









The following pictures are taken in kind by the author . There may be some color difference between the pictures you receive . Because of the difference of manufacturer or batch, there may be some difference in appearance and shape. At this time, the material you receive should prevail.

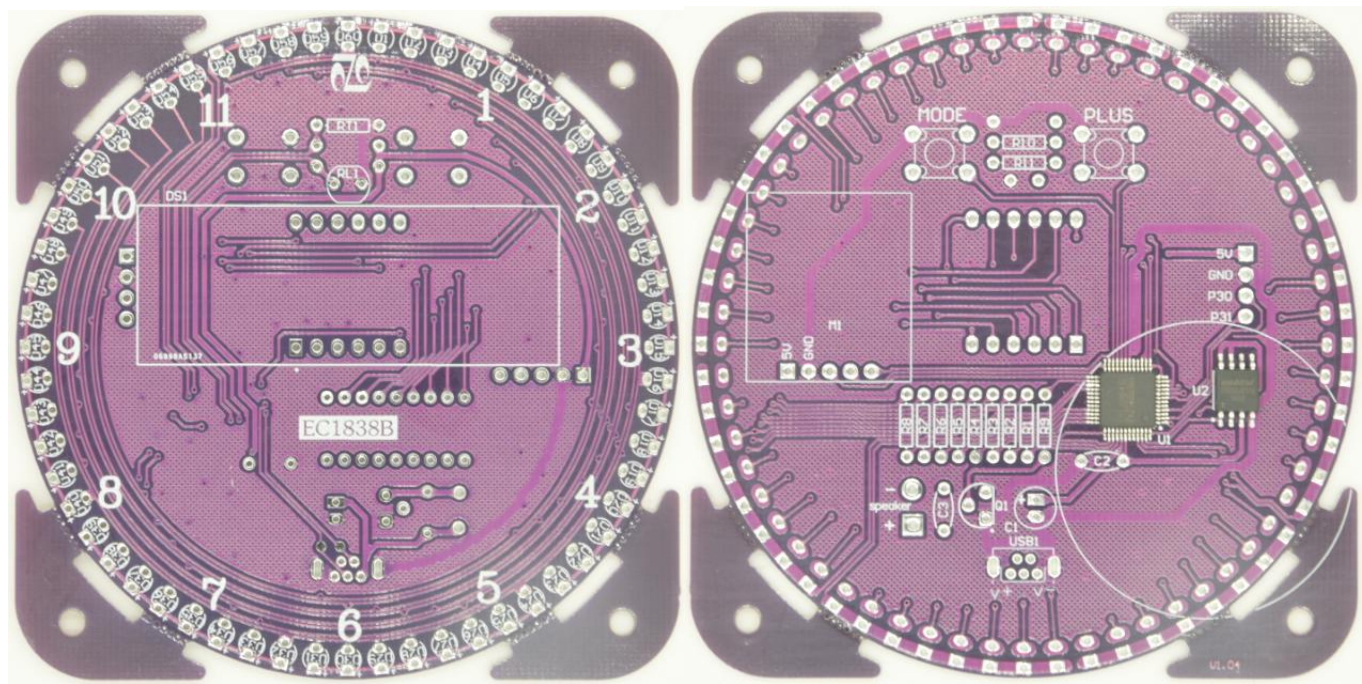
To know the components in the package is a prerequisite for successful welding, so please pay close attention to content of this chapter. Let's start to learn with a list of components for this suite:

number	Component name	Specifications	Identifier on PCB	quantity
1	PCB	81*81*1.6mm Violet		1
2	Clock module		M1	1
3	Nixie tube	0.56 inch 4-bit common positive nixie tube	DS1	1
4	LED	3mm Direct insertion	D1~D60	60
5	resistance	1/6W 470Ω Metal film resistance	R1,R2,R3,R4,R5,R6,R7,R8,R9	9
6	resistance	1/6W 20KΩ Metal film resistance	R10,R11	5
7	Electrolytic capacitor	16V100uF ±20% 5*7 Direct insertion	C1	1
8	Monolithic capacitor	104 Direct insertion	C2,C3	2
9	photoresistor	5506	RL1	1
10	Thermistor	MF58	RT1	1
11	Triode	S8050	Q1	1
12	USB socket	Mini-USB 180 degree Direct insertion	USB1	1
13	key	6*6*14mm	S1,S2	2
14	loudspeaker	8Ω2W		1

Next we let we know the components in the list through photos.

1. Circuit board

The specifications of the circuit board are as : 110mm\*34mm\*1.6mm purple.  
The following pictures is the PCB board taken on the front and back, respectively:



U1 and U2 have been welded on the board. These two components are MCU and memory chip respectively. Because these two are SMT Packaging Components, and pins are relatively tight, for those who are not skilled in welding technology, might not succeed in welding, So we welded it in advance.



When it is found that the clock can not save time after clock power off, it is very likely that the battery is power off , you can measure it with a multimeter, if the Voltage below 2V it means need to change a new battery.

This kit uses a 0.56 inch digital tube. The nixie tube has four colors: red, green, blue and white. Before it is lit, all three colors look like the following figure. The color can be identified by the model printed on the nixie tube. The red color is 5463BS, the green color is 5463BPG, the blue color is 5463BB, and the white color is 5463BW. Of course, the model printed by different manufacturers may be different. The best way is to light it to see the luminous color directly.



This kit uses 1/6W metal film color ring resistance. The color ring above the resistance represents the resistance value. If you do not understand the color ring, please use a multimeter to measure the resistance value. The following picture:

The electrolytic capacitor is divided into positive and negative electrodes. The white side of the capacitor is negative electrodes. When the pins are not cut out before, the lead of the negative electrodes is relatively short. Following chart :


Monolithic capacitors do not need to distinguish positive and negative. The upper label 104 indicates that the capacitance of the capacitor is 0.1 $\mu$ F. Following chart :

The following picture is a photoresistor. Its name shows that when there is light or no light, its resistance value is different



The following figure is a thermistor, which of course changes with temperature. It should be noted that the volume of thermistor is relatively small, we should pay attention not to drop it!

The Triode model is S8050.



Specification: Mini\_USB 180 degree direct insert.



The specifications are 6\*6\*14 mm.

## 12. loudspeaker

This kit use a 8  $\Omega$  2W small speaker which diameter is 36 mm. Interested users can measure it with a multimeter. The internal resistance of the horn is really about 8  $\Omega$  . The actual picture below is on the left and on the right is the back.



### 13. Power line

The power cord powers the clock. The USB cable with Mini-USB interface is adopted.

Please be sure to follow our tutorial step by step welding, thank you for your cooperation.

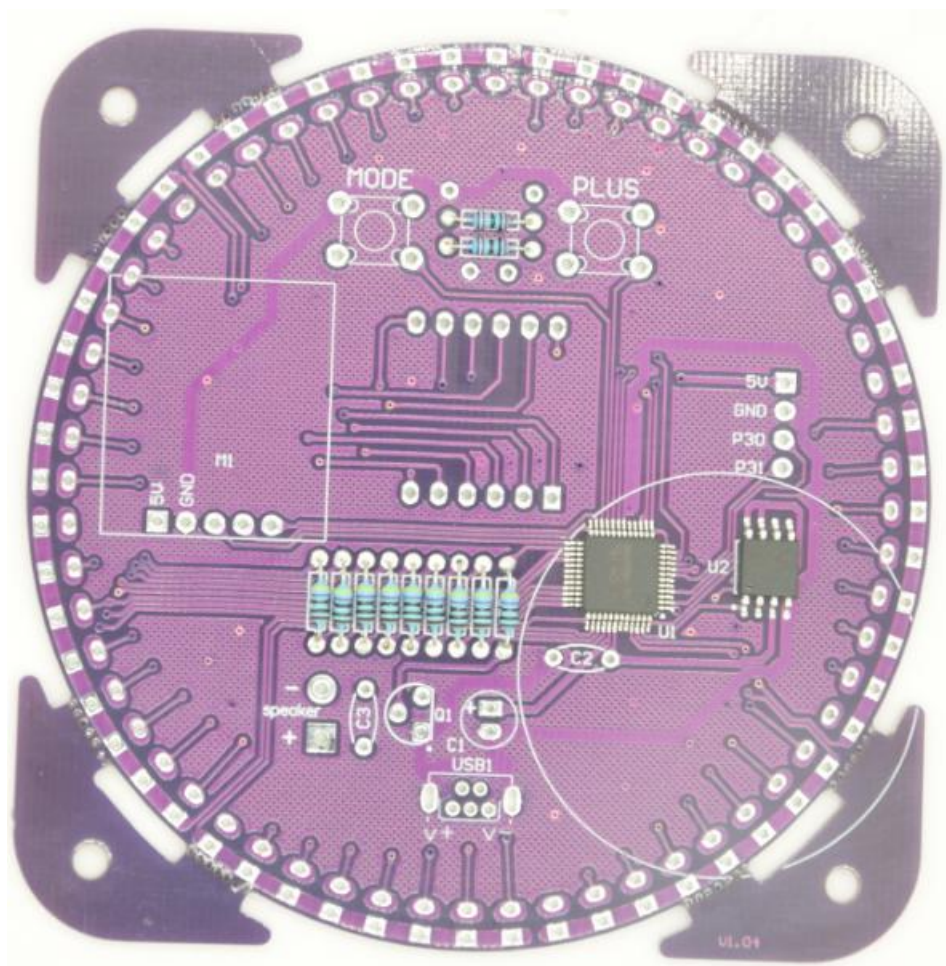
Next, I will not introduce how to weld any more. I will show the effect of welding directly.

There are two kinds of resistors in this kit. 470  $\Omega$  resistance is welded in the positions of R1~R9 and 20 K resistance is welded in the positions of R10 and R11.

A close-up photograph of a purple printed circuit board (PCB). In the center, a resistor with blue, yellow, and black bands is soldered between two circular pads. Below it, a capacitor is labeled 'R1' in white. To the right, a white circle highlights two adjacent circular pads, with a '+' sign printed below them. A white wire is visible at the top of the frame.

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## 2. Welding LED

Why the second step is to weld the LED first, because the LED is placed on the front, welding on the back, if welding other components on the back, it may affect the welding of the LED It should be noted that a small number of LED welding is in the position of the whole point and the rest of the positions are welded to another LED.This tutorial takes the combination of red green (red quantity and green quantity) as an example.

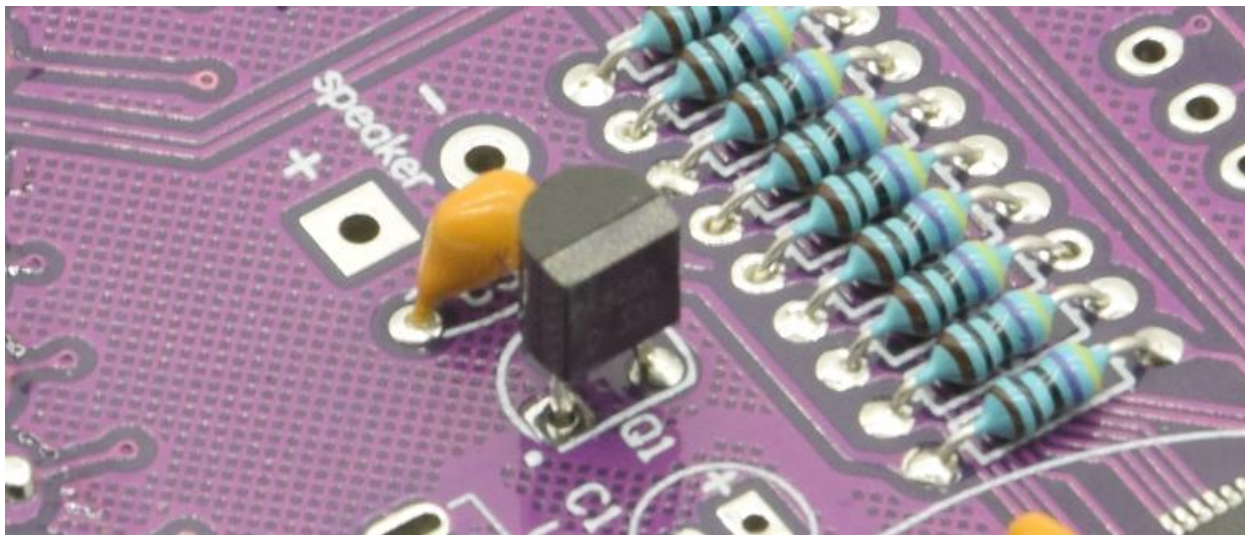
LED is also one by one to weld, first insert the LED into the board, pay attention to the positive LED inserted into the number of "+" pad. as follows:



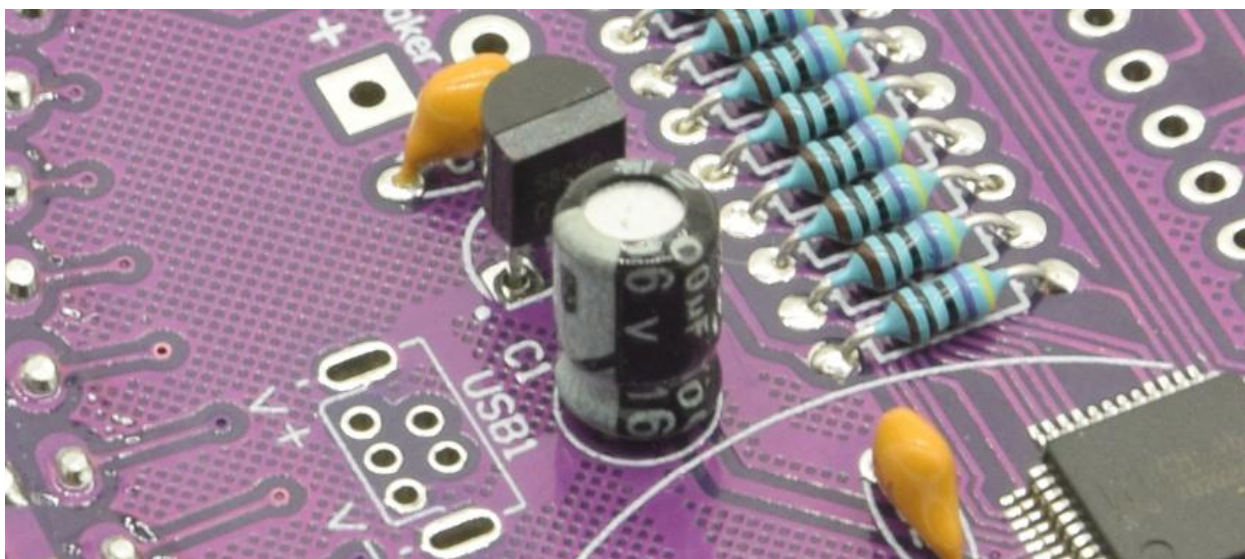
Then weld on the other side, as follows:

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The triode welding is located in the position of Q1. The three feet of the transistor should be separated and inserted into the three pads of Q1. Note that the plane of the transistor should be opposite to the straight line of the circuit board, as shown in the following figure:

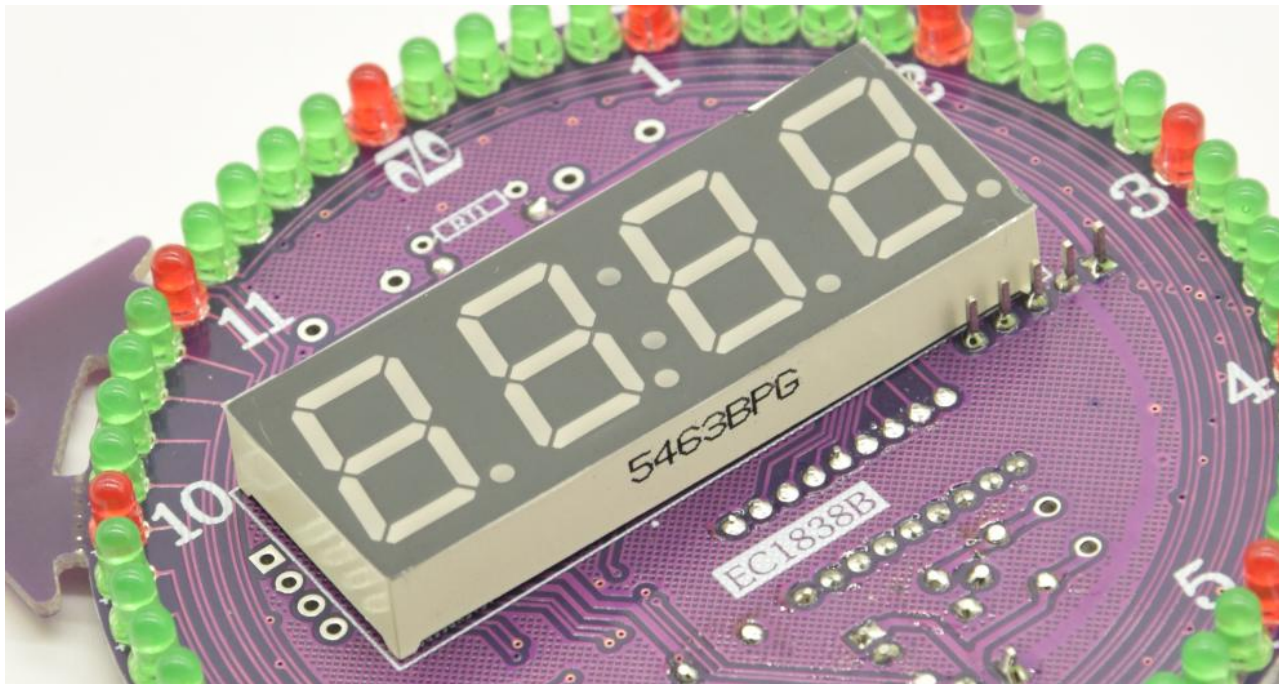


The electrolytic capacitor is welded in the position of C1. Note that the positive electrode of electrolytic capacitor should be inserted into the welding pad marked "+", as shown in the following figure:



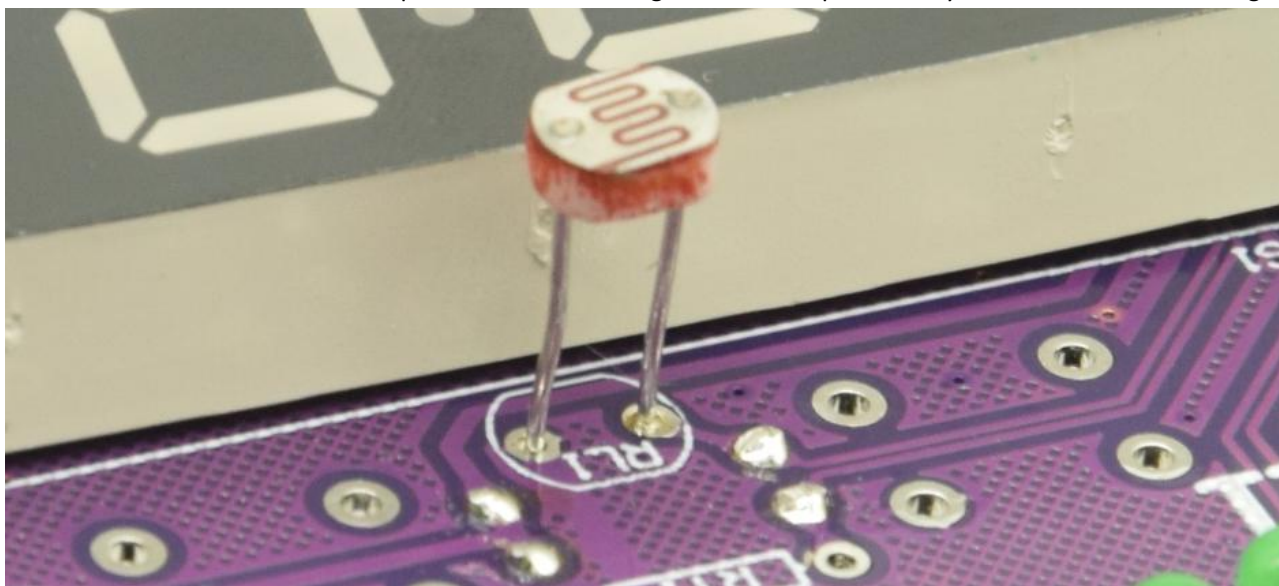
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## 9. Welding photosensitive resistance

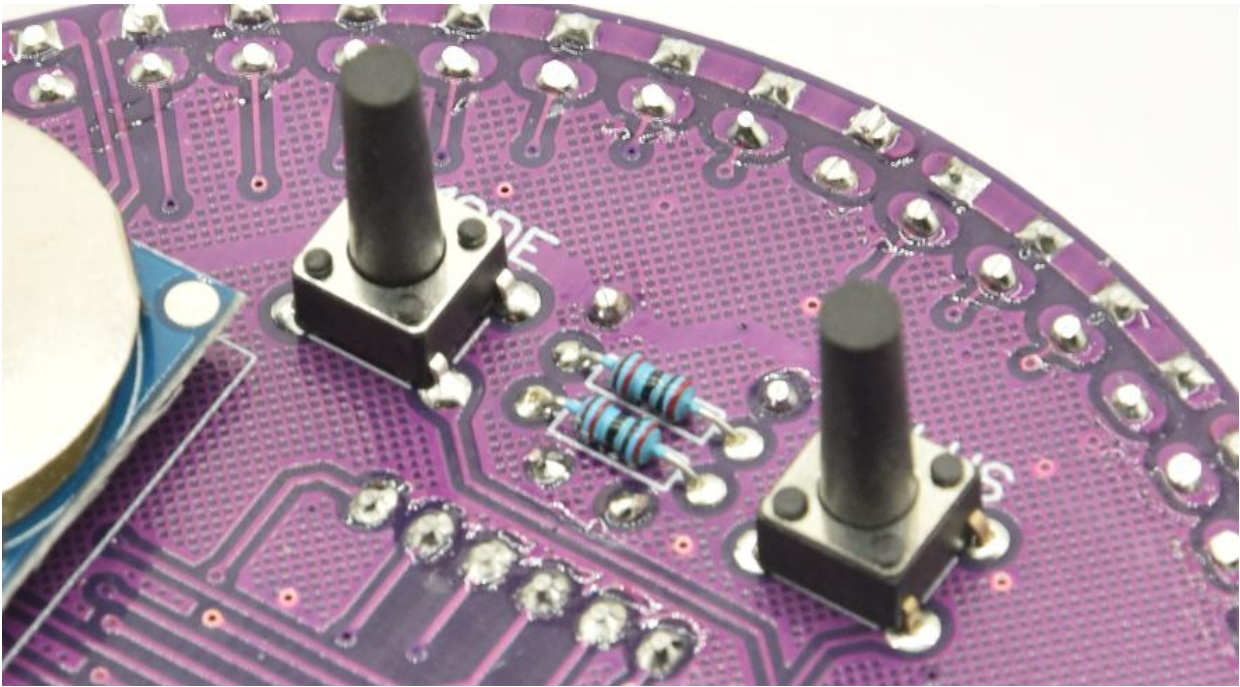
Photoresistor welding in RL1 position, it should be noted that the photoresistor is higher than the digital tube, otherwise the clock itself will affect the photoresistor, resulting in inaccurate photometry. As shown in the following figure:



## 10. Welding thermistor

Thermistor welding in RT1 position, but also with photosensitive as high as the measurement of environmental temperature is more accurate. As shown in the following figure:

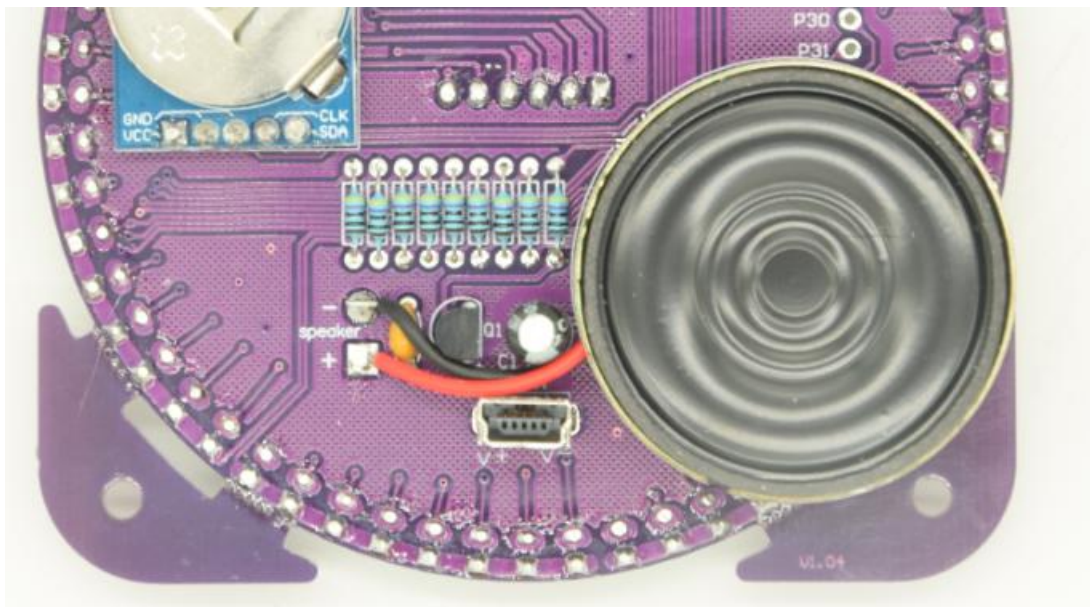
The location of MODE and PLUS on the PCB is as follows:



The loudspeaker should be welded in several steps. First, two horn lines are welded to the horn.

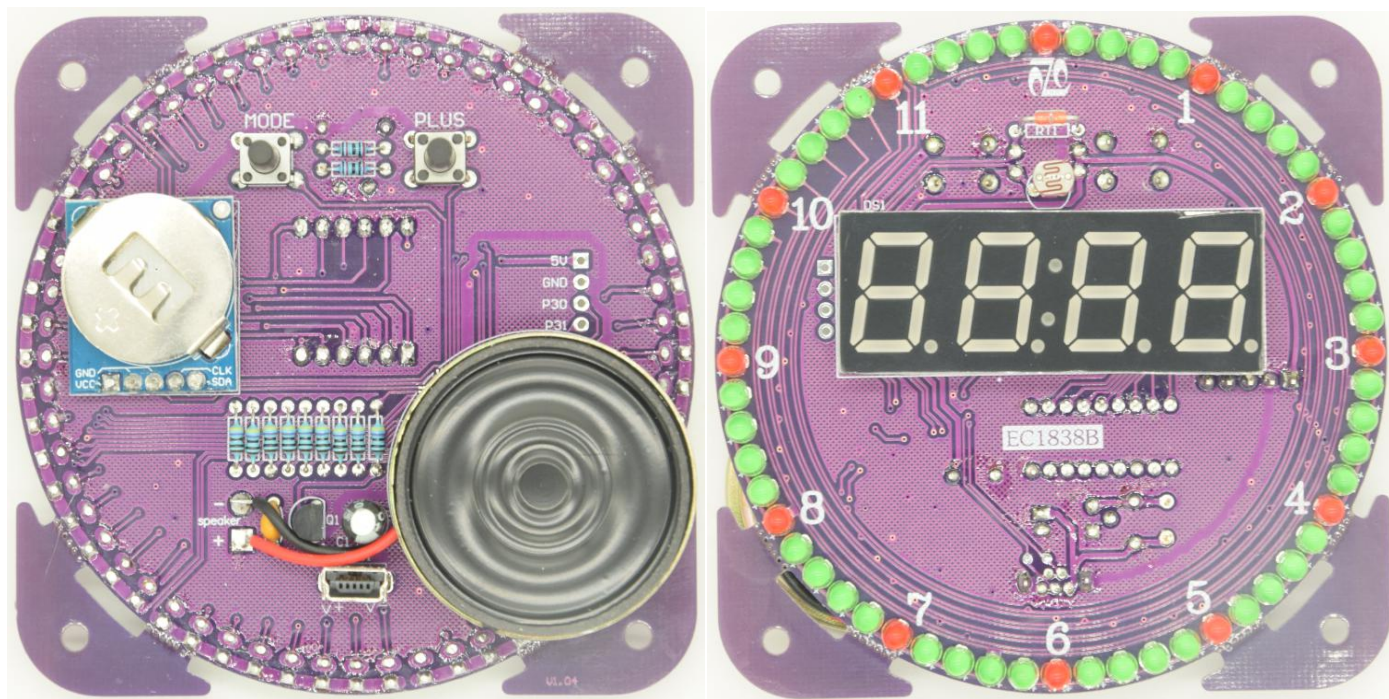
A circular purple PCB is shown, featuring a speaker, a USB port, and various electronic components. Two wires, one red and one black, connect the board to a small green PCB with a battery. The purple PCB has a speaker in the top left, a USB port at the bottom, and several integrated circuits and capacitors. The green PCB has a battery and a small electronic component. The wires connect the two boards, likely for power and data transfer.

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So far, the welding of the clock kit has been completed. Because there are many components in this kit, you must be careful when welding, not to virtual welding, not to weld bad components. When welding, the lead length must be cut short, and then weld the next component, otherwise the lead is too long, may interfere with the welding of the next component, resulting in poor welding.

Finally, two beautiful pictures completed by welding.



#### IV. Power on debugging

After the last step of welding, you can turn on the power to see if the clock is working properly. If it can be displayed properly, the welding is successful. If the clock does not work, or the display is not normal, indicating that there is a problem in welding, need to be carefully checked, see Chapter 6 for details.

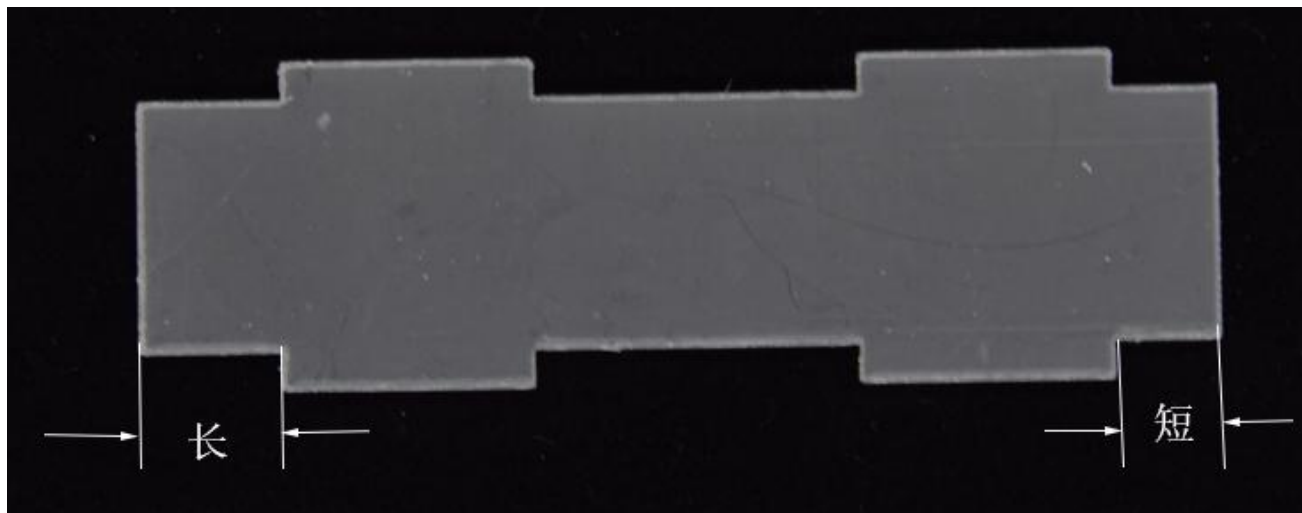
Normal work, when power on, there will be boot music, the lights are on the whole point, seconds walk normally, the middle of the digital tube flashing every second at two o'clock, as shown below:

## V. Assembly shell

## 1. Shell composition

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It should be noted that one end of the side board is longer, and the long end of the side board should be immediately followed by the short end of the other board, so that it can just fit the jack hole of the whole back board. As follows:



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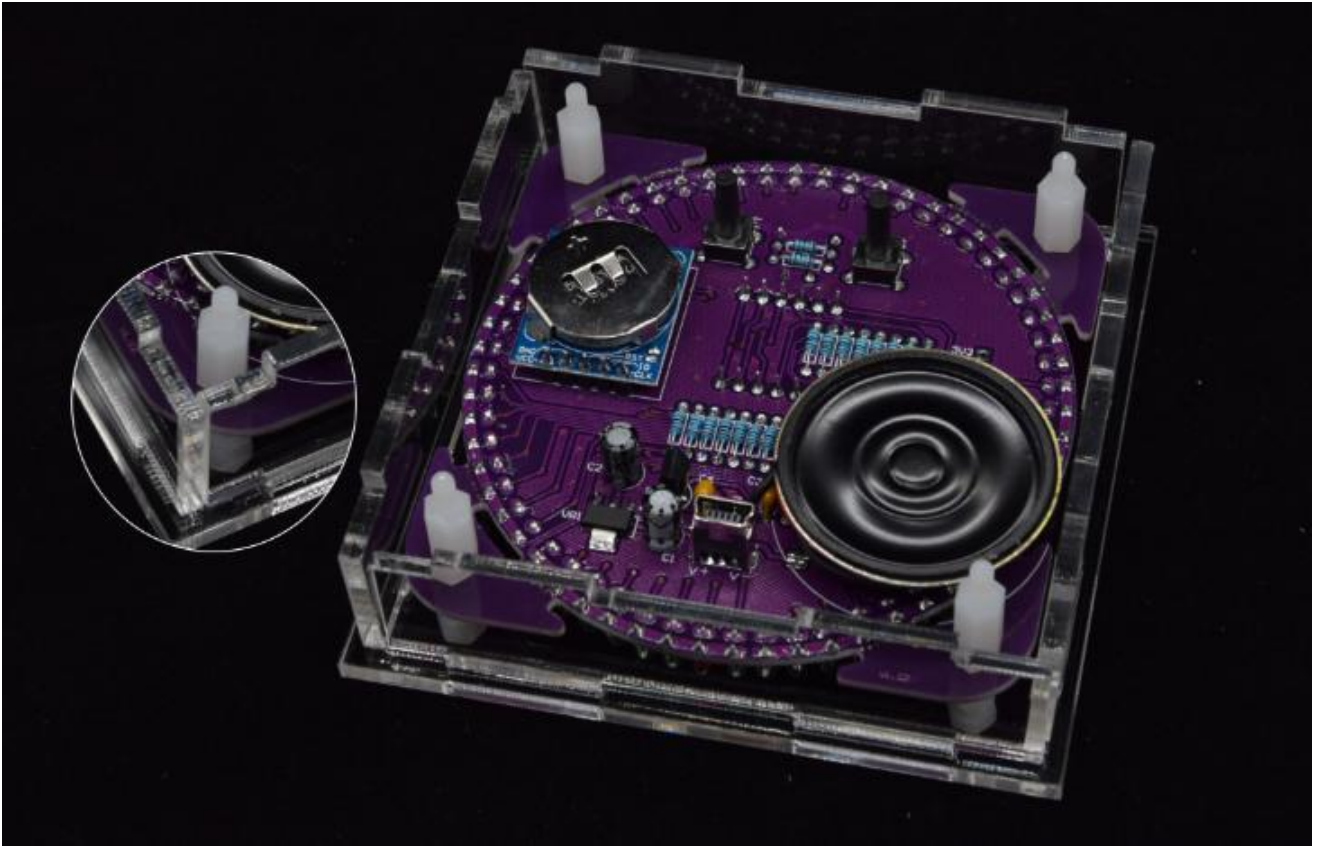
## 2. Installation of a stud

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Install the front panel and tighten the nut:

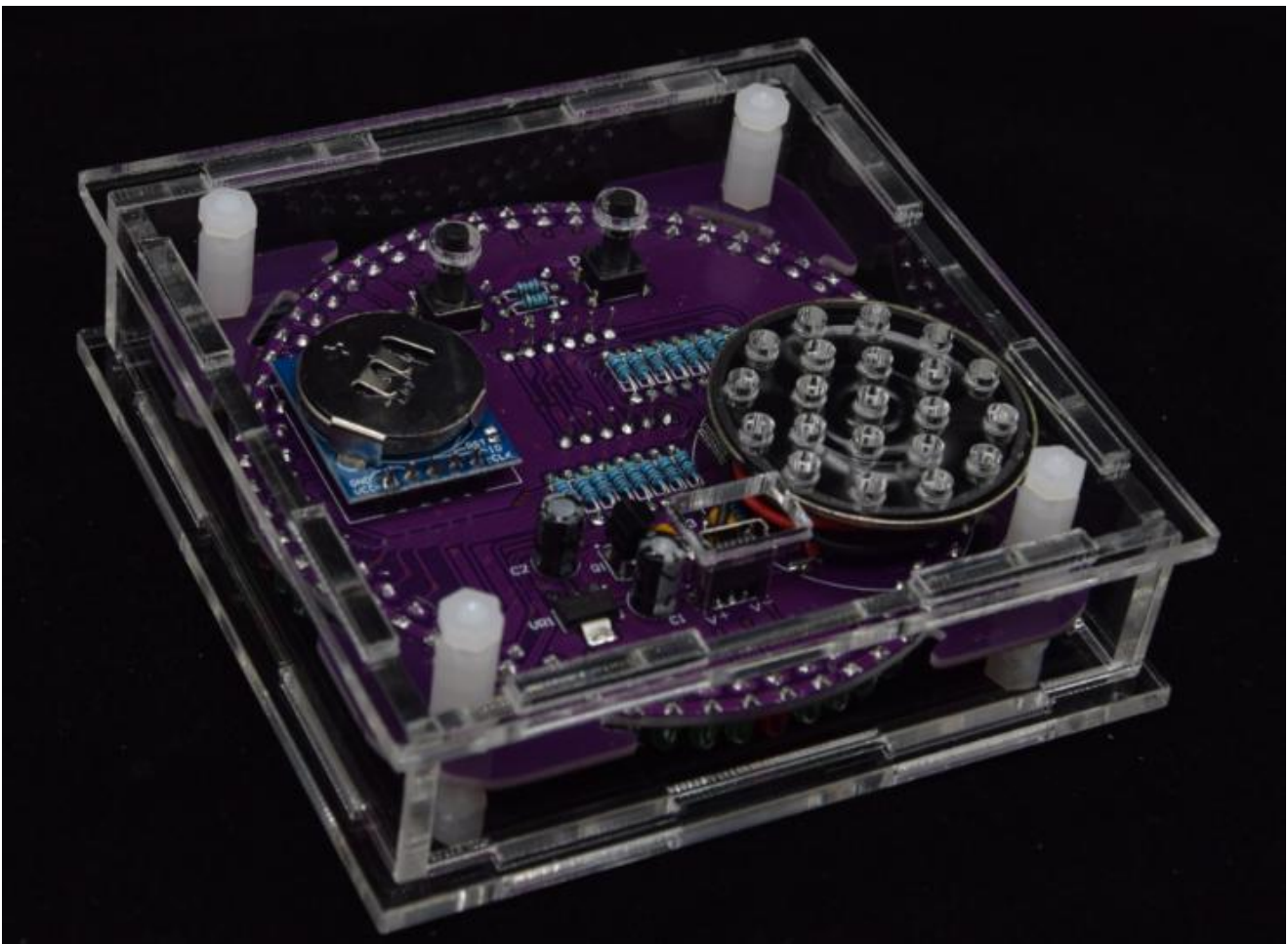


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Pay attention to the long end of the side board followed by the short end of the other board so that you can just fit the four side boards.

## 5. Install back panel



Install the back panel and screw the nut.

### 1. Prompt "Err1"

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When the program cannot recognize the voice memory chip, this prompt will appear. We will test that the voice memory chip is normal before leaving the factory, and this error will not appear generally. If the customer changes the memory chip, this prompt may appear.

Wav file error prompt. This prompt appears when the wav file name is incorrect or other wav file problems occur.

Single chip verification failure prompt. If you use a single-chip microcomputer that has not been initialized by our store, this prompt will appear.

When we find new welding problems, we update them to this document. In order to facilitate everyone to solve problems in time, as far as possible so that all people can weld success.