Little Bear 4Bit Digital Electronic Clock DIY Kit

1.Introduction:

TJ-56-441A is a 4Bit Digital Electronic Clock DIY Kit. It will display current date, time, temperature in the real time, Alarm clock music.User can set alarm as your needs.It is easy to operate, beautiful design, very suitable for home or office environment.

2.Feature:

1>.Yellow-Blue color LED display
2>.Automatic brightness adjustment
3>.Time/Date/Alarm/Temperature
4>.Adjustable alarm clock music
5>.Time memory function
6>.Temperature value can be calibrated
7>.Voice Hourly Report
8>.DIY manual soldering
9>.Simple and easy to operate

3.Parameter:

1>.Work voltage:DC 5V
2>.LED color:Yellow-Blue
3>.Work Temperature:-20℃~85℃
4>.Work Humidity:0%~95%RH
5>.Size(Installed):95*85*22mm

4.Function:

1>.Display time: Hour, Minute, Second.
2>.Display date: Year, Month, Day.
3>.Display week.
4>.Display current temperature in Celsius.
5>.Adjustable alarm clock music: 4 music.
6>.Voice Hourly Report.
7>.Automatic brightness adjustment.
8>.Adjustable volume.
9>.Set display mode.
10>.Calibration temperature display value.

5.Set Method:

1>.It displays the current time by default in hour-minute. Note:
2>.Press S1/left button to display month-day, week, year.
3>.Press S2/right button to display temperature, alarm time, minute-second.
4>.Switch LED Display Mode:
4.1>.Keep press two buttons about 3 second enter into Switch LED Display Mode.
4.2>.There are a total of 13 display modes for LED.
5>.Set Method:
5.1>.Keep press two buttons about 5 second until display ‘Fu-1’ enter into set mode.
5.2>.Short press S1/left button to switch set mode from Fu-1 to Fu-5. The parameter 1~5 will flash automatically.
5.3>.Short press S2/right button to selected mode.
5.4>.The selected or setting parameters will flash automatically.
5.5>.S1/left button is used to change value.Note: The value just can increase and then start to increase again.
5.6>.S2/right button is used to set parameter or confirm selected.
6>.Fu-1 mode:Set time in Hour:Minute.
6.1>.Set Hour: Short press S1/left button to set value for current hour.

6.2>.Set Minute: Short press S2/right button to select set for minute.And then press S1/left button to set value for current minute.

6.3>.Press S2/right button again to save and exit set mode.

7>.Fu-2 mode:Set date in Month, Day and Year.

7.1>.Set Month: Short press S1/left button to set value for current month.

7.2>.Set Day: Short press S2/right button to select set for day.And then press S1/left button to set value for current day.

7.3>.Set Year: Short press S2/right button to select set for year.And then press S1/left button to set value for current year. It can display from 2000 to 2099.

7.4>.Press S2/right button again to save and exit set mode.

8>.Fu-3 mode:Set alarm time in Hour:Minute.

8.1>.Set Hour: Short press S1/left button to set value for alarm hour. Note: the hour can be set 24 which means turn OFF alarm.

8.2>.Set Minute: Short press S2/right button to select set for minute.And then press S1/left button to set value for alarm minute.

8.3>.Press S2/right button again to save and exit set mode.

9>.Fu-4 mode: Set Hourly Report, Display Mode, Set Brightness.

9.1>.It can display 4bit: The first bit is used to set Hourly Report. The second bit is used to set Display Mode and the last two bit are used to set Brightness.

9.2>.Set Hourly Report:

9.2.1>.Short press S1/left button to disable and enable Hourly Report function.

9.2.2>. '1' means enable Hourly Report function.

9.2.3>. '0' means disable Hourly Report function.

9.3>.Set Display Mode:

9.3.1>.Short press S2/right button to select set the second bit to set display mode. And then press S1/left button to switch display mode.

9.3.2>. '0' means just display time.

9.3.2>. '1' means display time and interval display temperature. The interval time is about 59 second and display temperature in 1 second. That is, the temperature is displayed for 1 second every minute.

9.3.3>. '2' means display time and interval display date and temperature. The interval time is about 58 second and display date in 1 second and display temperature in 1 second. That is, the temperature and date are displayed for 1 second each minute.

9.3.4>. '3' means just display temperature. Note: In this mode,user can calibration temperature value at normal display interface by two buttons.

9.4>.Set Brightness.

9.4.1>.Short press S2/right button to select set the last two bits to set display brightness. And then press S1/left button to switch display mode.

9.4.2>. 'A' means the display brightness is automatically adjusted according to the ambient brightness.

9.4.3>. '1' to '15' means set the brightness level. The brightness of the display will not change.

9.5>.Press S2/right button again to save and exit set mode.

9.6>.E.g. '1215' means: Enable Hourly Report function; Display time and interval display date and temperature; The brightness level is 15.

10>.Fu-5 mode: set Alarm Clock Music, set Volume.

10.1>.Set Alarm Clock Music: Short press S1/left button to select 4 music.

10.2>.Set Day: Short press S2/right button to select set volume.And then press S1/left button to set volume value from '4' to '40'. Maximum volume when '40' is displayed.

10.3>.Press S2/right button again to save and exit set mode.

6.Note:

1>.Garbled characters are displayed when the power is turned on for the first time, and the settings

need to be completed before they can be displayed correctly.

2>.When calibrating the temperature value, user must select only temperature display mode at first.

7.Component listing:

NO.	Component Name	PCB Marker	Parameter	QTY
1	0805 SMD Resistor	R10,R11,R14,R15	10Kohm	4
2	0805 SMD Resistor	R12	100Kohm	1
3	0805 SMD Resistor	R9	15ohm	1
4	0805 SMD Resistor	R1-R8	470ohm	8
5	0805 SMD Resistor	R13	200Kohm	1
6	SMD Button	S1,S2	3*3*6mm	2
7	1206 SMD 1N4148 Diode	ID1		1
8	Micro USB Socket	USB		1
9	DS1302 Clock IC	U2	SOP-8	1
10	0.56in 4Bit Digital Tube	SMG	Red	1
11	SOT-23 S8550 Transistor	Q1	2TY	1
12	0805 SMD Capacitor	C1,C2	5pF	2
13	0805 SMD Capacitor	C3	10uF 106	1
14	Passive Buzzer	SPEAKER		1
15	GL5516 Photoresistor	GM		1
16	0805 SMD 10K NTC Temperature Sensor	RM	Black	1
17	Crystal Oscillator	Y1	32768Hz	1
18	CR1220 Battery	J2		1
19	CR1220 Battery Socket	J2		1
20	STC15W404AS	U1	SOP-28	1
21	3mm Blue LED			48
22	3mm Yellow LED			12
23	Micro USB Power Wire			1
24	White Isolation Column			8
25	M3*20mm Screw			4
26	M3 Nut			4
27	Acrylic Board			2
28	PCB			1
Note:Users can complete the installation according to the PCB silk screen and component list.				

8.Application:

1>.Practical at home

2>.Indoor display

3>.Simple appearance, easy office

4>.Wall decoration

9.Installation Tips:

1>.User needs to prepare the soldering tool at first.

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.

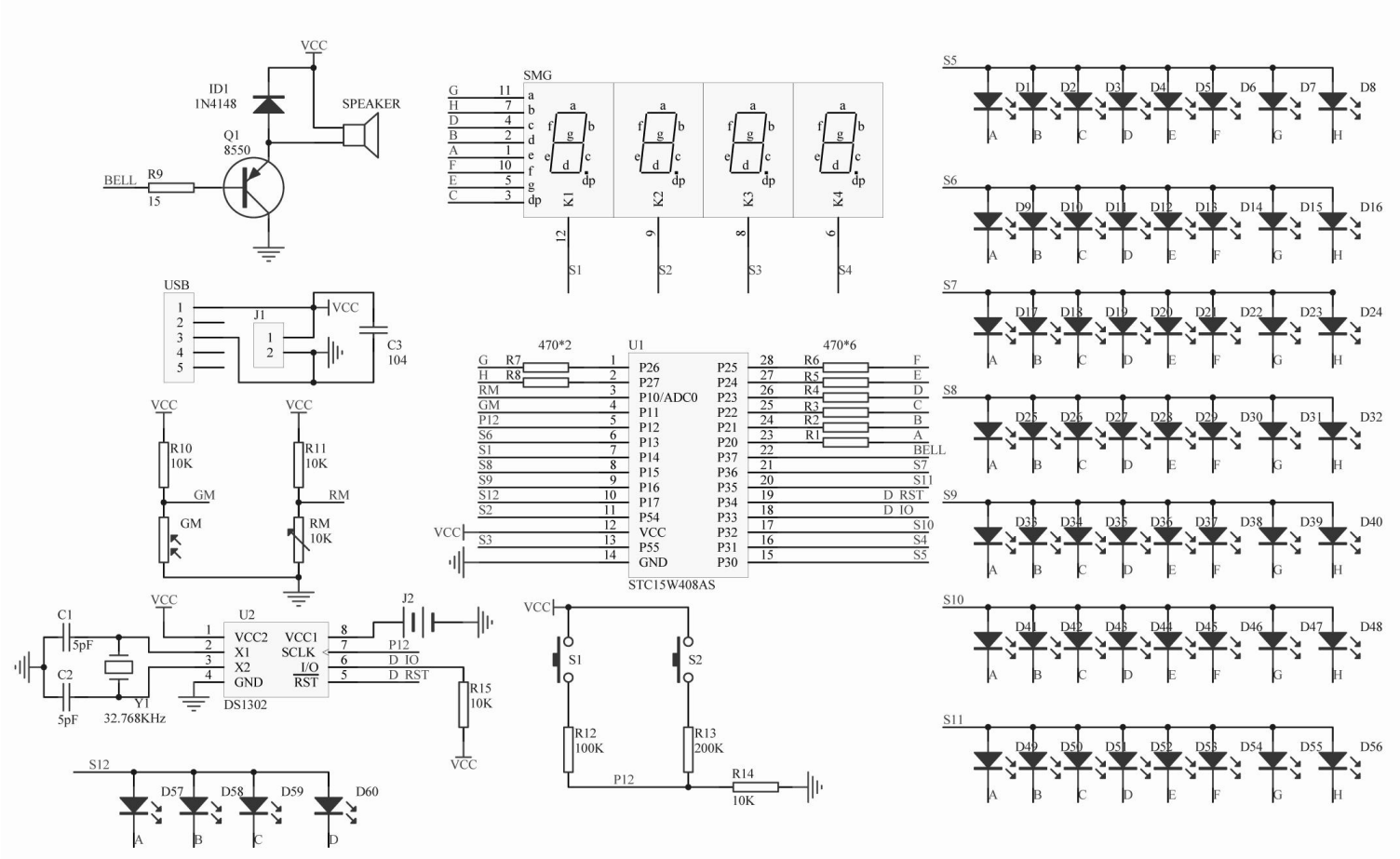
7>.Install complex components preferentially.

8>.Make sure all components are in right direction and right place.

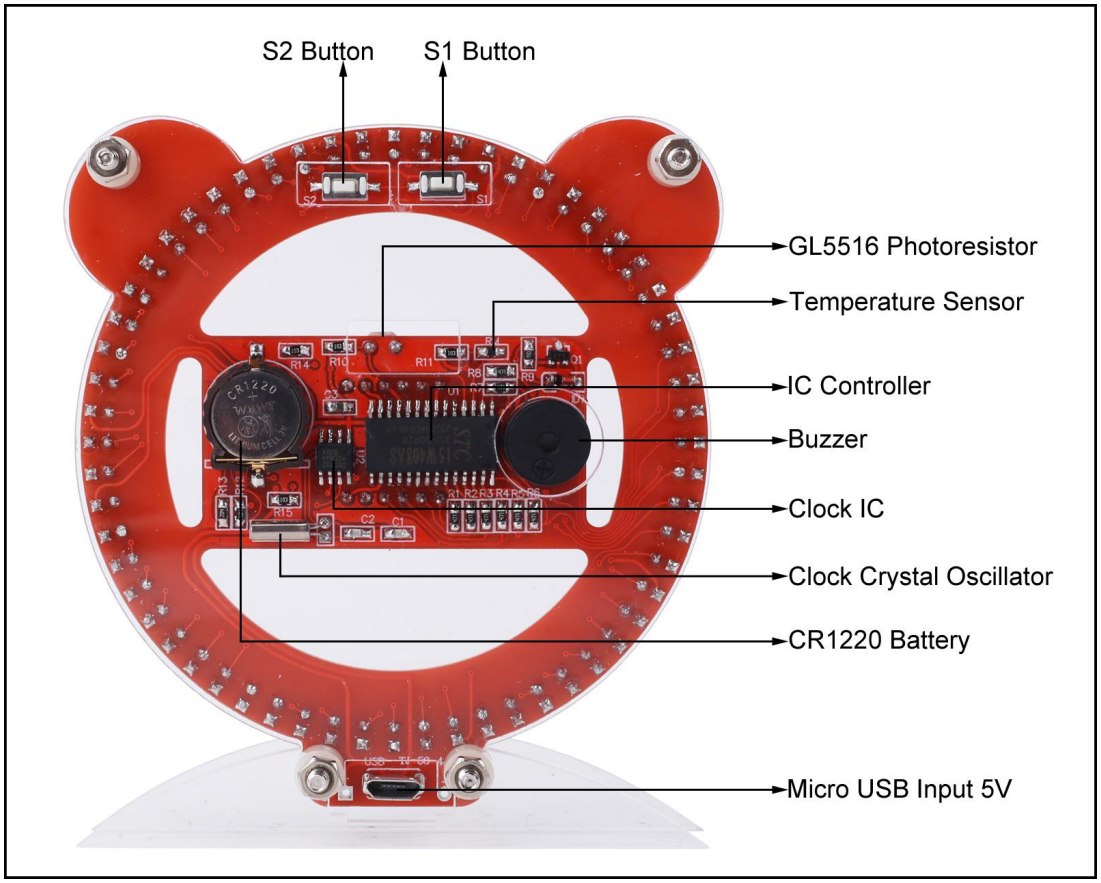
9>.Please wear anti-static gloves or anti-static wristbands when installing electronic components.

10>.It is strongly recommended to read the installation manual before starting installation!!!

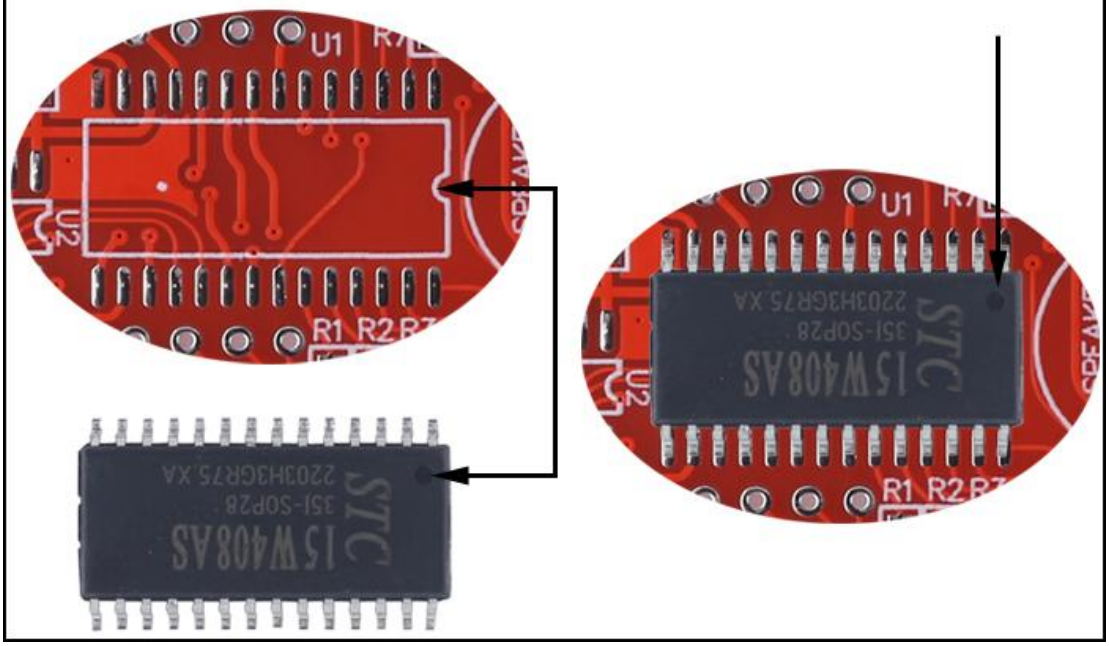
10.Schematic:



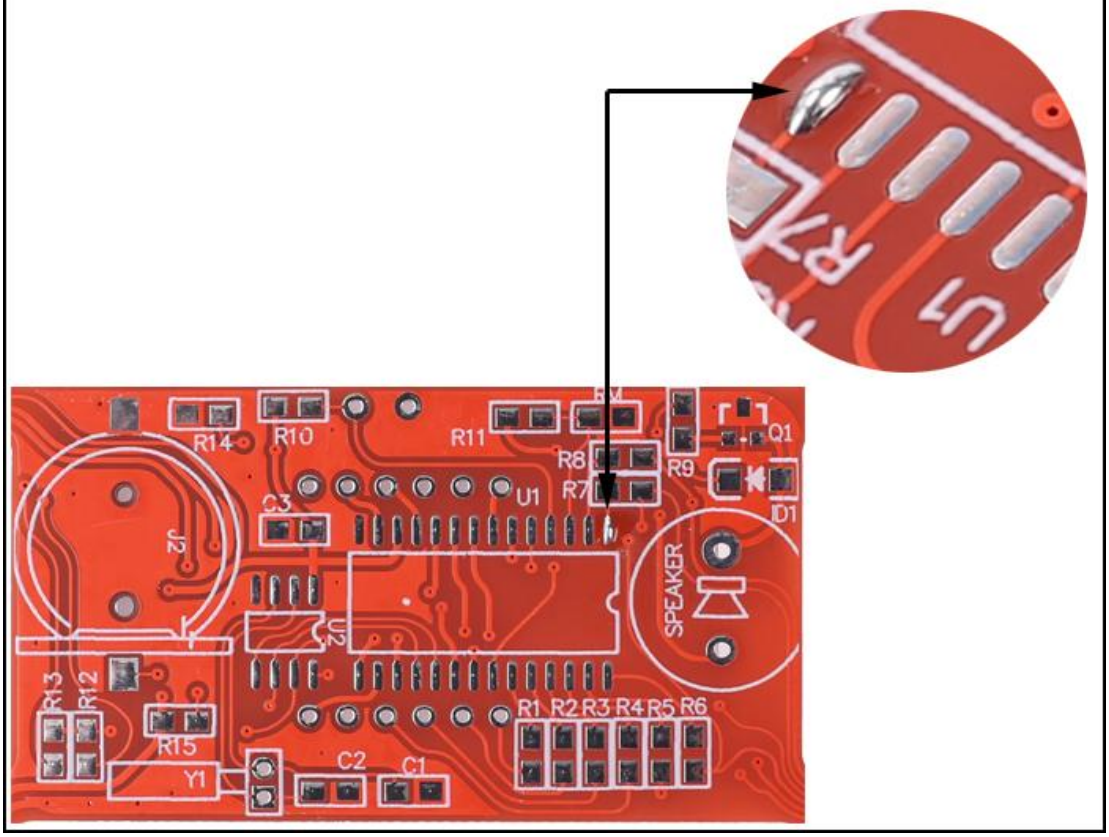
11.Installation Steps(Please be patient install!!!):



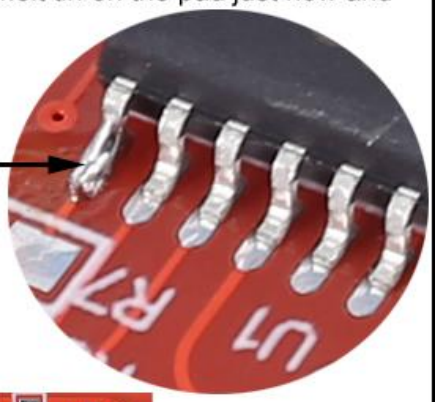
Step 1: Install 1pcs SMD components SOP-28 STC15W404AS at U1.
Verify and confirm the installation direction of STC15W404AS.
There is a dot mark on one end of the IC and there is a gap mark on PCB silk screen where the IC can place on.These two marks are corresponding to each other and are used to specify the installation direction of the IC.

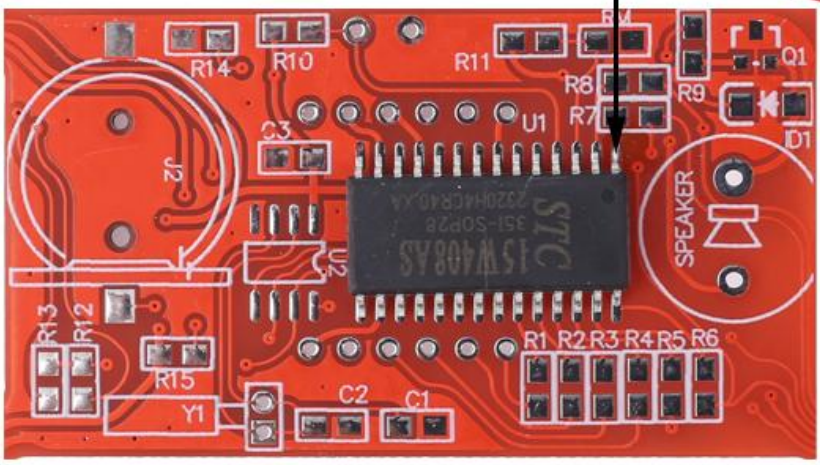


Step 2: Randomly choose a pad on the PCB, and then melt the solder on this pad.

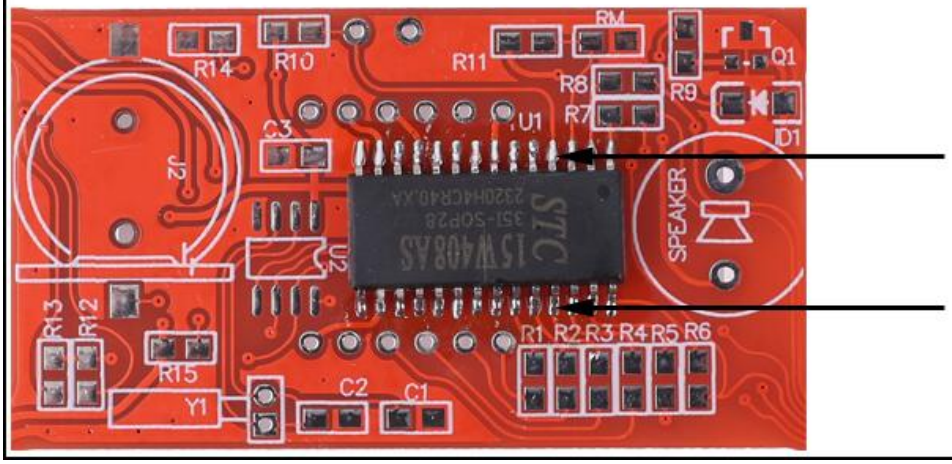


Step 3: Fix STC15W404AS: Use a soldering iron to melt tin on the pad just now and hold STC15W404AS with tweezers in the other hand to place/press on U1 to prevent movement.
Take care to match and align each pads.
Then remove soldering iron.
Then remove tweezers after solder tin cooling and solidification.

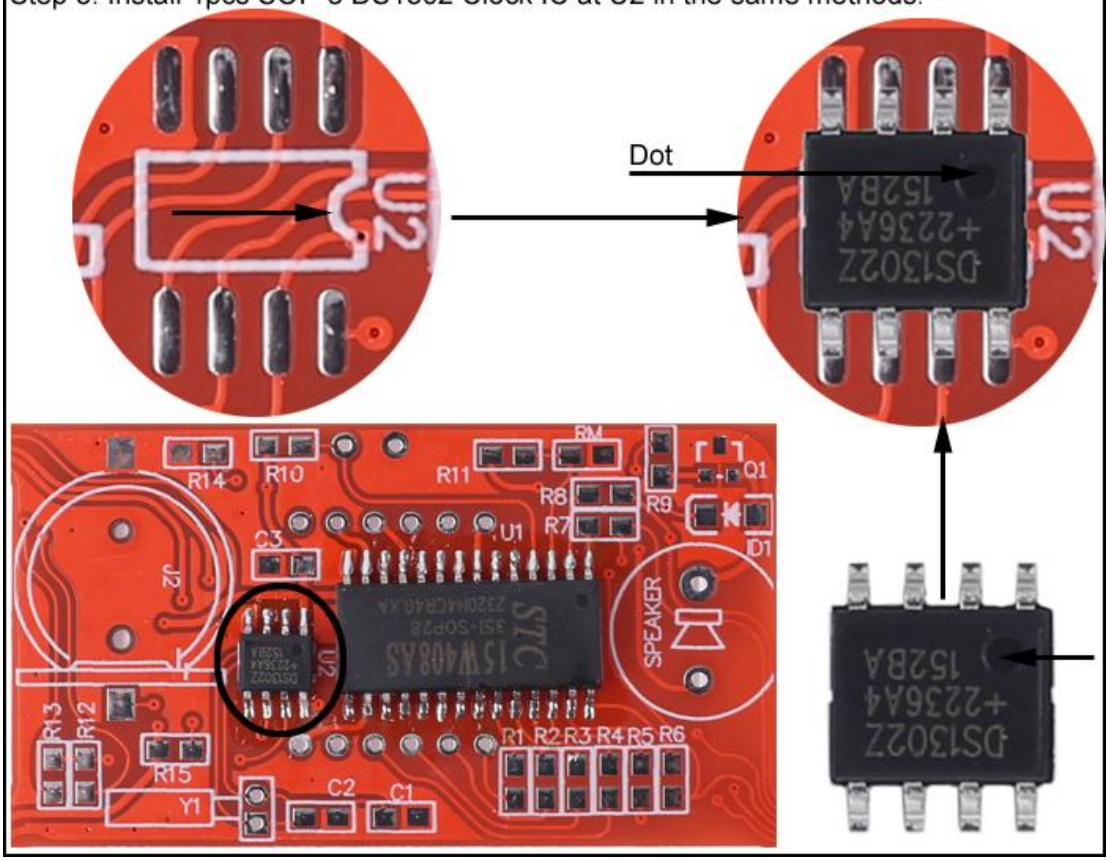




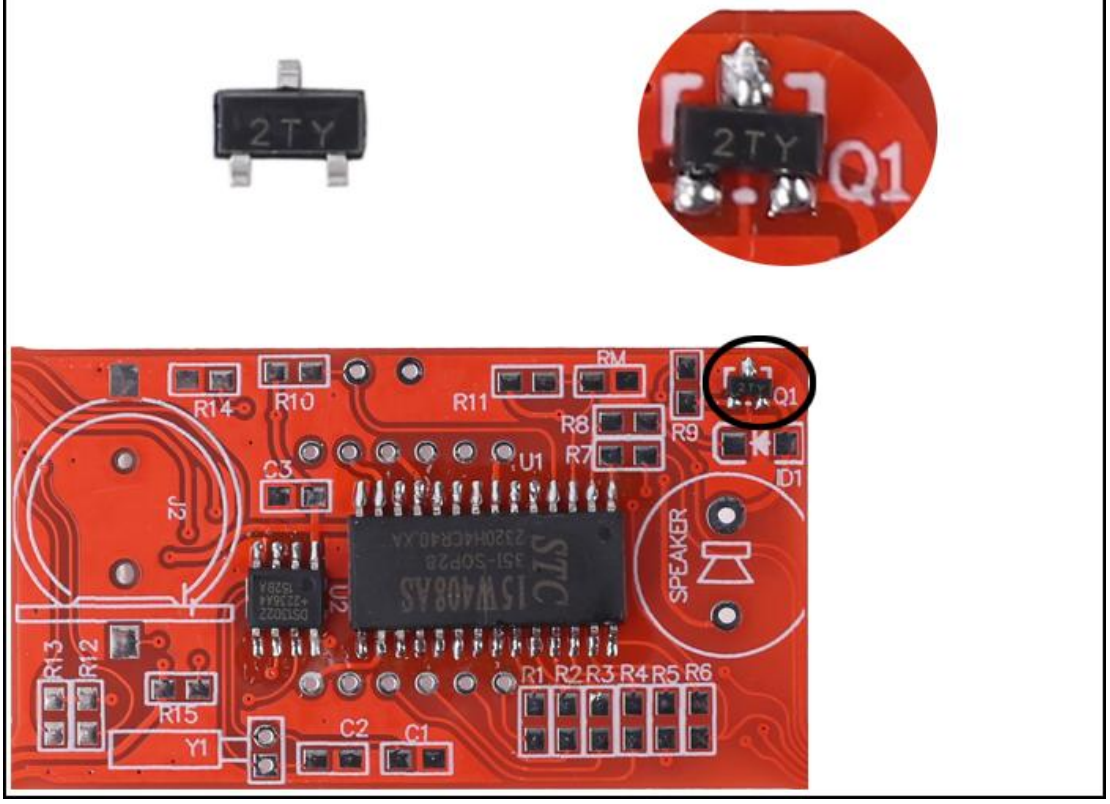
Step 4: Connect others pads on STC15W404AS by tin and soldering iron.



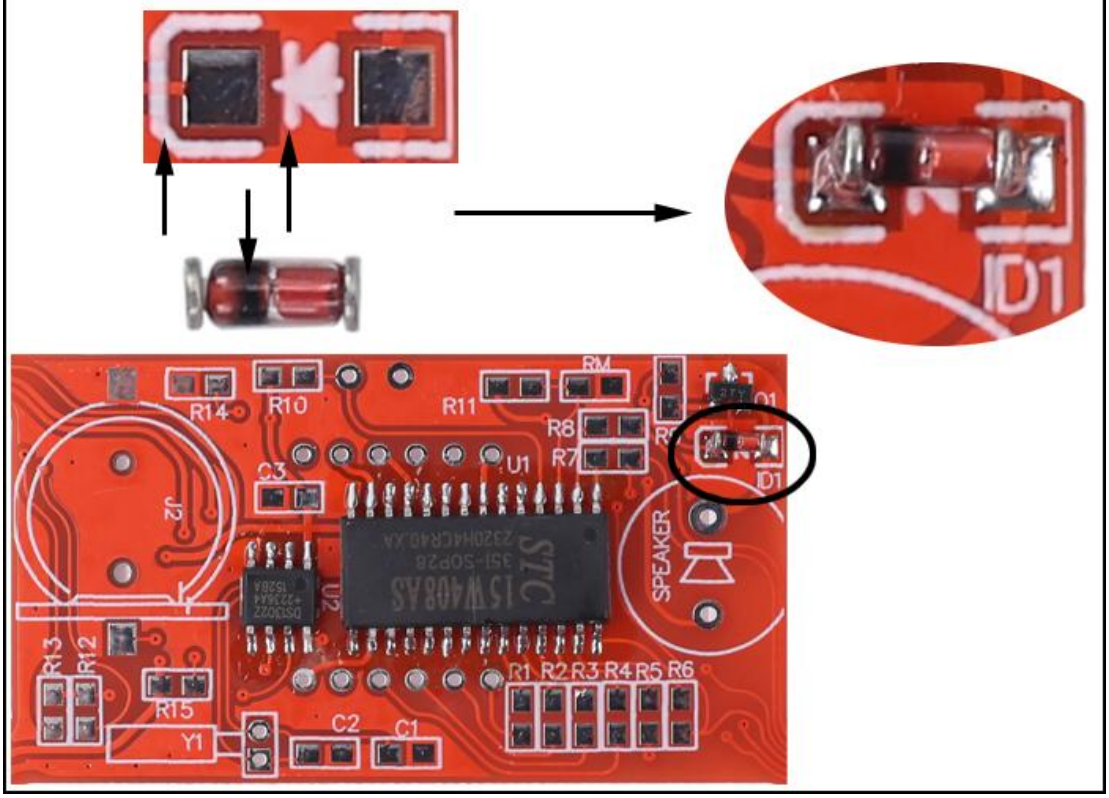
Step 5: Install 1pcs SOP-8 DS1302 Clock IC at U2 in the same methods.



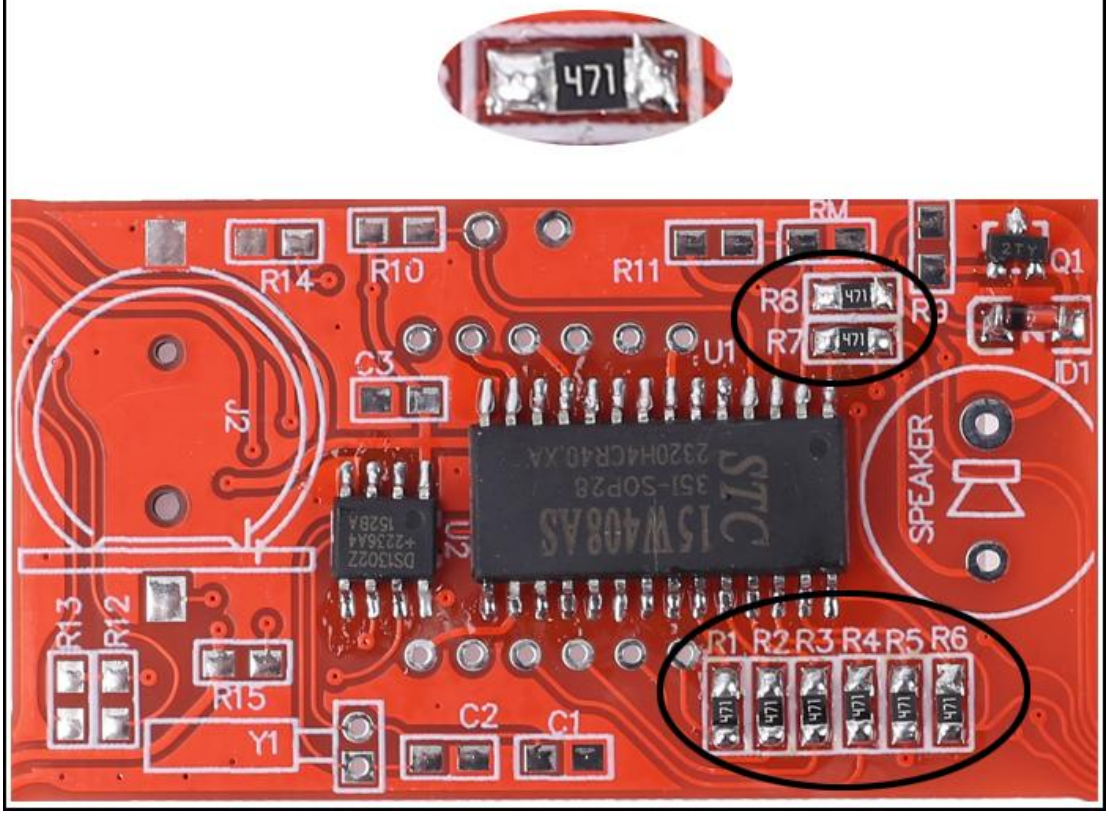
Step 6: Install 1pcs SOT-23 S8550 Transistor with screen printing '2TY' at Q1 in the same methods.



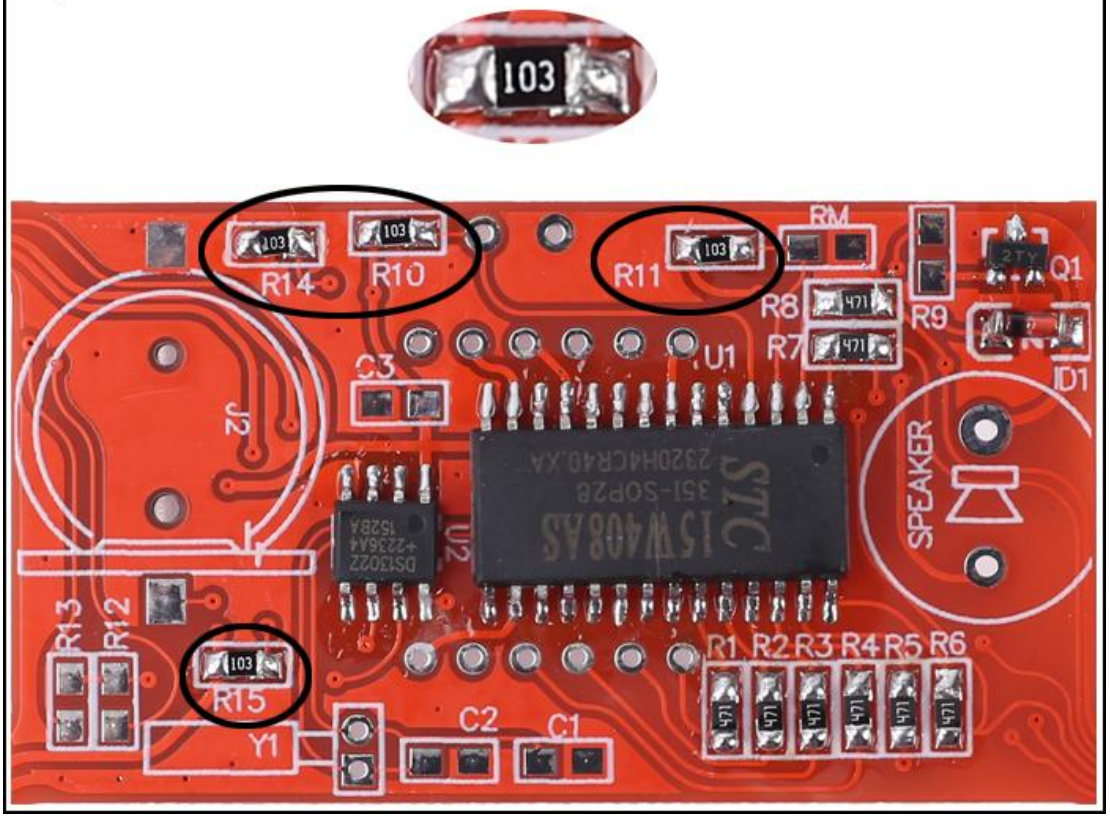
Step 7: Install 1pcs 1206 SMD 1N4148 Diode at ID1. Pay attention to the installation direction. Note: The black mark on Diode and white mark on PCB are corresponding.



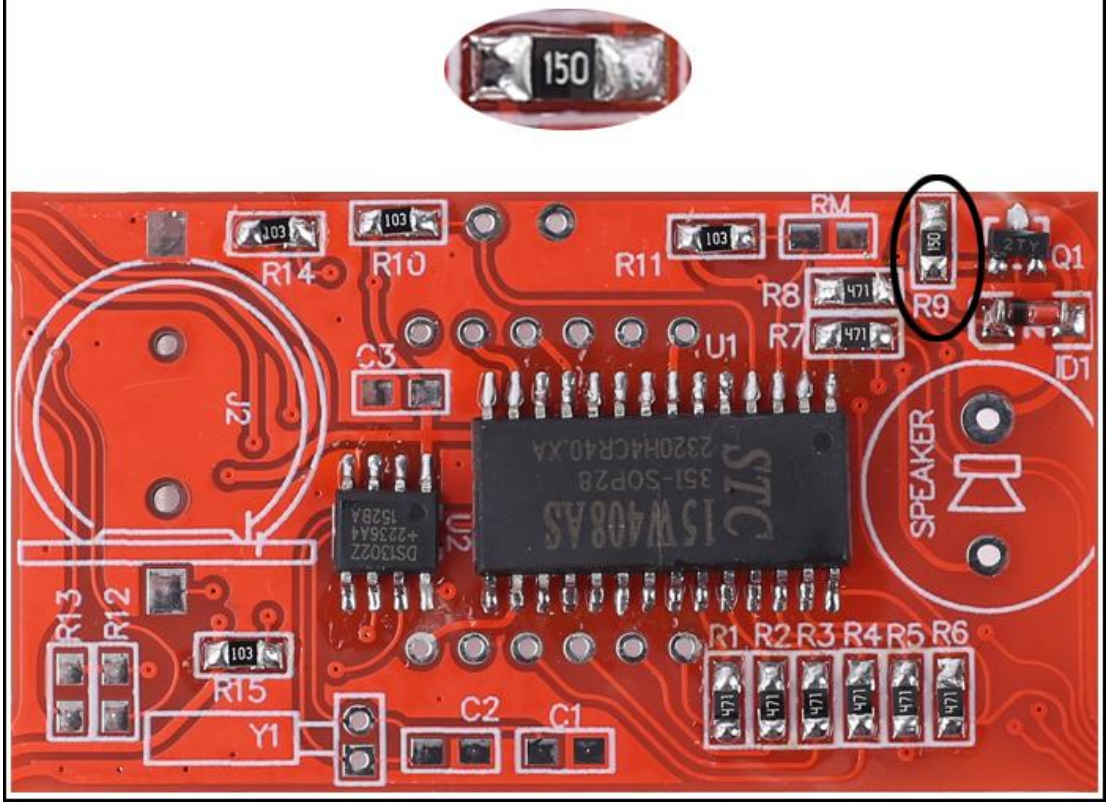
Step 8: Install 8pcs 470ohm 0805 SMD Resistor with screen printing '471' at R1-R8.



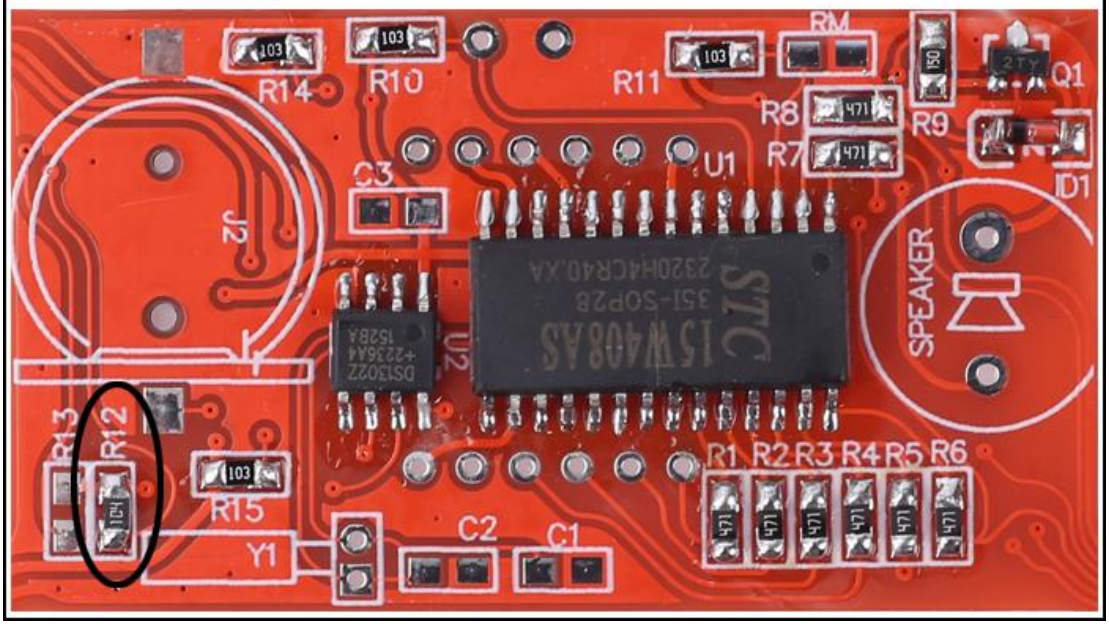
Step 9: Install 4pcs 10Kohm 0805 SMD Resistor with screen printing '103' at R10,R11, R14,R15.



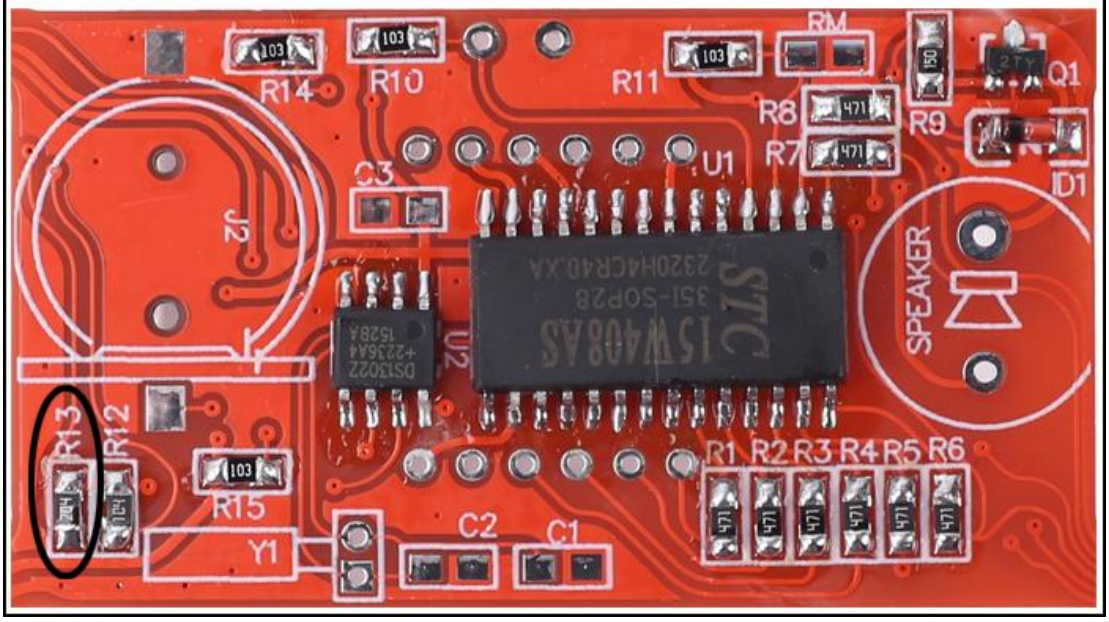
Step 10: Install 1pcs 15ohm 0805 SMD Resistor with screen printing '150' at R9.



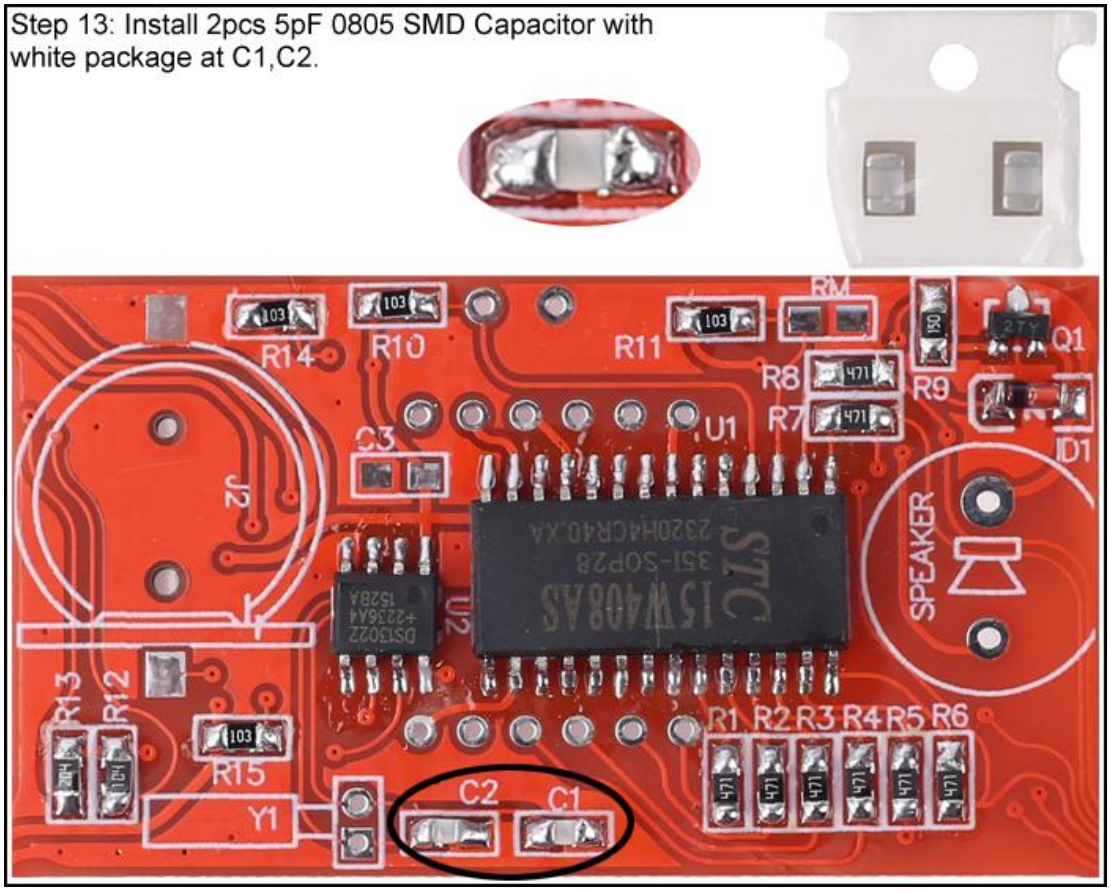
Step 11: Install 1pcs 100Kohm 0805 SMD Resistor with screen printing '104' at R12.



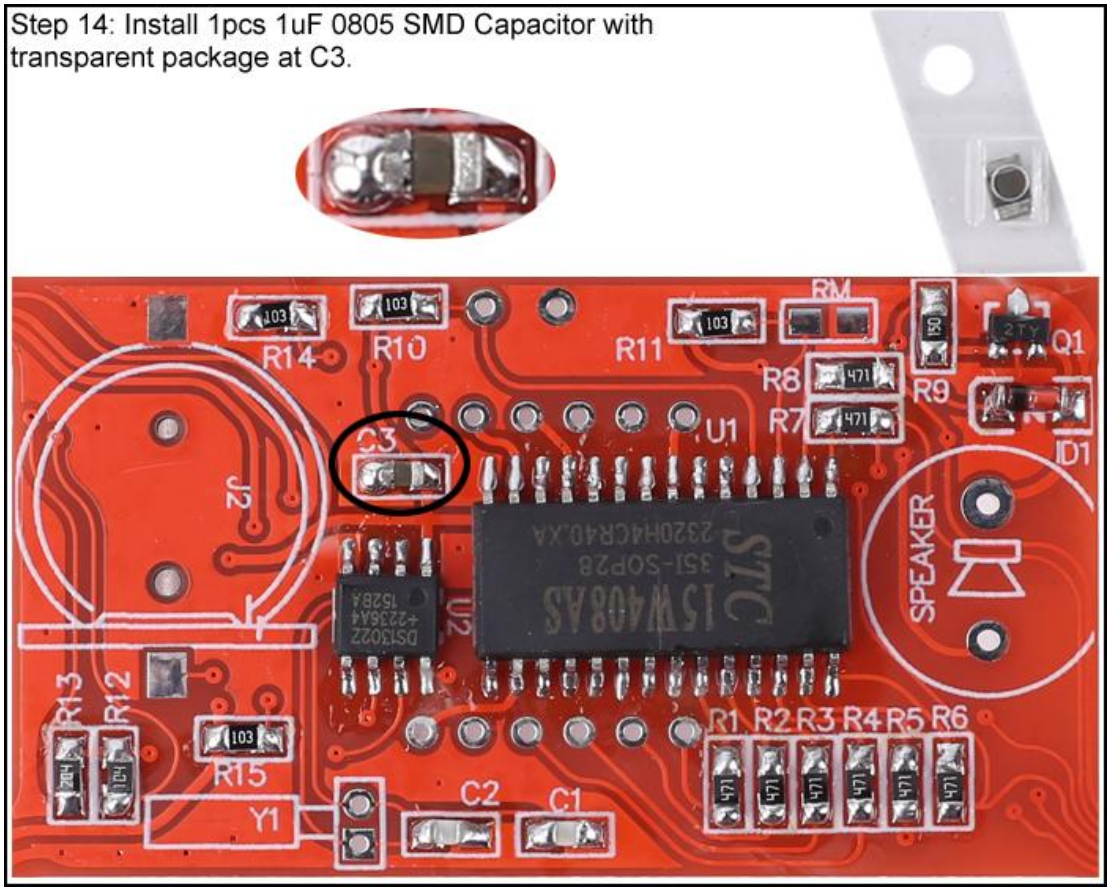
Step 12: Install 1pcs 200Kohm 0805 SMD Resistor with screen printing '204' at R13.



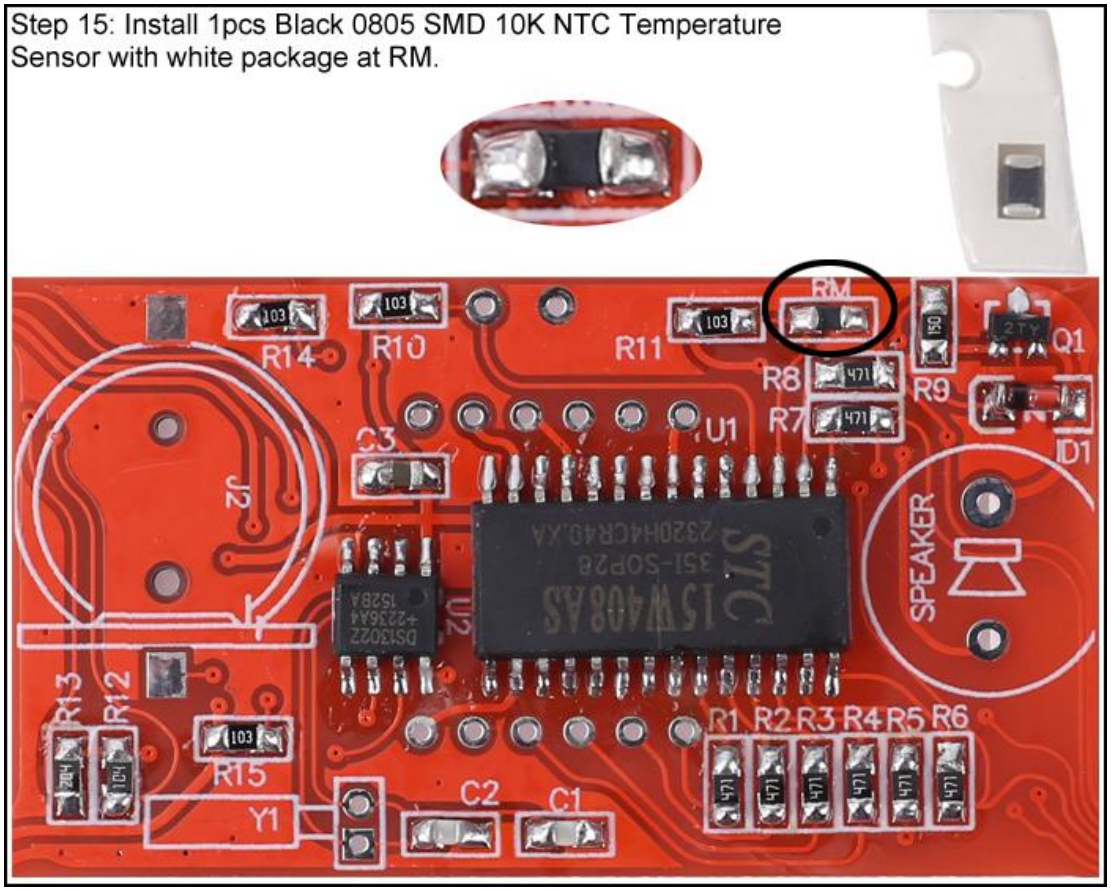
Step 13: Install 2pcs 5pF 0805 SMD Capacitor with white package at C1,C2.



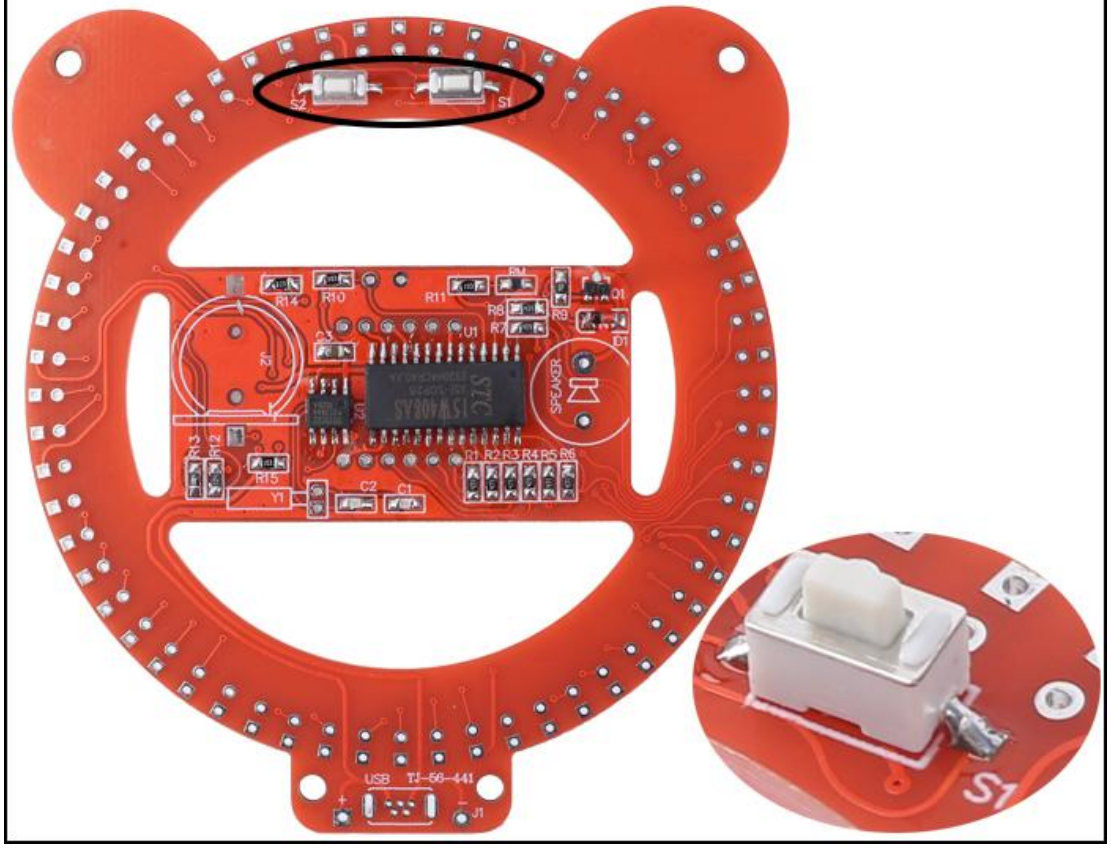
Step 14: Install 1pcs 1uF 0805 SMD Capacitor with transparent package at C3.

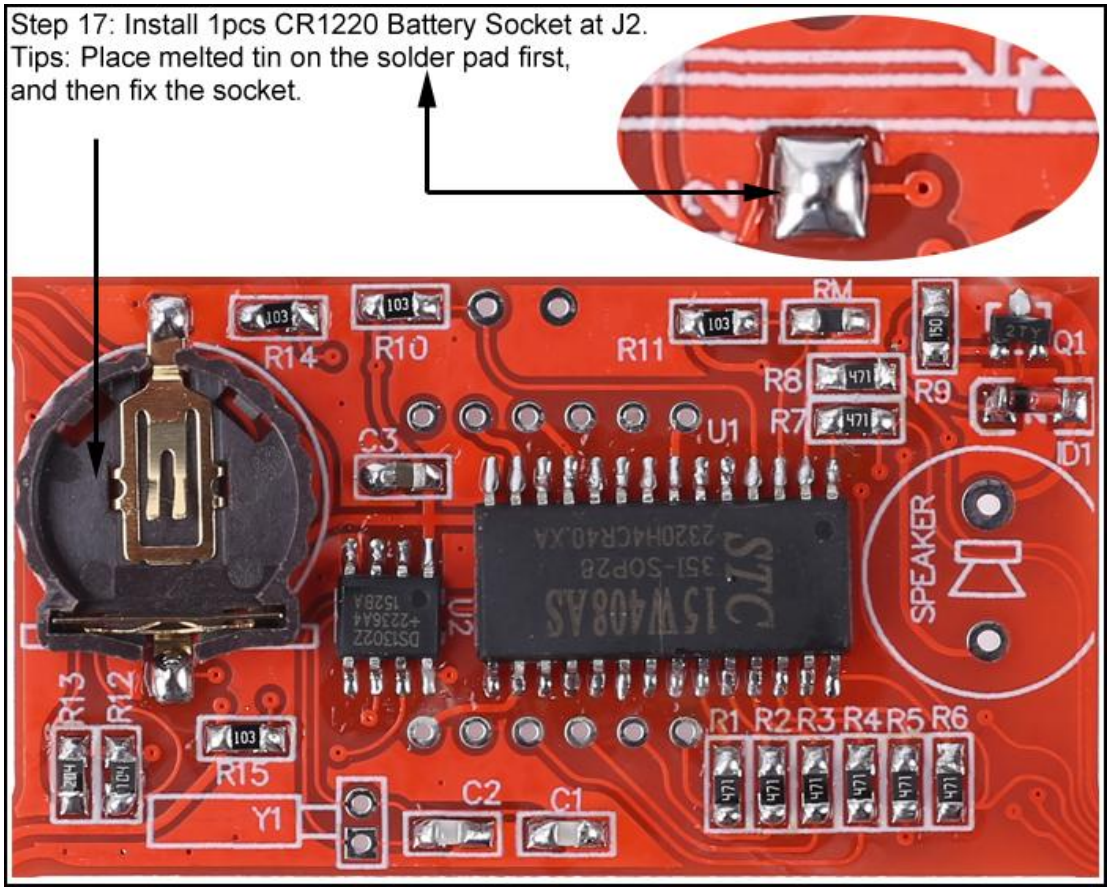


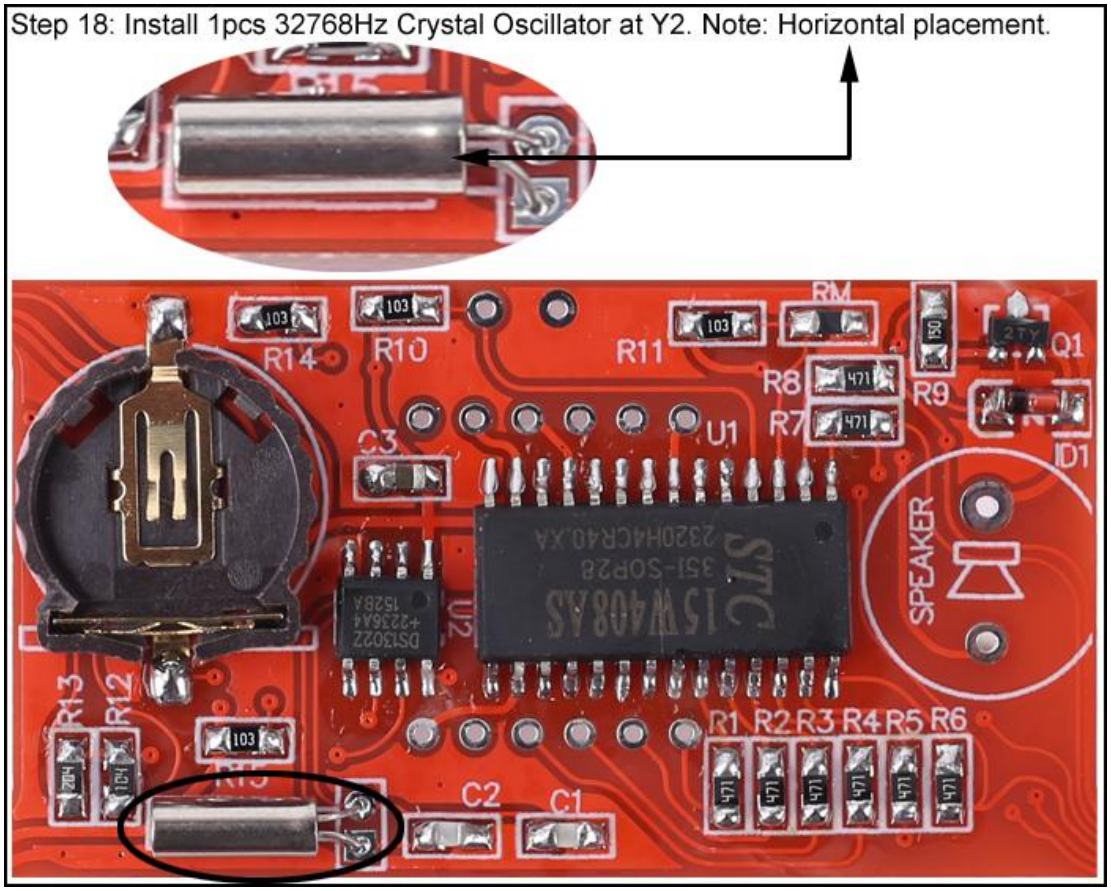
Step 15: Install 1pcs Black 0805 SMD 10K NTC Temperature Sensor with white package at RM.



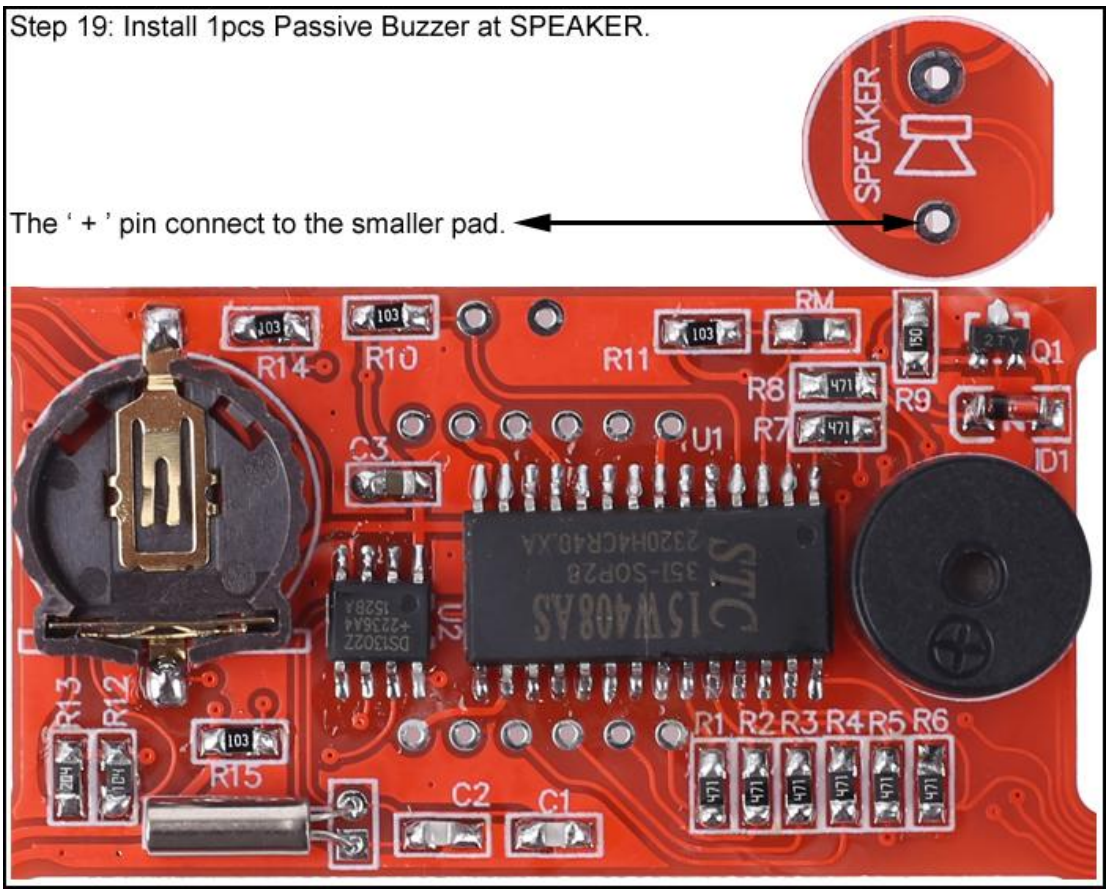
Step 16: Install 2pcs 3*3*6mm SMD white Button at S1,S2.



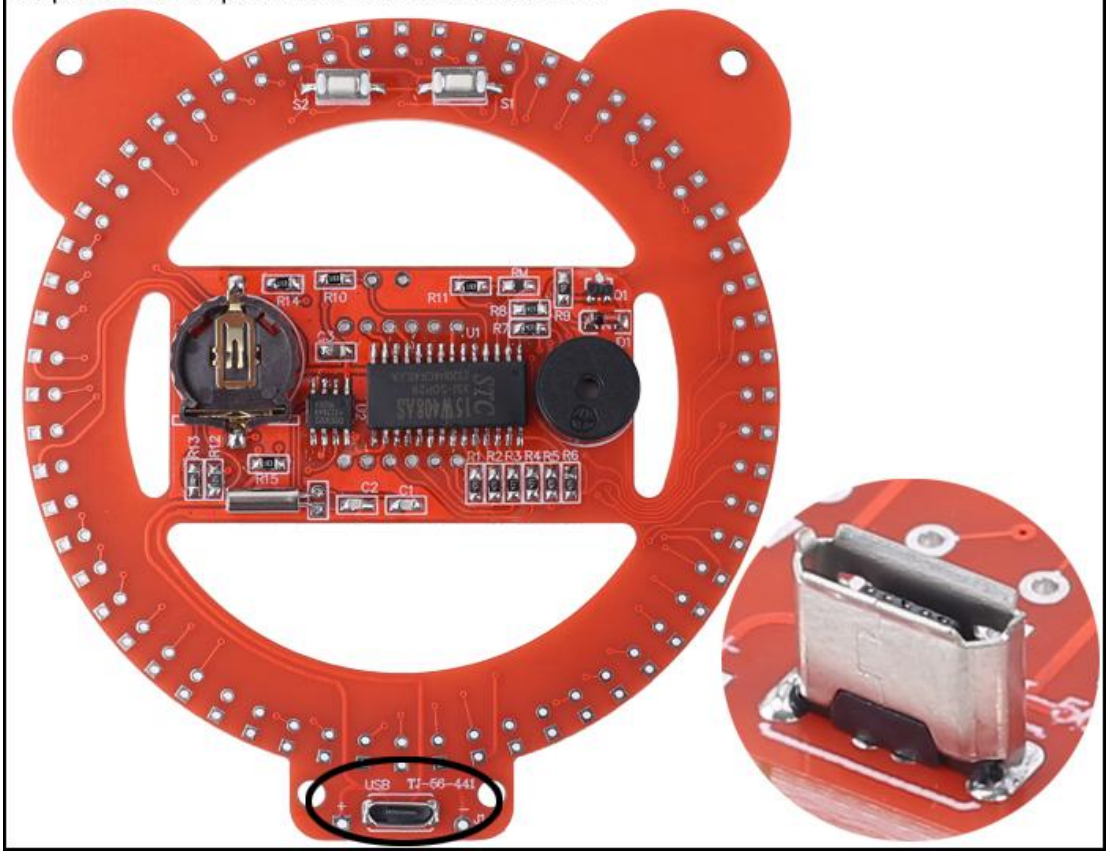

Step 17: Install 1pcs CR1220 Battery Socket at J2.
Tips: Place melted tin on the solder pad first,
and then fix the socket.
R14
R10
R11
RM
R8
R7
R9
Q1
D1
C3
U1
U2
SPEAKER
R13
R12
R15
Y1
C2
C1
R1 R2 R3 R4 R5 R6


Step 18: Install 1pcs 32768Hz Crystal Oscillator at Y2. Note: Horizontal placement.
R14
R10
R11
RM
R8
R7
R9
Q1
D1
C3
U1
U2
SPEAKER
R13
R12
C2
C1
R1 R2 R3 R4 R5 R6

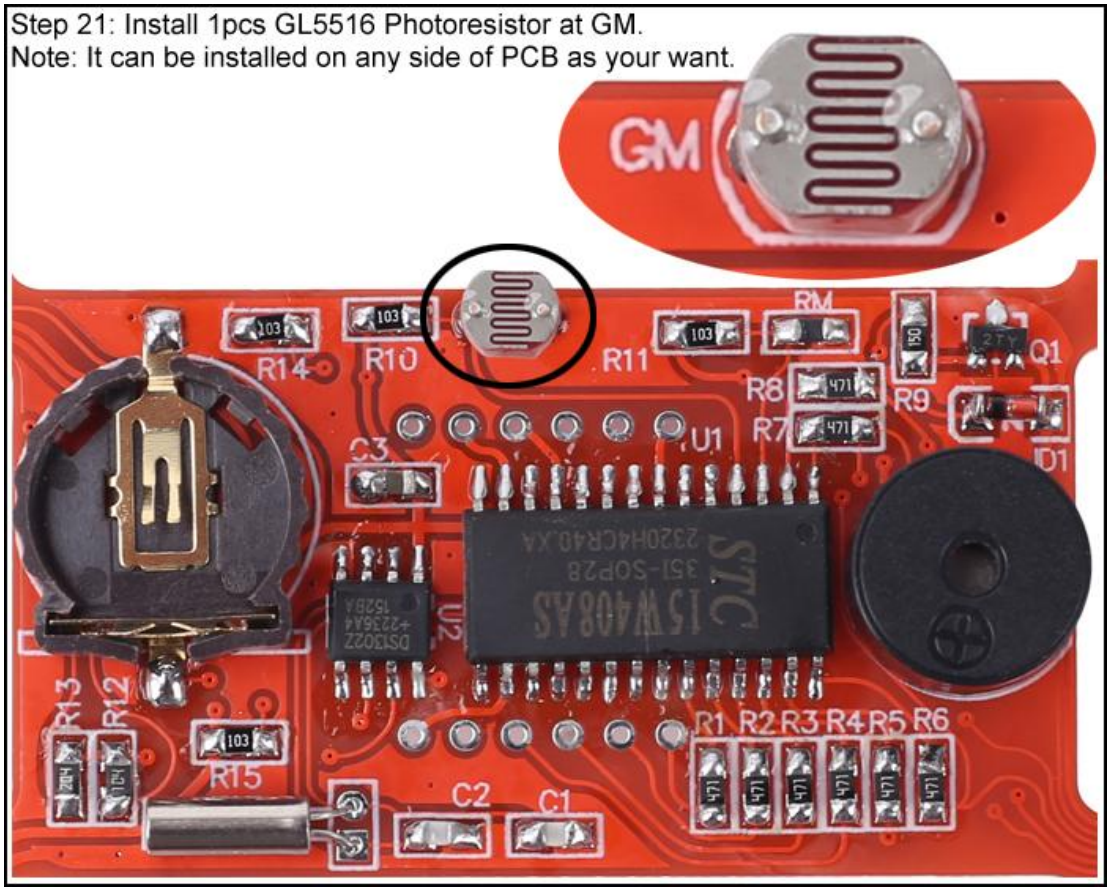
Step 19: Install 1pcs Passive Buzzer at SPEAKER.



Step 20: Install 1pcs Micro USB Socket at USB.



Step 21: Install 1pcs GL5516 Photoresistor at GM.
Note: It can be installed on any side of PCB as your want.



Step 22: 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:

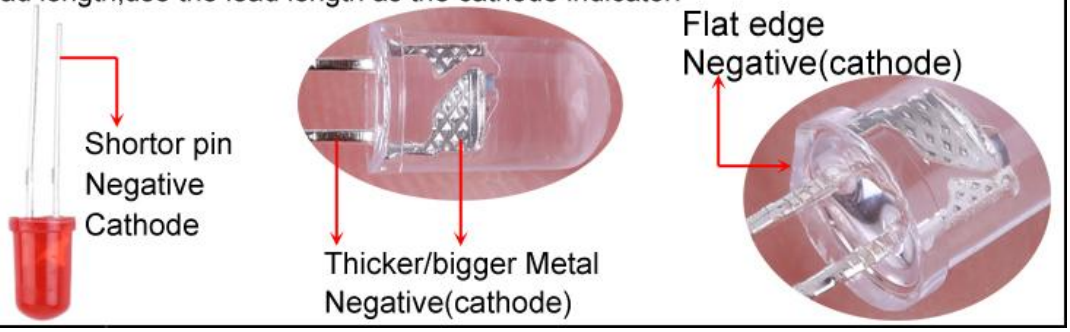
22.1>.According to the length of the LED lead to distinguish. The longer pin is positive(anode) lead. The shorter pin is negative(cathode) lead.

22.2>.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.

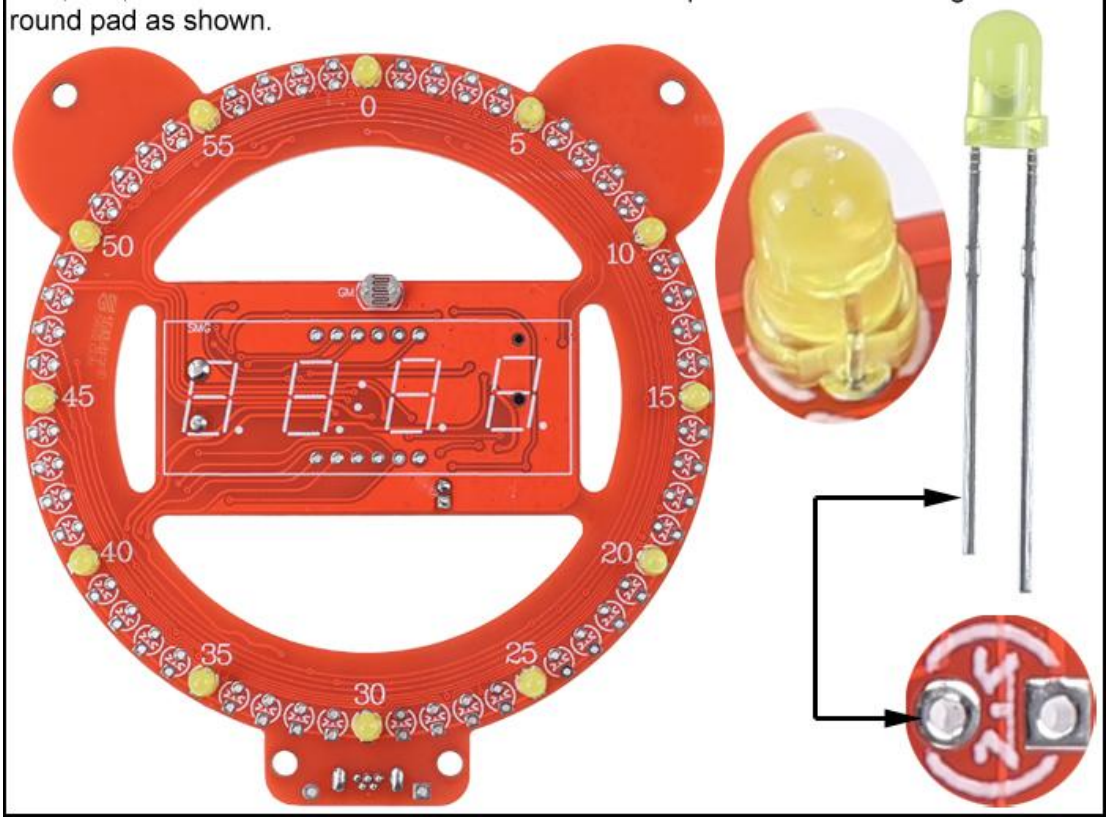
22.3>.Identify by edge of plastic case.The negative(cathode) lead of the LED should be the pin nearest the flat on the plastic case.

22.4>.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)

22.5>.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.



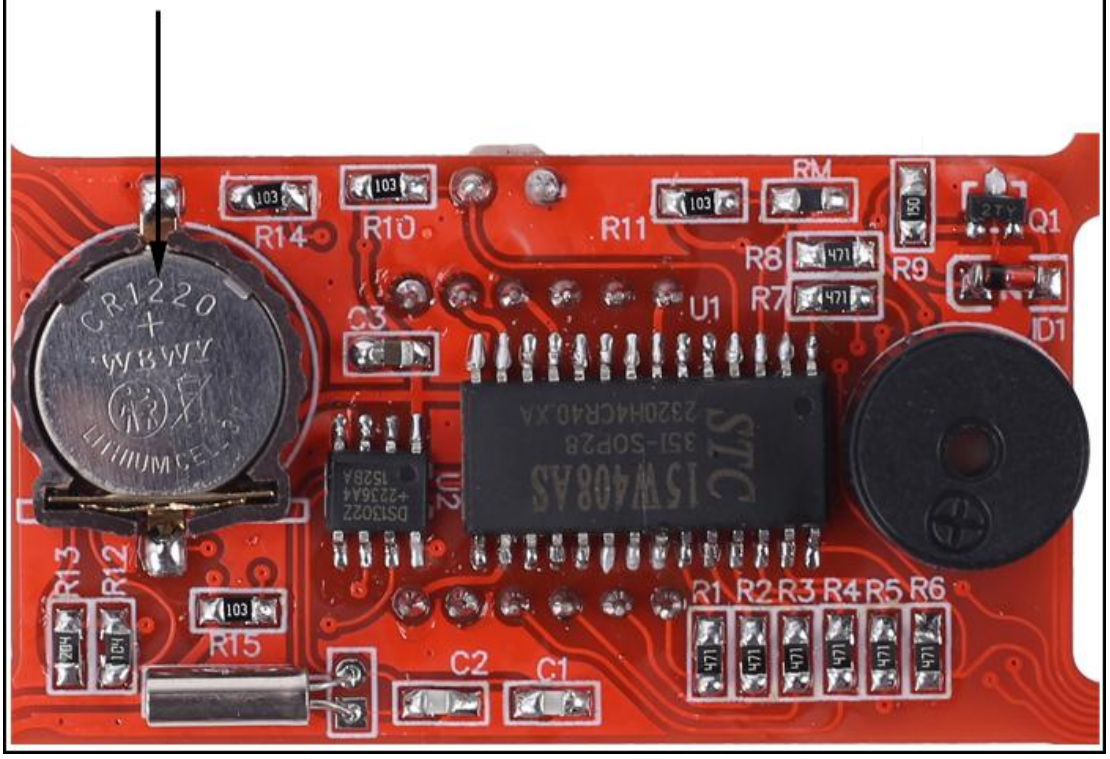
Step 23: Install 12pcs 3mm Yellow LED at D0,D5,D10,D15,D20,D25,D30,D35,D40, D45,D50,D55 on PCB another side. Note: the shorter pin connect to flat edge or round pad as shown.



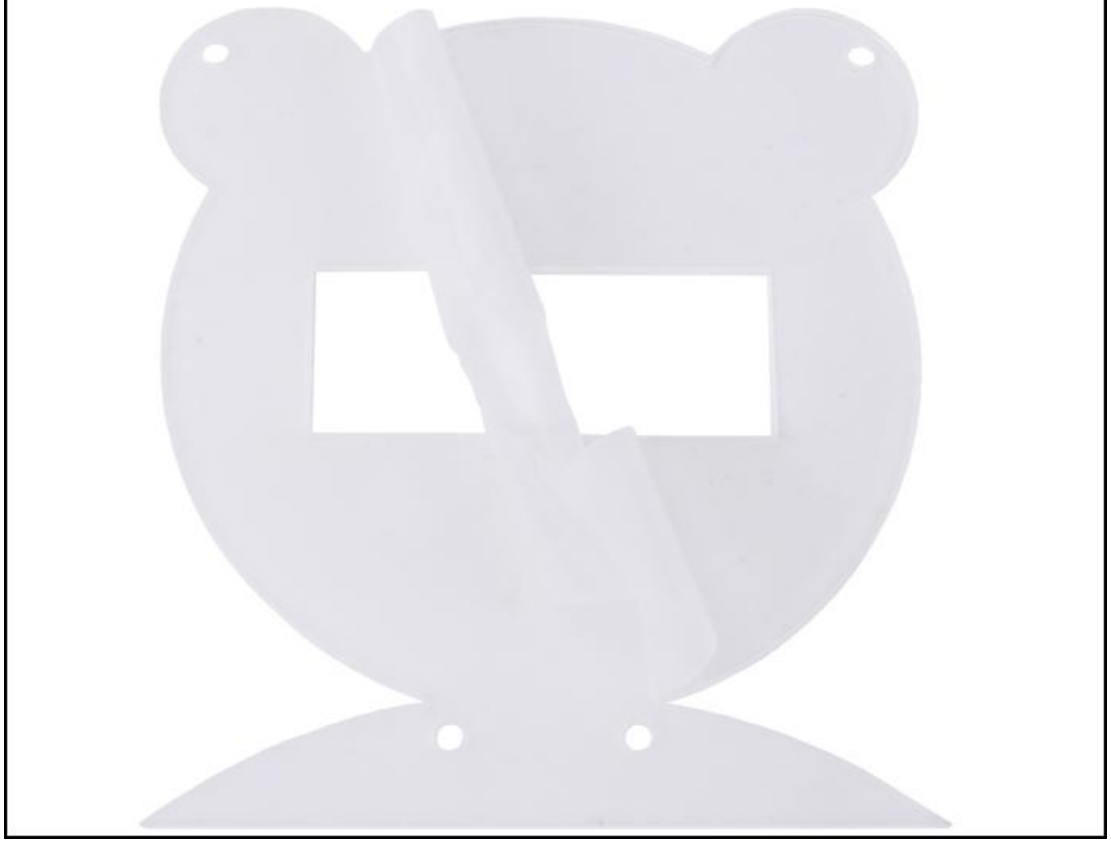
Step 24: Install 48pcs 3mm Blue LED. Note: the shorter pin connect to flat edge or round pad as shown.

Step 25: Install 1pcs 0.56in 4Bit Digital Tube at SMG. Pay attention to the installation direction of the decimal point.

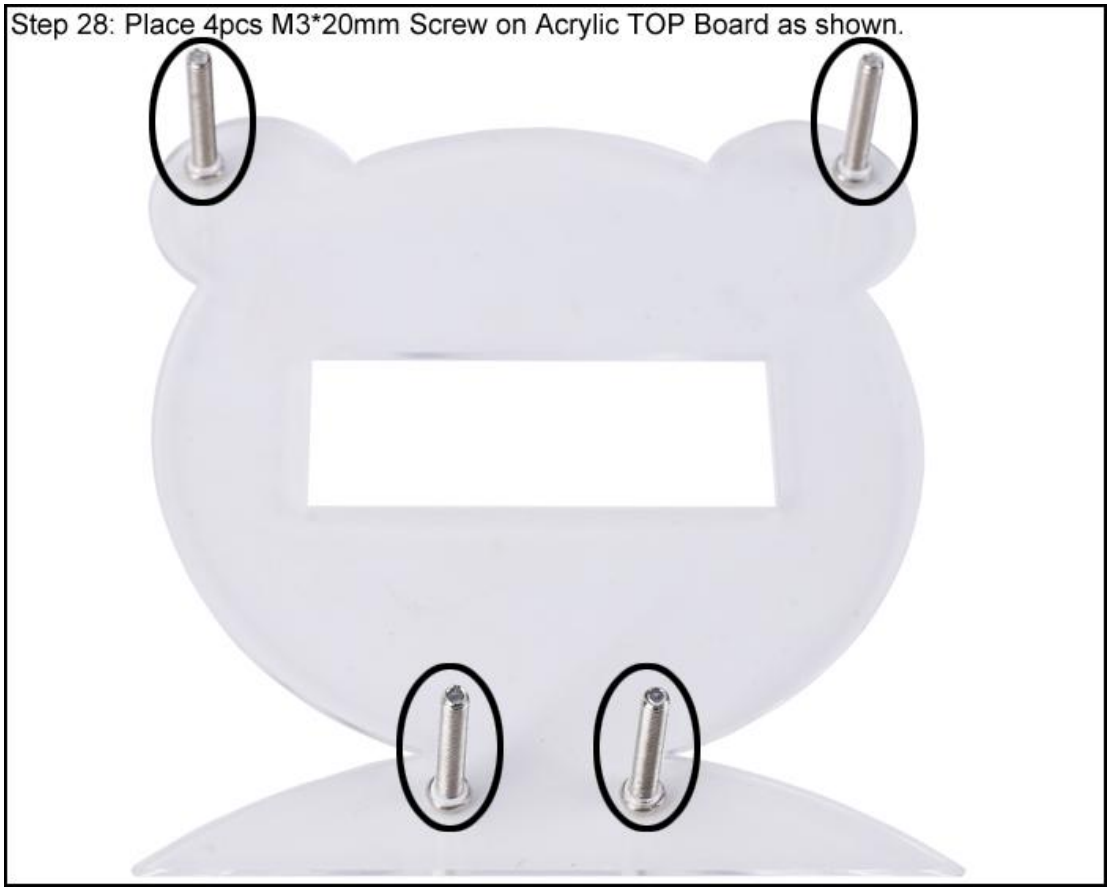
Step 26: Install 1pcs CR1220 Battery on CR1220 Battery Socket. Note: The positive electrode of the battery faces outward.



Step 27: Tear off the protective film on the black acrylic surface.

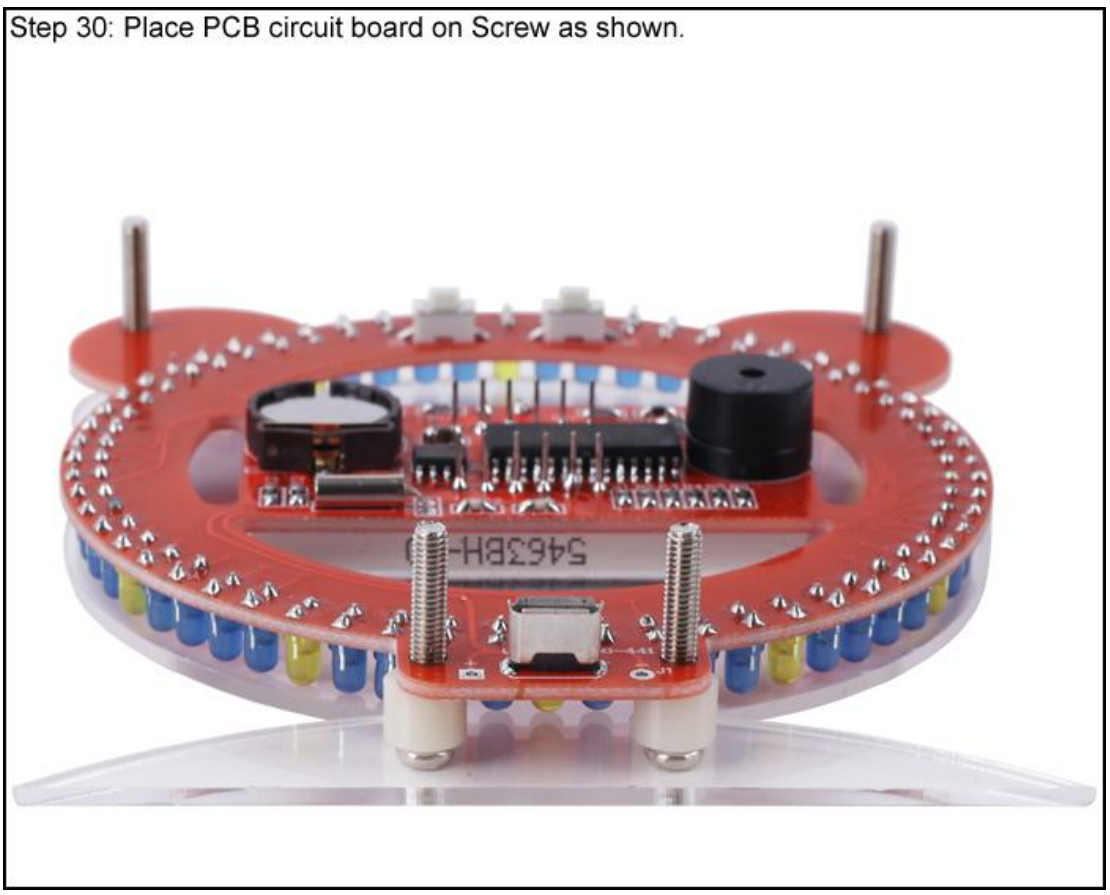


Step 28: Place 4pcs M3*20mm Screw on Acrylic TOP Board as shown.

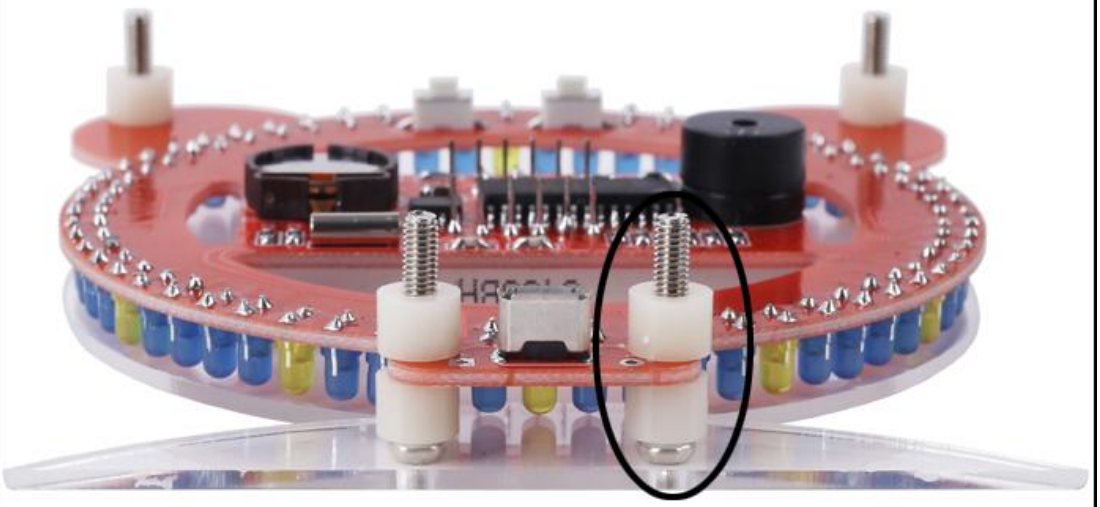


Step 29: Place 4pcs White Isolation Column on Screw as shown.

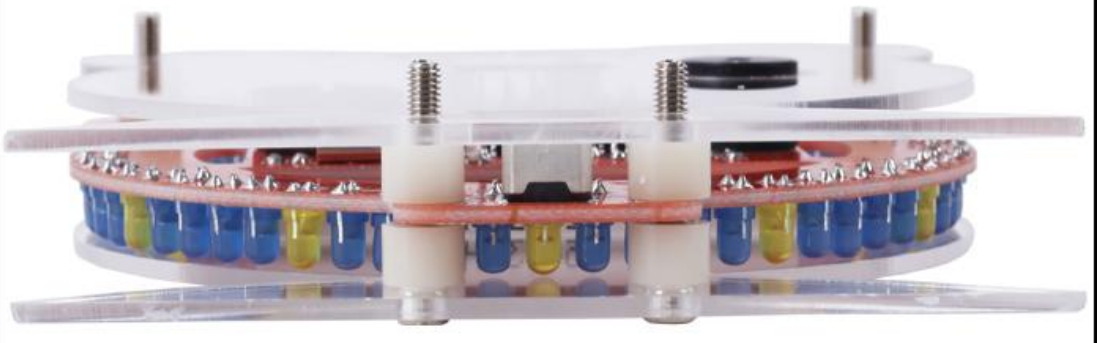
Step 30: Place PCB circuit board on Screw as shown.



Step 31: Place 4pcs White Isolation Column again on Screw as shown.



Step 32: Place another Acrylic Board on Screw as shown.




Step 33: Fix by 4pcs M3 Nut.