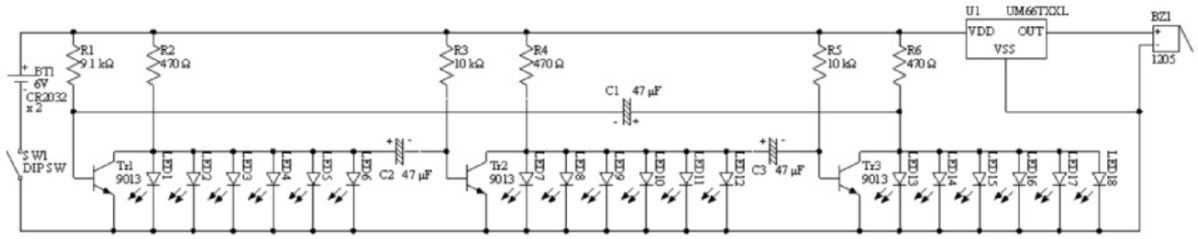
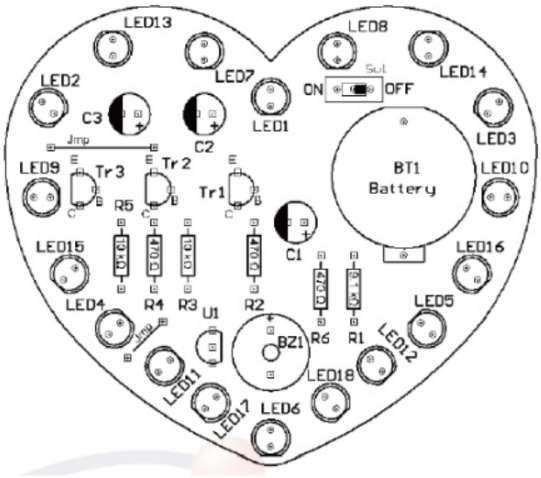
電路圖：



電路板圖(底視圖)：

零件配置圖(上視圖)：



PCB Material Contents

Components	**Component number**	**Specifications**	**Quantity**	**Notes**
Resistor	R1	9.1k2/0.25W	1	White, Brown, Red
Resistor	R2,R4,R6	4700/0.25W	3	Yellow, Purple, Brown
Resistor	R3, R5	10kΩ/0.25W	2	Brown Black Orange

Capacitor	C1~C3	47μ F/16V	3	Electrolytic Capacitor
Transistor	TR1~TR3	9013	3	TO-92, NPN
IC	UI	UM66xxL	1	TO-92, CMOS Music IC
Light Emitting Diode	LED1~LED18	φ 5mm	18	Red
Buzzer	BZ1	SAT-1205	1	Passive
Switch	S1	DIP Switch	1	Single Group Dip Switch
Jumper	JMP	φ 0.6mm x 3cm	2	Single core wire
Battery Holder	BT1	CD2032 x 2	1	
Circuit Board		OK-004	1	

Specifications

working principle:

1. This kit uses the basic common emitter (CE) amplification configuration of transistors and is connected in series to form a 3-stage ring amplifier. 2. Since the transistor works in two regions: saturation and cutoff, the transistor only has two states: ON and OFF.

3. When the power supply is turned on, the three amplifiers will supply power at the same time. Since the forward bias voltage between the B-E pins of the transistor is about 0.6V, the saturation voltage between C-E is about 0.2V. The circuit configuration is the same, so the capacitors of C1~C3 The voltage difference is the same (about 0.4V, the negative terminal is higher than the negative terminal). At this time, the LED cannot light up and will enter a steady state (the transistor is fully conductive).

4. In this circuit, the resistance of R1 is deliberately slightly lower than the base resistance of the other two-level transistors, so that C1 charges faster than the other two capacitors, allowing Trl to turn on (ON) earlier than the other two transistors. , so as to break the above-mentioned steady state. At this time, the transistor will be affected by the ON of the previous stage of electronics and turn OFF; therefore, the three-stage transistors will turn OFF one by one in order. When the transistor is OFF, then A group of LEDs is lit.

Production instructions:

1. According to the assembly diagram, install each component on the circuit board, use diagonal pliers to cut off the excess wire ends and tidy them up.

2. The soldering iron tip of the electric soldering iron should be kept clean. If the surface is oxidized, gently wipe off the oxide layer with a wet cloth. Otherwise, it will hinder the conduction of heat and affect the zinc joint work.

3. The order of assembling and welding electronic parts should be from the lower components first; such as: jumper → resistor → switch → transistor → music IC → capacitor, light-emitting diode → buzzer → battery holder.

4. The welding sequence of electronic parts is as follows:

(1) Preparation: Keep the soldering iron and soldering iron close to the object to be soldered, keep ready for welding at any time, and confirm the welding position.

2) Soldering iron tip contact: Make the soldering iron tip contact the workpiece, use the tip to heat it, and do not press hard.

(3) Melting solder: After touching the tin wire to the workpiece, melt the appropriate amount of solder.

(4) Remove the tin wire: When the solder melts to the required amount, quickly pull out the tin wire.

(5) Take away the soldering iron: After the melted solder has expanded to the required range on the object to be soldered, leave the soldering iron. Pay attention to the leaving speed and direction.

(6) Do not heat the welding for too long or use a soldering iron to apply solder before soldering; when the welding method is correct, the solder joints formed should be round and bright.

Precautions:

(1) The 2032 battery is different from ordinary batteries. The larger area on the outside (covering almost the entire battery) is the positive electrode of the battery; the smaller area (center) side is the negative electrode of the battery. Please assemble the battery holder according to the printed pattern on the circuit board. (2) Transistor,

Electrolytic capacitors and light-emitting diodes (LEDs) have polarity and cannot be connected incorrectly (heating and explosion may occur): ① The front of the transistor attached to this kit

faces you, and the pins are arranged from left to right (E) The pole, base (B) pole, and collector (C) pole should be assembled according to the direction shown in the printed circuit board diagram.

② The long leg of the electrolytic capacitor is the positive pole, marked + on the circuit board (the copper foil solder tab is square): the short leg is the negative pole, and the negative side is usually marked on the component shell (the copper foil solder tab is round).

③ The light-emitting diode (LED) will not light up if it is connected incorrectly. The long leg is the positive (A) pole and is marked on the circuit board. The short leg is the negative (K) pole. In addition, there will be a mark on the shell (usually on the negative side). Notched): The printed pattern on the circuit board is for A pole on the round side (the solder tab on the copper foil surface is round), and on the flat side it is K pole (the soldering tab on the copper foil surface is square).

(3) The front side of the music IC on the circuit board faces you, and the pins are arranged from left to right as ground (VSS) pole, power supply (VDD) pole, and output (OUT) pole. Please assemble according to the direction shown in the printed circuit board diagram.