

HE004 Flashing LED Birthday Cake Tower DIY Kit

1.Introduction:

HE004 is a Flashing LED Birthday Cake Tower DIY Kit. It adopts a 7-layer cake tower design, collecting 83 LED lights in five colors, and can play happy birthday music songs. It is very suitable for birthday parties, Christmas and other activities

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

2.Function:

- 1>.5 Color LED Flashing Automatically
- 2>.7-Layer Cake Tower Design
- 3>.10 Automatic Flashing Mode
- 4>.Adjustable Flashing Speed
- 5>.Play Happy Birthday Music Song
- 6>.Adjustable ON/OFF Music
- 7>.Dual Power Supply Mode
- 8>.DIY Hand Soldering

3.Parameter:

- 1>.Work Voltage:DC 4.5V-5V
- 2>.Power Type: USB or AA Battery
- 3>.LED Color: White/Red/Blue/Yellow/Green
- 4>.Work Temperature:-40℃~85℃
- 5>.Work Humidity:5%~95%RH
- 6>.Size(Installed):80*80*125mm

4.Use Methods:

1>.Connect USB Power Wire or install 3pcs AA Battery to provide working power. Note: Please do not connect USB power and battery at the same time.

2>.Switch Toggle Switch to turn ON/OFF work power supply.

3>.Rotate the potentiometer to change the flashing frequency and speed of the LED.

4>.Press button to start or stop music playback.

5.Component Listing:

NO.	Component Name	PCB Marker	Parameter	QTY
1	STC8G1K08-38I Controller	U1	DIP-16	1
2	S8550 Transistor	Q1-Q8	TO-92	8
3	Passive Buzzer	Beep	5V	1
4	Potentiometer	R16	1K	1
5	Black Touch Button	S1	6*6*7mm	1
6	SS-12F44G5 Toggle Switch 1P2T	S2	5Pin	1
7	IC Socket	U1	DIP-16	1
8	Ceramic Capacitor	C1-C8	0.1UF 104	8
9	Metal Film Resistor	R1-R6,R10-R15,R23-R26	10ohm	16
10	Metal Film Resistor	R20-R22,R27-R28,R31-R34	1Kohm	9
11	Metal Film Resistor	R7-R9,R17-R19,R29-R30	2Kohm	8
12	3mm Red LED	D22-D39	2Pin	18
13	3mm Blue LED	D40-D54	2Pin	15
14	3mm Green LED	D67-D74	2Pin	8
15	3mm Yellow LED	D75-D80	2Pin	6
16	3mm White LED	D1-D21,D55-D66,D76-D78	2Pin	36
17	DC-005 Power Socket	P2	5.5*2.1mm	1
18	USB to DC005 Power Wire	P2	100cm	1
19	AA*3 Battery Box	POWER	AA*3	1

20	M3*20mm Copper Pillar	/	/	4
21	M3*5mm Screw	/	/	4
22	M3*8mm Screw	/	/	2
23	M3 Nut	/	/	2
24	PCB HE004-A Circuit Board	/	80*80mm	1
25	PCB HE004-B Circuit Board	/	101*24mm	1
26	PCB HE004-C Circuit Board	/	70*70mm	1
27	PCB HE004-D Circuit Board	/	60*60mm	1
28	PCB HE004-E Circuit Board	/	50*50mm	1
29	PCB HE004-F Circuit Board	/	40*40mm	1
30	PCB HE004-G Circuit Board	/	30*30mm	1
31	PCB HE004-H Circuit Board	/	20*20mm	1

Note:Users can complete the installation according to the PCB silk screen and component list.

6.Application:

- 1>.Training welding skills
- 2>.Student school
- 3>.DIY production
- 4>.Project Design
- 5>.Electronic competition
- 6>.Gift giving
- 7>.Crafts collection
- 8>.Home decoration
- 9>.Souvenir collection
- 10>.Graduation design
- 11>.Holiday gifts

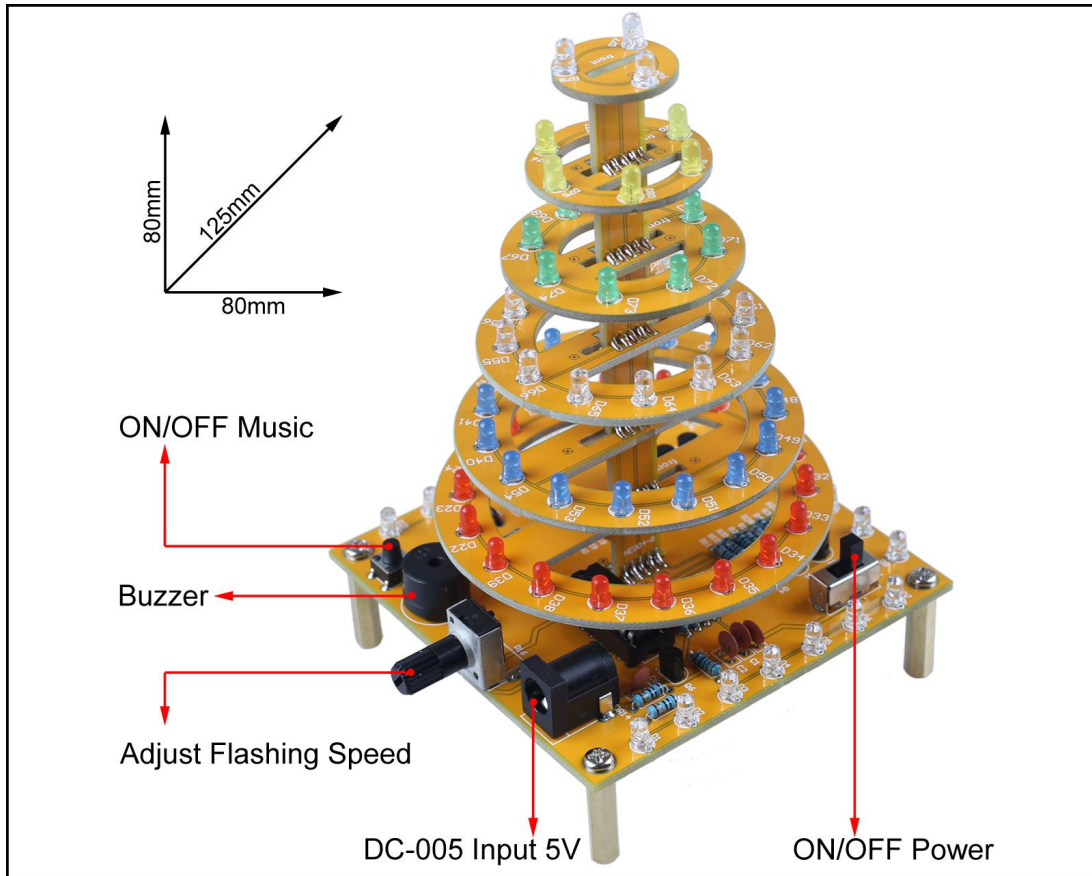
7.Note:

- 1>.Please do not connect USB power and battery at the same time.
- 2>.LED round PCB board must be in the same sides which can make sure by silk screen ' front '.
- 3>.LED round PCB board must be perpendicular to rectangle PCB.

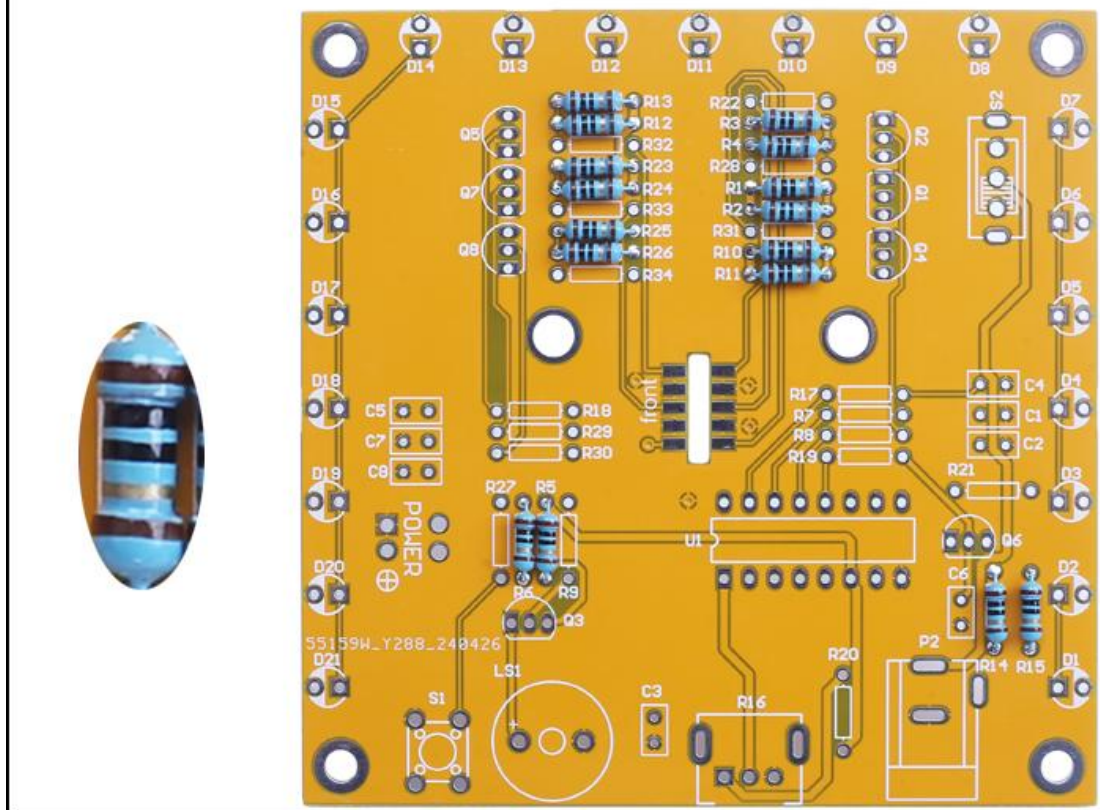
8.Installation Tips:

- 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>.' + ' 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(1.0 second), otherwise it will damage the 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>.It is strongly recommended to read the installation manual before starting installation!!!
- 11>.Please wear anti-static gloves or anti-static wristbands when installing electronic components.

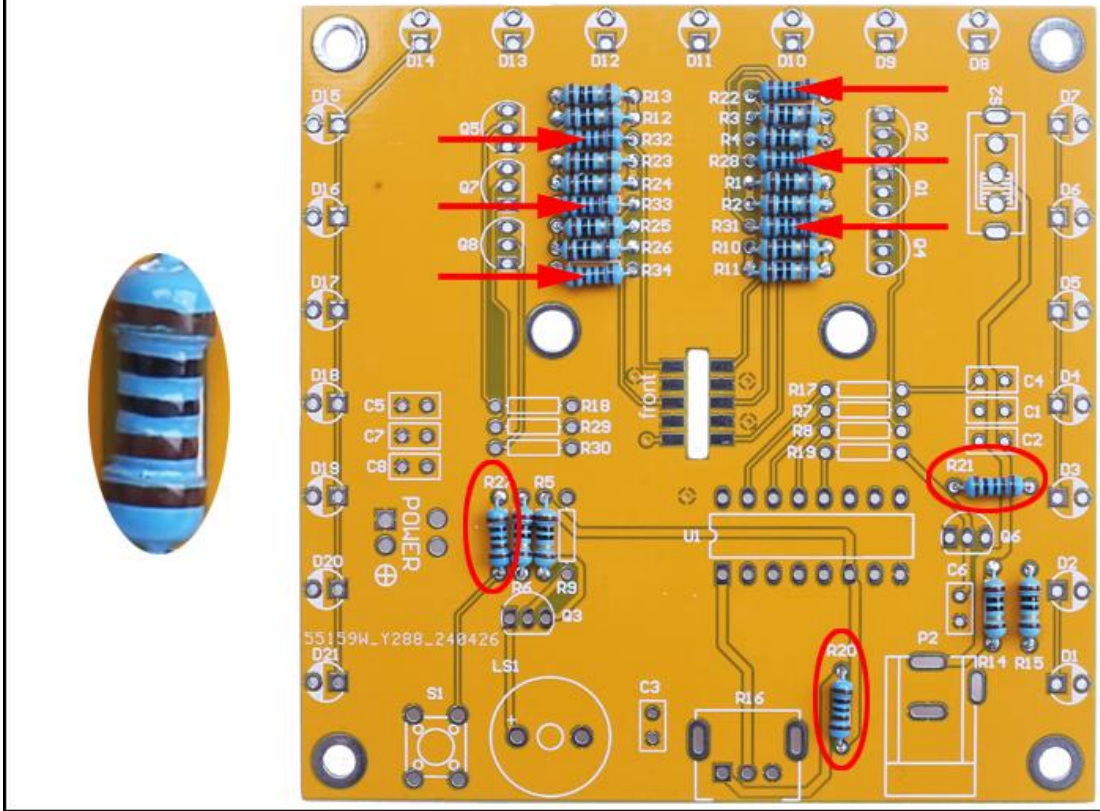
9.Installation Steps(Please be patient install!!!):



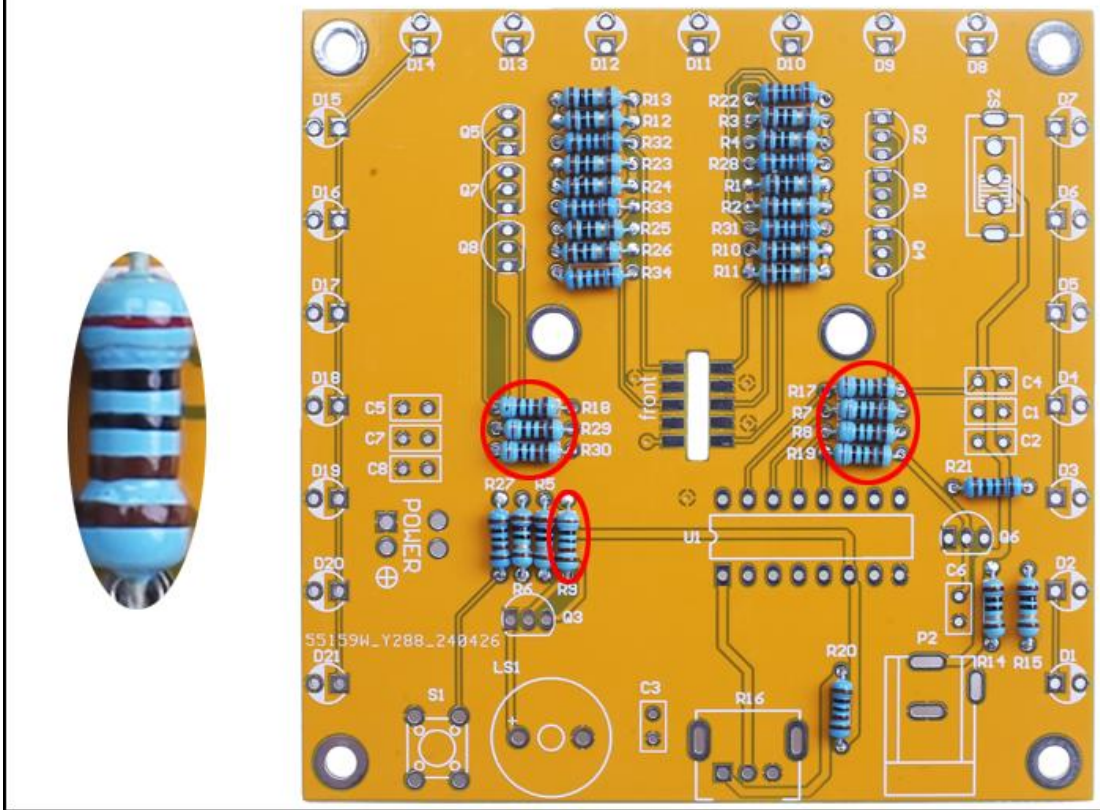
Step 1: Install 16pcs 10ohm Metal Film Resistor at R1-R6,R10-R15,R23-R26.



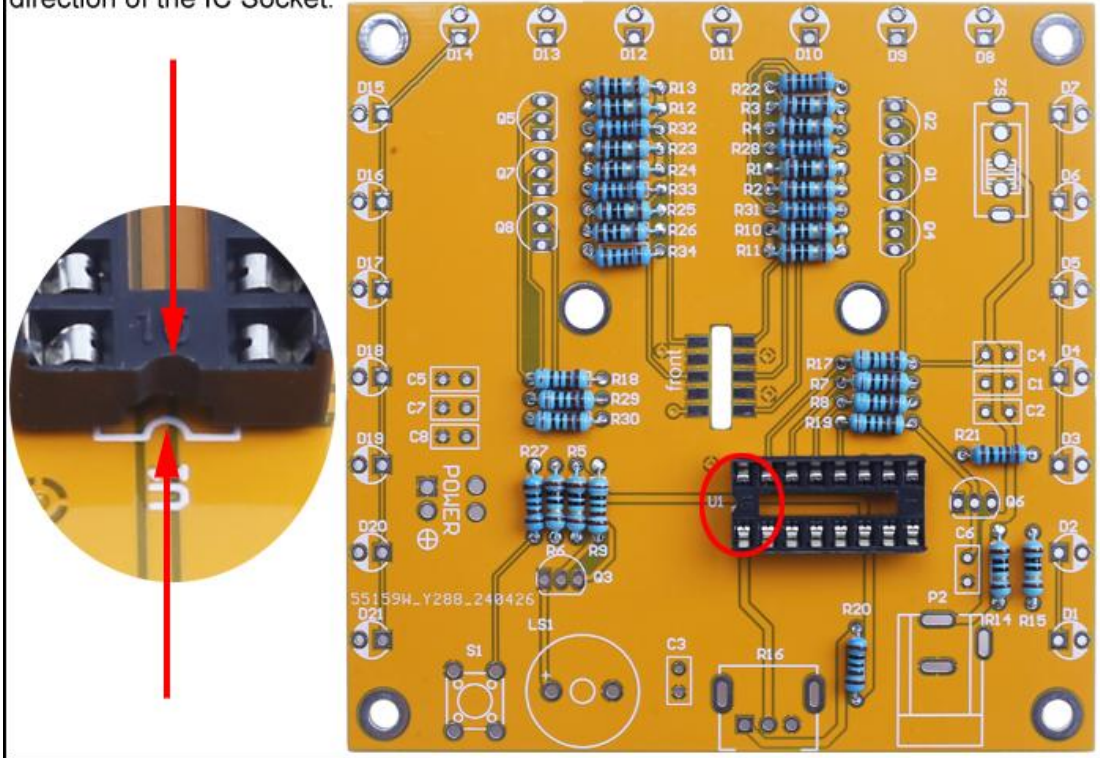
Step 2: Install 9pcs 1Kohm Metal Film Resistor at R20-R22,R27-R28,R31-R34.



Step 3: Install 8pcs 2Kohm Metal Film Resistor at R7-R9,R17-R19,R29-R30.



Step 4: 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 installation direction of the IC Socket.

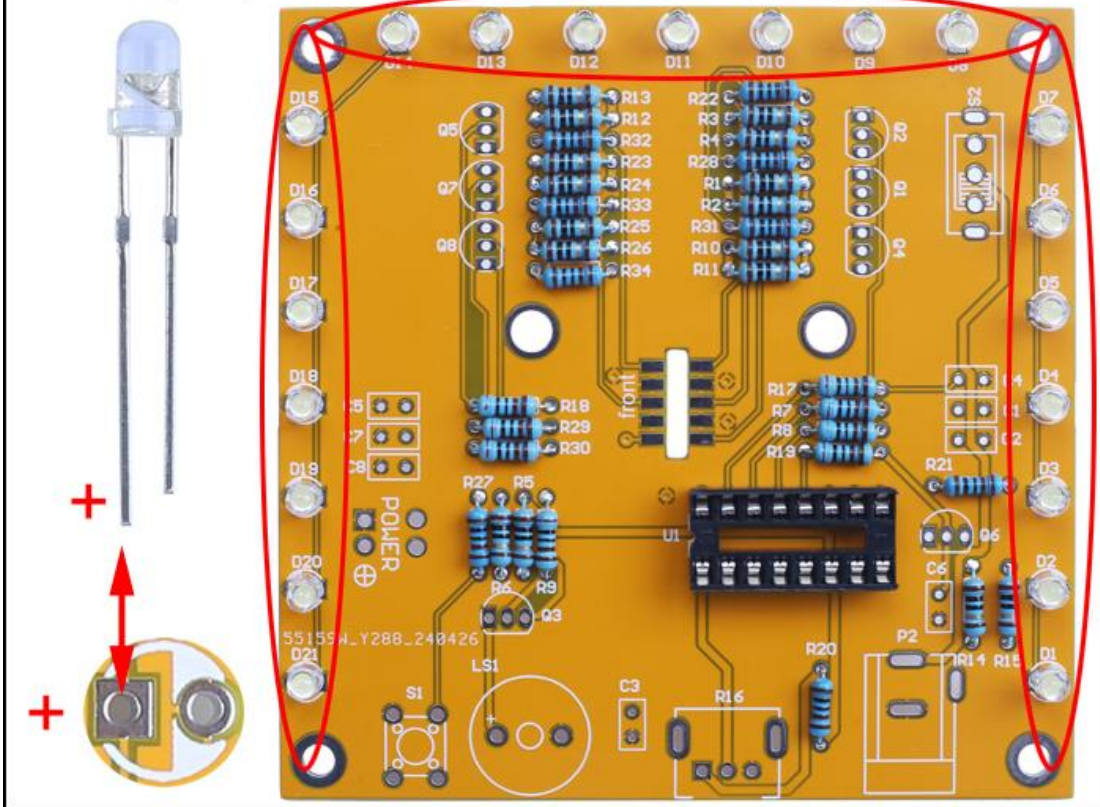


Step 5: Identify the positive(anode) and negative(cathode) lead of LED. The leads of the LED must be installed correctly, otherwise the LED cannot be turned on. Here are four methods as following:

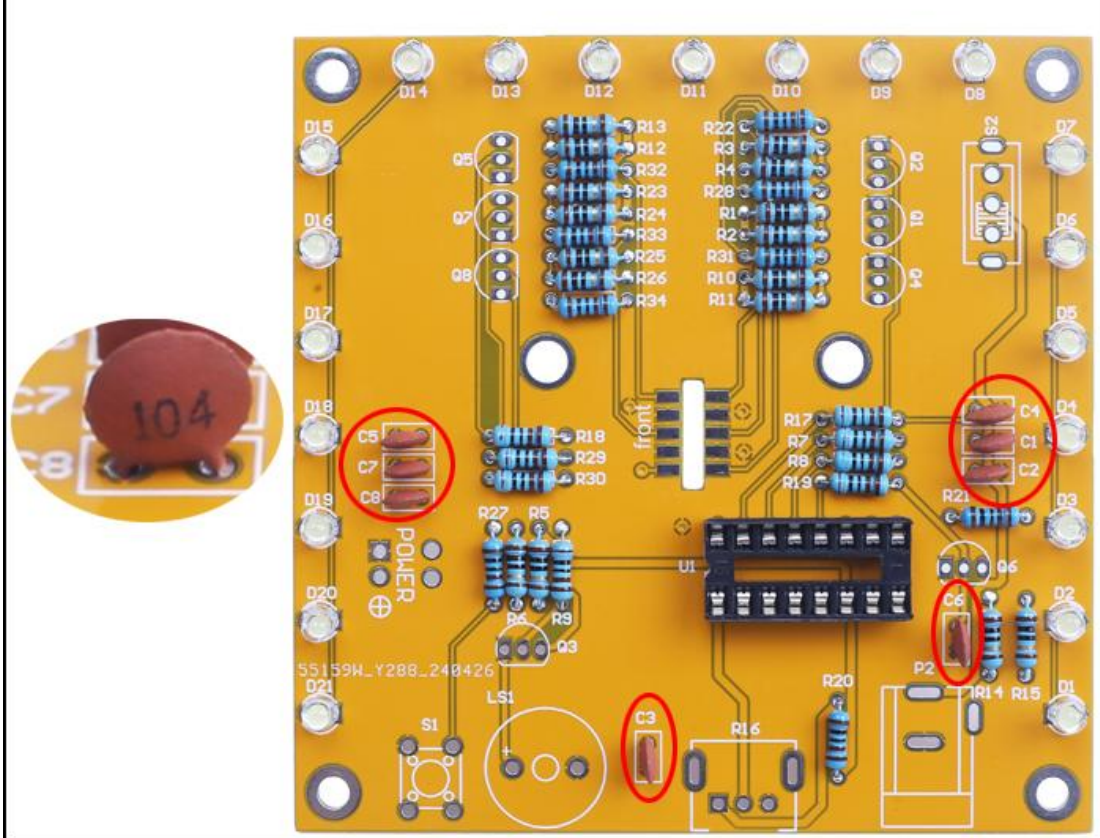
- 5.1>.According to the length of the LED lead to distinguish. The longer pin is positive(anode) lead. The shorter pin is negative(cathode) lead.
- 5.2>.Identify the negative(cathode) of the LED is to look into the plastic case where one can see that the negative(cathode) is much thicker/bigger inside the plastic case than the anode lead.
- 5.3>.Identify by edge of plastic case. The negative(cathode) lead of the LED should be the pin nearest the flat on the plastic case.
- 5.4>.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)
- 5.5>.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.



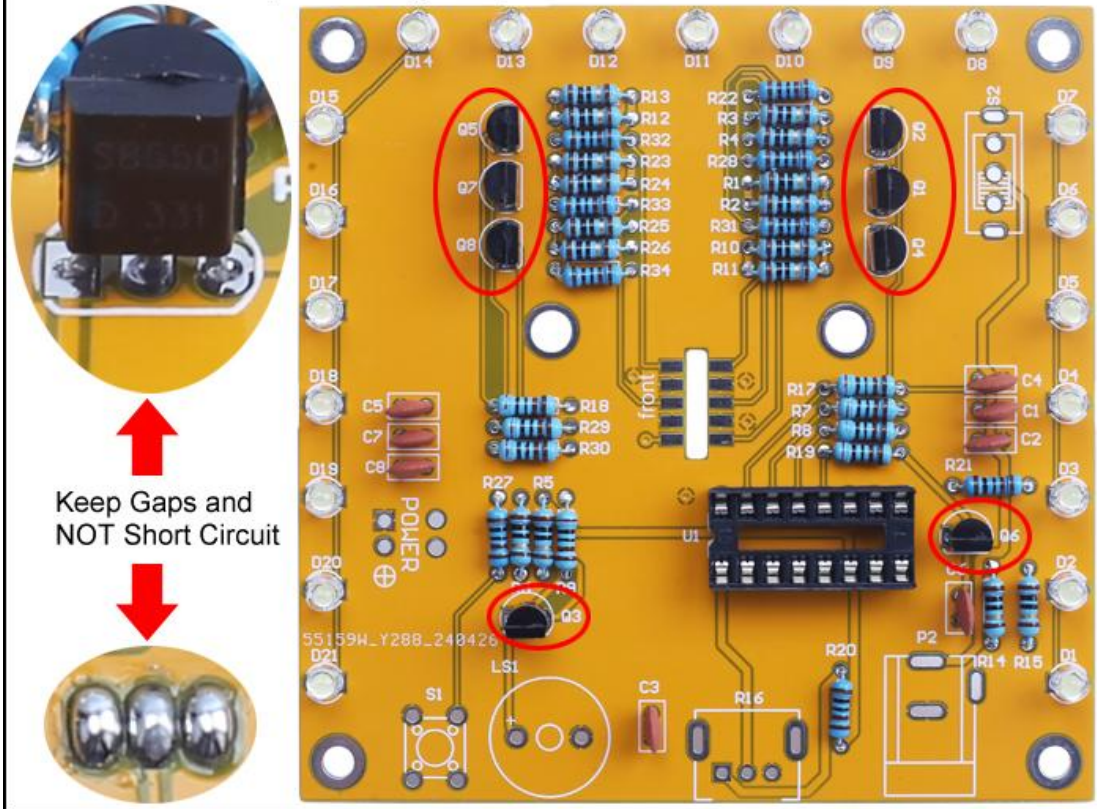
Step 6: Install 21pcs 3mm White LED at D1-D21. Note: the longer pin is positive pole connect to square pad.



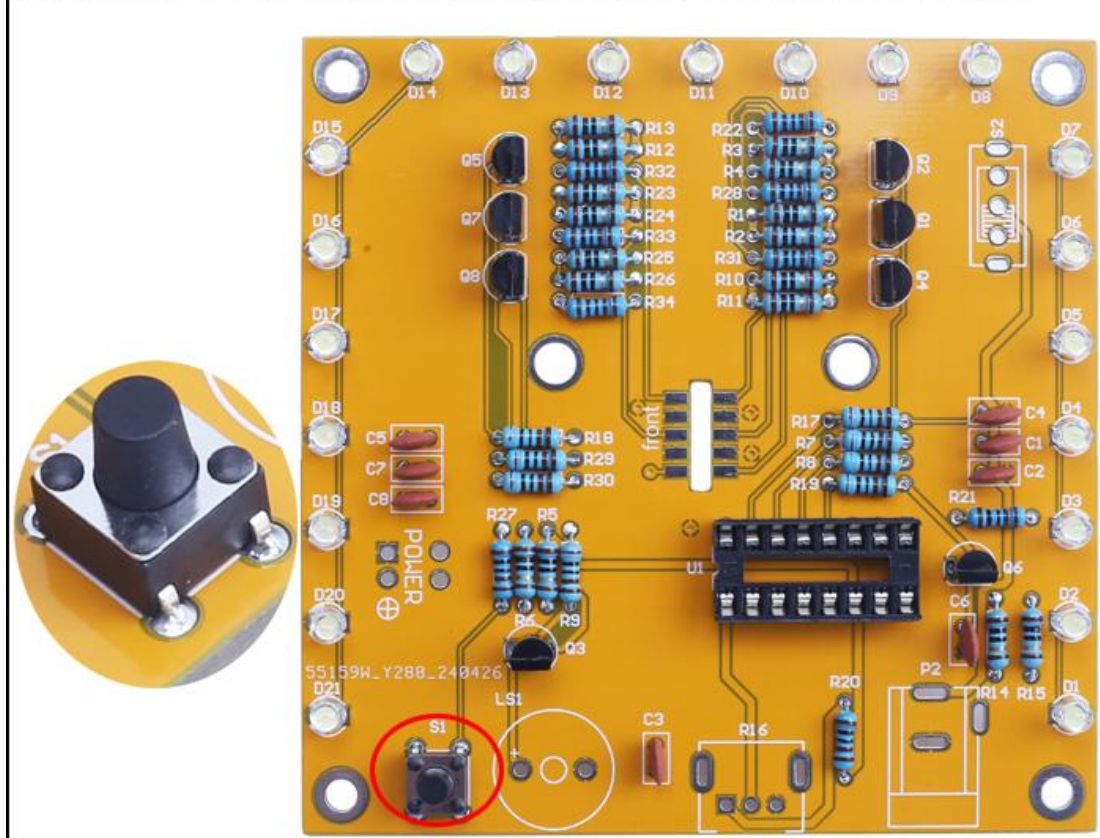
Step 7: Install 8pcs 0.1UF 104 Ceramic Capacitor at C1-C8.



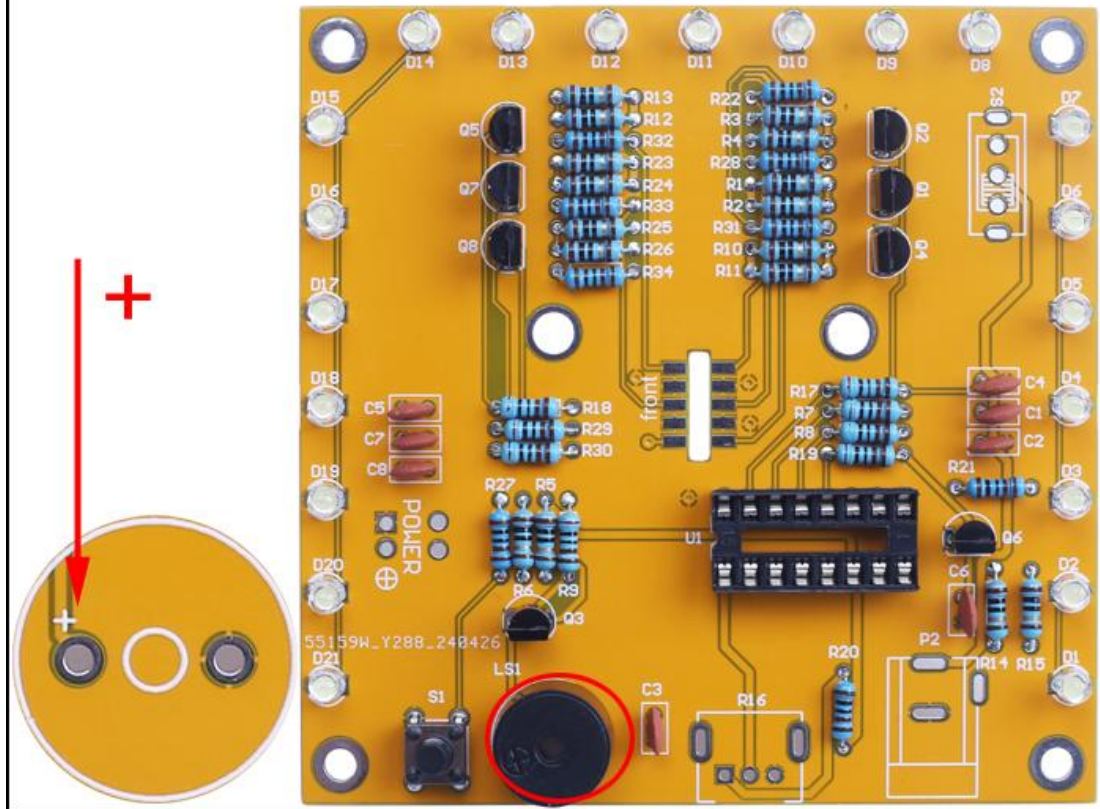
Step 8: Install 8pcs TO-92 S8550 Transistor at Q1-Q8. The arc on the PCB correspond to the arc of the components. Adjacent pins must not be short circuited.



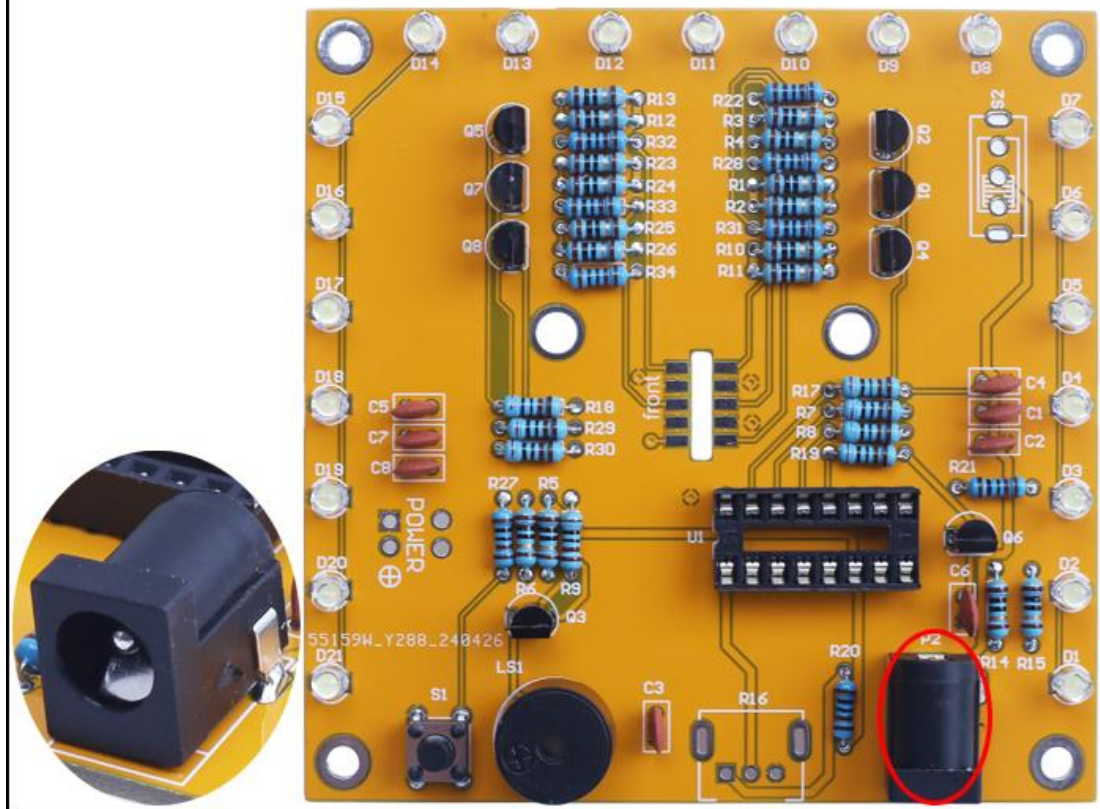
Step 9: Install 1pcs 6*6*7mm Black Touch Button at S1 as music ON/OFF switch.



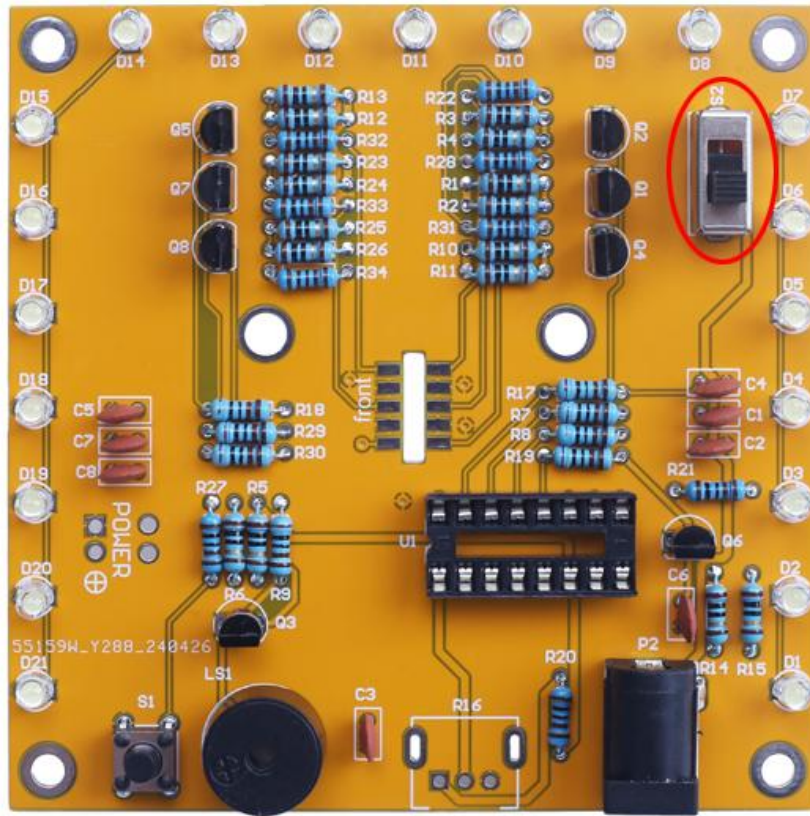
Step 10: Install 1pcs 5V Passive Buzzer at Beep. The positive pole connect to ' + ' pad.



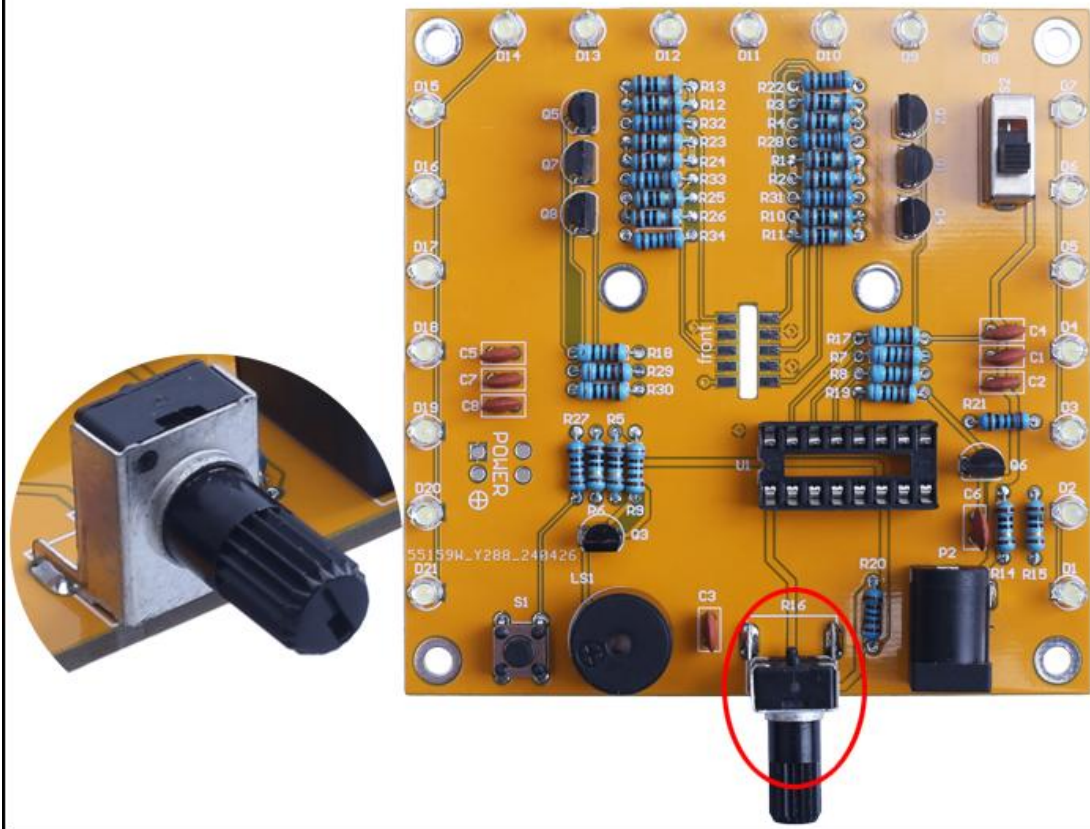
Step 11: Install 1pcs 5.5*2.1mm DC-005 Power Socket at P2.



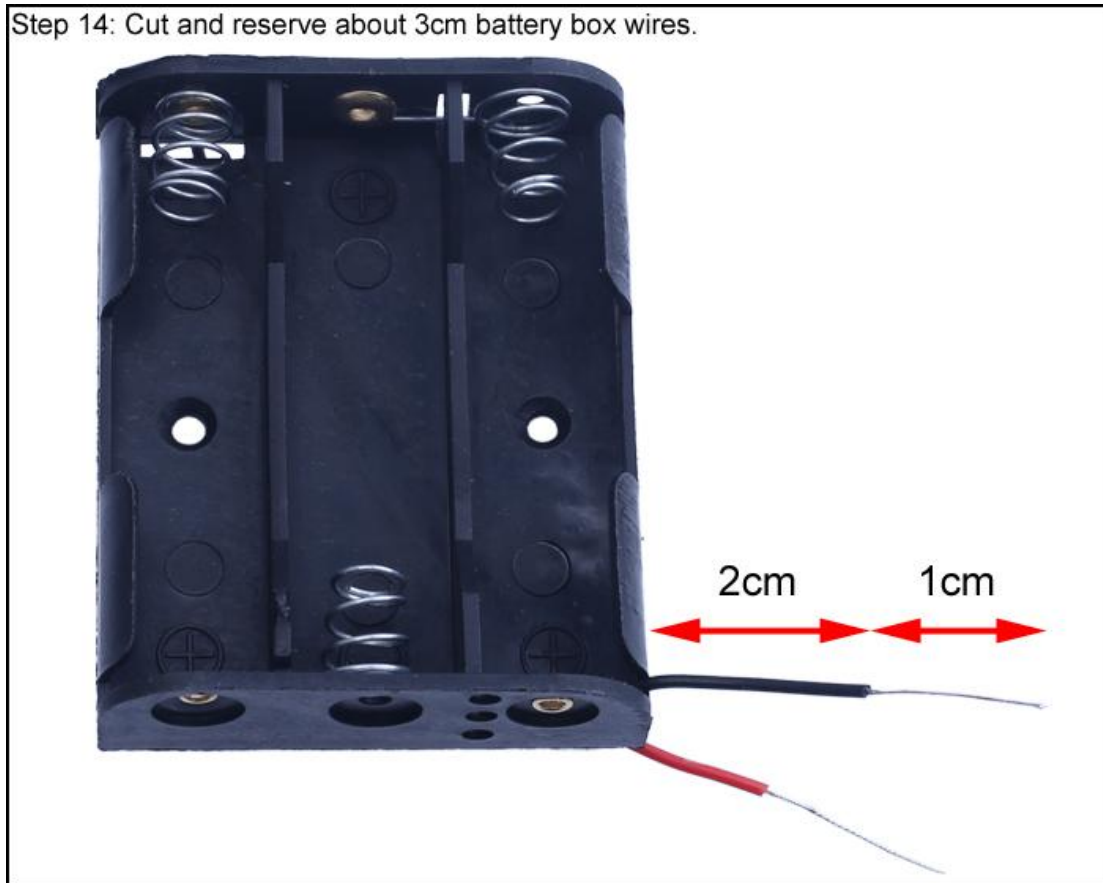
Step 12: Install 1pcs SS-12F44G5 Toggle Switch 1P2T at S2 as power switch.



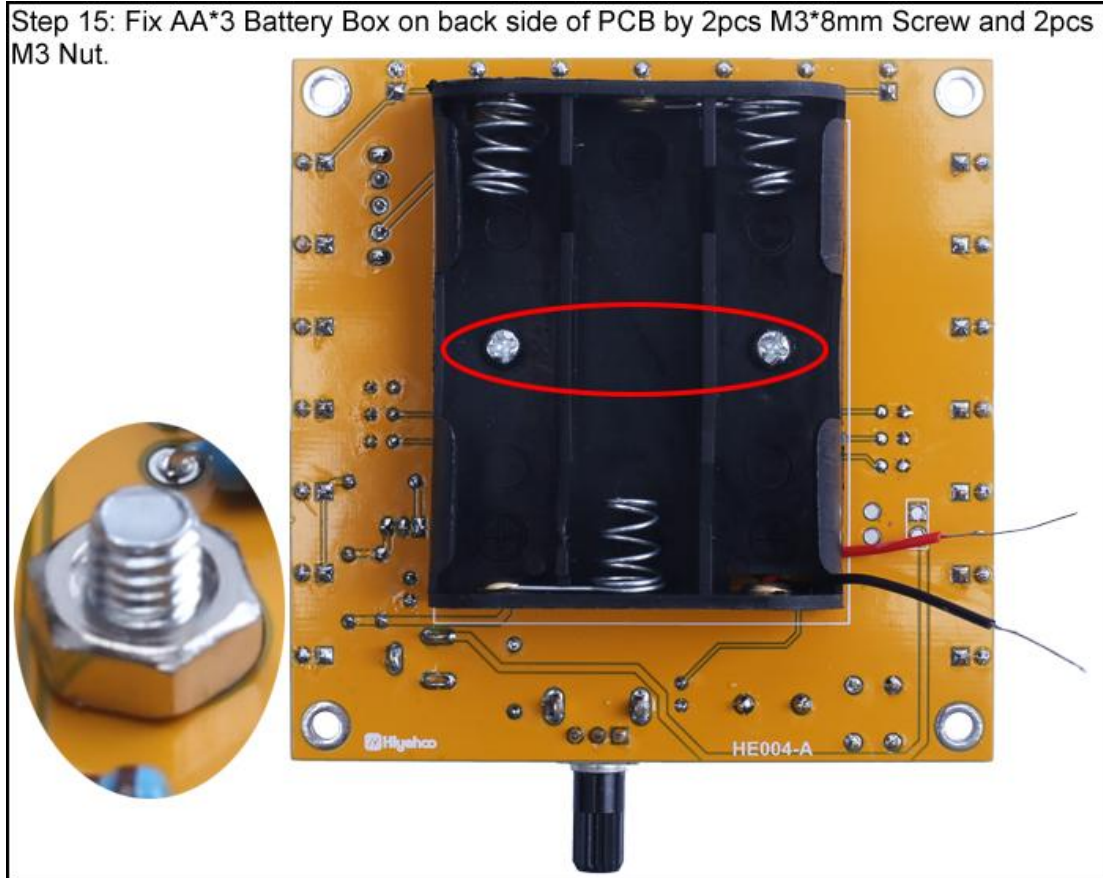
Step 13: Install 1pcs B102 1K Potentiometer at R16 to change LED flashing frequency.



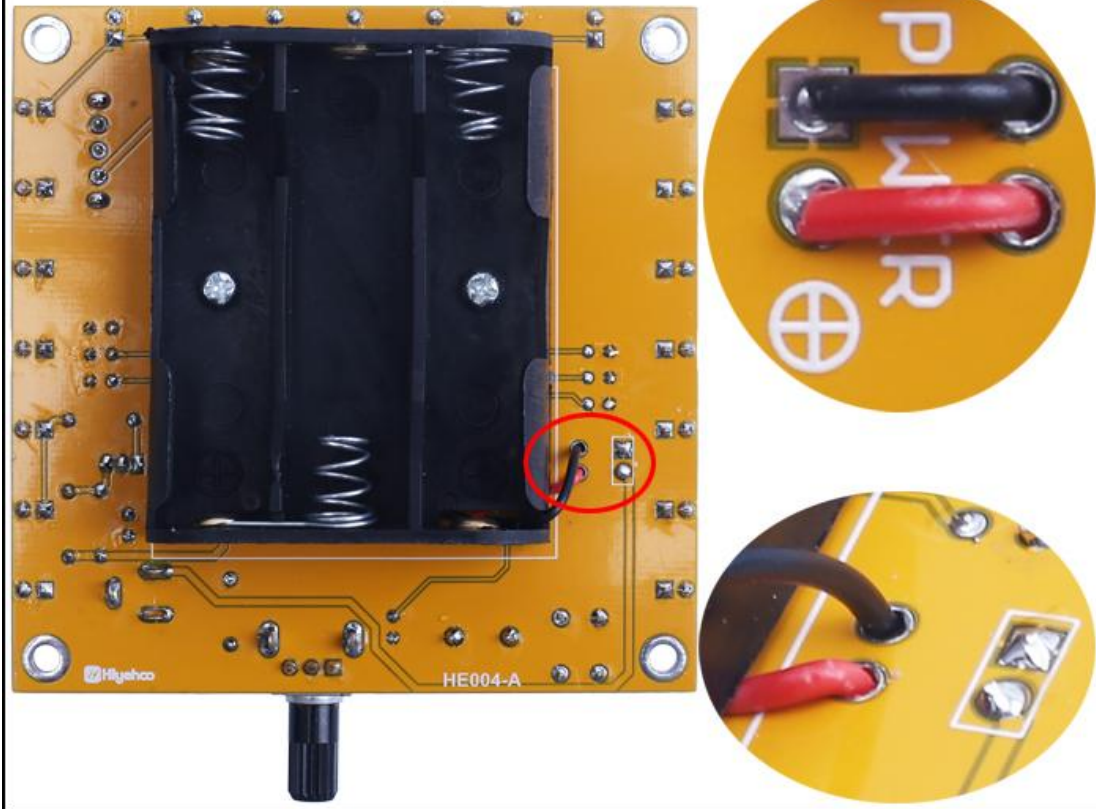
Step 14: Cut and reserve about 3cm battery box wires.



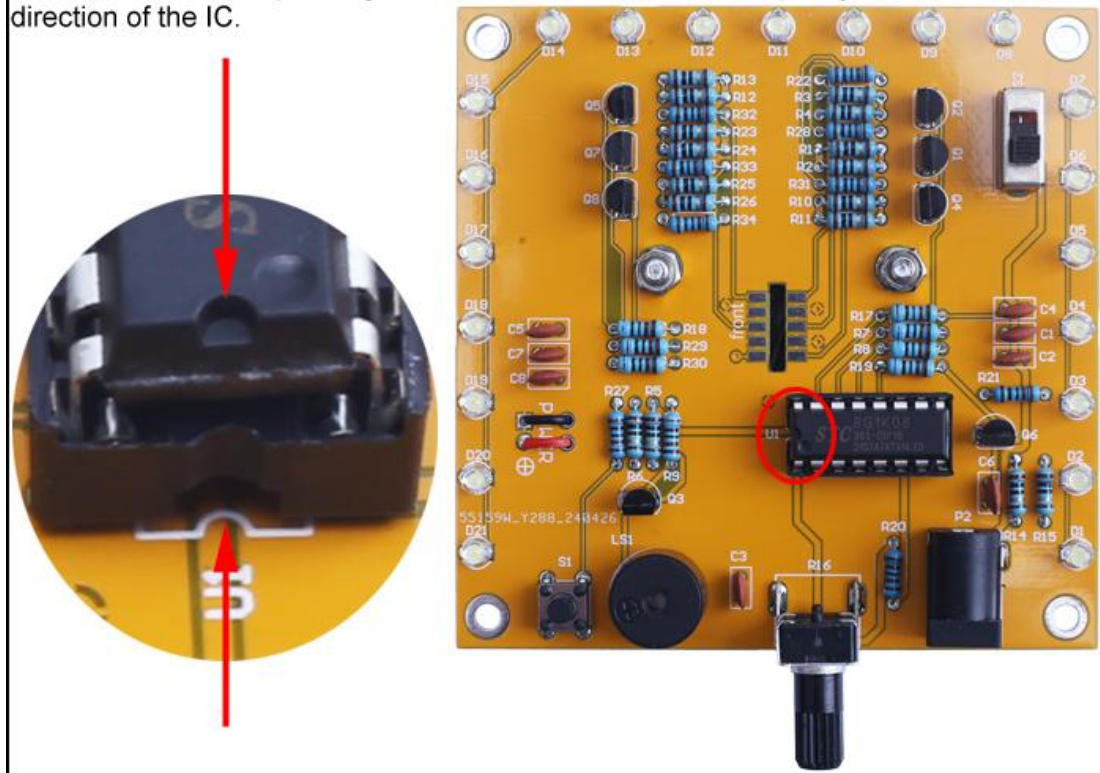
Step 15: Fix AA*3 Battery Box on back side of PCB by 2pcs M3*8mm Screw and 2pcs M3 Nut.



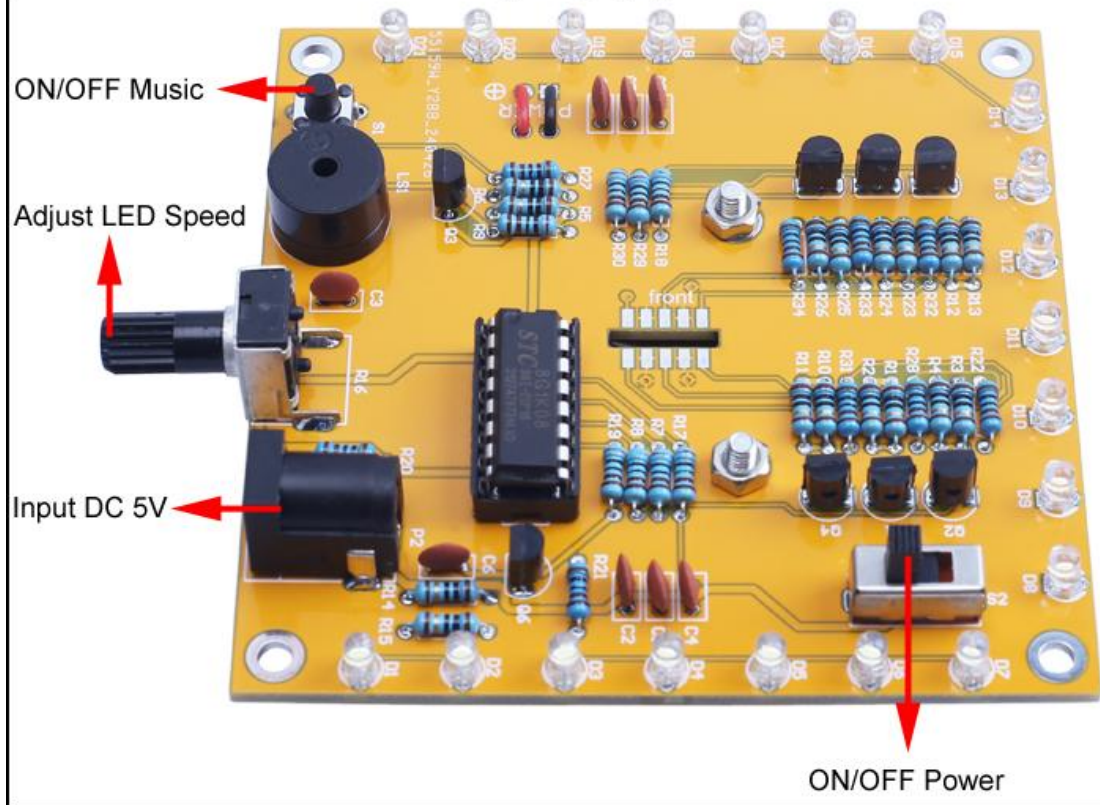
Step 16: Connect wires from battery box to PCB. Wires passing through PCB holes and red wire connect to '+' round pad.



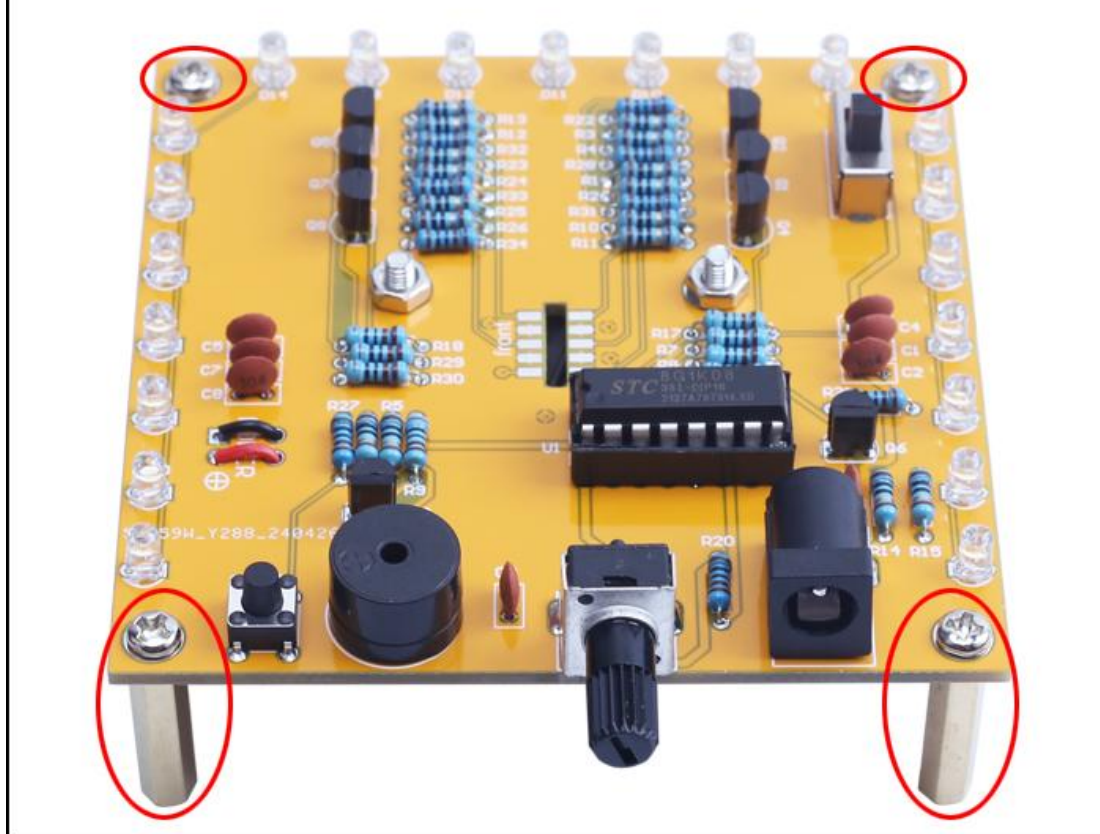
Step 17: Install 1pcs DIP-16 STC8G1K08-38I MCU at U1. There is a gap mark on one end of the IC and there is a gap mark on IC Socket where the IC can place on. These two marks are corresponding to each other and are used to specify the installation direction of the IC.



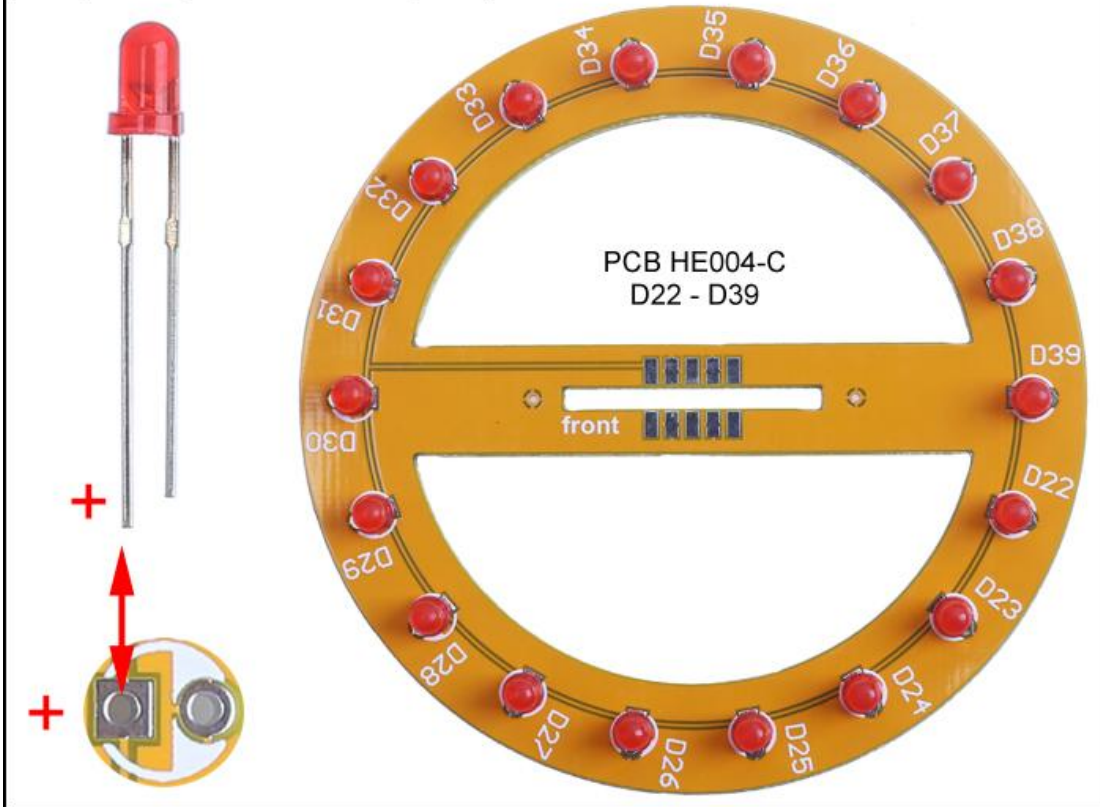
Step 18: Test. Turn ON S2 Power Switch and the press S1 button after connect USB power. It is OK if LED automatic flashing and playing music.



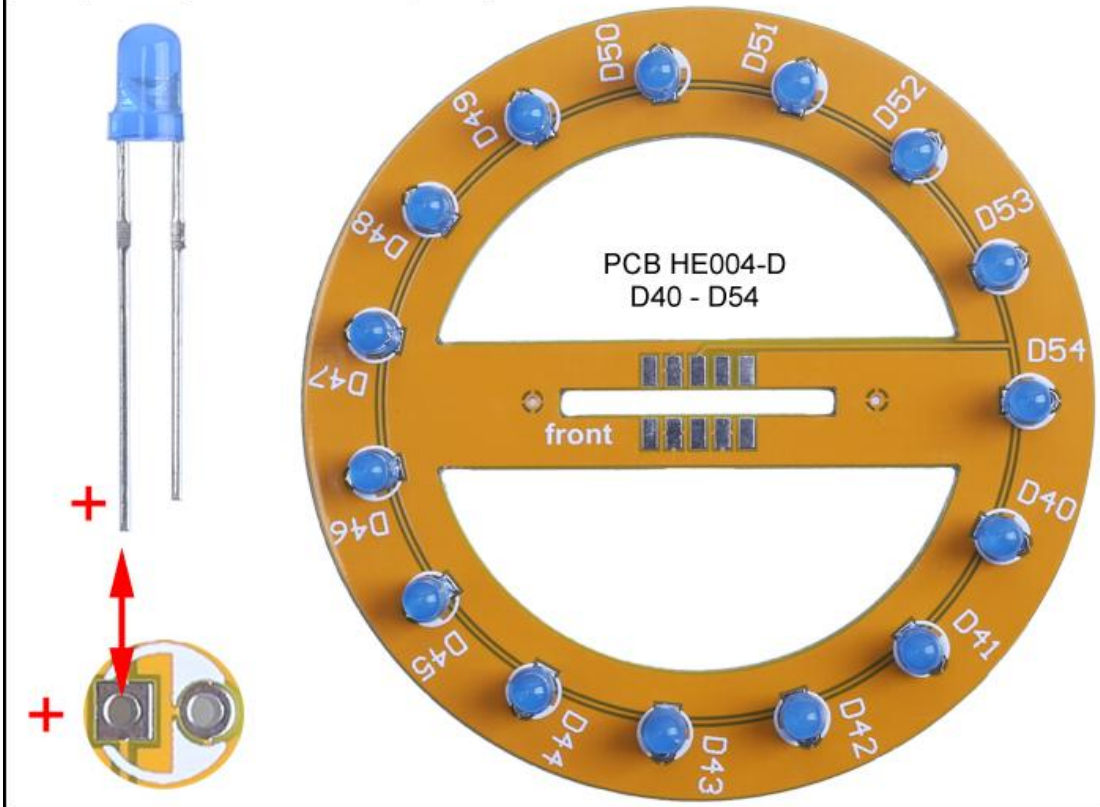
Step 19: Fix 4pcs M3*20mm Copper Pillar by 4pcs M3*5mm Screw.



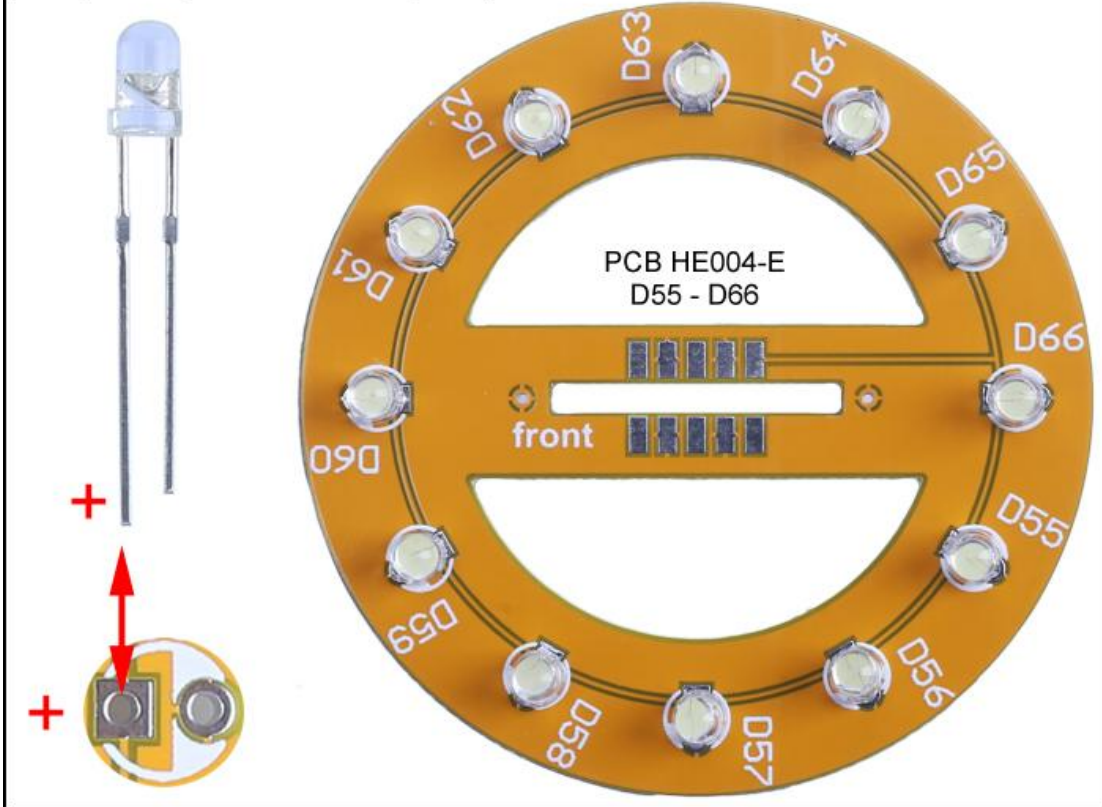
Step 20: Install 18pcs 3mm Red LED at D22-D39 on PCB HE004-C. Note: the longer pin is positive pole connect to square pad.



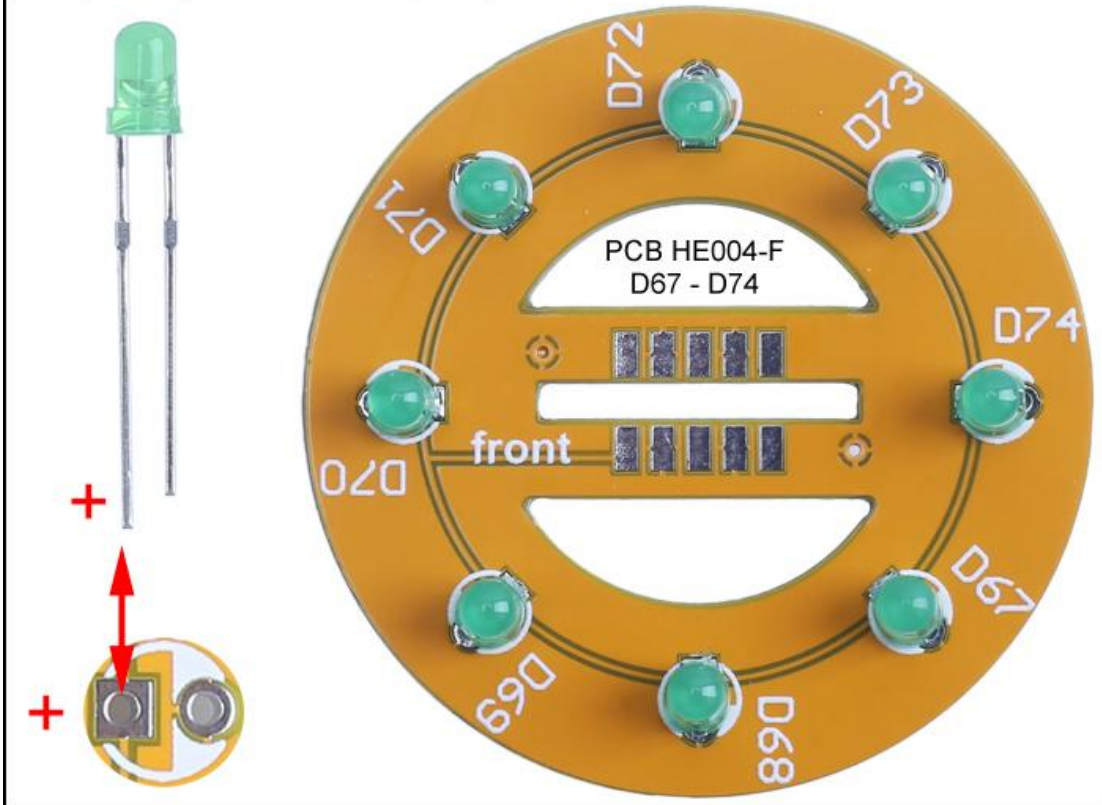
Step 21: Install 15pcs 3mm Blue LED at D40-D54 on PCB HE004-D. Note: the longer pin is positive pole connect to square pad.



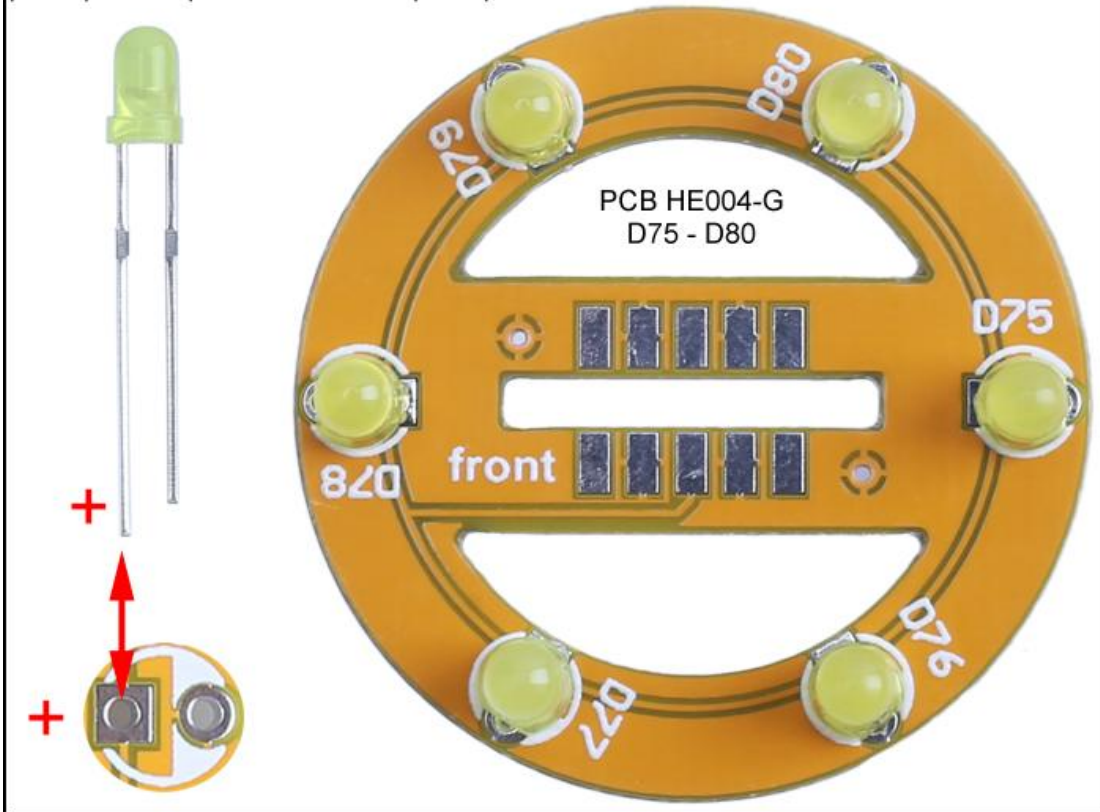
Step 22: Install 12pcs 3mm White LED at D55-D66 on PCB HE004-E. Note: the longer pin is positive pole connect to square pad.



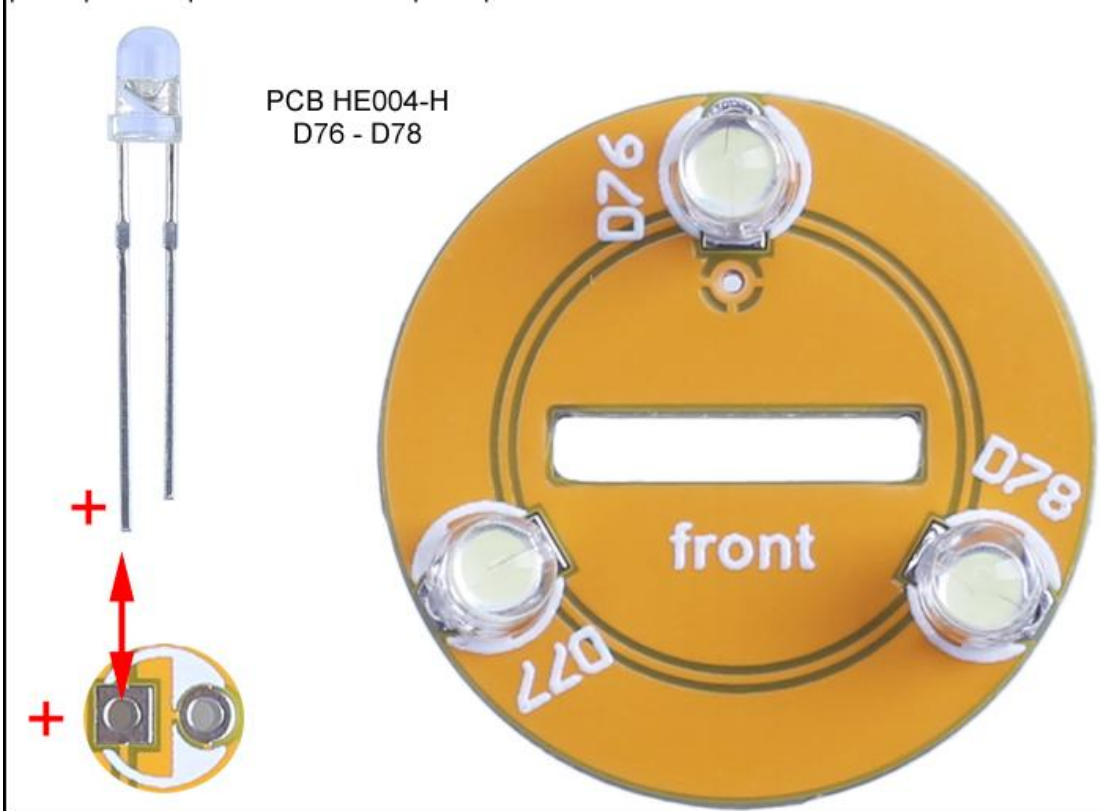
Step 23: Install 8pcs 3mm Green LED at D67-D74 on PCB HE004-F. Note: the longer pin is positive pole connect to square pad.



Step 24: Install 6pcs 3mm Yellow LED at D75-D80 on PCB HE004-G. Note: the longer pin is positive pole connect to square pad.

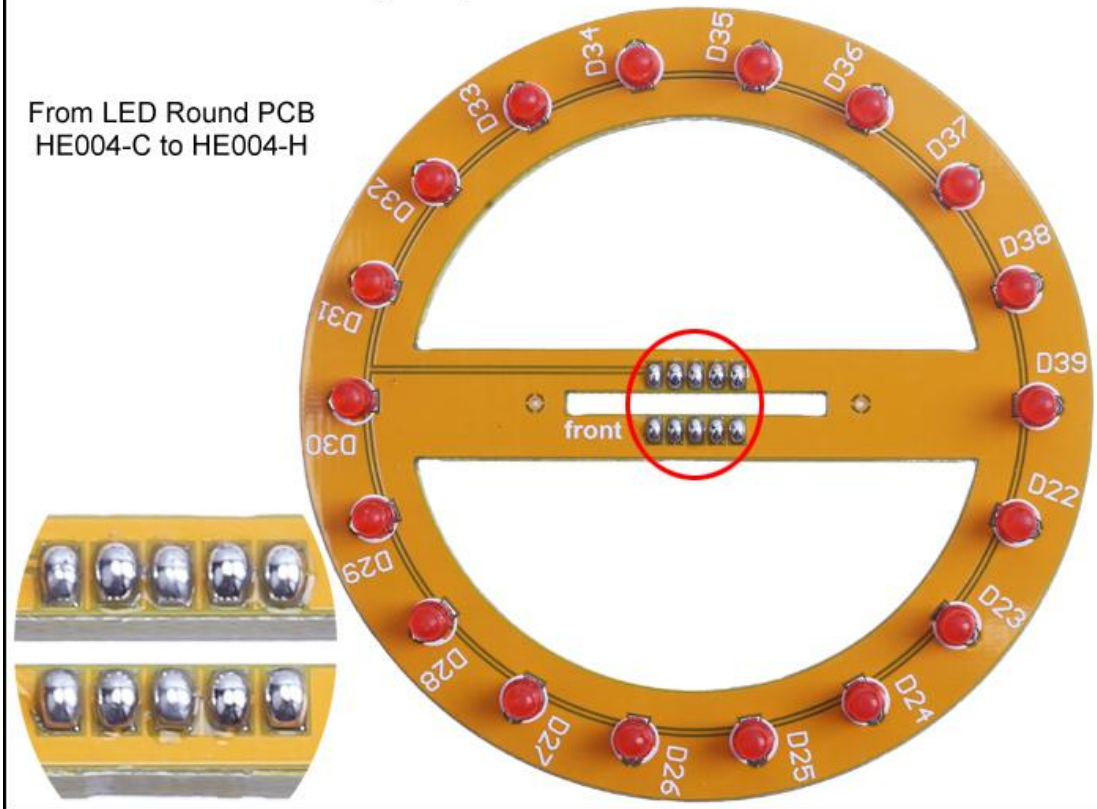


Step 25: Install 3pcs 3mm White LED at D76-D78 on PCB HE004-H. Note: the longer pin is positive pole connect to square pad.

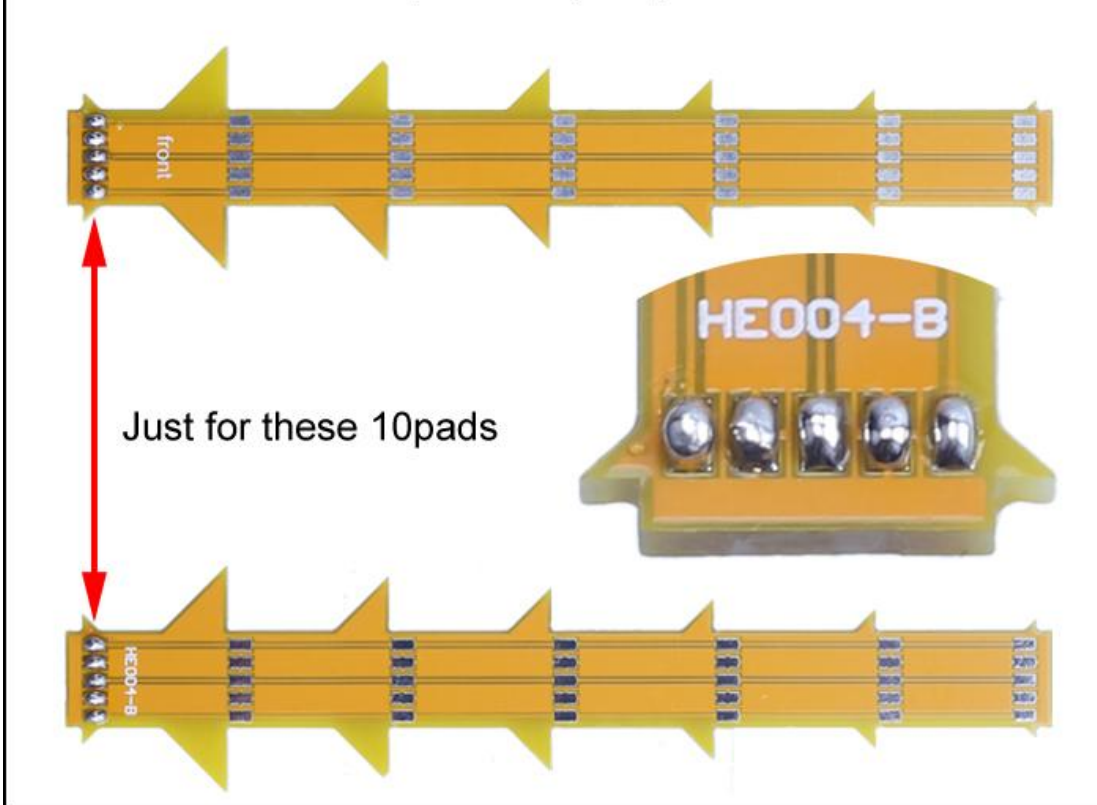


Step 26: Melt as much tin as possible on 10 pads on each PCB from LED round PCB HE004-C to HE004-H. But adjacent pads cannot be short circuited.

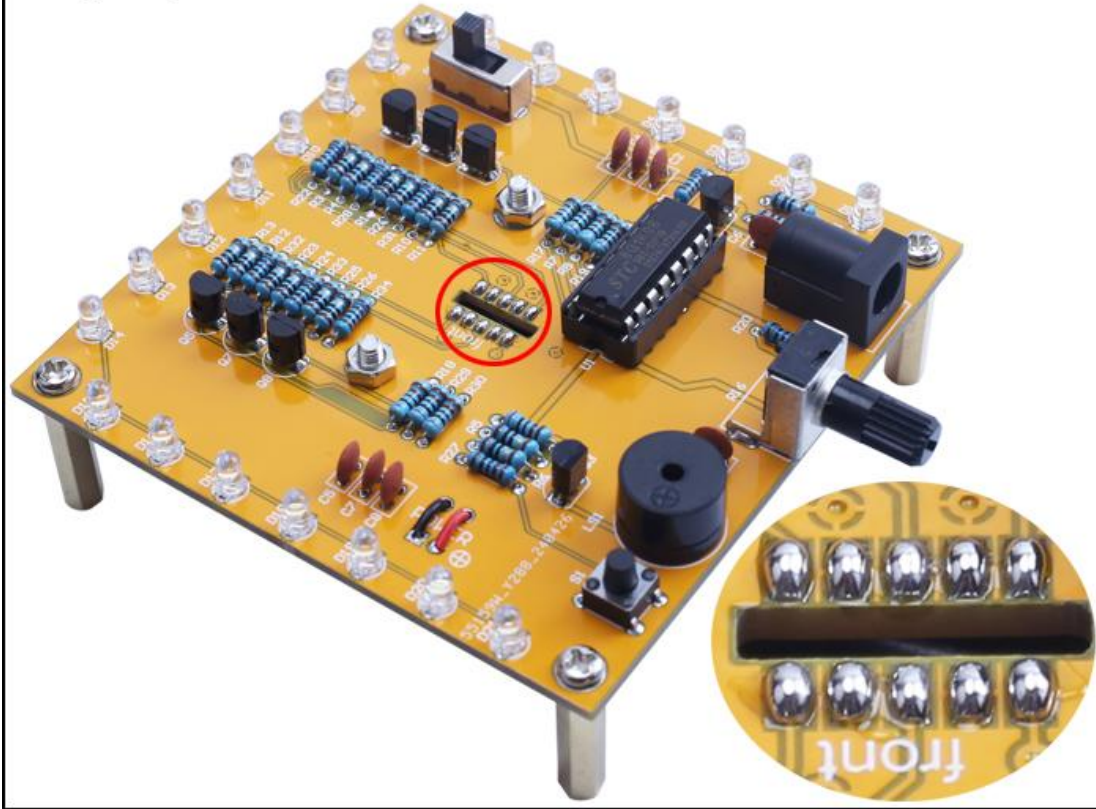
From LED Round PCB
HE004-C to HE004-H



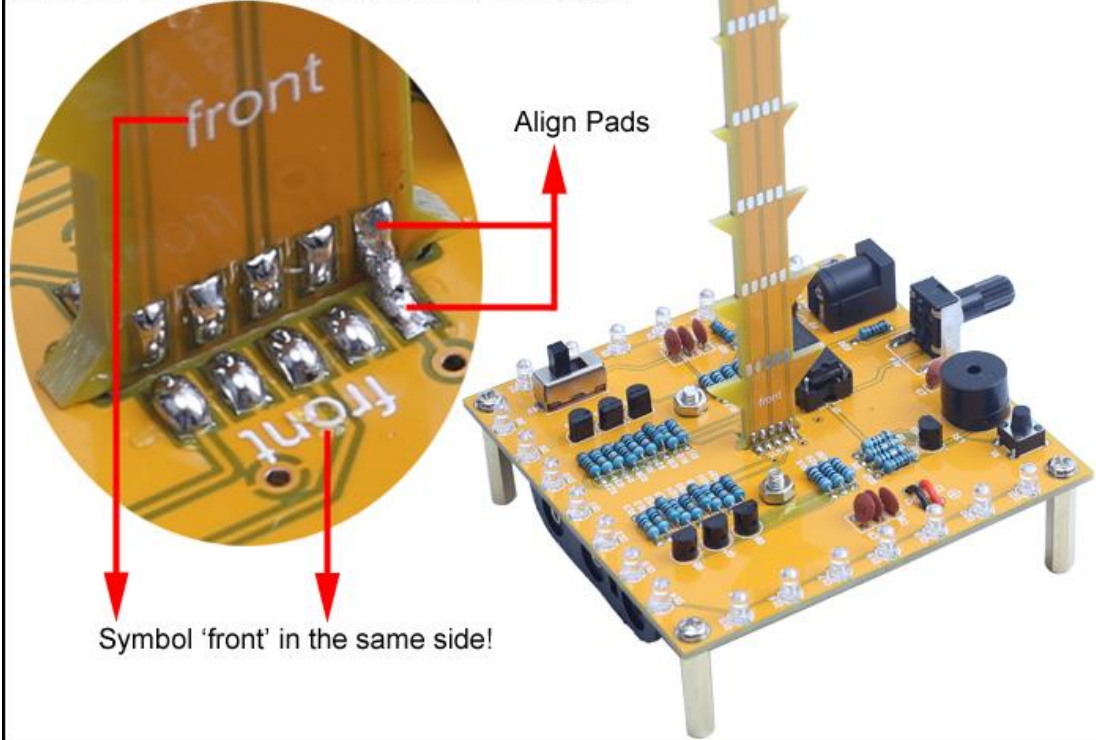
Step 27: Melt as much tin as possible on 10 pads at the bottom on both sides of PCB HE004-B. Note: Just for bottom pads. But adjacent pads cannot be short circuited.



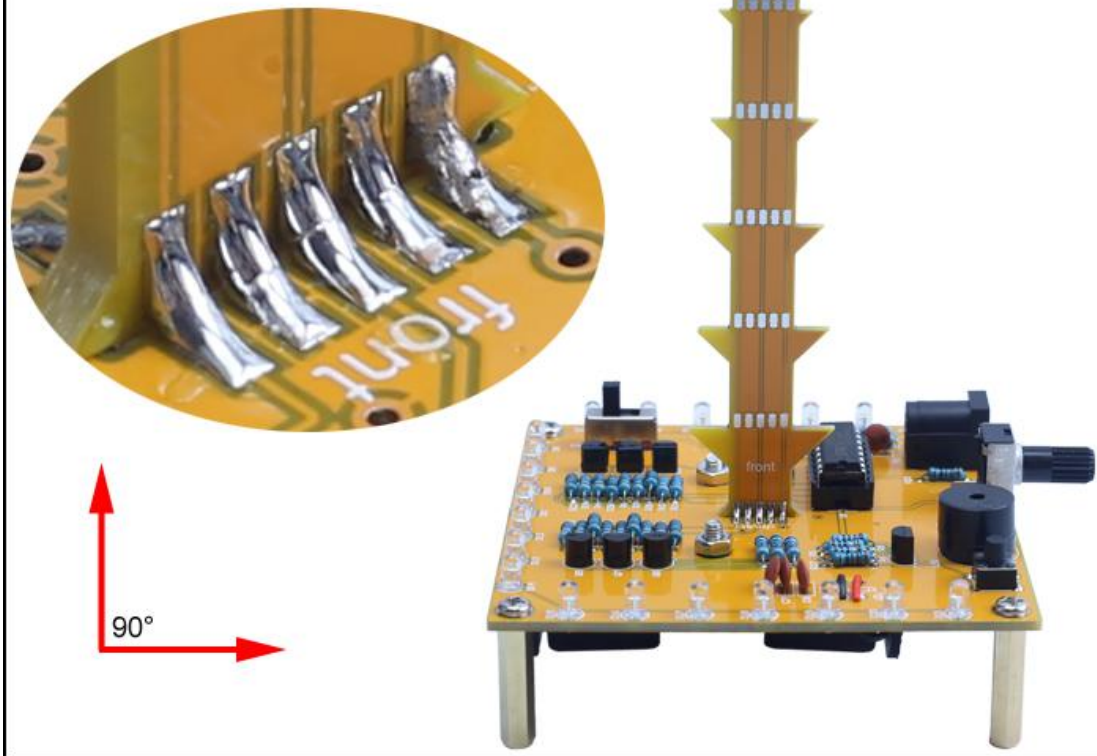
Step 28: Melt as much tin as possible on 10 pads on PCB HE004-A. But adjacent pads cannot be short circuited.



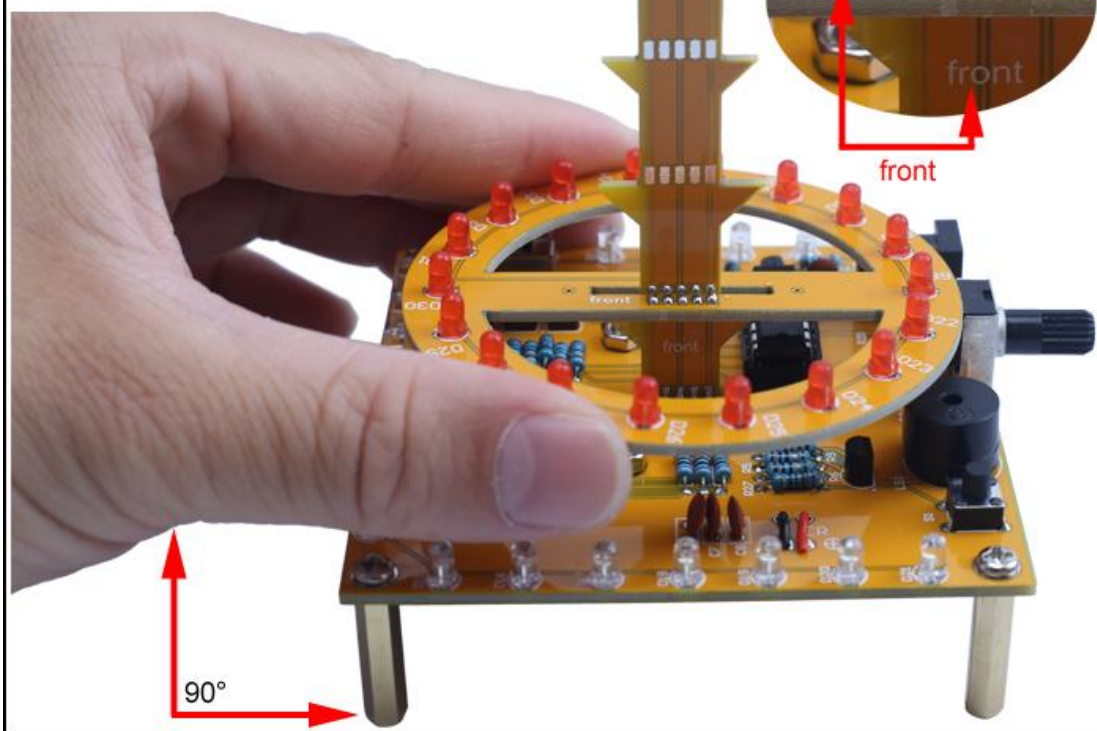
Step 29: Insert PCB HE004-B into HE004-A with two silk screen ' front ' in the same side which are used to determine installation direction. Fix any one pad at first after align each pad and ensure that the two PCB are perpendicular to each other.



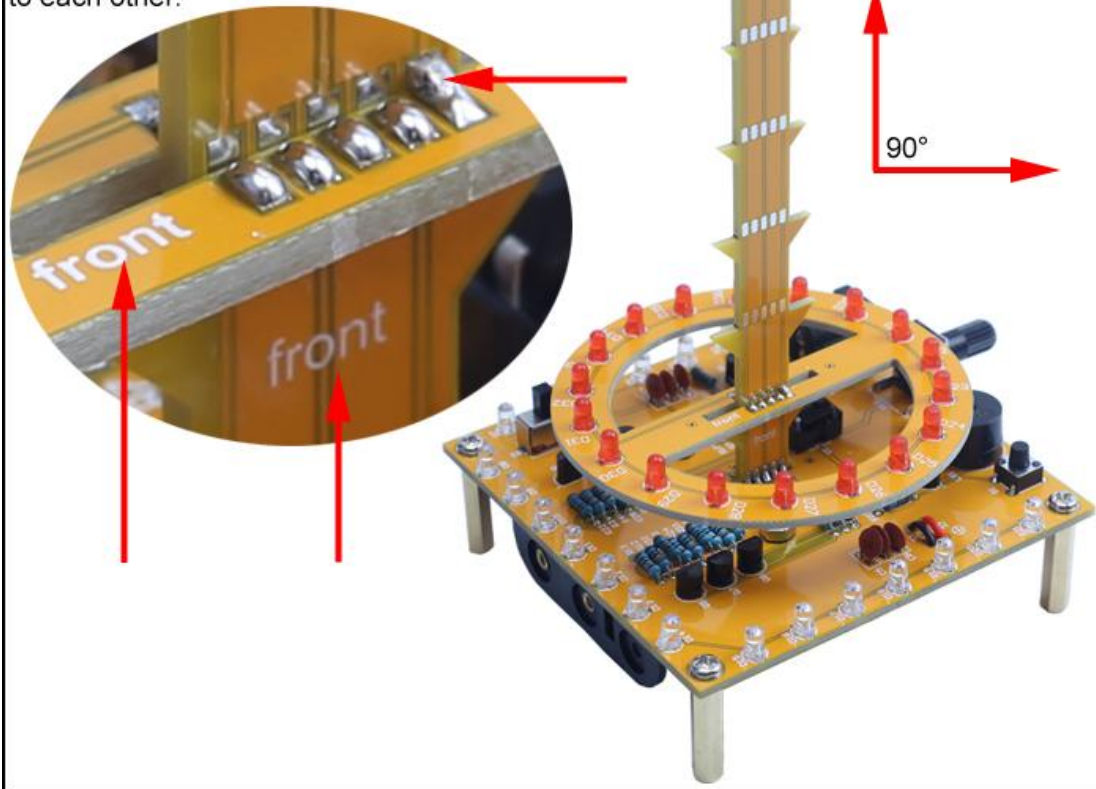
Step 30: Connects other pads But adjacent pads cannot be short circuited. Make sure they are vertical and pads cannot be short circuited.



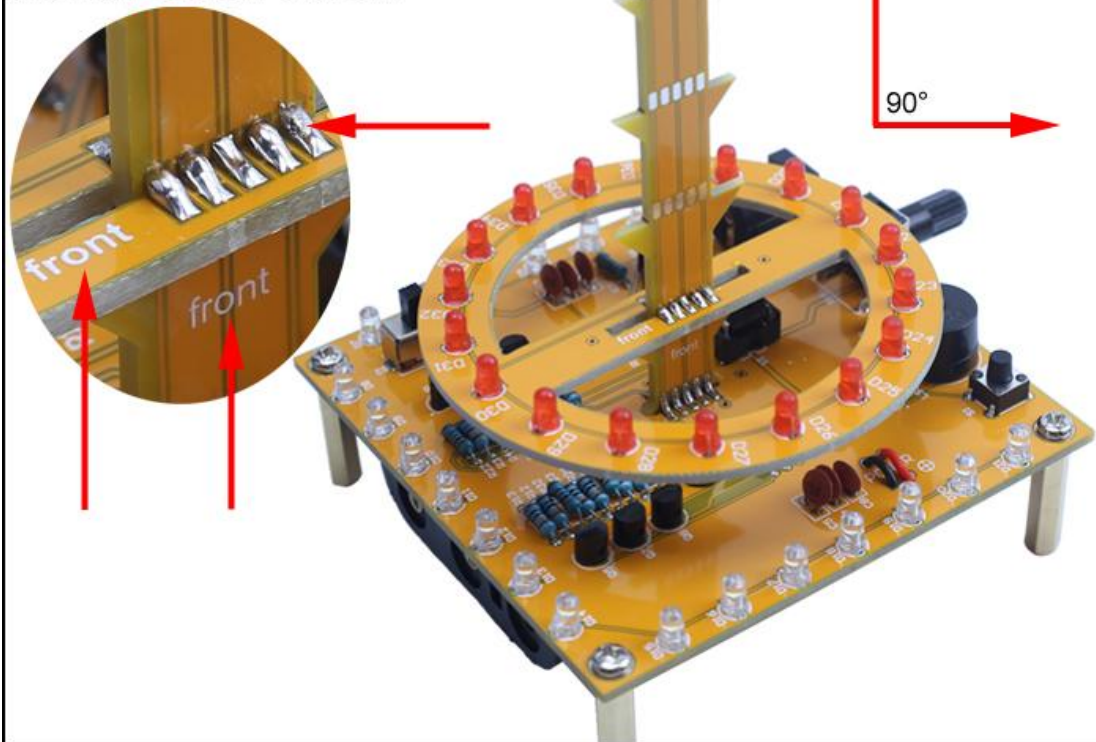
Step 31: Align 10 pads from PCB HE004-B and Red LED PCB HE004-C and ensure they are perpendicular to each other. Silk screen 'front' in the same side.



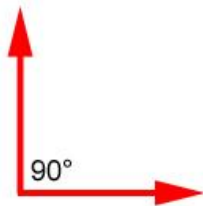
Step 32: Fix any one pad at first after align each pad and ensure that the two PCB are perpendicular to each other.



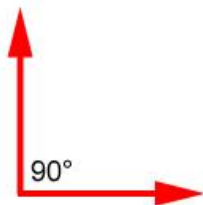
Step 33: Connects other pads But adjacent pads cannot be short circuited. Make sure they are vertical and pads cannot be short circuited. **Test** after Power ON.



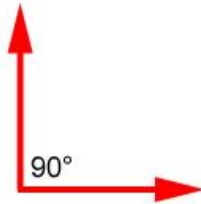
Step 34: Fix Blue LED HE004-D on HE004-B in the same methods. Vertical, align, pads cannot be short circuited and silk ' front ' in the same side.
Test after Power ON.



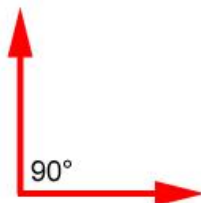
Step 35: Fix White LED HE004-E on HE004-B in the same methods. Vertical, align, pads cannot be short circuited and silk ' front ' in the same side.
Test after Power ON.



Step 36: Fix Green LED HE004-F on HE004-B in the same methods. Vertical, align, pads cannot be short circuited and silk ' front ' in the same side.
Test after Power ON.



Step 37: Fix Yellow LED HE004-G on HE004-B in the same methods. Vertical, align, pads cannot be short circuited and silk ' front ' in the same side.
Test after Power ON.



Step 38: Fix White LED HE004-H on HE004-B in the same methods. Vertical, align, pads cannot be short circuited and silk ' front ' in the same side.
Test after Power ON.

