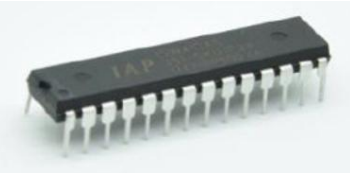
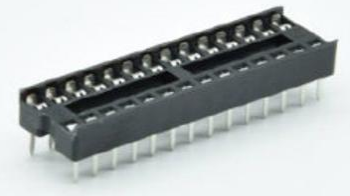






## 3D Christmas Tree Soldering Tutorial

### Components List:

Name	Picture	Specification	LOGO	QTY.
<b>Type: Music Version</b>				
Resistance	red black brown gold	200R	As silk screen	13
	red black orange gold	20K	R1, R2	2
IC		IAP15W408AS DIP28	U1	1
IC holder		28P	U1	1
Power amplifier chip		8002A	U2	1
Speaker (Bluetooth version does not require installation)		8Ω 0.5W with speaker cable	LS1	1
LED		Colorful flash (5mm)	As silk screen	37
Electrolytic capacitor		25V100uF	C1 C2	2
Monolithic capacitor		104	C4 C7	1

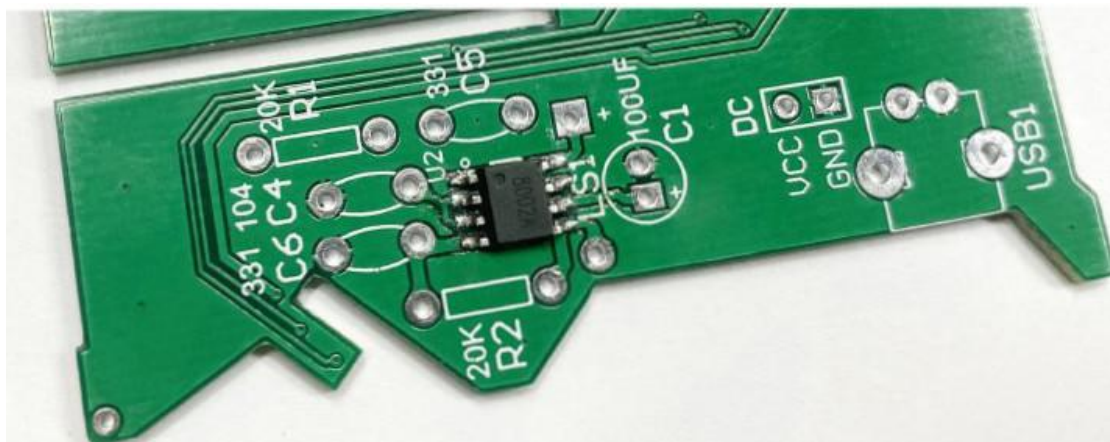
		331	C5 C6	2
Infrared receiver			M2	1
Toggle Switches		Bent feet (5 feet)	S1	1
Circuit board		6 specifications		15
USB socket		Mini_USB 90 degrees	USB1	1
Power cable				1
<b>Type: Bluetooth Version (OPTIONAL)</b>				
90 degree bent female header		6P	P2	1
Bluetooth module				1
Speaker		4 Ω 3W		1
Shell		Acrylic material		1

## Steps of soldering

### 1. Solder the power amplifier chip

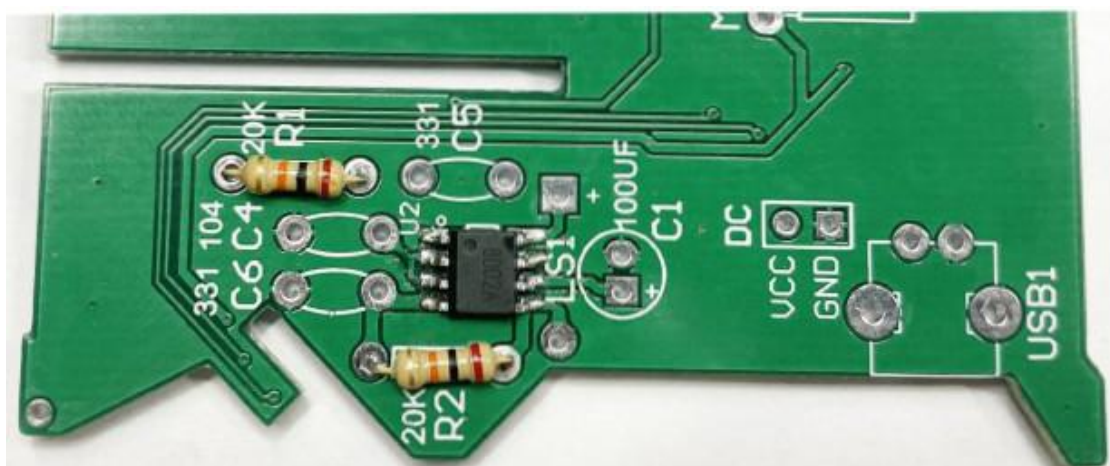
Now let's solder a component with more pins, solder it next to the LSI (it should be U2, but this board does not print U2, and this logo will be added in future versions). This is also the step of soldering the voltage regulator tube. First, put a little solder on a pad, as shown below:

Put the chip in place. Note that the small dots on the chip should correspond to the small pins on the circuit board, and all the pins should be aligned on the pads. Melt off the solder just placed, so that one pin is soldered. As shown below:



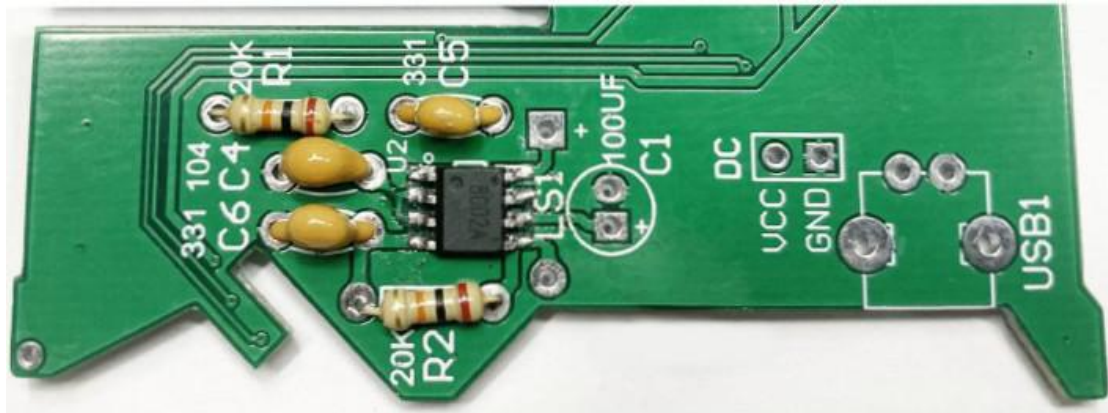
### 2. Welding resistance

Now start to solder the direct plug components, first solder the resistors, of which the 20K ohm resistors are soldered on R1 and R2. As shown below:



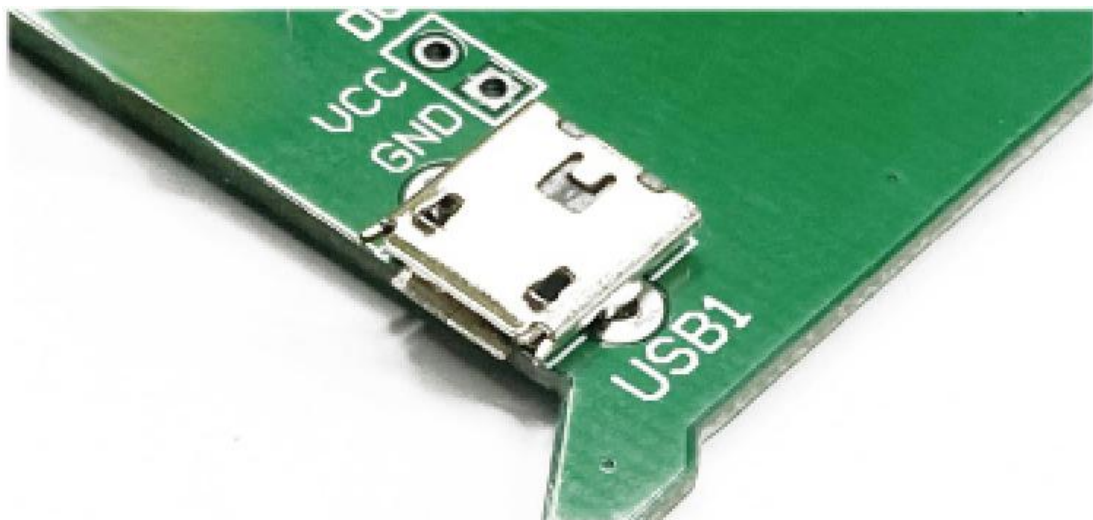
### 3. Soldering monolithic capacitor

The monolithic capacitors are welded at C4, C5, and C6, as shown below:



### 4. Solder the USB socket

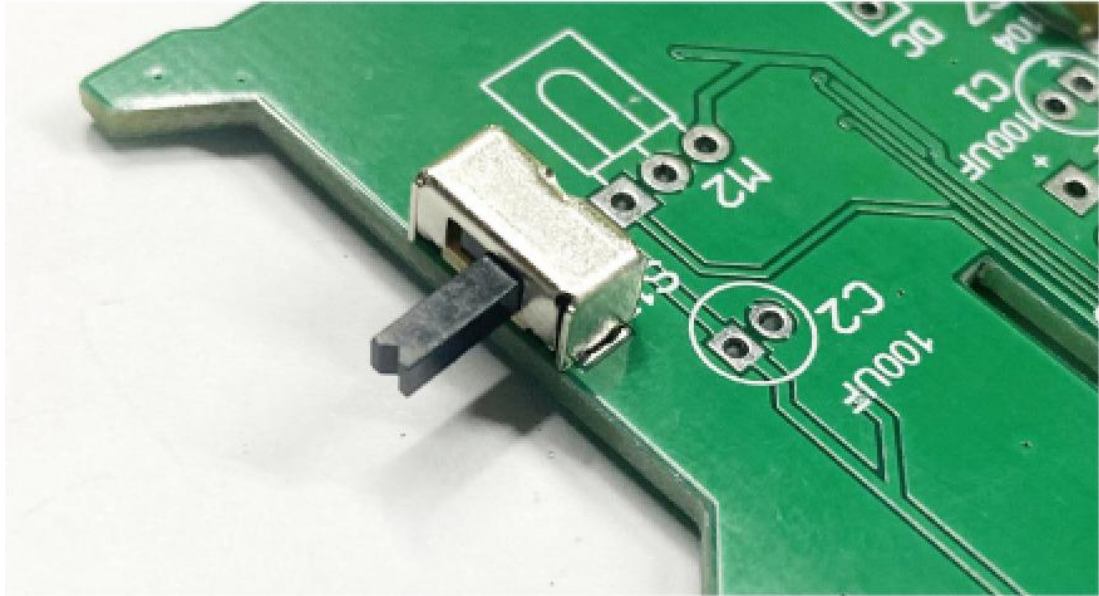
Solder it to the position of USB1. As shown in the picture



### 5. Solder the pull switch

Weld at S1 position. As shown



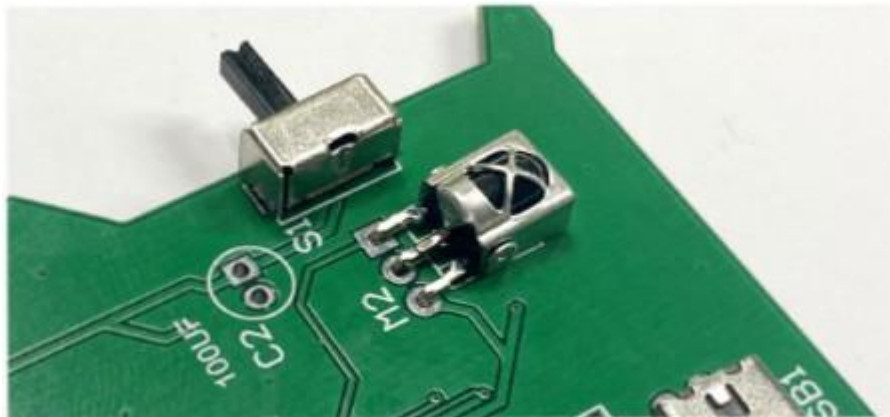


## 6. Solder the infrared receiver

First, bend the infrared receiving head 90 degrees. Be sure not to bend it at the bottom end of the pin. If you bend it at the bottom end, the pin will easily break. As shown below:

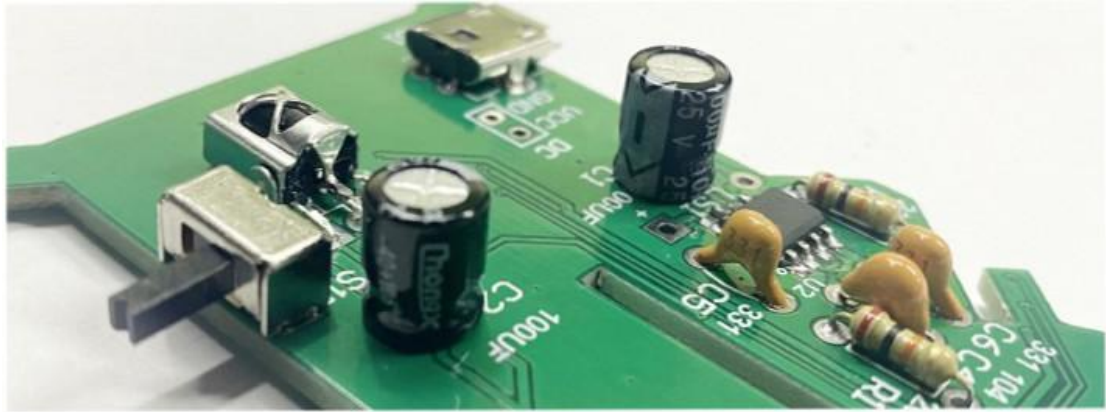


Solder the infrared receiver to the M2 position, making sure the raised side faces up. As shown below:

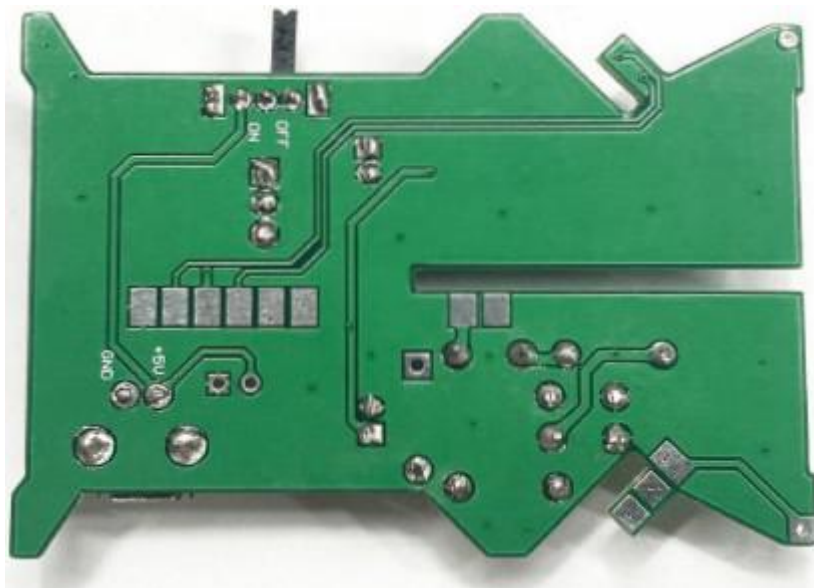
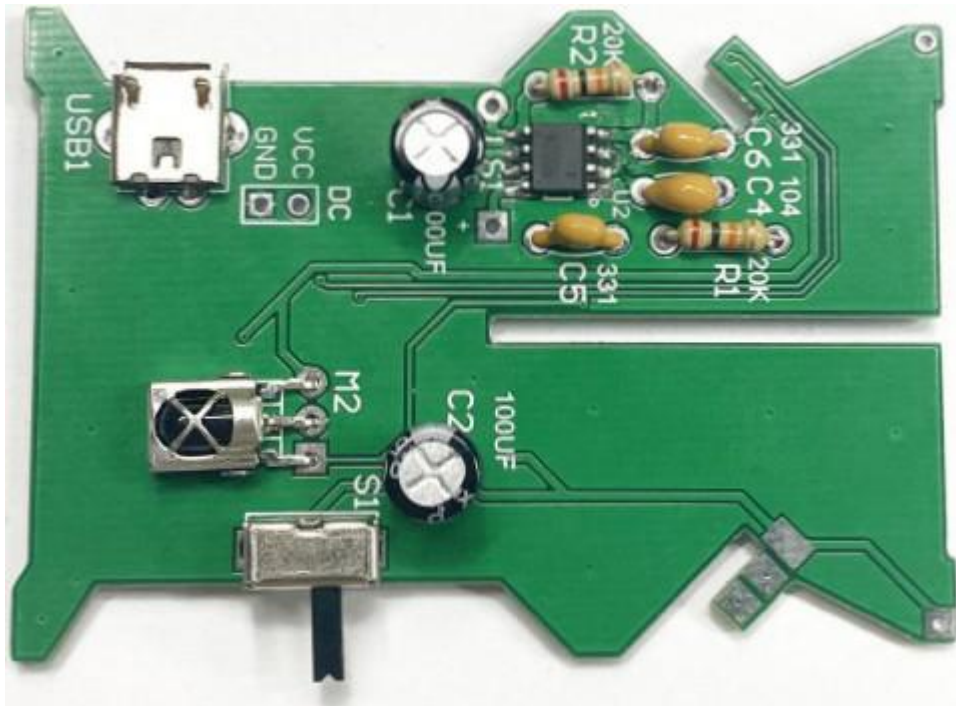


## 7. Electrolytic capacitor

Solder the electrolytic capacitor to the positions of C1 and C2. Note that the positive electrode must be soldered to the pad marked with +. After soldering, be careful to cut off the pins on the back, as shown in the figure below:

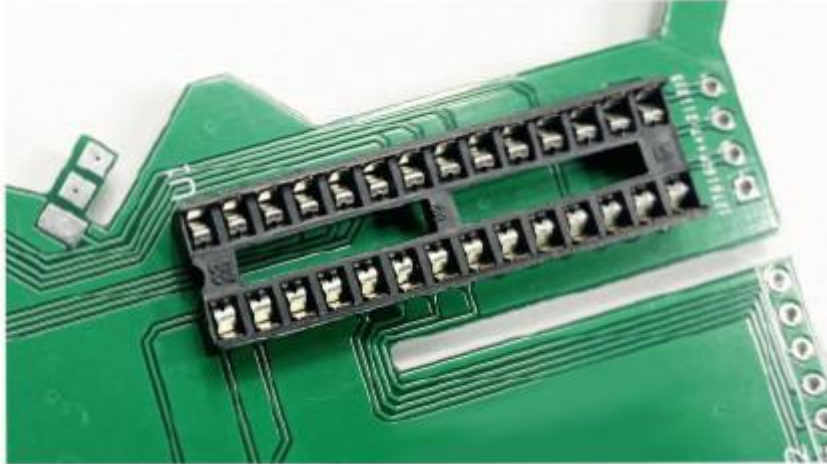


The welding of C board is completed. Here are two completed pictures of C board:

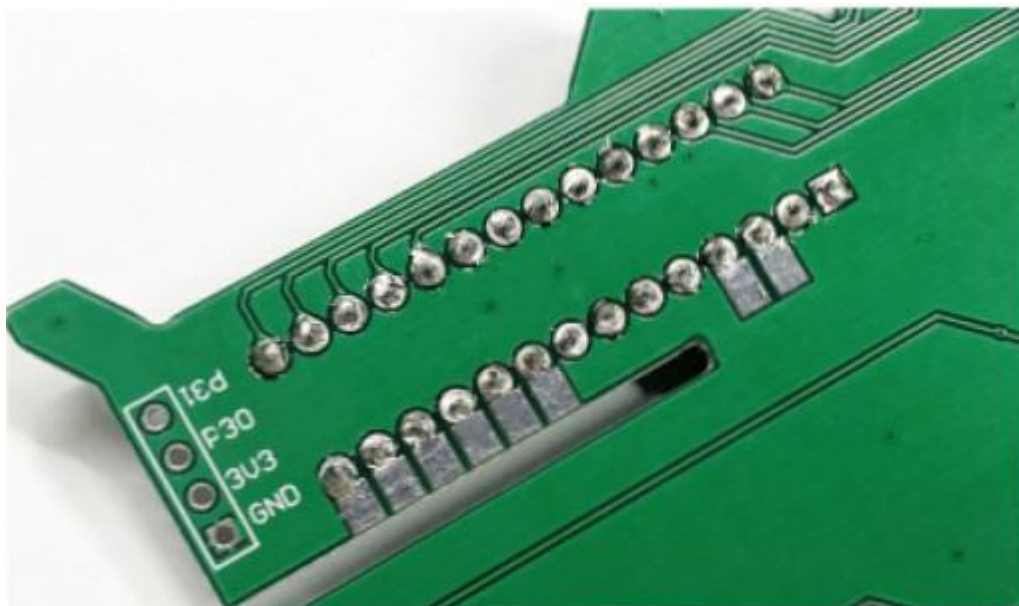


## 8. Solder IC holder

The IC holder is soldered to the position of U1. Note that the notch on the IC holder should be consistent with the notch on the silk screen on the circuit board, as shown below:

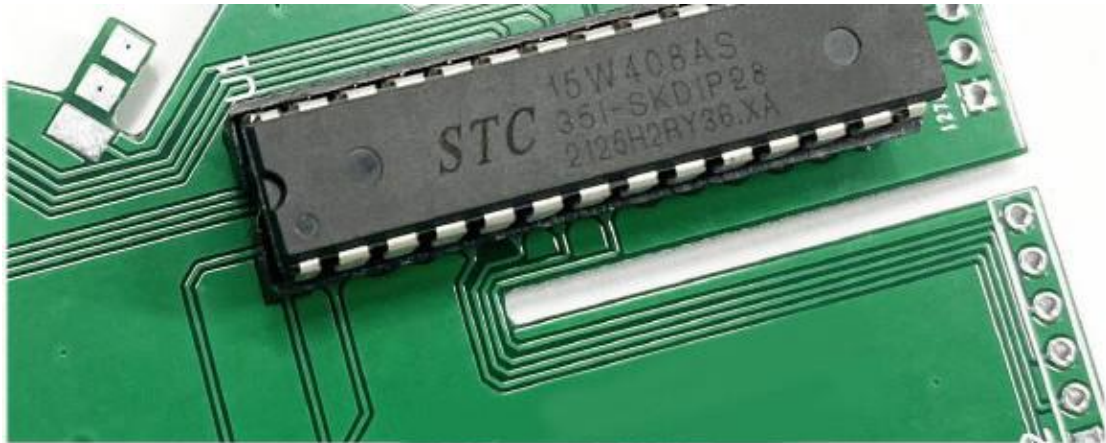


It is necessary to confirm that the notches on all the IC seats have passed through the circuit board before starting to solder. Do not put so much solder on the square pad to avoid jamming when the circuit board is assembled later - as shown below:



After soldering, you can plug in the microcontroller. The direction of the notch on the microcontroller should be consistent with the notch printed on the circuit board, as shown below:





Some novices often break the MCU when plugging it in. Here is a little tip for your reference only. You can first break each pin of the MCU to 90 degrees. Be careful not to bend the pins until each pin is bent. The pins can all fit into the pin sockets on the IC holder, and then forcefully press the microcontroller into the IC holder, and that's it.

At this point, all the components on the tree trunk have been soldered, and now the three tree trunk PCBs are put together.

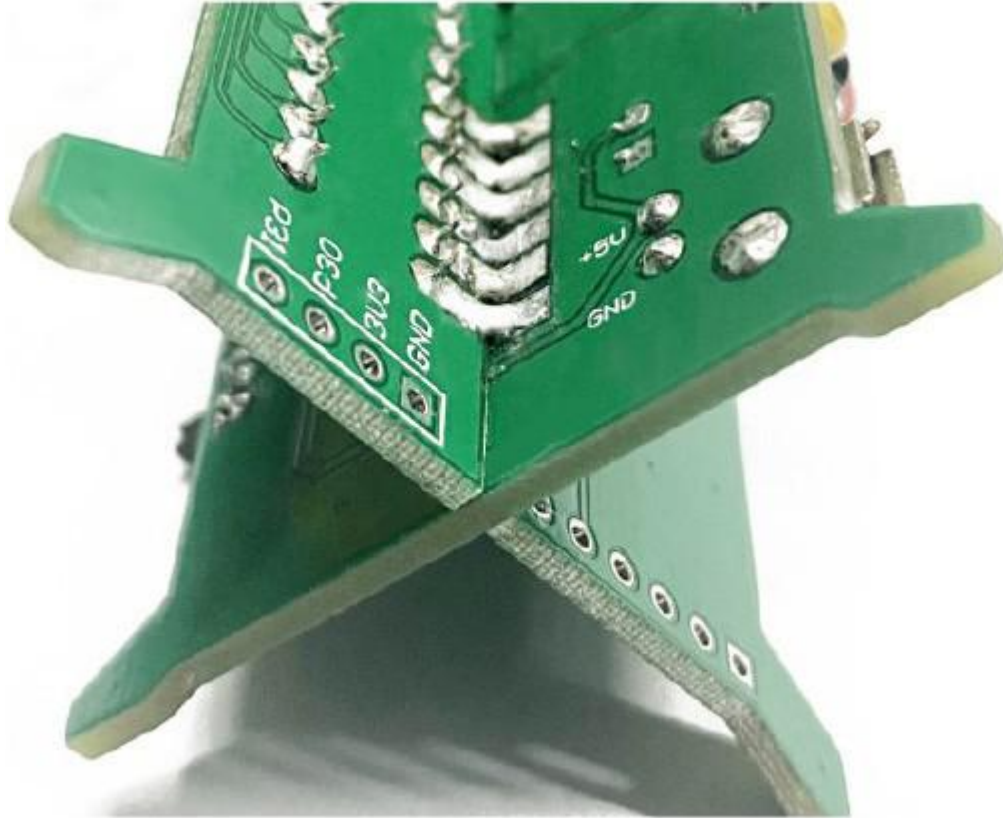
## 9. Put together board C and board A

Insert board C into the bottom of board A. If the direction is correct, the square pad of board A corresponds to the square pad of board C. First connect one pad with solder, as shown in the figure below:





Then adjust the two PCBs so that they are perpendicular to each other. Be sure to be vertical, otherwise it will be more difficult to solder the leaves. As shown below:



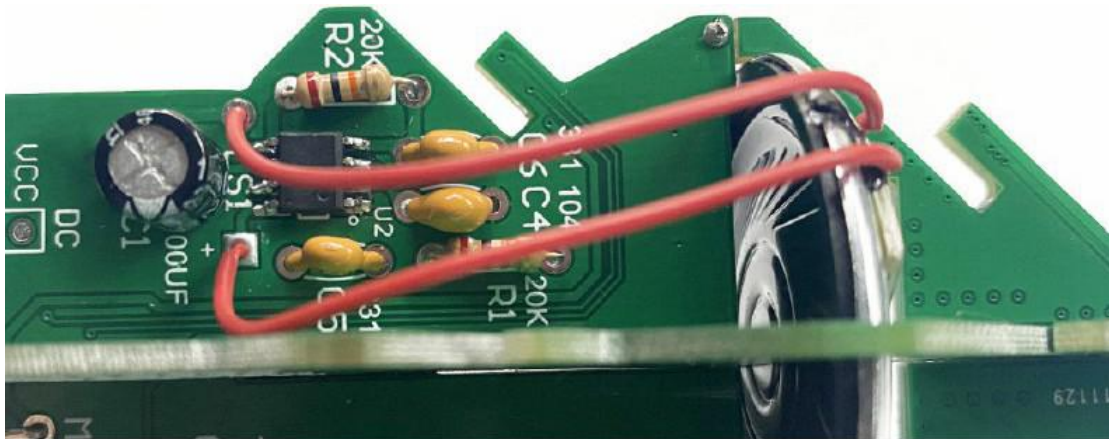
## 10. Install speakers

First, install the speaker in the space on the top of the C board. Be sure to install it in the middle as shown below:



## 11. Solder the speaker wire

Use wires to connect the speaker to the circuit board. Connect them to the two pads of the speaker and the two pads next to LS1 on the circuit board. Pay attention to the alignment. The soldering on the back is as shown below:



## 12. Install B board

Insert board B on top of board A and align it with board C. If the direction of board C is correct, the square pads on board C will also correspond to the square pads on board A. After alignment, first connect a pair of pads, as shown below:



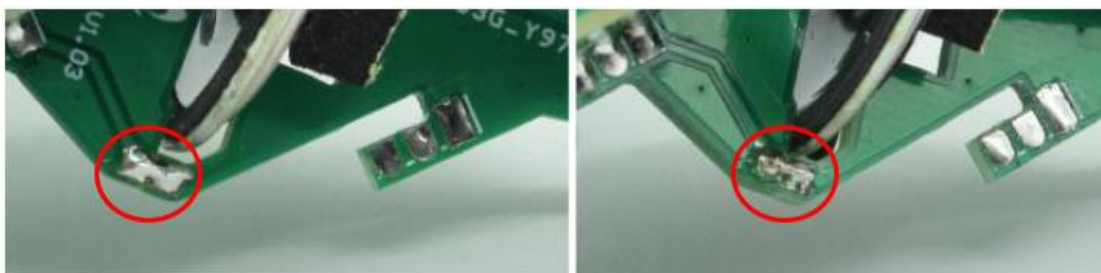
Then connect all the pads. There are a total of 8 pads on boards A and B, and two pads on boards B and C. Don't miss them! As shown below:







Among them, the connection between board B and board C may be difficult to connect using only solder. You can cut a small piece of component pin to connect it yourself and then apply tin, as shown below:



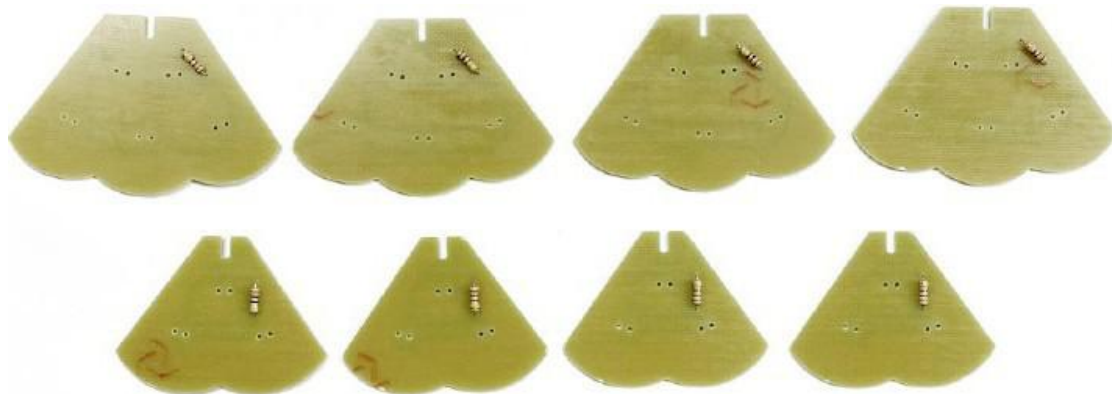
13. Solder the 200R resistor



Now, the tree trunk welding is completed. After the welding is completed, you can turn on the power and test it. If there is music output, it means the welding is correct and you can start welding the leaves.

## 14. Solder the 200R resistor

Install the resistor on the back and solder the front as shown below:

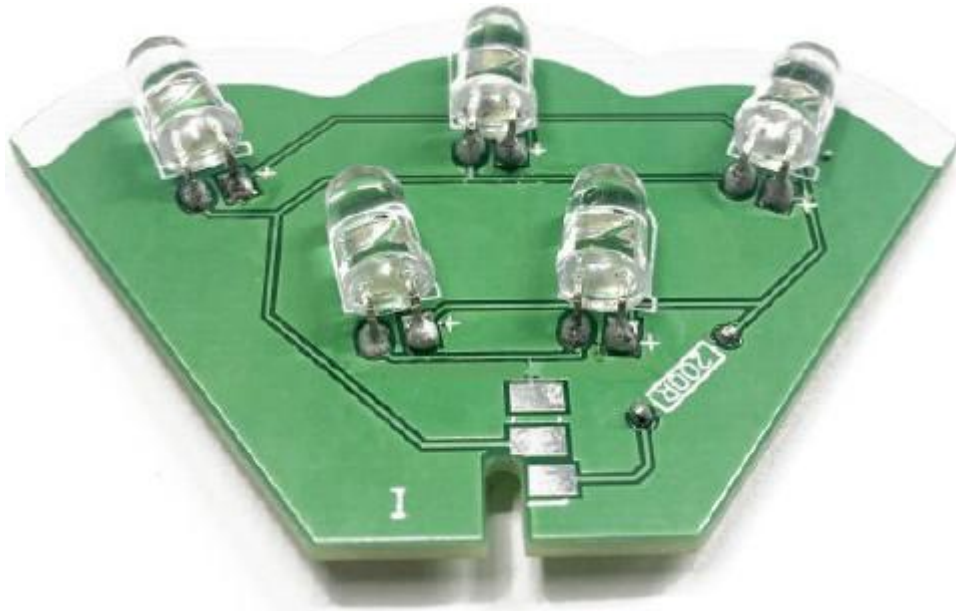


## 15. Solder LED lights

First, bend the LED pin 90 degrees. Be sure not to bend the pin at the bottom. If you bend it at the bottom, the pin will easily break. Also pay attention to the folding direction. If the direction is reversed, it will not work when soldered to the circuit board! As shown below:



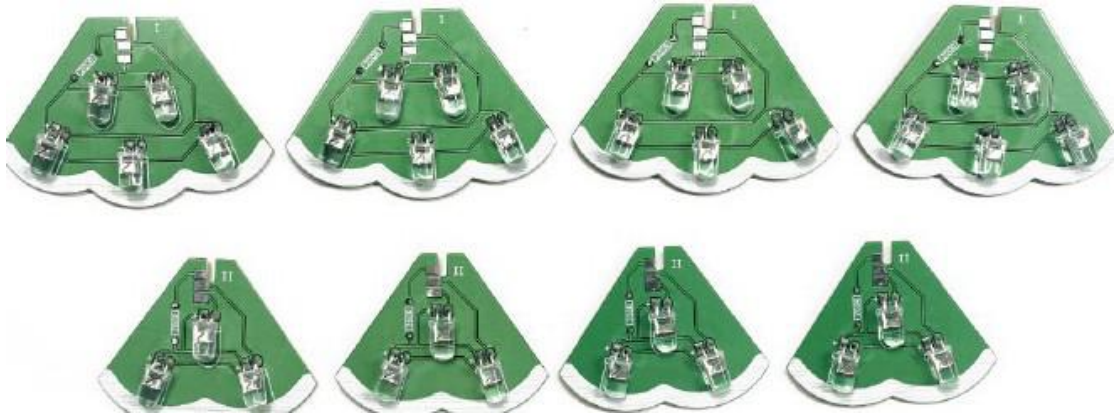
Then weld it to the board. The positive electrode must be welded on the pad marked with +. The requirements for welding the LED are not high. Just make sure the LED is connected to the circuit board, as shown below:



Then cut off the pins at the back, be sure to keep them as short as possible, as shown below:

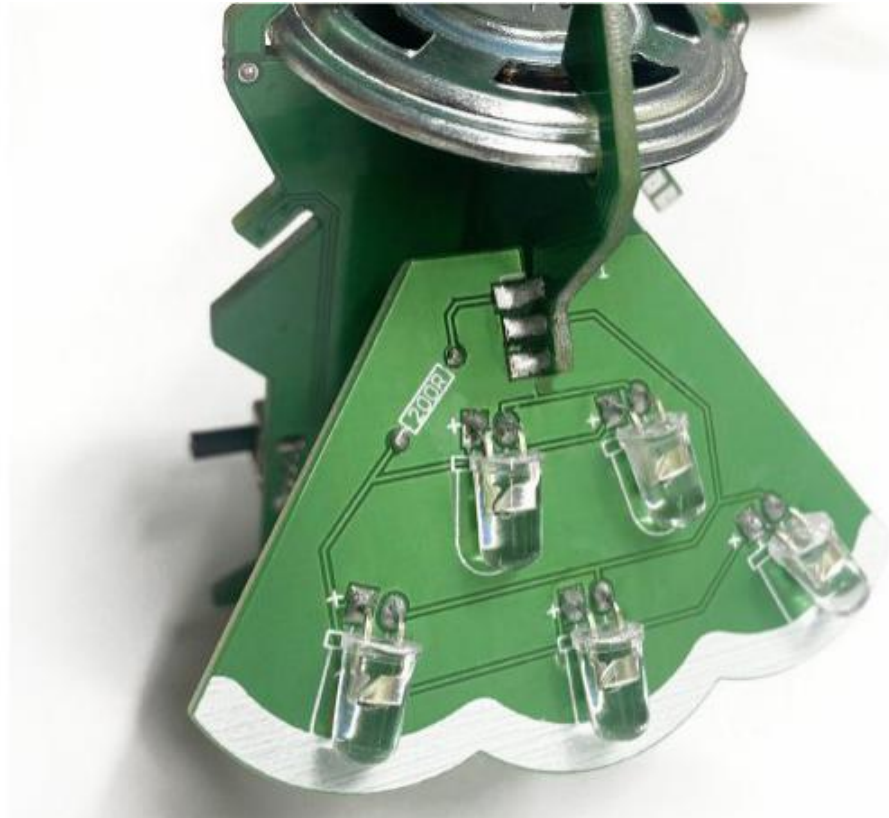


Weld all the lights one by one in this way, as shown below:



## 16. Weld the first layer of leaves

Insert the circuit board marked I (board with 5 LEDs) onto the first layer of tree trunk. After insertion, the three pads on the leaves will correspond to the pads on the trunk. After the pads are aligned, place the pads on the trunk. Just connect them together, as shown below:



Weld the 4 blades in sequence:





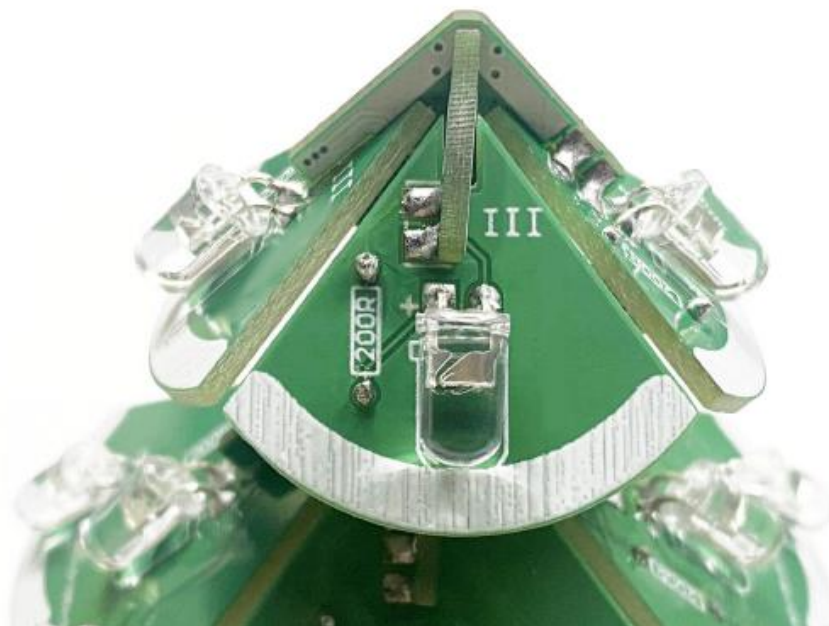
## 17. Weld the second layer of leaves

Insert the circuit board marked II (the board with 3 LEDs) into the second layer of tree trunks, using the same welding method as the first layer of leaves, and install the four boards in sequence, as shown below:



## 18. Weld the third layer of leaves

Insert the circuit board marked III (board with 1 LED) into the topmost tree trunk. Use the same welding method as the first layer of leaves to install the four boards in sequence, as shown below:



## 19. Solder the top LED light

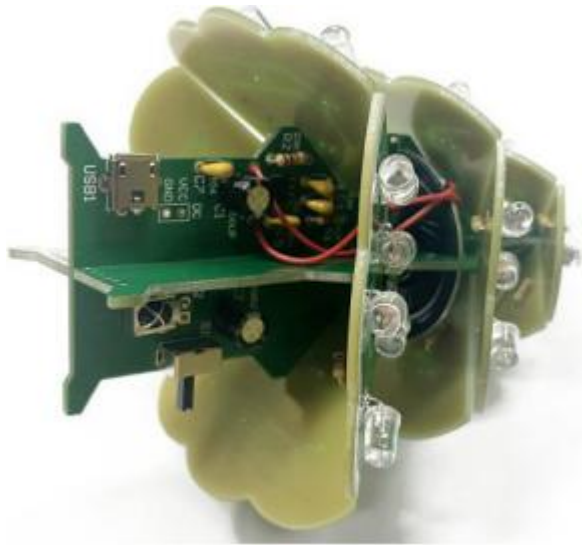
Note that the LED lamp legs are divided into positive and negative, long is positive and short is negative. The long leg corresponds to the + number on the board, and the short leg corresponds to the - number on the board, as shown below:



The welding of the Christmas tree is completed, let's take a look at the finished picture:

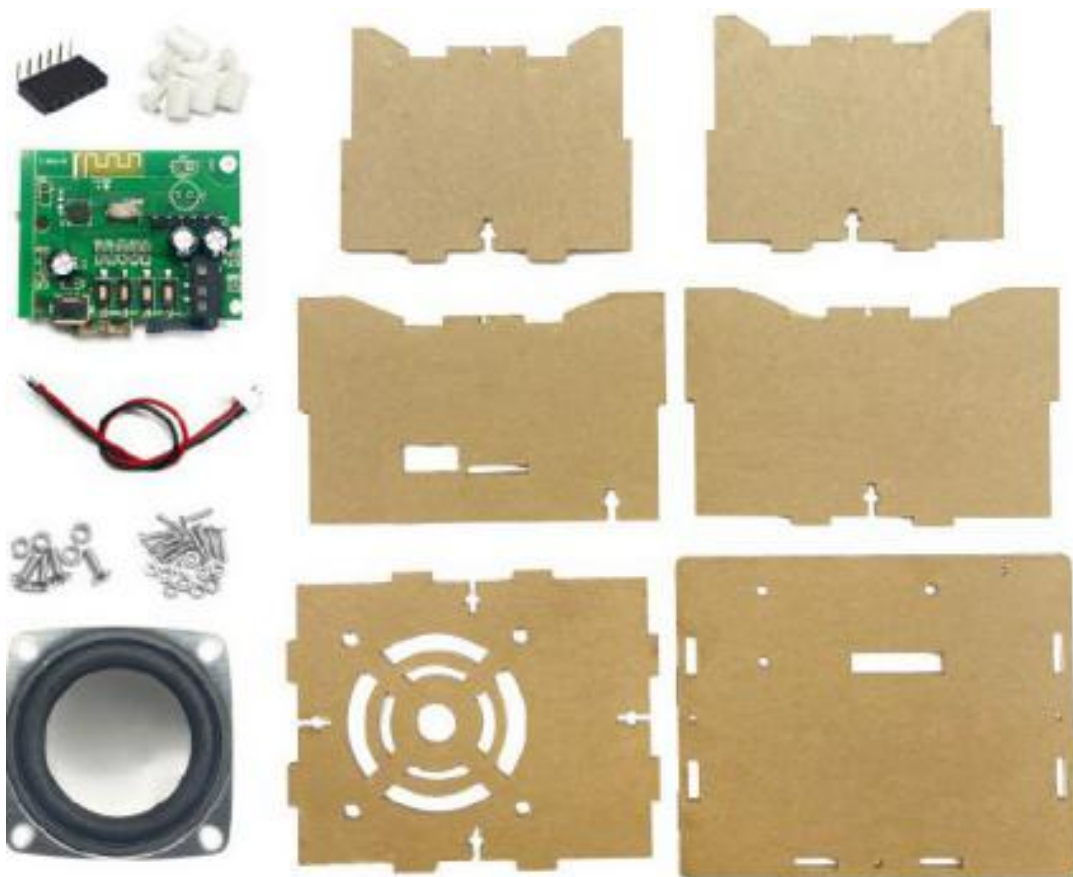


Take a look inside the tree:



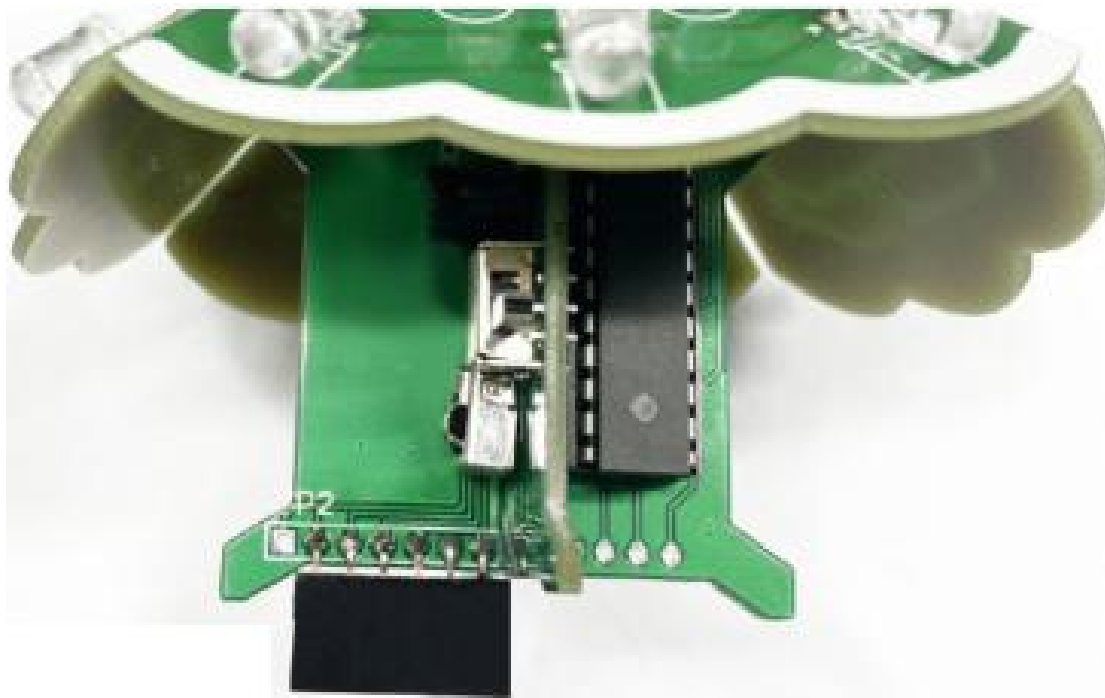
Next, the Bluetooth module and base shell installation instructions

The following parts are displayed (the yellow protective film of the outer casing can be peeled off, and it will be transparent after being peeled off)



Install the female socket at P2 position and solder it:

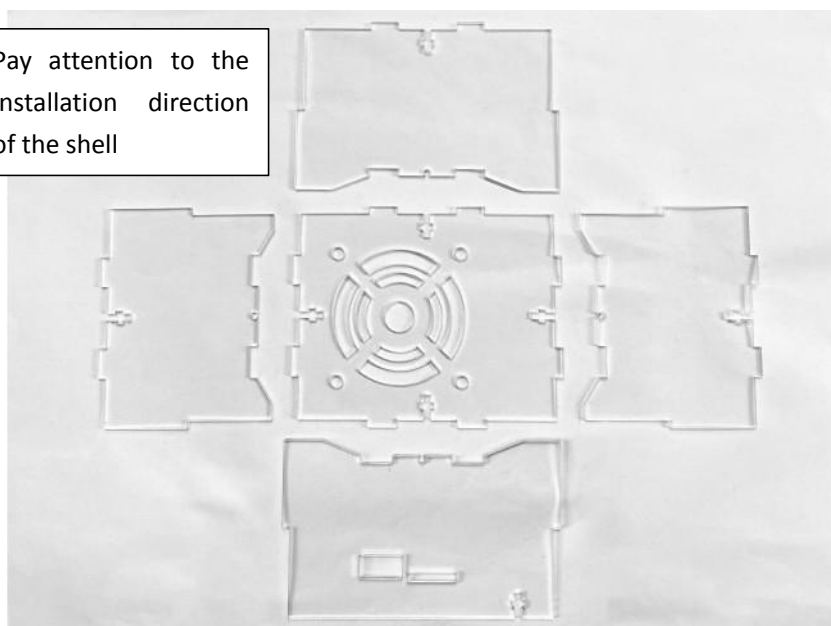




Connect the speaker power cord, pay attention to the positive and negative points, refer to the following figure

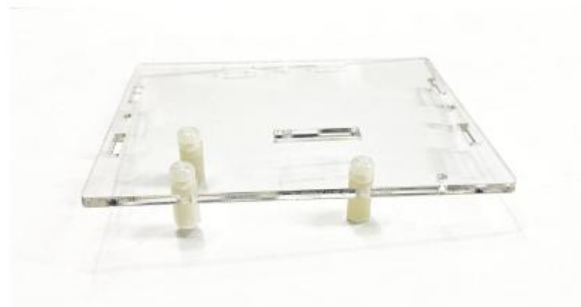
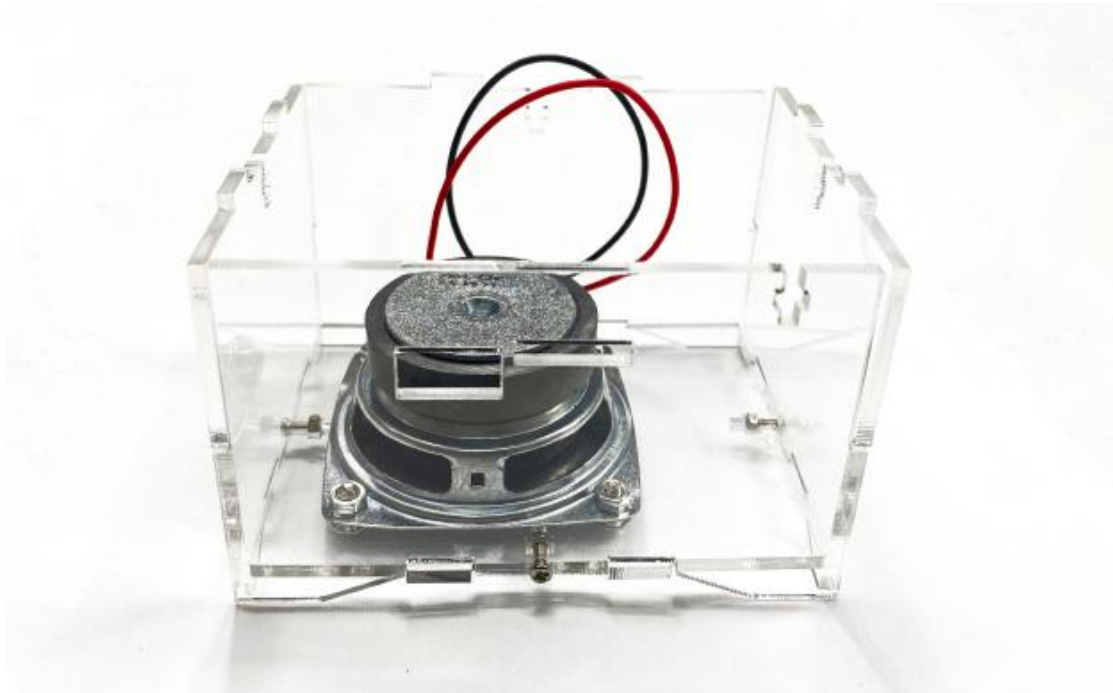


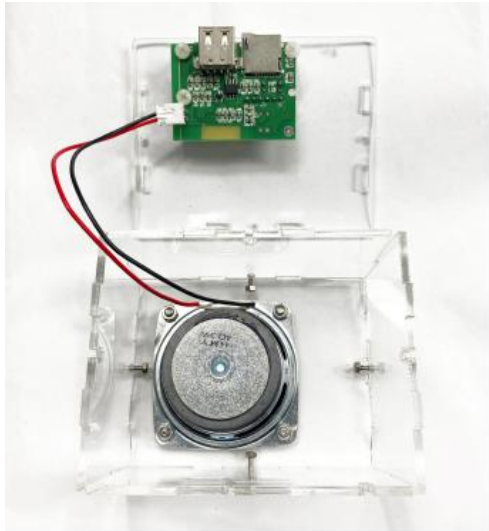
Pay attention to the installation direction of the shell



Please refer to the following figure for the installation method.







Finally, align the female header at the P2 position of the Christmas tree with the hole in the shell and insert it into the pin header of the Bluetooth module. Refer to the following picture.



After the Christmas tree is assembled, plug it in and it's ready to use.



## 20. Power-on debugging

After the previous step of welding is completed, you can power on to see if it works normally. The step of powering on is to plug in the USB cable first, connect the other end of the cable to the 5V power supply (can be a mobile phone charger, computer USB, etc.), and then unplug the Pull the switch to ON to complete the power-on process. During normal operation, all lights should start flashing. After the lights finish flashing, the electronic music inside the microcontroller will start to play (because the Bluetooth module (optional) is not installed yet).

## 21. Troubleshooting some common problems

In order to facilitate everyone's inspection, this kit has some self-check functions so that everyone can quickly solve the problem.

### 1. Some lights don't light up

The most common problem with this kit is that an LED does not light up. If any light does not light up, check whether the lamp is soldered properly or burned out, or whether the corresponding microcontroller pins are plugged in properly, or whether the IC holder is properly soldered.

### 2. All LEDs are off

If all the LEDs are not on, you need to consider whether the power supply is normal and whether the microcontroller is plugged in properly. First, use a multimeter to measure the pads marked with the "+" and "-" symbols on the USB socket to see if the voltage is about 5V. If First, measure the two pads marked GND and 3V3 on the bottom of the microcontroller (measured on the back of the circuit board) to see if they are around 3.3V. You can also directly measure whether pins 12 and 14 of the microcontroller are around 3.3V.

### 3. After inserting the memory card, it will not play the music in the card or the internal music of the microcontroller.

In this case, the WAV format music is not found in the memory card. Please check whether there is a WAV file in the memory card and whether the WAV file is in the root directory.

### 4. Other error messages

We will update this document as new welding issues are discovered. In order to facilitate everyone to solve the problem in time, try to make welding successful for everyone.