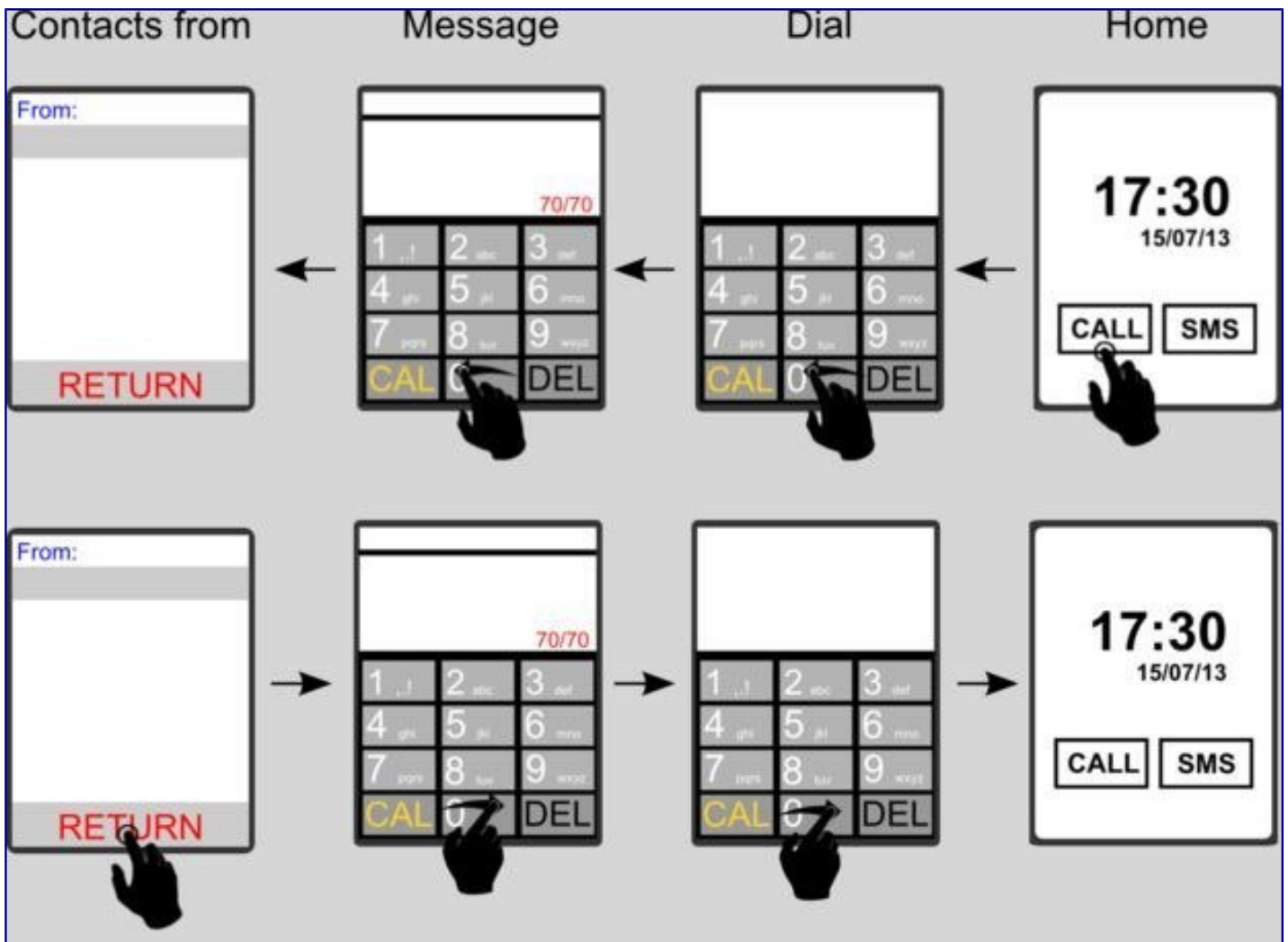
This Arduino Phone contains the following main functions.

1. receive & send message, letter input

2. dial & answer calls

3. real time clock display

4. A simple UI, You can switch function by sliding your finger on the screen. A standard 12 key input method for inputting message.

Step 7: 3D print a shell
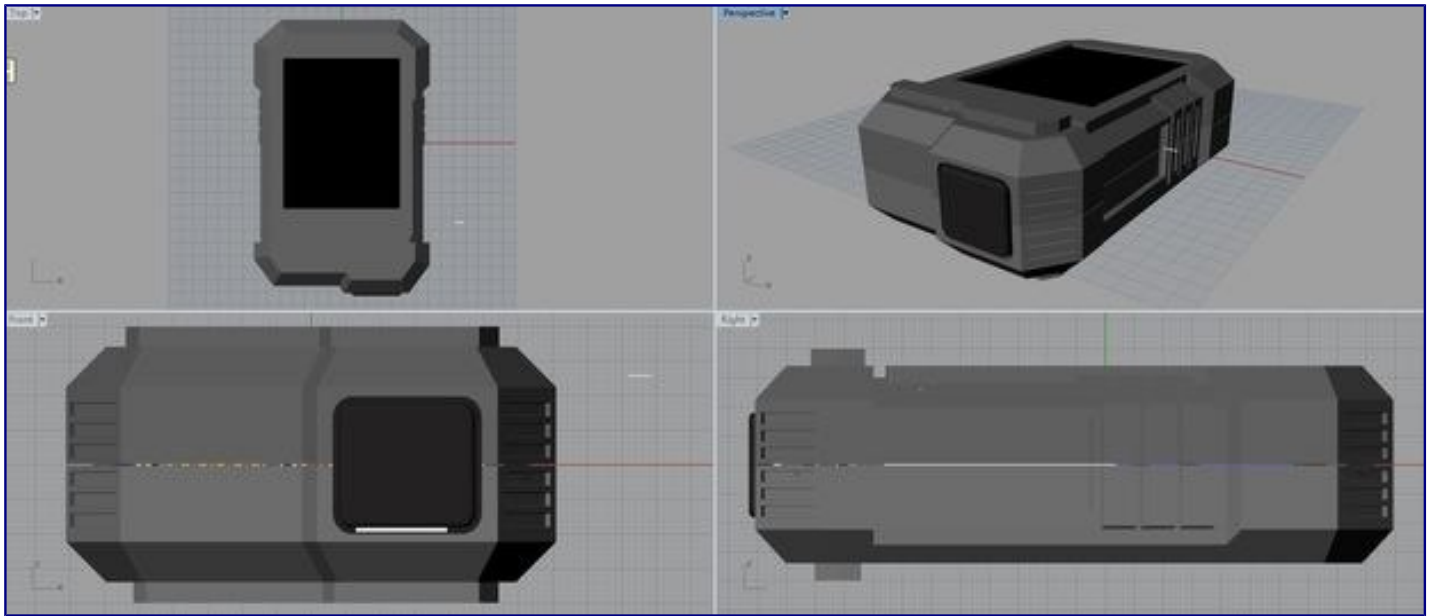
- 3D print stl.zip

Step 8: Assembly exploded figure
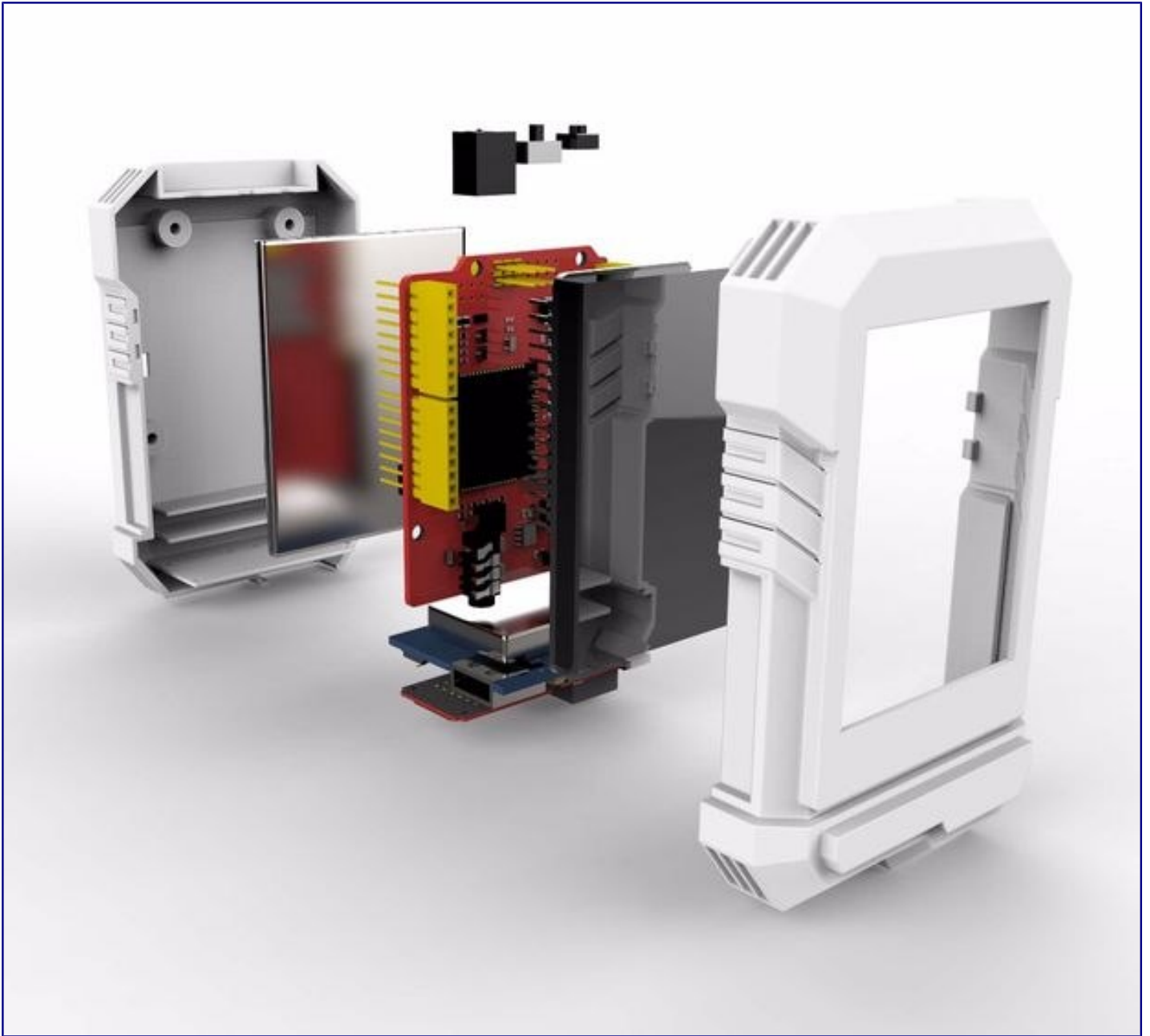
There is an assembly exploded figure to give you a clear mind to do the assembly.

Then let's go to the next step.

Step 9: Fix the solar panel
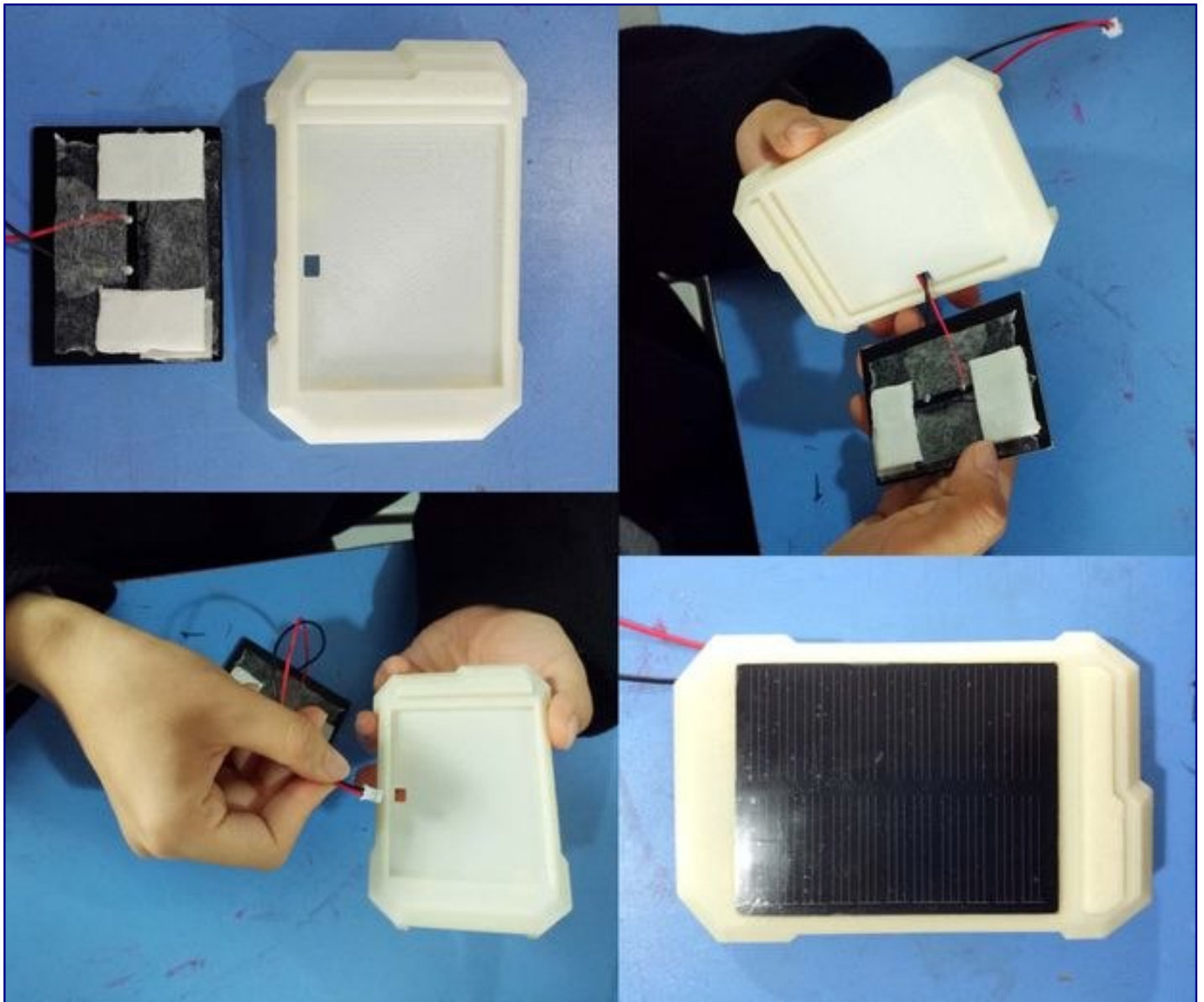
Put the solar panel in the groove of the bottom shell,

Pass the electric wire through the small hole. Paste the solar panel.

Step 10: Fix Seeeduino GPRS
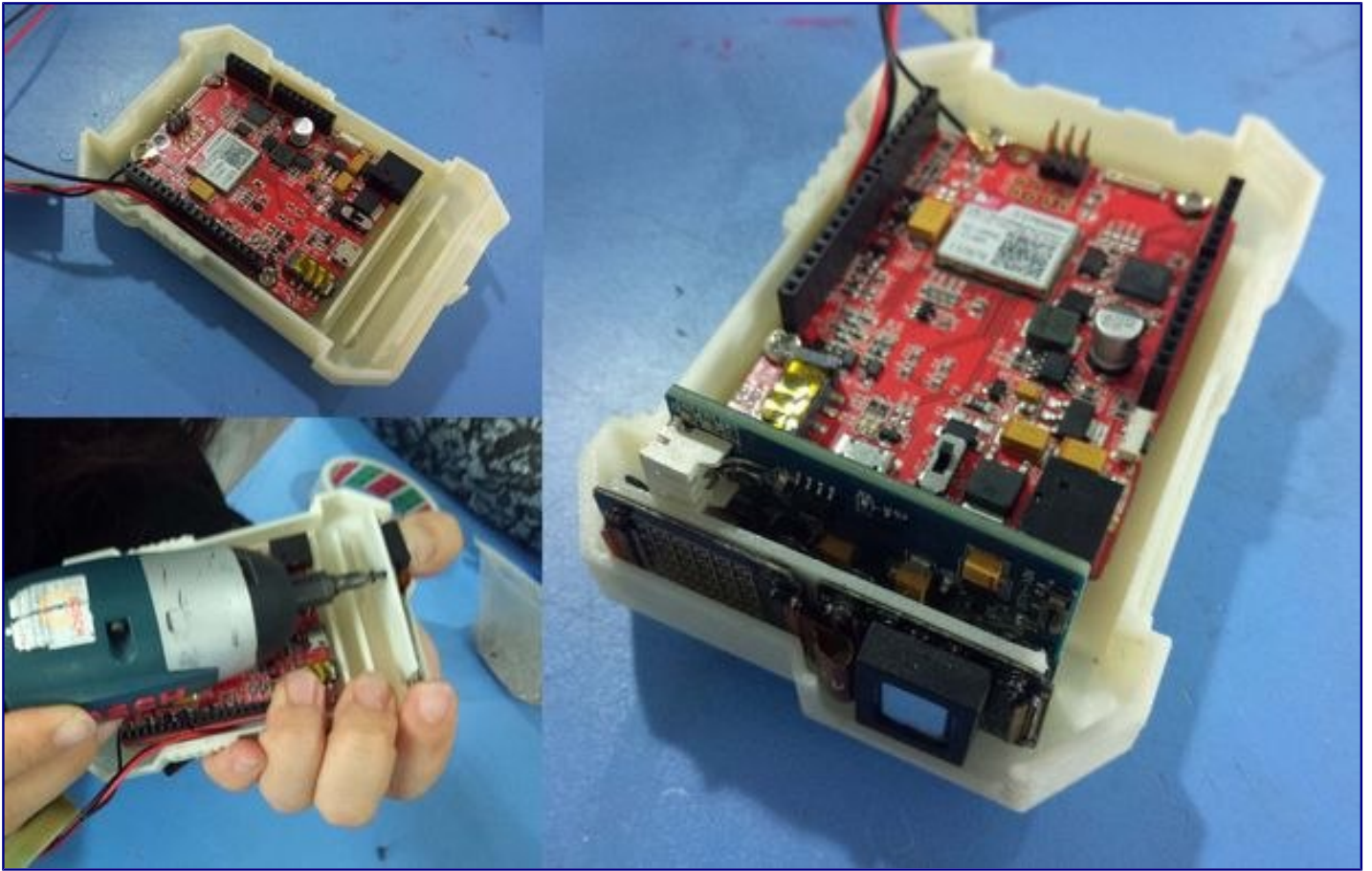
There are 3 fix palces on the back of the bottom shell, its diameter is 3mm,and the thickness is 1mm.Fix Seeeduino GPRS on the back of the top shell with 3 screws.

Step 11: Fix the other modules

fix the Lipo Rider、 Xadow Audio、 Xadow GSM Breakout

Following the picture to find the right fix places ,then fix the Lipo Rider、 Xadow Audio、 Xadow GSM Breakout on the bottom shell.

Step 12: Make it better

It's an open source project.

So far Arduino Phone 2.0 is still simple and crude, it only has the capacity to make the basic communication. But I believe that it will grow up better and better with the help of the community. And this is why people like open source and the community.

If you get a better idea, or you had made some improvement in the code, please give me pull request in Github. I am really appreciate that.

Cheers。

We have a be nice comment policy.
Please be positive and constructive.

[pablo de paris](#)
15 days ago

I am putting together the phone following your instructions and I can get the screen to light up, but nothing shows up on the screen.

I may have not understood the part where you explain the you have to cut a wire on the board (step 2). Can you explain a bit more where do you have to attach the green wire? Can you post more detailed pictures?

[Ambles](#)
3 months ago

This is the coolest project ever. It is exactly what I have wanted to do. In fact, I wish I knew how to take an older unused cell phone I have and make is bluetooth so I can answer and dial phone calls with it. This is so I have a spare handset so when I am doing work and cleaning around the house and I don't want to damage my "real" cell phone, I can just carry the handset with me.

Anyway, this project is my most absolute favorite. Fantastico! Well, well done!

[mwellman1](#)

I am a backer of the Pine 64 project on kickstarter, and they will be shipping soon you can see there website [here](#) There board is a quad core 64bit board that runs at half an amp at 5v. It also has RPi compatible i/o headers. It runs full android and MAY be a way to make this a full "smart" phone. If there is a gsm/gprs module that will work on it. I wont get my board for a couple months, but it may be worth looking into, and would only need an android phone program to be reworked to function with whatever GSM/GPRS module was installed I would think... I may look into it when I get mine, as one of them will be worked into a tablet to run Linux and Android with swappable sdhc cards, or possibly dual boot, another thing i will be looking into but adding phone capabilities to the tablet assembly should not be hard.

[leseagle](#) [mwellman1](#)

Thanks for the tip I purchased one of these Pine 64... sounds great I am going to give it to my grandsons who is a wiz and see what he can do with it. Any suggestions? So do think it will ship in May? Les@LesLaMotte.com

mwellman1 leseagle

I do, I just got my backer kit mail and some of the stuff I want I will have to wait till April for. unfortunately that delays my board by a month as I am in the March shipping group. my first pine I plan to get the tablet enclosure the battery camera 7 inch display as well as the temp and humidity sensor and the light sensors, I also will likely be ordering the 64gb sdhc card loaded with ubuntu, I may get a smaller one with Android installed, I have to look at the install process for Android if it's like I think it is I may just download and get a second card elsewhere.

The idea here is that I will be able to use it as a full Android/ubuntu tablet by opening it and swapping memory cards. This tablet will be equipped with at minimum the batter and real time clock backup battery, screen side camera for Skype or whatever, Ambient light detector to automatically adjust screen brightness, and the temp/humidity sensor so I can get those readings. I expect to have to program Ubuntu to use some of this, but I am not sure as I have not looked into how Android or ubuntu will interface with the i2c headers. I may get the i2c expansion board for kicks as I doubt it will fit inside the tablet enclosure but I can setup a connectors for it possibly, but since i2c is serial I can use more than one sensor per port, they just need separate addresses, either way I hope to add a full weather suite to the tablet eventually and possibly phone abilities. I am a star trek fan, but I think real tricorders will never be a tool by themselves I think they will be contained in our phones, just like the padd and communicator was joined in a smartphone. someday all those devices will probably be one device with the hardware unlocked with key codes to access the stuff you want instead of a bunch of different devices with differing capabilities. Companies have started doing this like Rigol oscilloscopes... anyways that's my idea, I may even use it to run the cnc router design software and to control the cnc router all in one unit instead of having to design on one computer and route from another. I have all sorts of ideas... router, etc, the applications are almost endless, it's a very powerful embedded computer at a really inexpensive price point. It only lacks in a configurable memory port, the boys have to be ordered with the amount of ram you want, almost always you will want all 2gb. The other place is graphics, I don't know how well it will run graphics, but if you want something that power full invidea has a similar board that's almost 200 dollars... but that is very spendy for something you tinker with so I don't recommend it, besides, this isn't really for doing that though it will play many games fine.

Seeed Studio (author) mwellman1

That sounds great. About GSM/GPRS modules, you can try http://www.seeedstudio.com/depot/Xadow-GSM-BLE-p-2...

jruss007

Is it possible to get the source file for the case zip. I need to modifiy the demensions to allow for my print to print it.

jruss007 jruss007

j.russ4886@gmail.com

ChromaM

May you please supply a different link (amazon preferably) for the Lipo Rider v1.3, and the Xadow devices (GSM Breakout and Audio)?

ChromaM ChromaM

If you are able to do any of then, please do the Lipo Rider v1.3 as it is unavailable at the site you supplied.

othman.rahmanir

Can you send me a video after the functioning and Thanks

gmail: othmang16@gmail.com

ChromaM

Could someone place some links on the switches and buttons used in this project? Thanks!

Seeed Studio (author) ChromaM

Hi again, I found those parts was include in the OPL, and I had added the link at the part list. Please refer to Step 2. Thanks.

Seeed Studio (author) ChromaM

Hey, if you are going buy buy the modules in the list from Seeed, you can tell me your order number via private message, I can give you some of the materials. I am sorry that I didn't make it clear in the instructable, I will add some link later, if I can find one. Thanks.
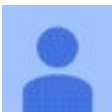

Blaise_Gauba

That is SO cool!

Shrk

???

TheA8

how did you make the Assembly exploded figure (the photo)

Actually, I used 2 software in this explosive view.The 3D model designed by Rhino and rendered by Keyshot.

1. Put different model in right place wherever you want.

2.Give them different layer.

3.Then use the software render the 3D model.

I'm glad you like it.Recently I go to my hometown to celebrate the Chinese, Spring Festival.If you don't mind,I can make a video to explain the explosive view from step to step after this vacation.

I'm almost 100% sure that's just exploded view in Solidworks. Long time since I used it, but as I remember it's really easy.

thank you
do you now any good free 3d printing software

Well, TobbaBK is right, Solidworks has the ability to make a exploded figure, yet I am using another software.

Am thinking about write an instructables to tell people how to make 3D modules from Eagle file, and make a exploded figure as well.

Is there any other screen I could use besides the 54$ dollar one? I want to make this, but don't want to spend that much on a screen.

[Seeed Studio](#) (author) [CheezGreater](#)

Well. Hmmm, how to say.. Yes, I think you guys can get a cheaper one from Taobao, I am not sure if you had ever heard about Taobao. :-)

[billyrobot](#)

I agree with "TheA8". Beautiful exploded presentation. I have watched hundreds of youtube videos and instructables and just haven't seen any being used. Nice work.

[Seeed Studio](#) (author) [billyrobot](#)

Thanks man.

[FabienL](#)

Why use the seeeduino GPRS ?

Why not the tiny one : Xadow GSM+BLE ? (http://www.seeedstudio.com/depot/Xadow-GSM-BLE-p-2560.html?cPath=84_120)

[Seeed Studio](#) (author) [FabienL](#)

That's because I made ArduinoPhone V1 years ago, which use Arduino UNO as the controller. But uno hasn't the ability to make a phone call, then I have to add a GPRS Shield, which make the phone too

big. And the most important is I want this series of ArduinoPhone should be based on Arduino(Seeeduino GPRS is in Arduino Leonardo bootloader).

The Xadow GSM+BLE has another name, RePhone. :)

Actually I was thinking about making 3D shell for RePhone as well. But don't have a good idea yet.

jgfesser

So I am new to the tinkering community since I find it amazing. How can it make and receive calls without being on a network? How does it transmit a signal/log a phone number. Just curious.

Thanks!

ccyg8774 jgfesser

This devices need to be on a network. An (activated) SIM Card needed to be inserted into the GPRS shield.

SteveMann

Nice to see some open source hardware. I bought a Librem laptop computer for reasons similar to your Arduino Phone. It would be nice to see your phone make it to the marketplace like Librem. Have you ever thought of starting a company to manufacture an open hardware phone? If you do, let me know and I might be one of your first customers!

Trigger_ijaz

Hi, i am new to this, can i use an arduino instead ?..

Seeed Studio (author) Trigger_ijaz

There's no GSM/GPRS function consist in an Arduino(UNO/Leonardo/Mega), you need to add an external board. You can refer to ArduinoPhone 1.0. It use an Arduino UNO and a GPRS Shield. Maybe that's what you want.

Thanks.

Trigger_ijaz Seeed Studio

Thank u so much !..
Now i have an idea how to work it out :) !.

Seeed Studio (author) Trigger_ijaz

Sounds great. Can't wait to see it.

Trigger_ijaz Seeed Studio

Will do!. :) but can i have your personal contact no, or else can you whatsapp me on 9176665442?..

Declangraymullen

This is really sweet! Have you thought about building something similar but with a raspberry pi and full android?

Seeed Studio (author) Declangraymullen

Sounds a great idea. I will try when I got some free time.

patrick10998

And why have it an stand by time for 40hours without an Lipo? Just over the solar panel?

Seeed Studio (author) patrick10998

There's an 1000mA/H Battery, and there will be some low power function in the code, such as turn off the screen backlight when the phone is not used. And the solar panel will have some help as well.

patrick10998

Hi, this is awesome!

Can u pls make a Video?

Seeed Studio (author) patrick10998

Sounds great. Will make one later. Thanks.

patrick10998

So the GPRS Board have an Arduino Leonardo integrated? :D

Have it an LIPO? Don't see one...?

Seeed Studio (author) patrick10998

Yep, there's an Atmega32U4 on board.

No Lipo, it's why a Lipo-Rider is needed.

[GoodWinApps](#)

This is really awesome! I built a simple start ArduinoPhone following the Adafruit lesson, but it lacks functionality and features. While I still intend to improve it, now I will also build one like yours. Yours is way cooler than mine. There is a lot to learn, many thanks to you for sharing this information.

[Seeed Studio](#) (author) [GoodWinApps](#)

The phone you made look great as well.

I am glad that you like it, if you have any problem when making it, please let me know at no time, am pleasure to help.

[Tecwyn Twmffat](#)

Thanks! I'm gonna make one!

[Seeed Studio](#) (author) [Tecwyn Twmffat](#)

Sounds great.

[ndukovski](#)

Awesome project ;)