ICs & Robot Gadgets
Easy Deal Easy Fun
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1.Introduction:

It is a Blue LED Spectrum FM/Bluetooth Audio Speaker DIY Kit. It has 10pcs blue LED music spectrum display. It can play music form Bluetooth, FM, TF Card, U-disk with 4ohm 3W speakers.

It is a very interesting DIY electronic product which enables users to understand the circuit more clearly and learn welding skills.

2.Feature:

[4 Audio Input Methods] It can get audio from Bluetooth, FM, U-disk, TF card in 4 different methods which can meet the application needs of different scenarios. User can switch audio source as needs by press MODE button. Equipped with a standard 75cm FM antenna to enhance the stability of the FM signal.

[Battery charging protection] It is equipped with 18650 rechargeable battery box for offline outdoor use. Built-in battery charging protection board to protect battery charging and discharging and prolong battery life.

[Dual-channel stereo 3W] Built-in 3W power amplifier module which can drive 4ohm 3w speakers directly. Stable output with high fidelity music quality.

[Adjust playing status] It can adjust playing volume by keep press V+ and V- buttons. And change Next and Previous musics by short press V+ and V- buttons. Then press the second button to play or pause music.

[DIY Fun and Learning I] It is a DIY electronic welding kit, the user receives the most basic components, not only allows you to learn and practice electronic welding skills, but also experience the music fun brought by FM/Bluetooth players.

3.Parameter:

1>.Product Name:Blue LED Spectrum FM/Bluetooth Audio Speaker DIY Kit
2>.Work Voltage:DC 3.7V~5V
3>.Speaker: 4ohm 3W
4>.Channel: Dual-Channel Stereo
5>.Suitable battery:18650 Rechargeable Lithium Battery(No included)
6>.Battery charging protection:Yes
7>.Battery discharging protection:Yes
8>.Audio source:Bluetooth/FM/U-disk/TF card
9>.Antenna: 75~250mm professional antenna
10>.Work Temperature:-20℃~85℃
11>.Work Humidity:5%~85%RH
12>.Size(Installed):140*80*77mm

4.Functions:

1>.The default is Bluetooth working mode after power ON.

2>.U-disk/TF card has priority over Bluetooth/FM. But user can change audio source by MODE button.

3>.The audio source connected first has higher priority for U-disk and TF card.

4>.Short press V- and V+ button to change Next and Previous musics/FM status.

5>.Keep press V- and V+ button to adjust play volume.

6>.Press the second button to play or pause music.

7>.Automatically search and save FM stations: At FM mode, keep press the Play/Pause button 3sedonds to automatically search FM stations, and the Red indicator will keep flashing.Automatically save stations after searching.

8>.Note:It cannot save the last source mode/volume/playing audio.

5.Components List:

NO.	Component Name	PCB Silk	Parameter	QTY	Note
1	Metal Film Resistor	R1	20Kohm	1	Red/Black/Black/Red/Brown
2	Metal Film Resistor	R2	1.5Mohm	1	Brown/Green/Brown/Yellow/Brown
3	Metal Film Resistor	R3	10Kohm	1	Brown/Black/Black/Red/Brown
4	Metal Film Resistor	R4	470ohm	1	Yellow/Purple/Black/Black/Brown
5	Electrolytic Capacitor	C1	100uF	1	Longer pin is positive pole
6	Electrolytic Capacitor	C2	2.2uF	1	Longer pin is positive pole
7	Electrolytic Capacitor	C3	1uF	1	Longer pin is positive pole
8	S9018 Transistor	Q1	TO-92	1	
9	IC CD4017	U1	DIP-16	1	
10	IC Socket	U1	DIP-16	1	
11	Power Switch			1	
12	Blue LED	D1-D10	3mm	10	Longer pin is positive pole
13	Potentiometer	VR1	10Kohm	1	
14	MIC Microphone	MK		1	Green mark is negative pole
15	Connect wire		10cm	6	
16	DC Power Socket			1	
17	Antenna Socket			1	
18	Battery Charging Protection Board			1	
19	18650 Battery Box			1	

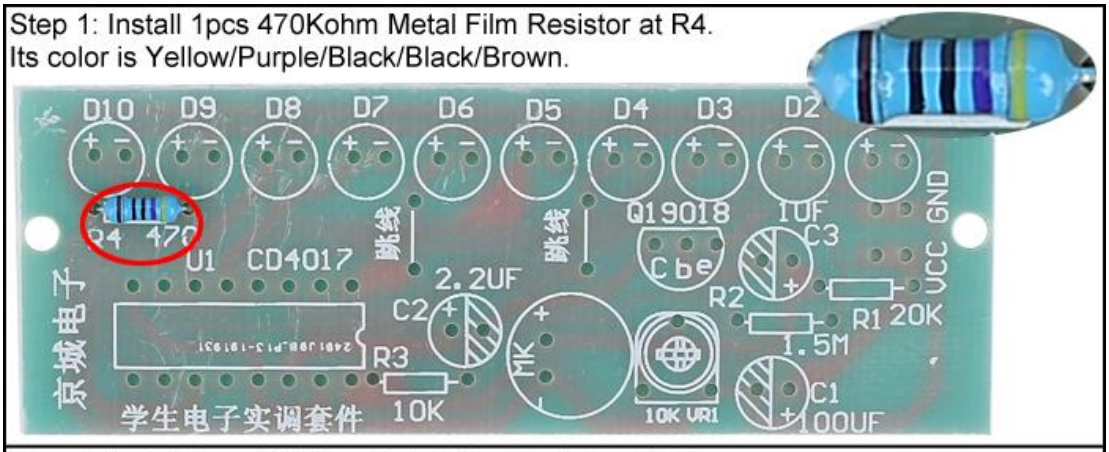
20	Antenna		75-250mm	1	
21	2Pin PH2.0 Wire		10cm	3	
22	Wire		15cm	2	Random color
23	Red Thin Wire		20cm	2	
24	Red Wire for Antenna		30cm	1	
25	USB Power Cable		100cm	1	
26	4ohm 3W Speaker		50*50mm	2	
27	Bluetooth Receiver			1	
28	Acrylic Board			6	
29	Nylon Through Column		M3*50mm	2	
30	Nylon Column		M3*30+6mm	8	
31	M3 Screw		M3*20mm	4	Round head
32	M3 Screw		M3*8mm	16	Round head
33	M3 Screw for battery box		M3*8mm	1	Flat head
34	M3 Nut			17	
35	PCB Circuit Board		56*32*1.6mm	1	

6.Installation Tips:

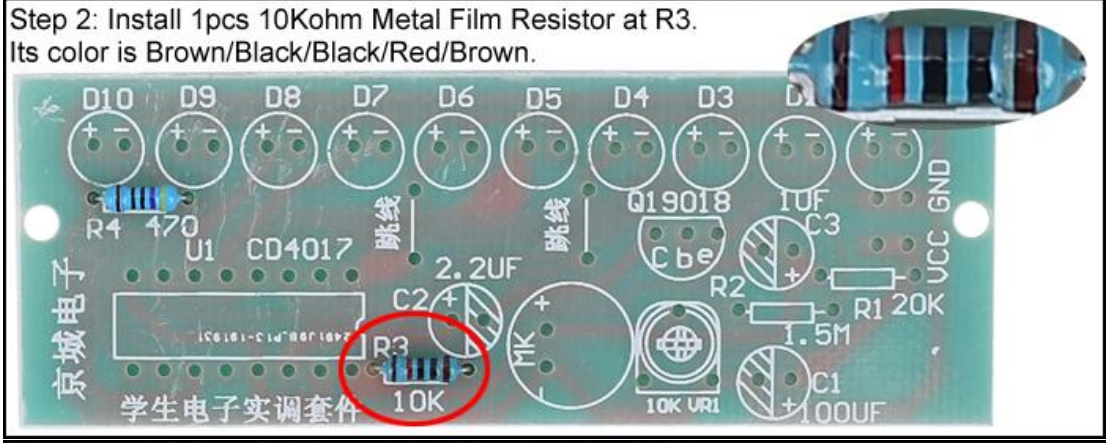
1>.User needs to prepare the welding tool at first.
1.1>.Soldering iron (<50 Watt)
1.2>.Rosin core ("radio") solder
1.3>.Wire cutters
1.4>.Wire strippers
1.5>.Philips screwdriver
2>.Please be patient until the installation is complete.
3>.The package is DIY kit.It need finish install by user.
4>.The soldering iron can't touch the components for a long time(3s), otherwise damage components.
5>.Pay attention to the positive and negative of the components.
6>.Strictly prohibit short circuit.
7>.User must install the LED according to the specified rules.Otherwise some LED will not light.
8>.Install complex components preferentially.
9>.Make sure all components are in right direction and right place.
10>.Check that all of the LED can be illuminated.
11>.It is strongly recommended to read the installation manual before starting installation!!!
12>.Please wear anti-static gloves or anti-static wristbands when installing electronic components.

7.Install steps:

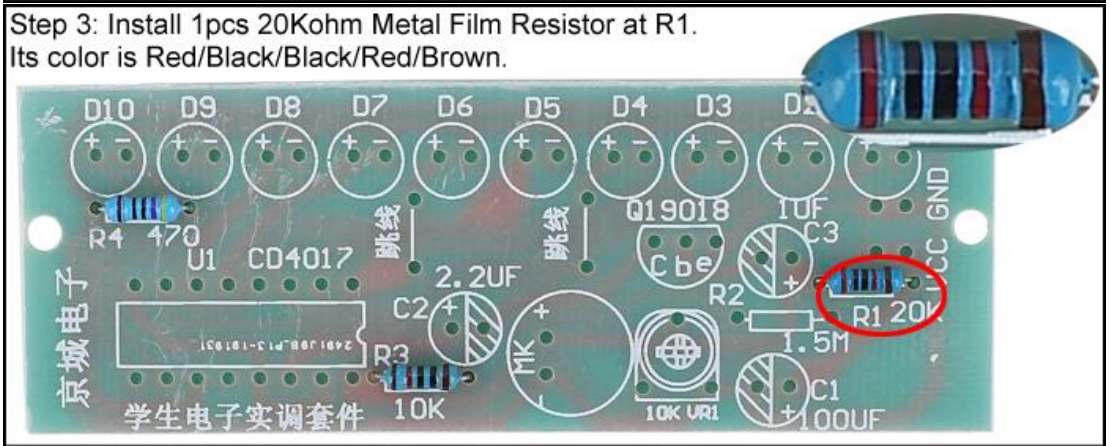
Step 1: Install 1pcs 470Kohm Metal Film Resistor at R4.
Its color is Yellow/Purple/Black/Black/Brown.



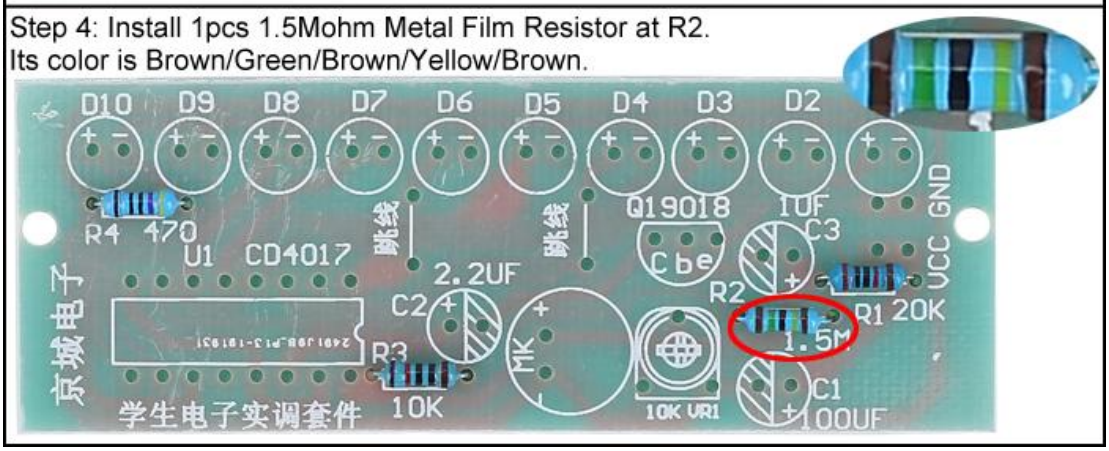
Step 2: Install 1pcs 10Kohm Metal Film Resistor at R3.
Its color is Brown/Black/Black/Red/Brown.



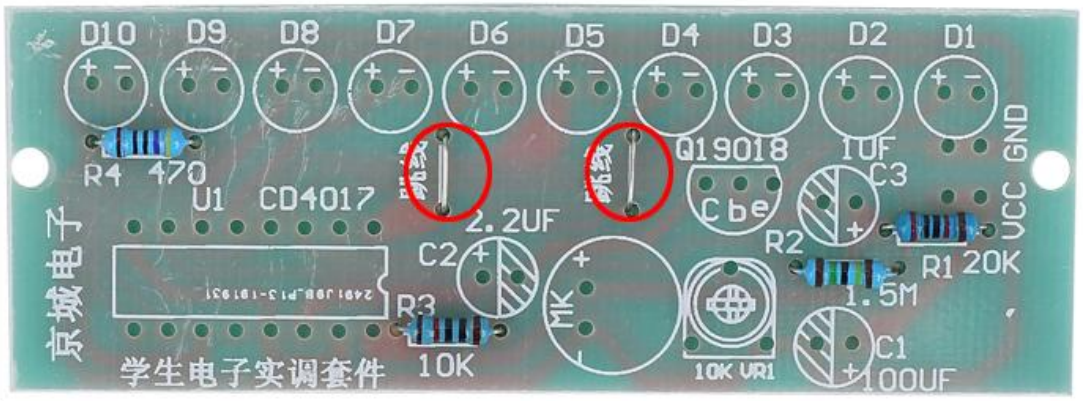
Step 3: Install 1pcs 20Kohm Metal Film Resistor at R1.
Its color is Red/Black/Black/Red/Brown.



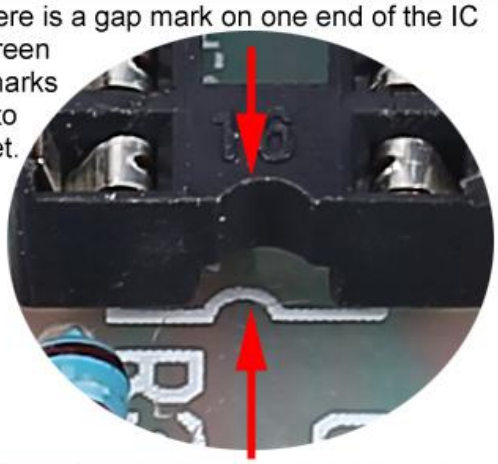
Step 4: Install 1pcs 1.5Mohm Metal Film Resistor at R2.
Its color is Brown/Green/Brown/Yellow/Brown.

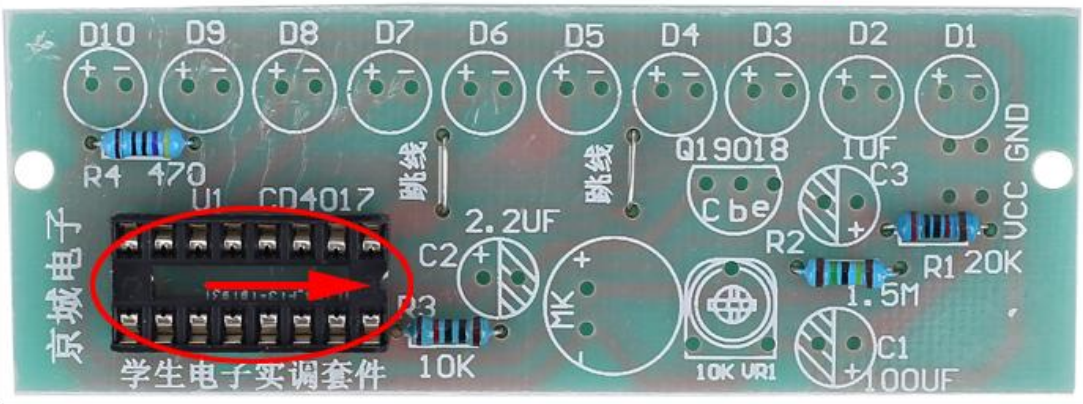


Step 5: Using the resistor pin metal wire that just cut, connect the 2 jumper pads.

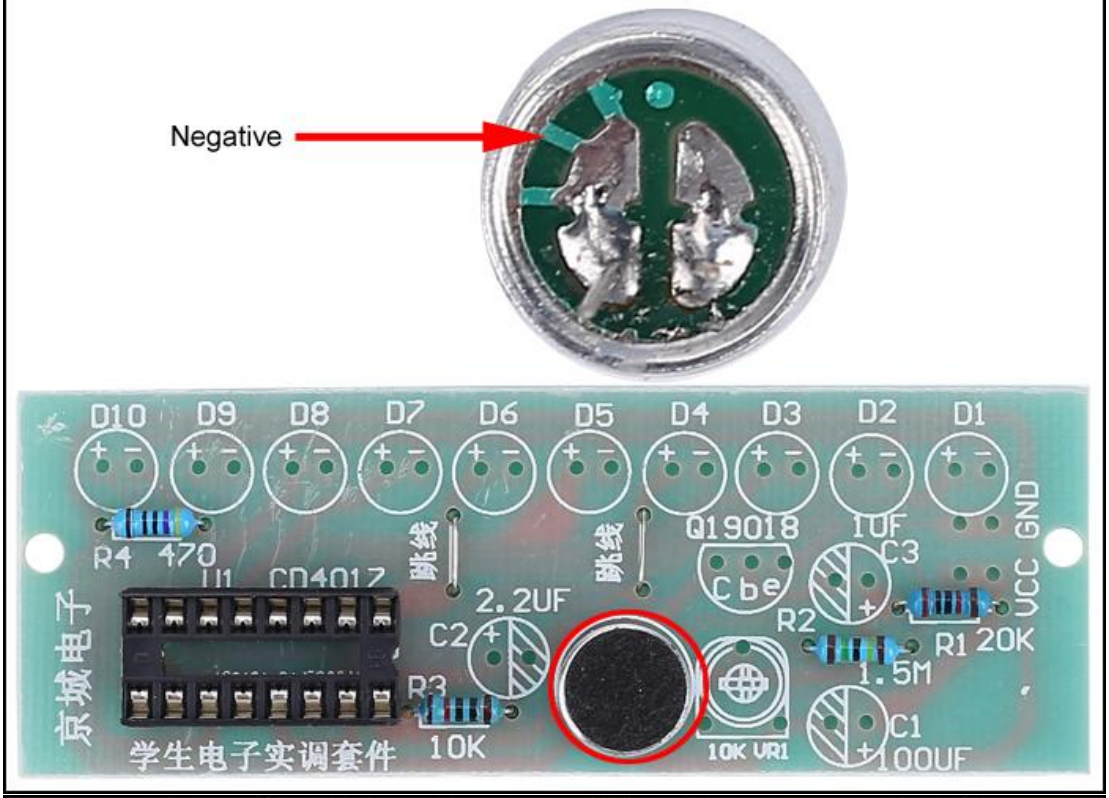


Step 6: Install 1pcs DIP-16 IC Socket at U1.There is a gap mark on one end of the IC Socket and there is a gap mark on PCB silk screen where the IC Socket can place on.These two marks are corresponding to each other and are used to specify the installation direction of the IC Socket.

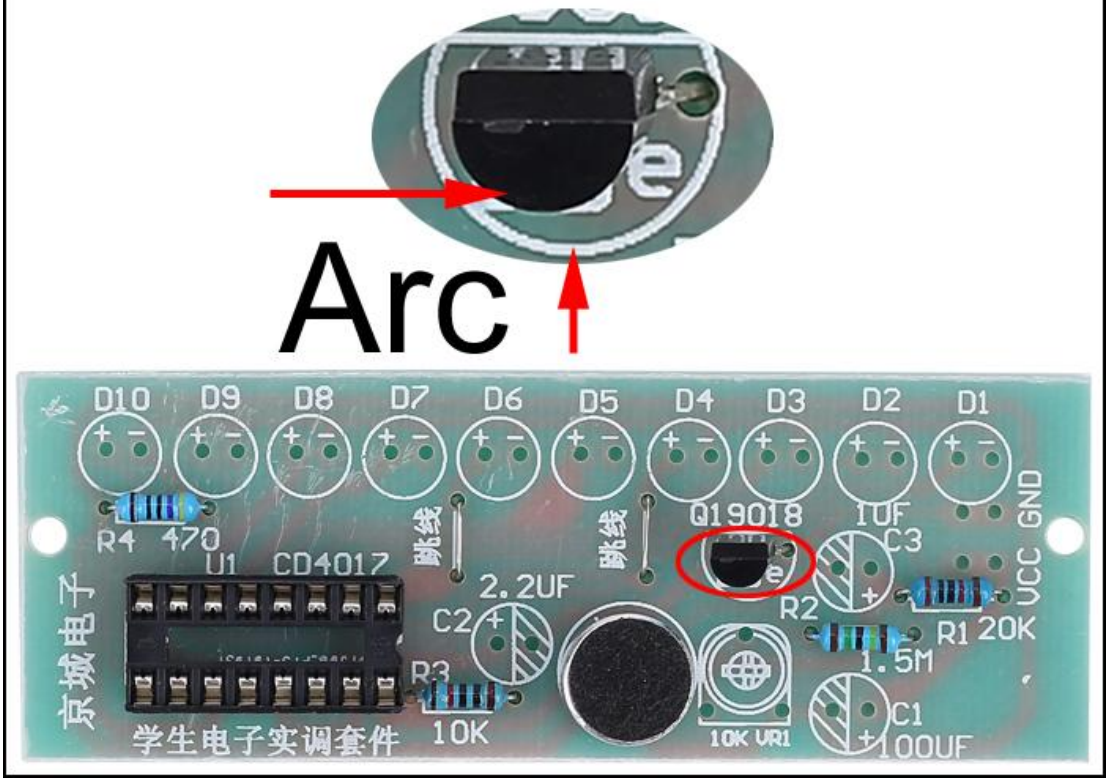




Step 7: Install 1pcs MIC Microphone at MK. MIC green marked pin is negative and connect to ' - '. Pay attention to the installation direction.

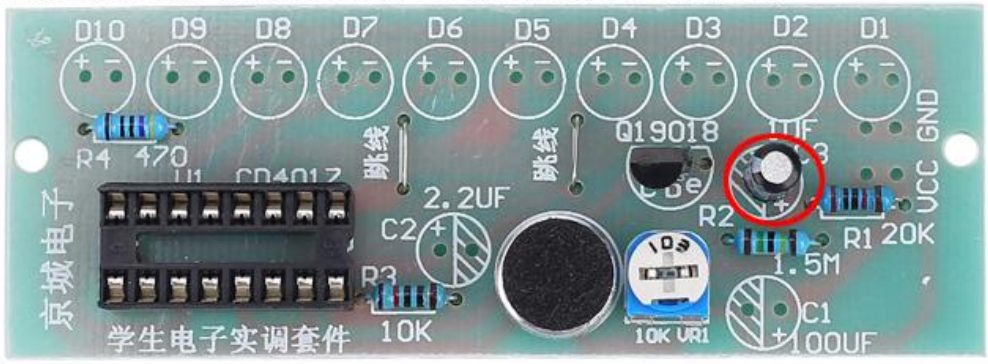


Step 8: Install 4pcs TO-92 S9018 Transistor at Q1. Note that the arc of S9018 corresponds to the arc silk screen on the PCB.

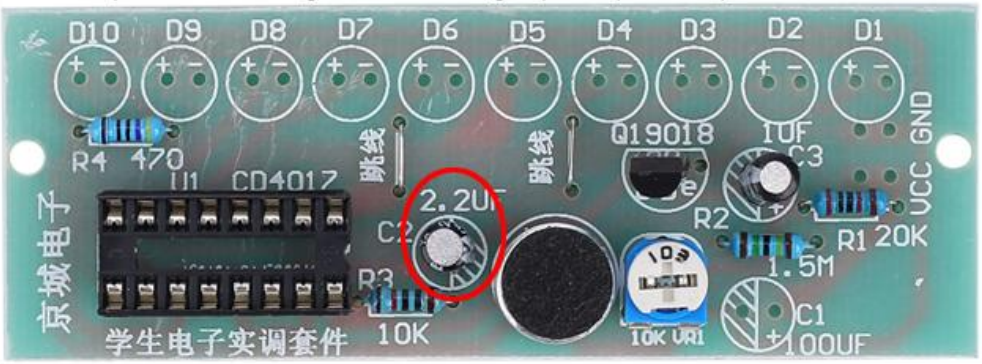


Step 9: Install 1pcs 10Kohm Potentiometer at VR1.

Step 10: Install 1pcs 1uF Electrolytic Capacitor at C3.Pay attention to distinguish between positive and negative.The Longer pin is positive pole.



Step 11: Install 1pcs 2.2uF Electrolytic Capacitor at C2.Pay attention to distinguish between positive and negative.The Longer pin is positive pole.



Step 12: Install 1pcs 100uF Electrolytic Capacitor at C1.Pay attention to distinguish between positive and negative.The Longer pin is positive pole.

Step 13: Identify the positive(anode) and negative(cathode) lead of LED.The leads of the LED must be installed correctly, otherwise the LED cannot be turned on.Here are four methods as following:

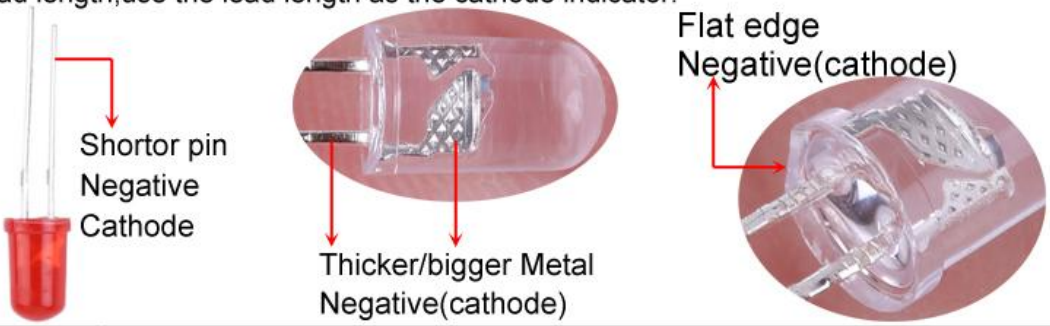
13.1>.According to the length of the LED lead to distinguish. The longer pin is positive(anode) lead. The shorter pin is negative(cathode) lead.

13.2>.Identify the negative(cathode) of the LED is to look into the plastic case where one can see that the negative(cathode) is much thicker/bigger inside the plastic case than the anode lead.

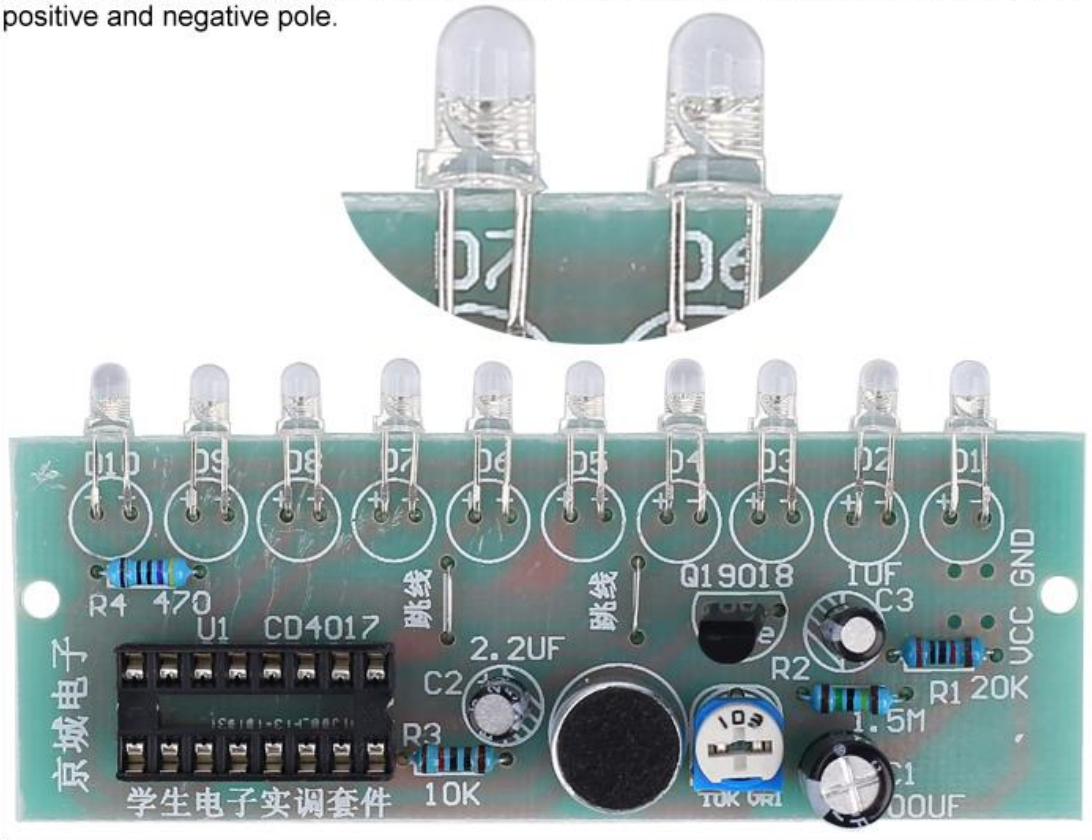
13.3>.Identify by edge of plastic case.The negative(cathode) lead of the LED should be the pin nearest the flat on the plastic case.

13.4>.Test by 3V battery or multimeter.The pin is positive(anode) lead which has connect to positive of 3V if LED can light up after connect 3V power supply.
(LED can not be powered directly from 3V for a short time:less then 0.5second)

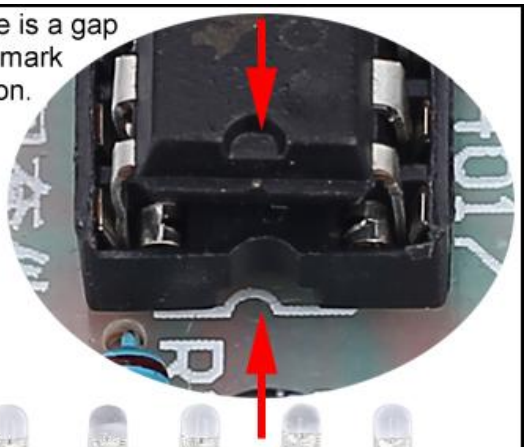
13.5>.Note:If the flat on package disagrees with other indicators(short lead,large cathode lead end), then other indicators take priority. I.e. if the flat disagrees with the lead length,use the lead length as the cathode indicator.



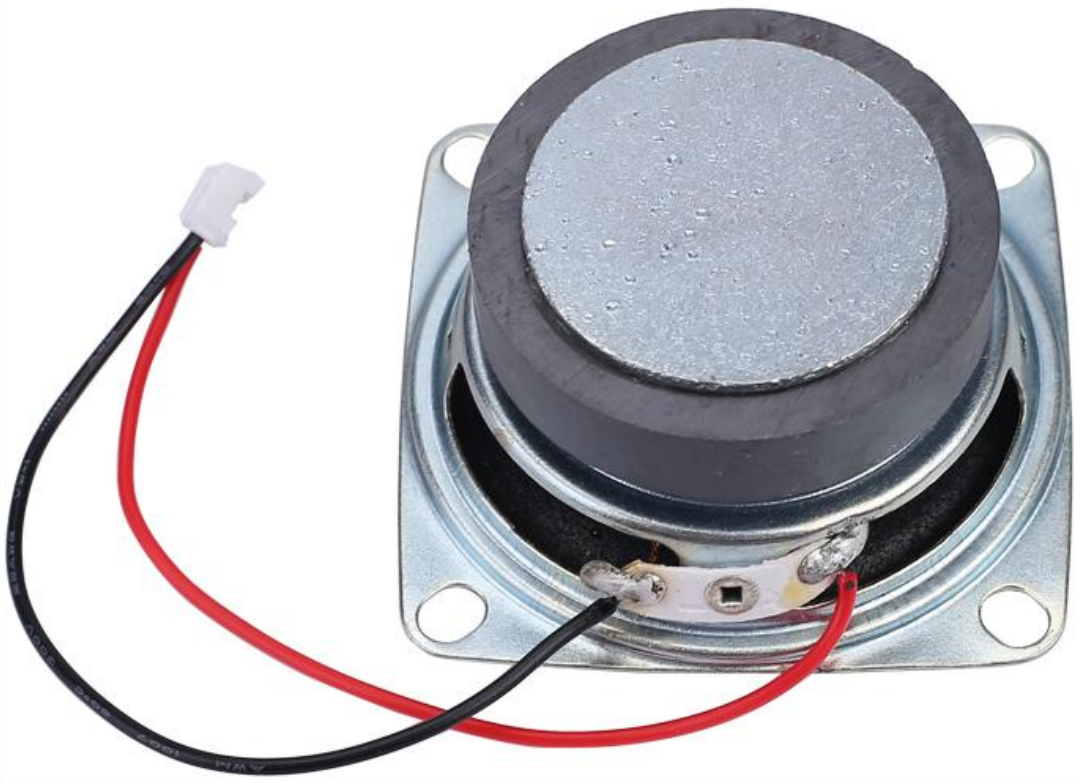
Step 14: Install 10pcs 3mm Blue LED at D1-D10. Pay attention to distinguish between positive and negative pole.



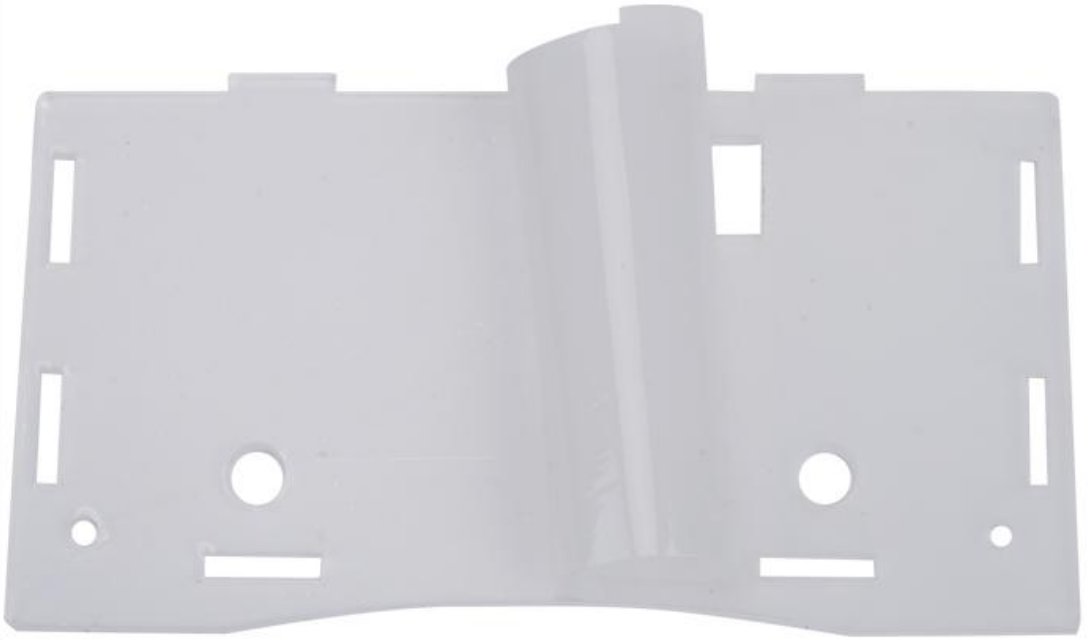
Step 15: Install 1pcs DIP-16 IC CD4017.There is a gap mark on one end of the IC and there is a gap mark on DIP-16 IC Socket where the IC can place on. These two marks are corresponding to each other and are used to specify installation direction of the IC.



Step 16: Install 4pcs 10cm 2Pin PH2.0 Wire on 2pcs 4ohm 3W Speaker.The speakers does not need to distinguish between positive and negative poles.



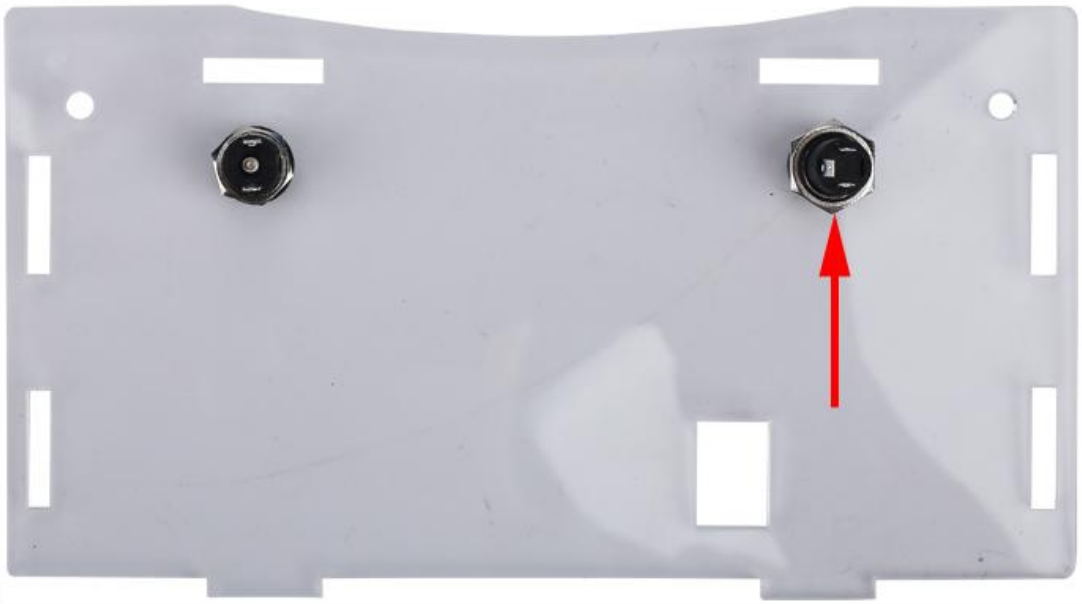
Step 17: Tear off the protective film on acrylic surface.



Step 18: Fix 1pcs power socket by the smaller nut on acrylic board. Pay attention to the comparison diagram and the front and back of the acrylic.

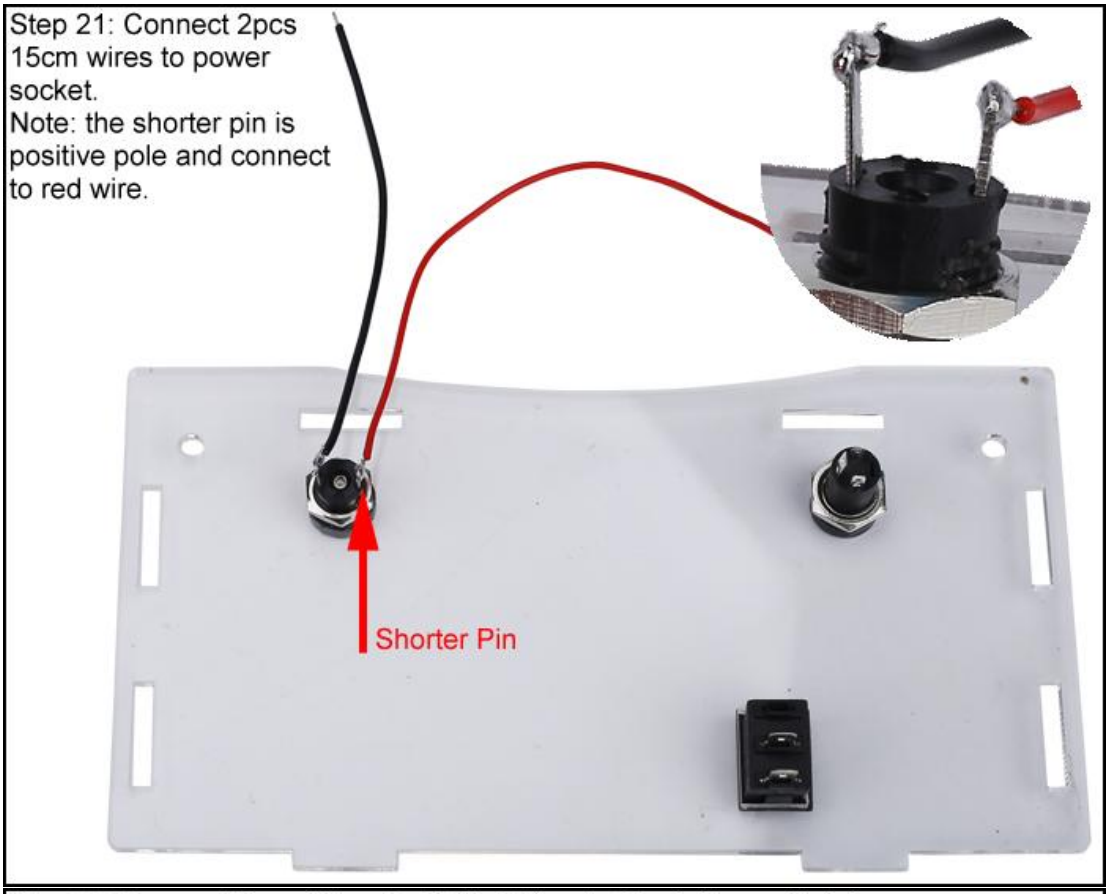
Pay attention to the placement direction of the acrylic.

Step 19: Fix 1pcs antenna socket by the biggest nut on acrylic board. Pay attention to the comparison diagram and the front and back of the acrylic.

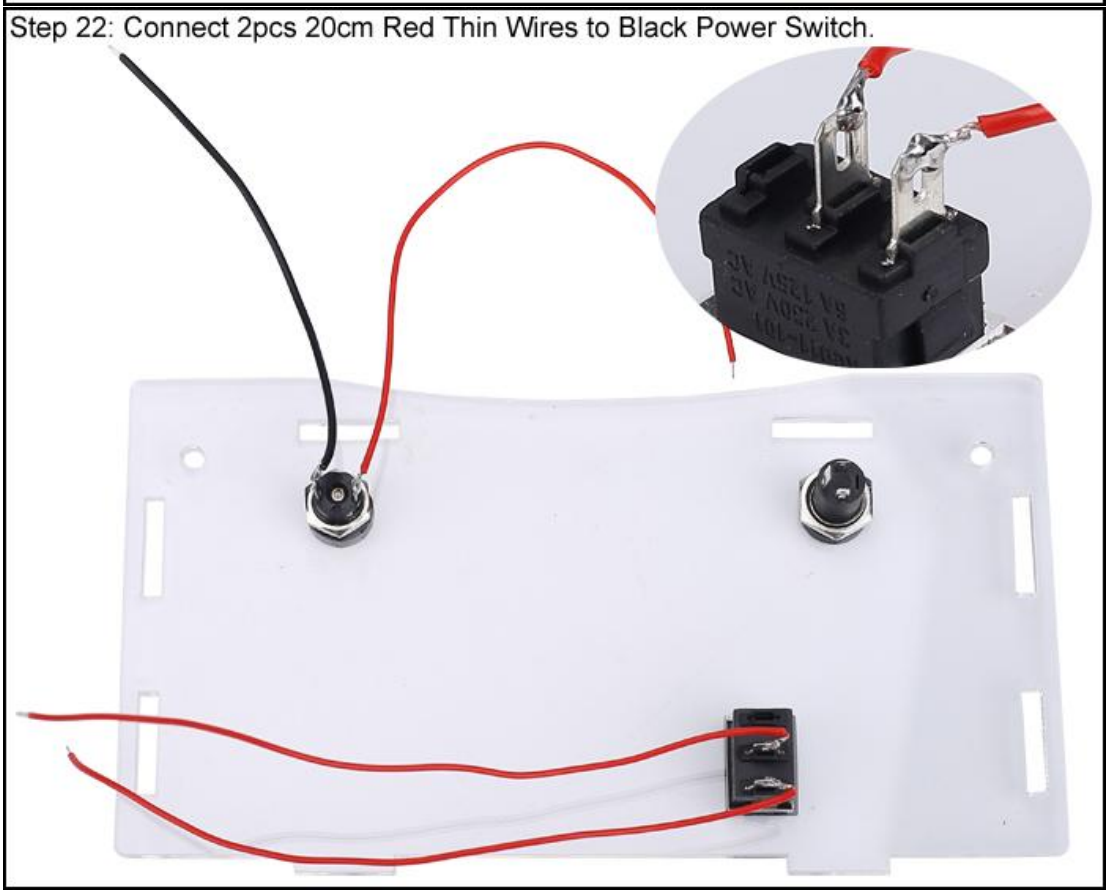


Step 20: Fix 1pcs Black Power Switch on acrylic panel. Pay attention to the buckle on the switch, which can be fixed by itself.Pay attention to the installation direction.

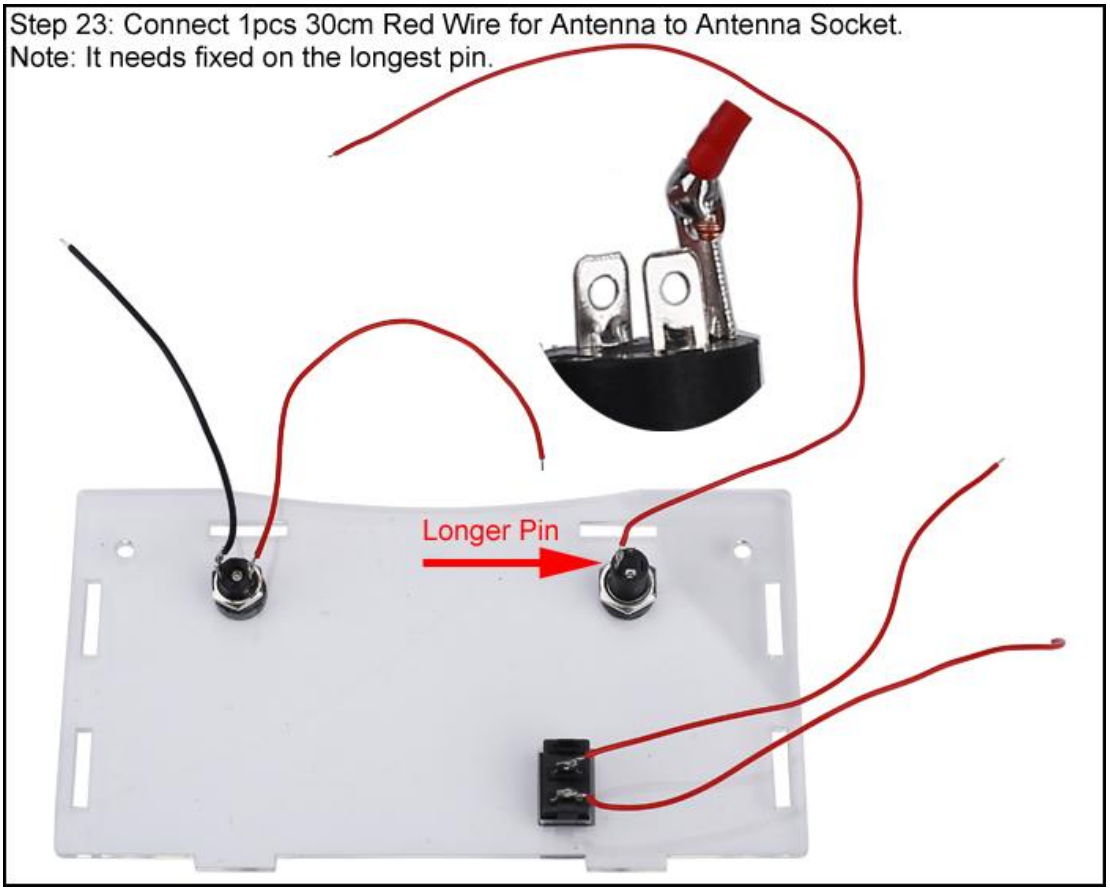
Step 21: Connect 2pcs 15cm wires to power socket.
Note: the shorter pin is positive pole and connect to red wire.



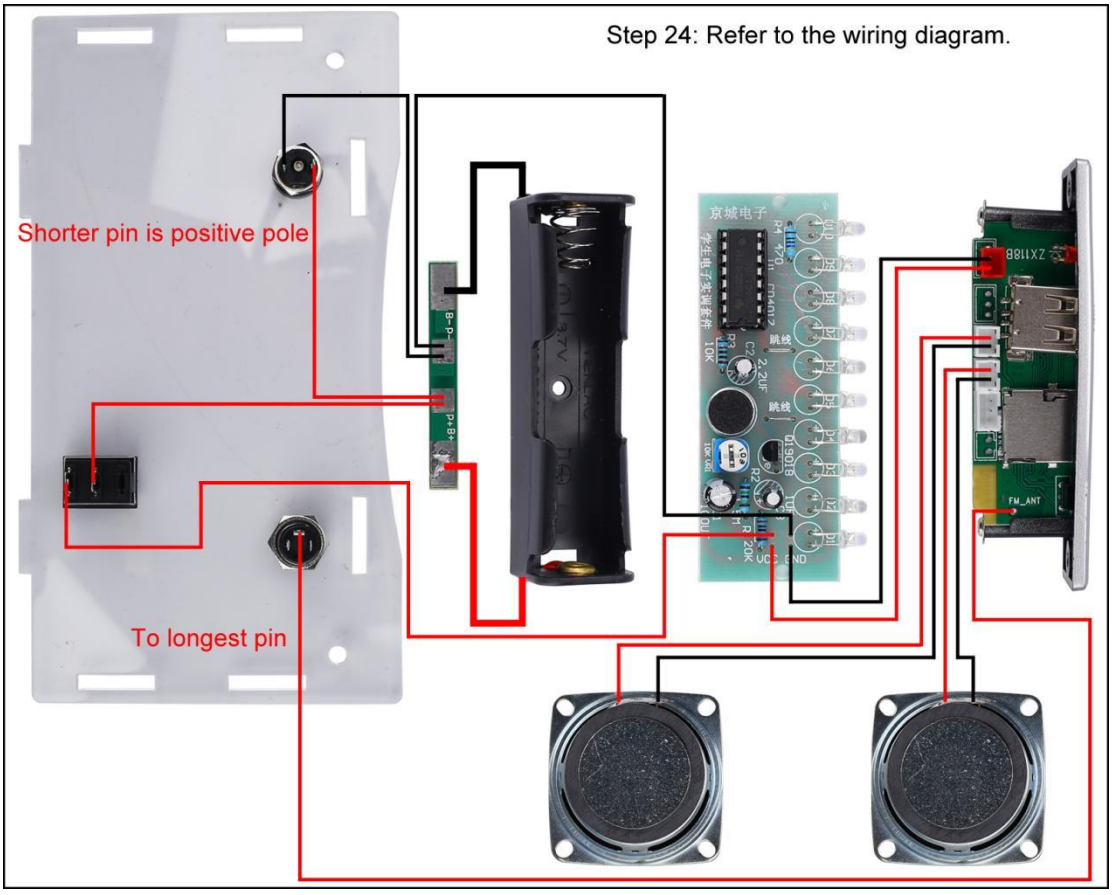
Step 22: Connect 2pcs 20cm Red Thin Wires to Black Power Switch.



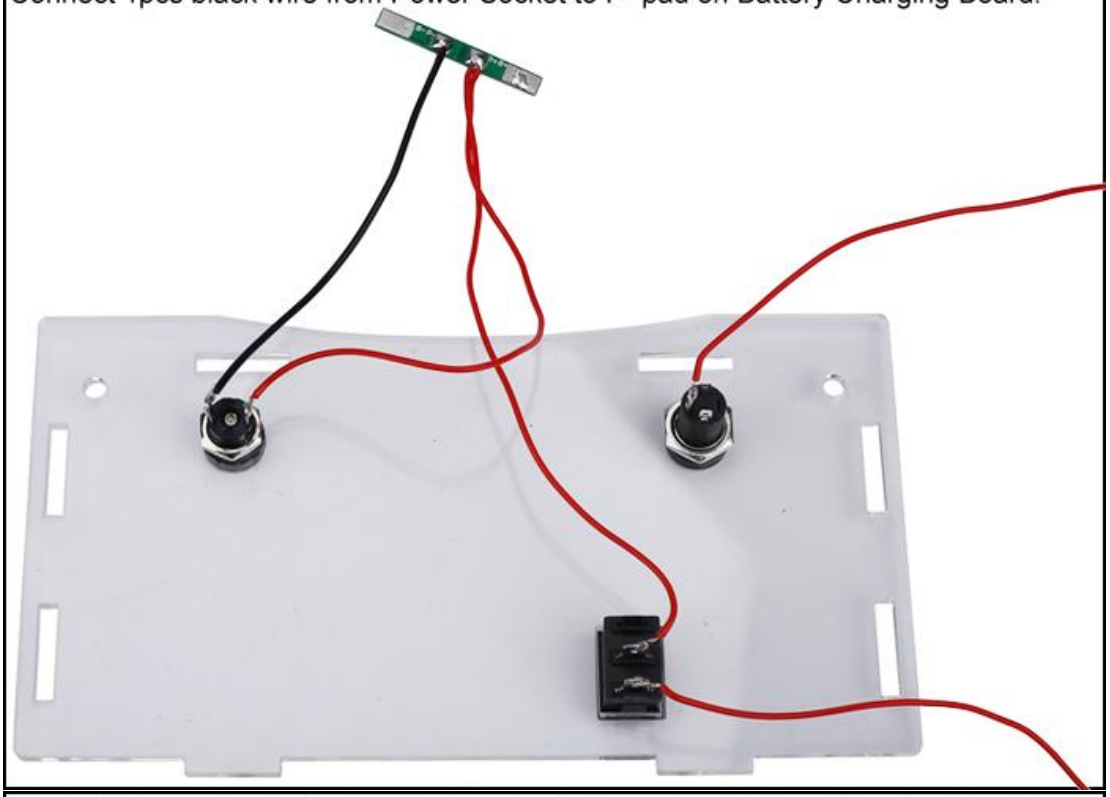
Step 23: Connect 1pcs 30cm Red Wire for Antenna to Antenna Socket.
Note: It needs fixed on the longest pin.



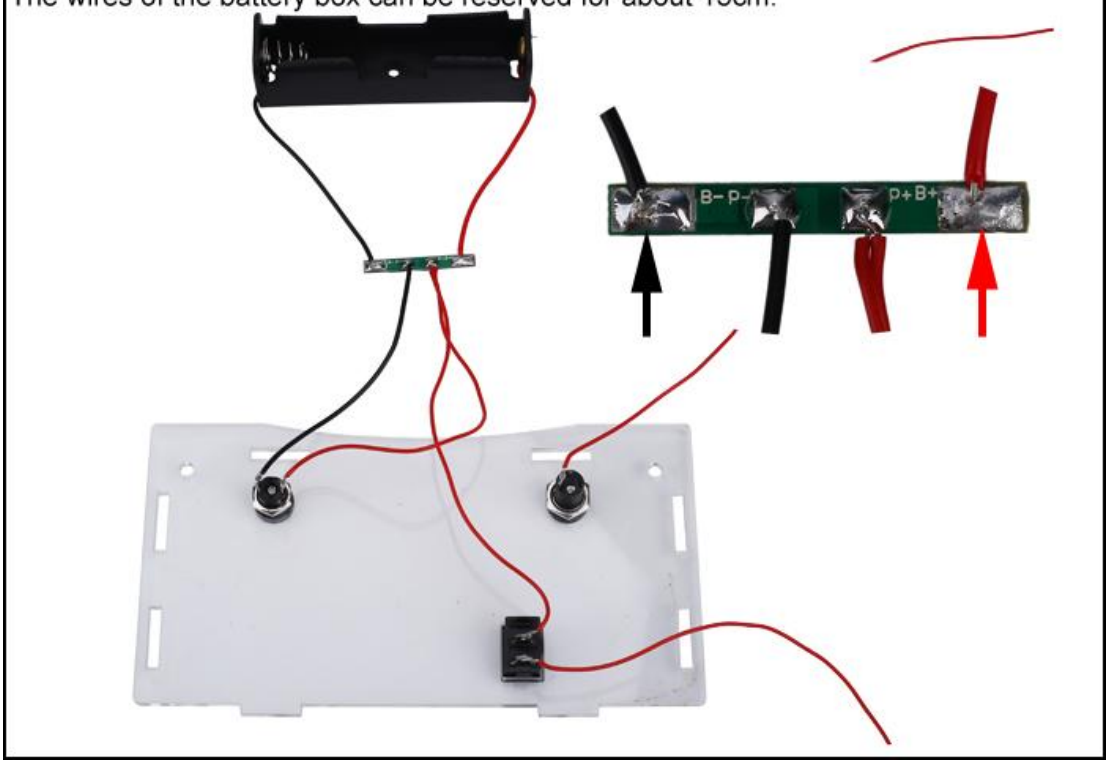
Step 24: Refer to the wiring diagram.



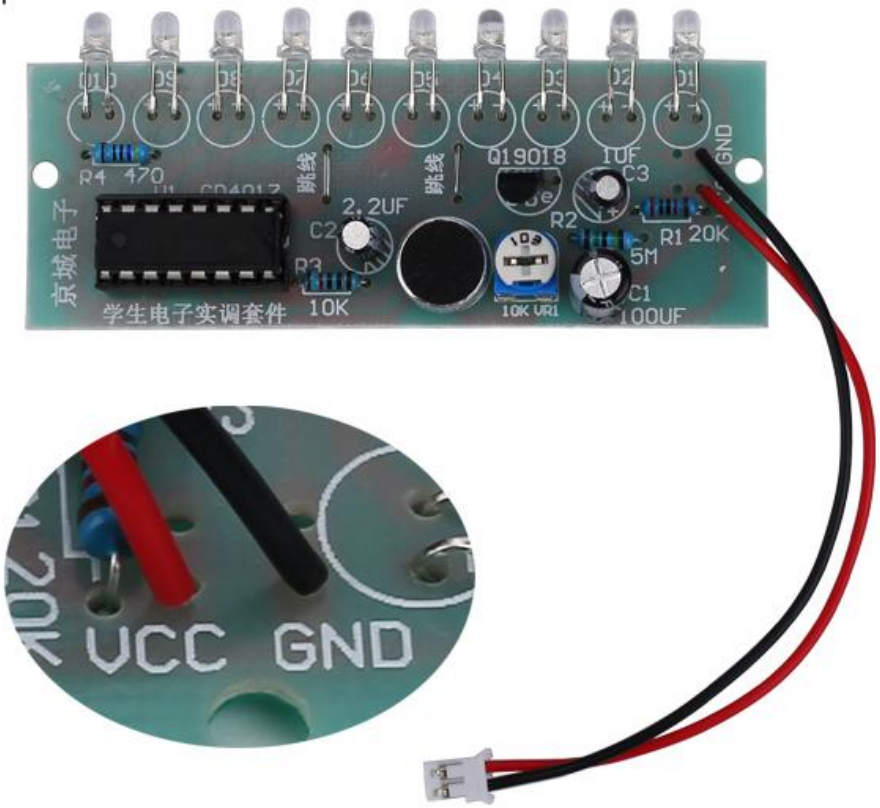
Step 25: Connect 2pcs red wires from Power Socket and Black Power Switch to P+ pad on Battery Charging Protection Board.
Connect 1pcs black wire from Power Socket to P- pad on Battery Charging Board.



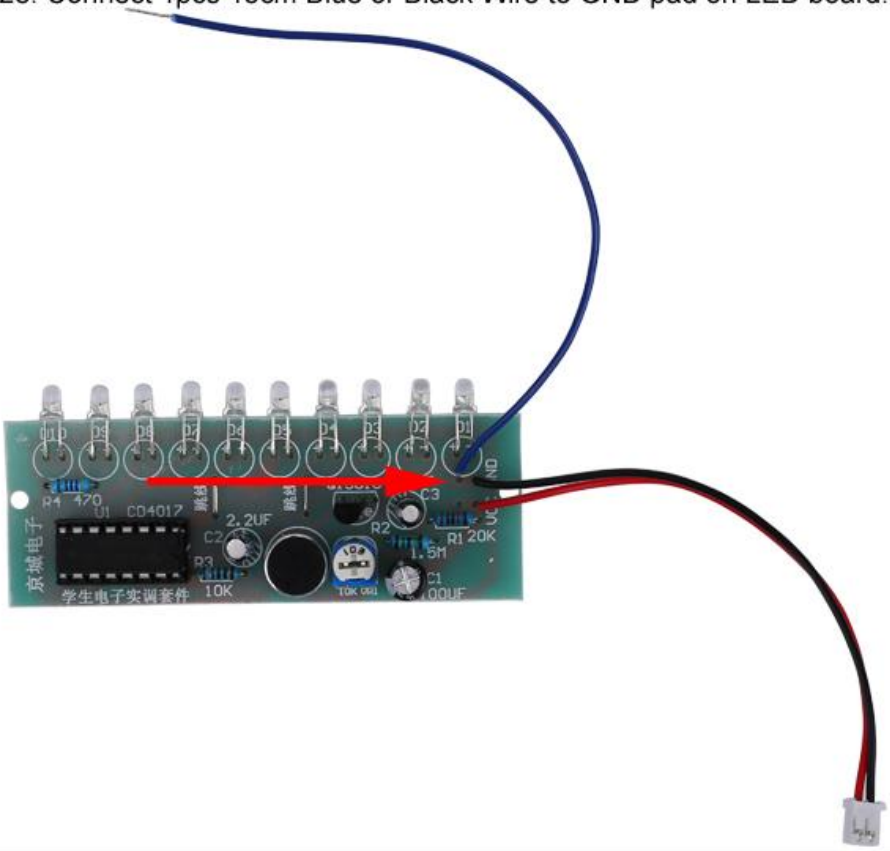
Step 26: Connect red wire form battery box to B+ pad on Battery Charging Board.
Connect black wire form battery box to B- pad on Battery Charging Protection Board.
Note that the positive and negative poles cannot be reversed.
The wires of the battery box can be reserved for about 15cm.



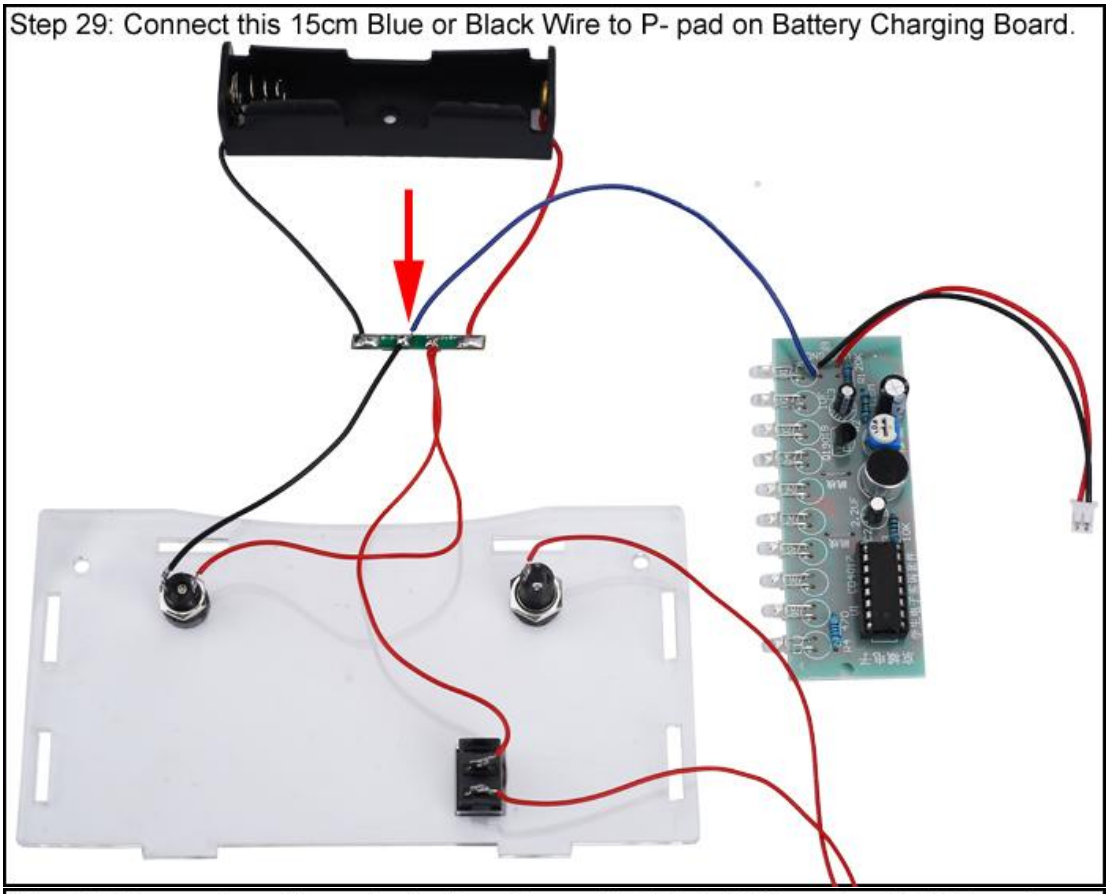
Step 27: Connect 1pcs 10cm 2Pin PH2.0 Wire on LED board. Red wire connect to VCC pad.



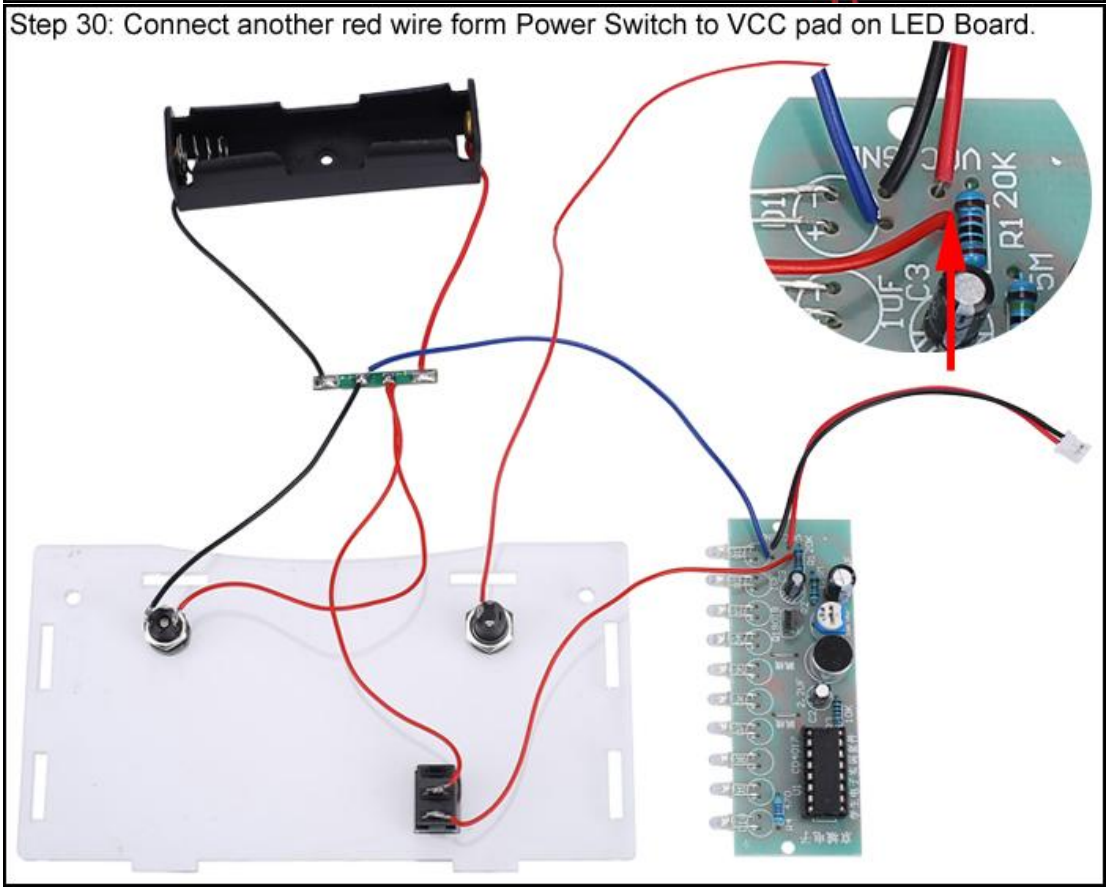
Step 28: Connect 1pcs 15cm Blue or Black Wire to GND pad on LED board.



Step 29: Connect this 15cm Blue or Black Wire to P- pad on Battery Charging Board.

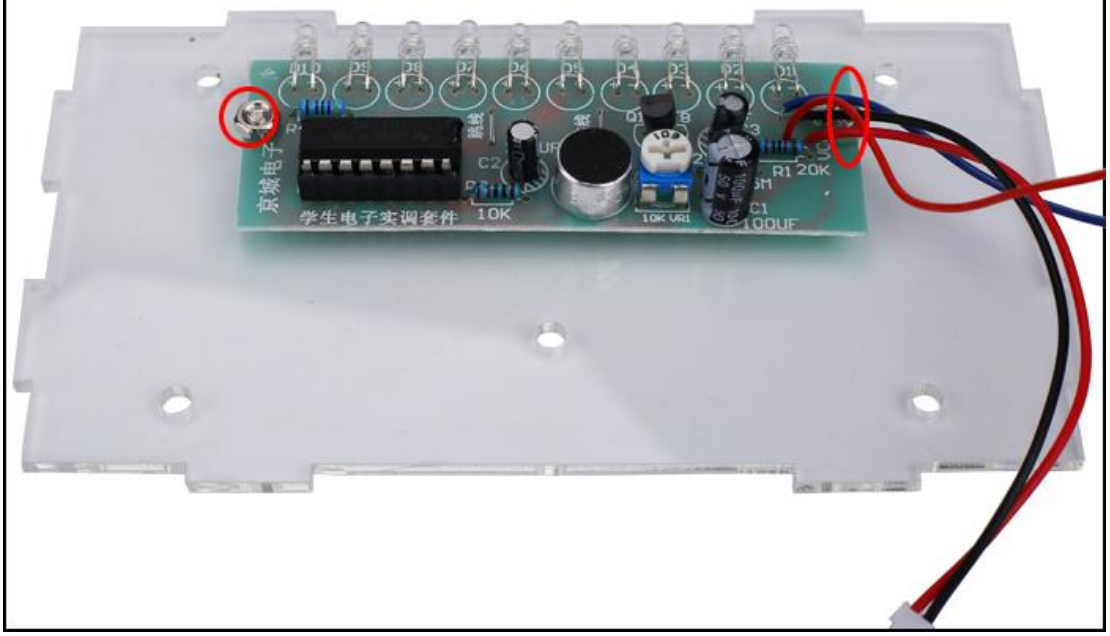


Step 30: Connect another red wire form Power Switch to VCC pad on LED Board.

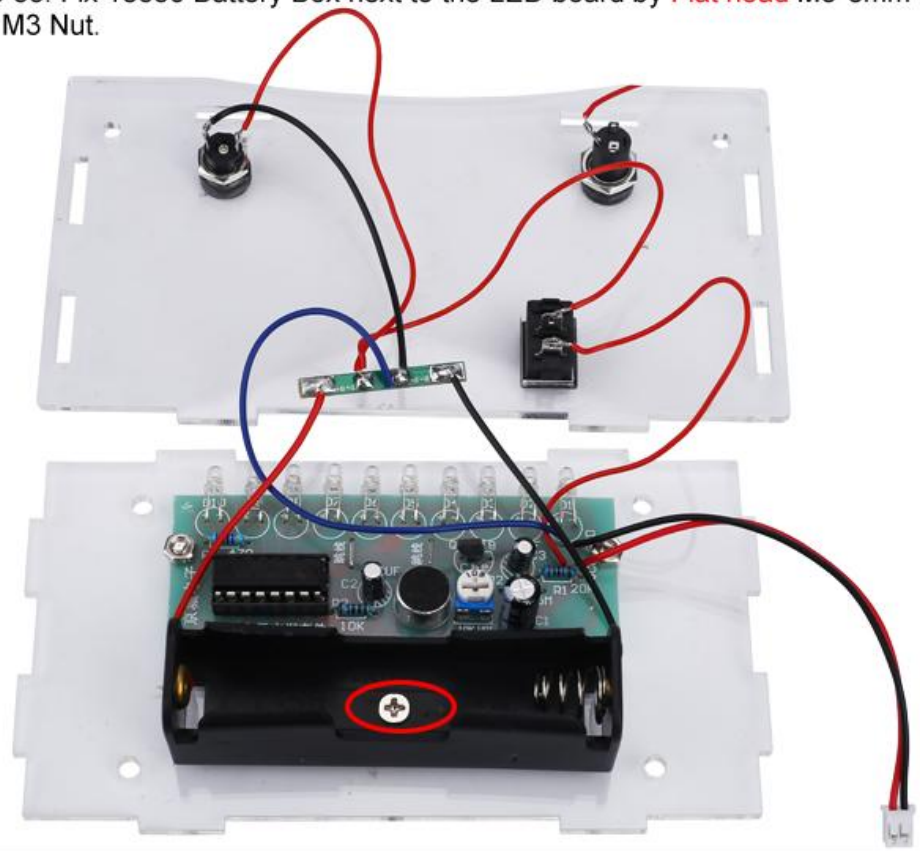


Step 31: Fix 2pcs speakers on the smaller acrylic panel by 8pcs M3*8mm Screw and 8pcs M3 Nut.

Step 32: Fix LED board on acrylic bottom plate by 2pcs M3*8mm Screw and 2pcs M3 Nut. Pay attention to keep the distance between the PCB and the acrylic board. Don't fix it too tightly.

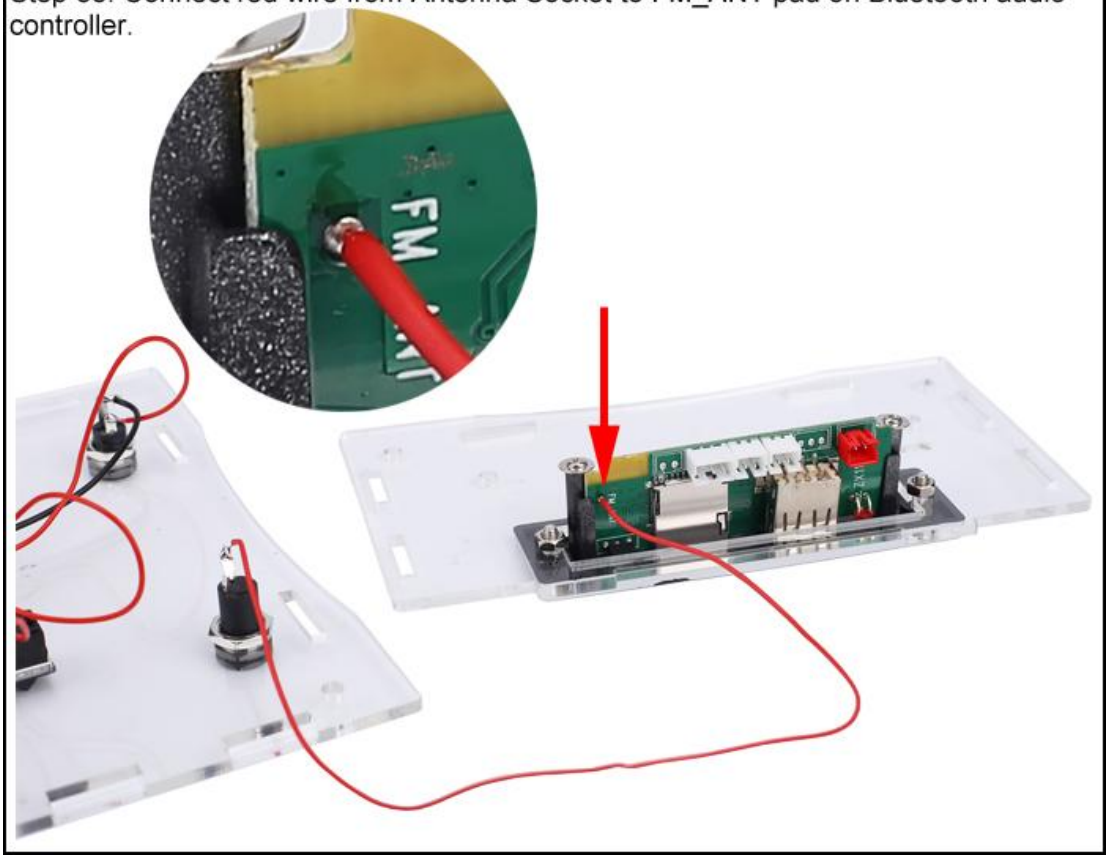


Step 33: Fix 18650 Battery Box next to the LED board by Flat head M3*8mm Screw and M3 Nut.

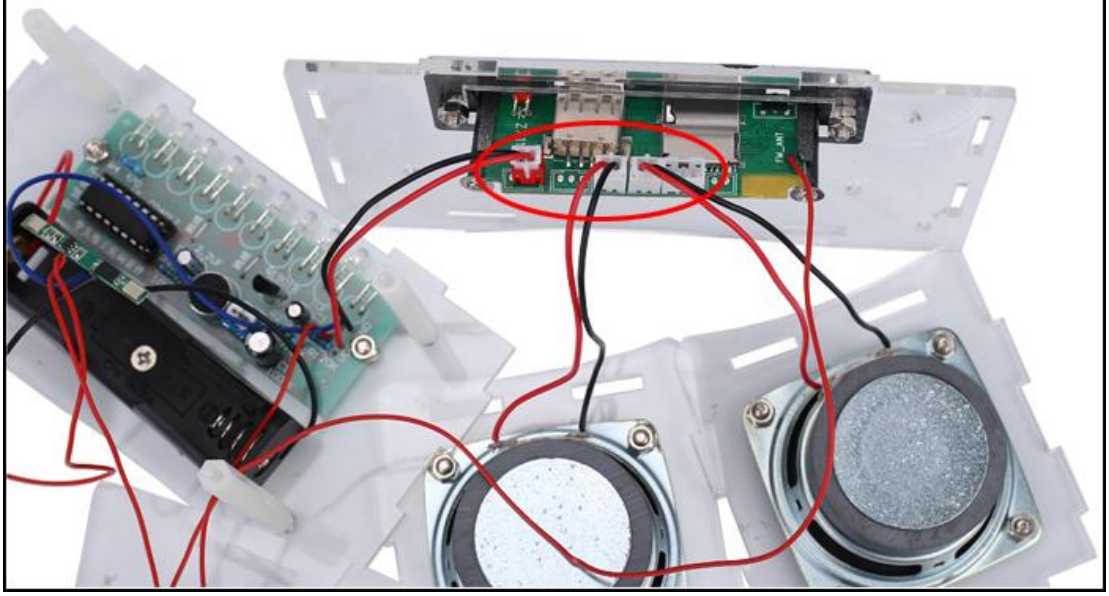


Step 34: Fix Bluetooth audio controller on acrylic panel by 2pcs M3*8mm Screw and 2pcs M3 Nut.

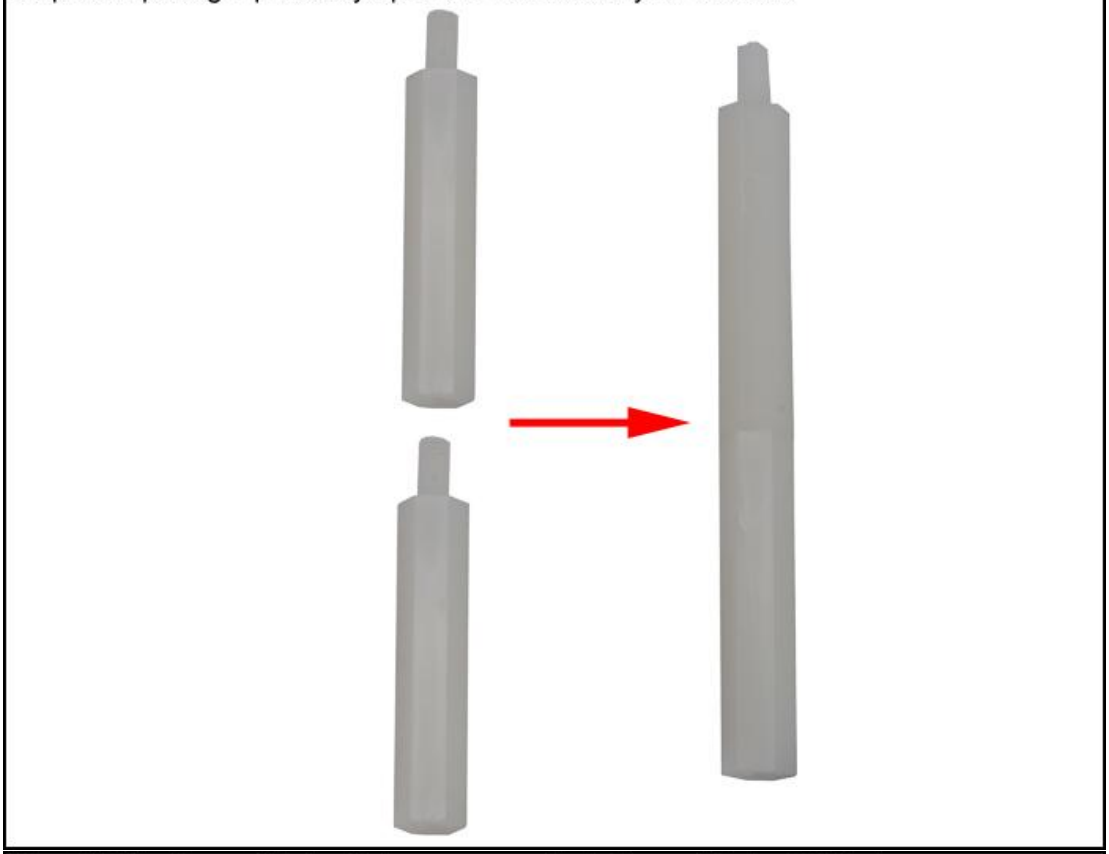
Step 35: Connect red wire from Antenna Socket to FM_ANT pad on Bluetooth audio controller.



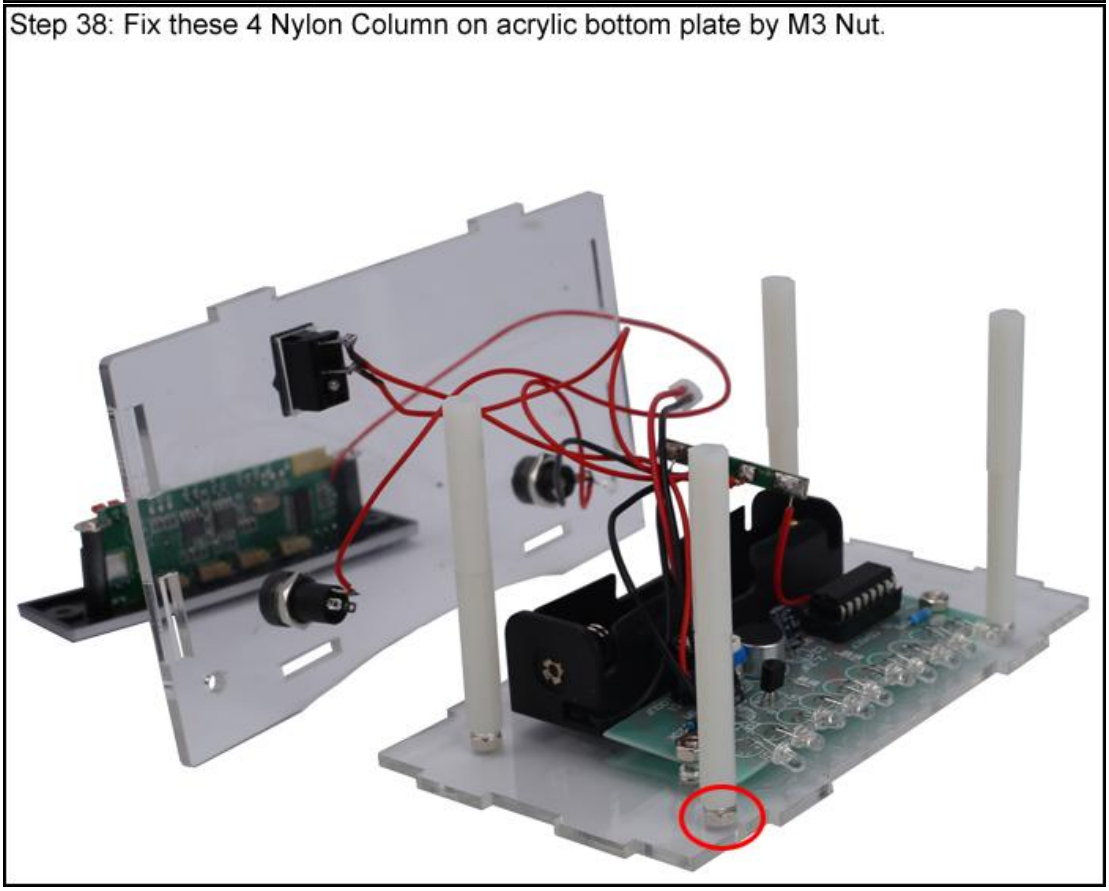
Step 36: Test.
Red socket on Bluetooth controller connect to LED board and another two 2Pin PH2.0 socket connect to speakers.
Then connect USB power to test its function.
LED will flashing once and play prompt tone.
User can test playing musics in turns from Bluetooth/FM/U-disk/TF card.



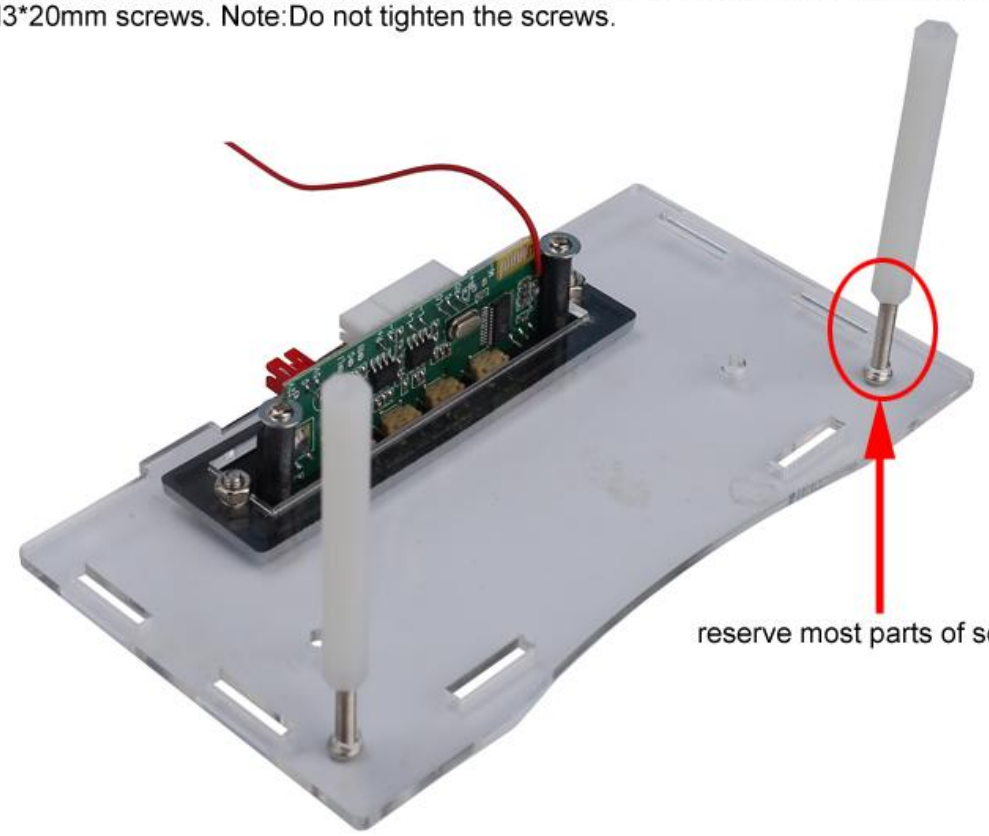
Step 37: Splicing 4 pillars by 8pcs M3*30+6mm Nylon Column.



Step 38: Fix these 4 Nylon Column on acrylic bottom plate by M3 Nut.



Step 39: Install 2pcs M3*50mm Nylon Through Column on another acrylic plate by M3*20mm screws. Note:Do not tighten the screws.

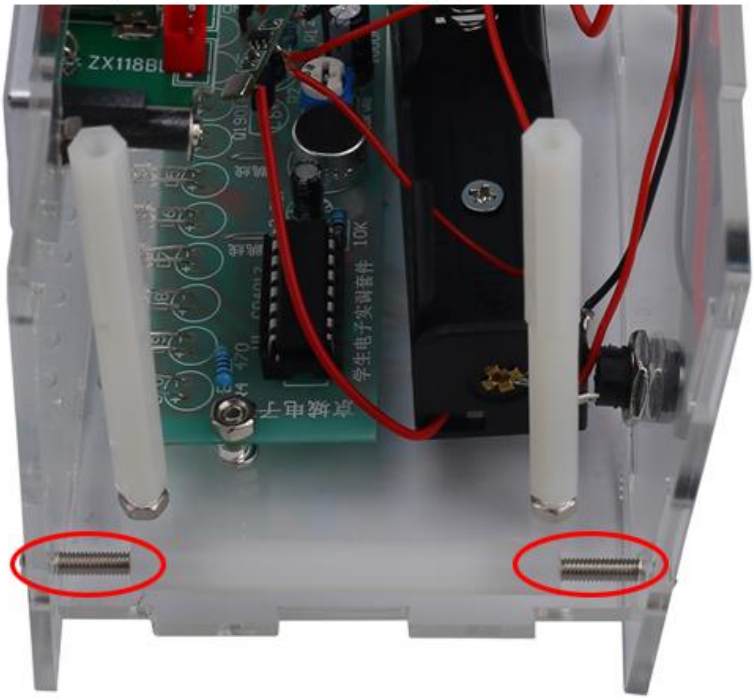


40>.Step 40: Fix Control Acrylic Plate and Socket Acrylic Plate by Nylon Through Column.

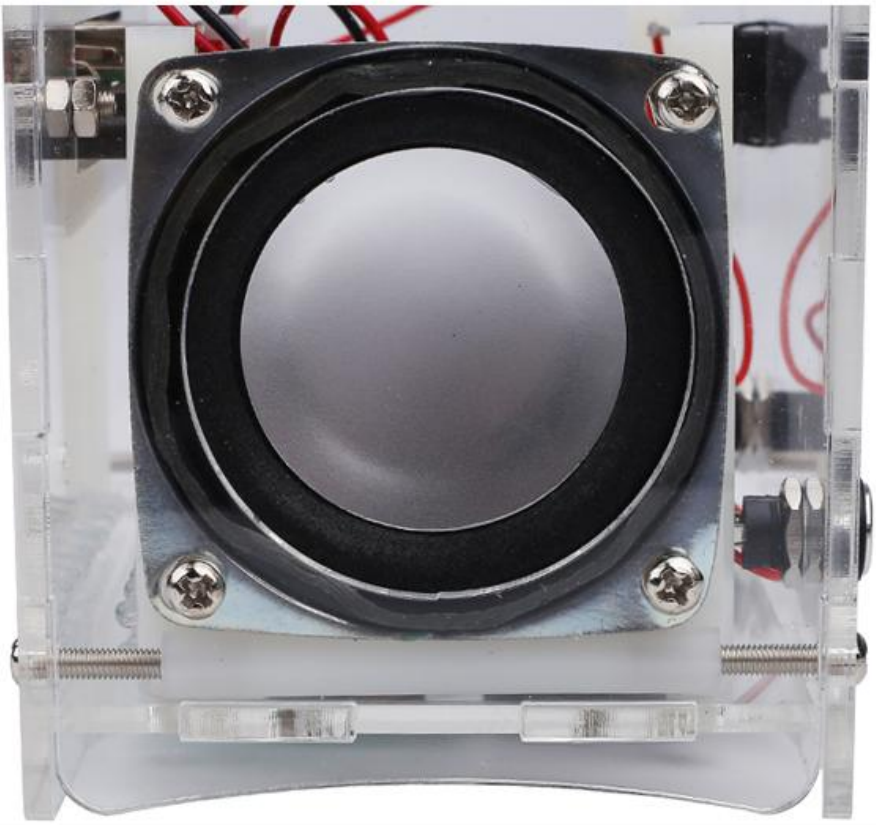
40.1>.User need other people to help align and hold acrylic plates and use 2pcs screwdriver to fix 4pcs M3*50mm.

40.2>.The pins from antenna and power socket can be bent slightly.

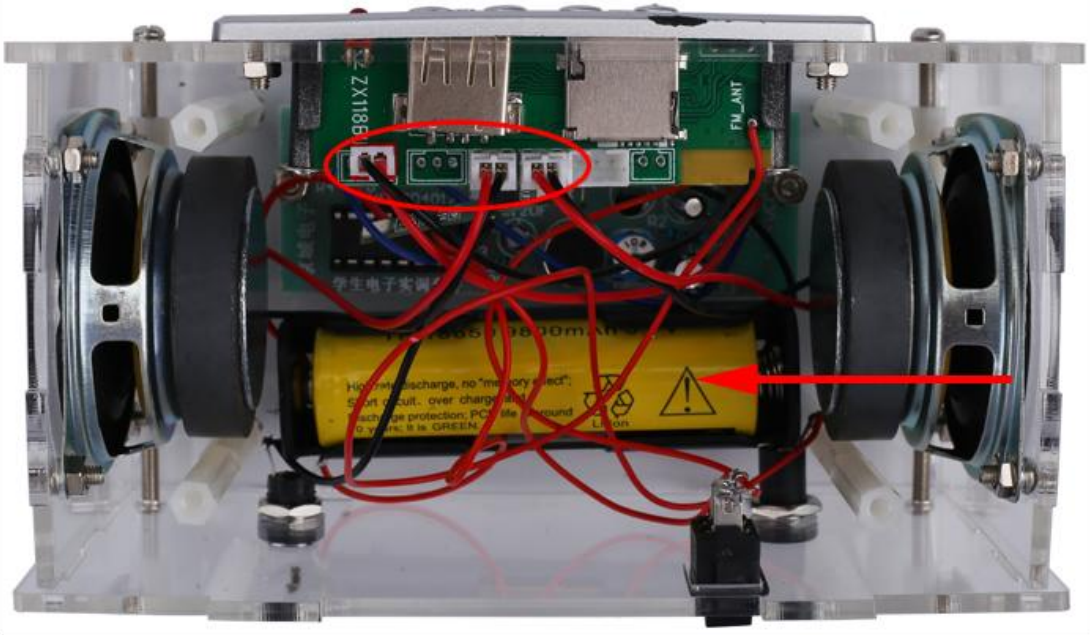
40.3>.Do not fix it completely, leave a little 3mm gap for the next step to install the speakers.

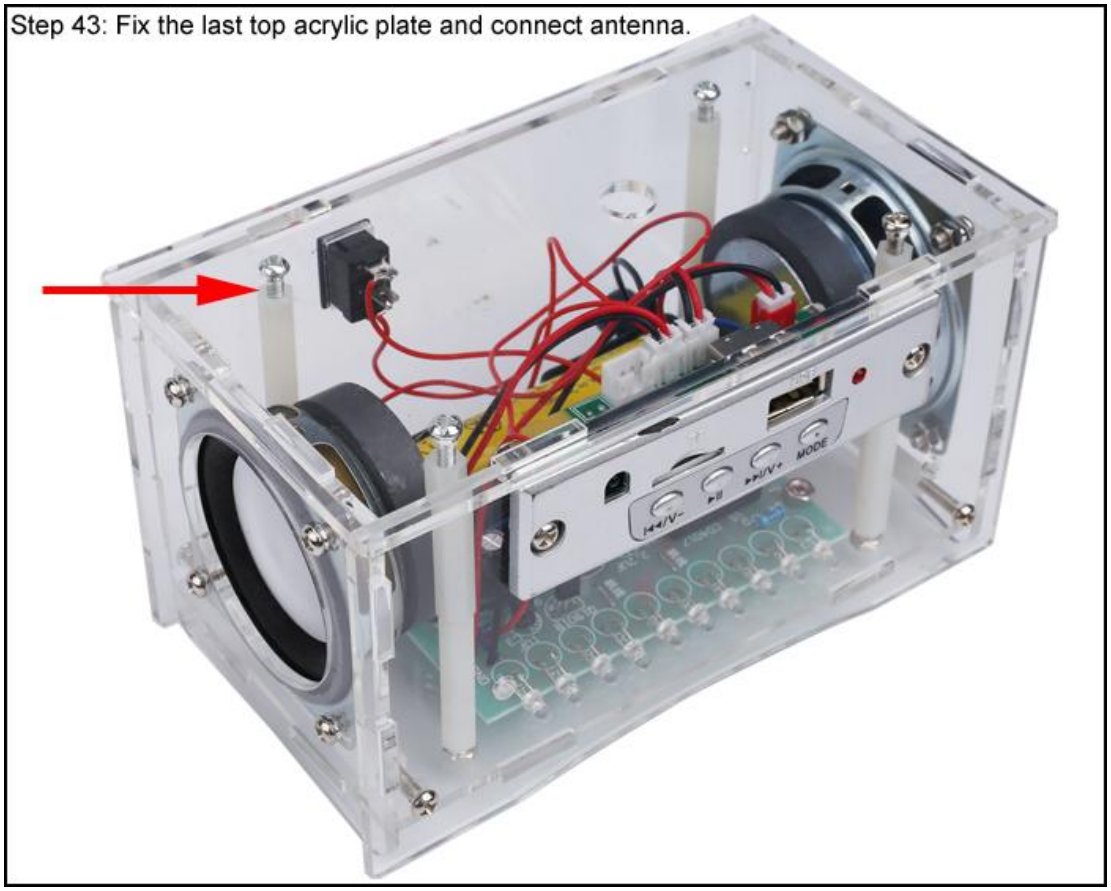


Step 41: Install 2pcs speakers and then fix 4pcs M3*50mm screws completely.



Step 42: Connect power wire from LED board to red socket on Bluetooth controller.
Connect speaker to white 2Pin PH2.0 socket.
Then install one 18650 rechargeable lithium battery.




Step 43: Fix the last top acrylic plate and connect antenna.
MODE