Christmas Tree Kit assembly instructions

Part no: TJ-56-180A

Installation - Component Order

1. Resistors R2, R4, R6, R7 (100R)
2. Resistors R1, R3, R5 (4k7)
3. Capacitors C1, C2, C3 (47uf)
4. Transistors Q1, Q2, Q3 (9014)
5. Red LED's D1-D6
6. Green LED's D7-D12
7. Yellow LED'S D13-D18
8. Slot the tree pcb's together
9. Solder tree to base
10. Solder LED D19 (Green or Red)
11. Solder Power switch and Micro USB

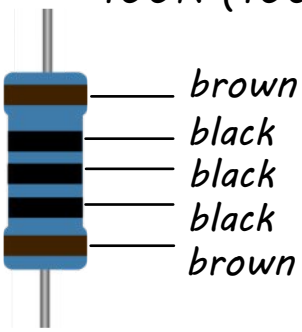
Step 1 - Soldering Resistors

Resistors are non-polarized and can be installed in any direction

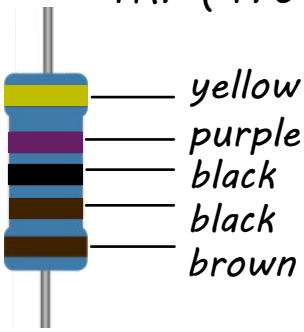
Name	Value	Identifier
Resistor	100R 	R2 / R4 / R6 / R7
Resistor	4K7 	R1 / R3 / R5

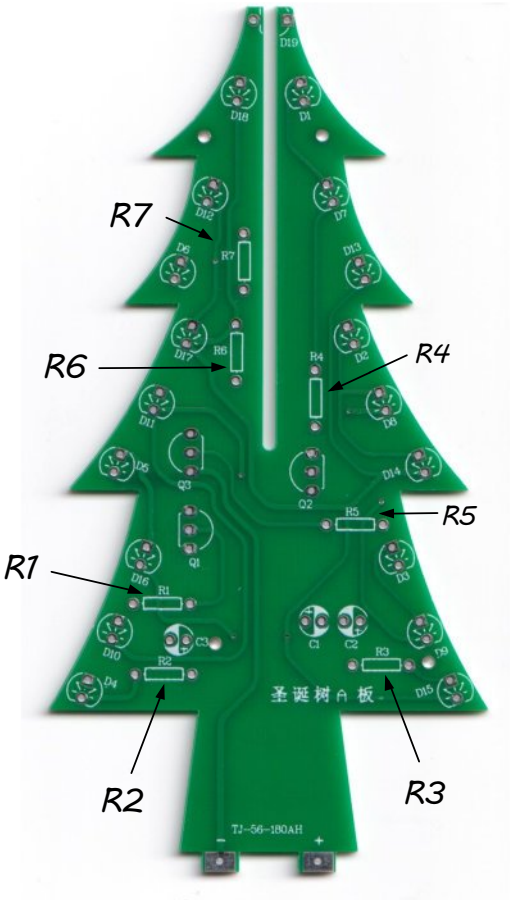
Resistor Colour Codes

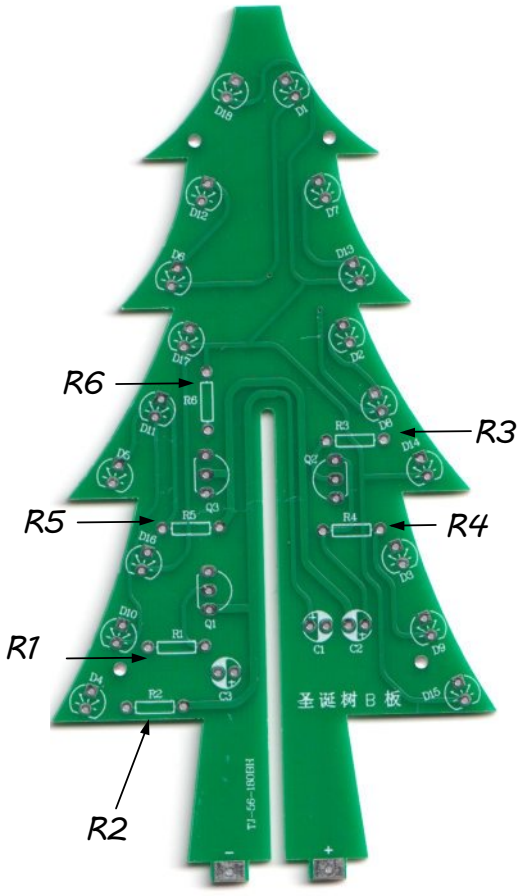
100R (100ohm)



4K7 (4700 ohm)

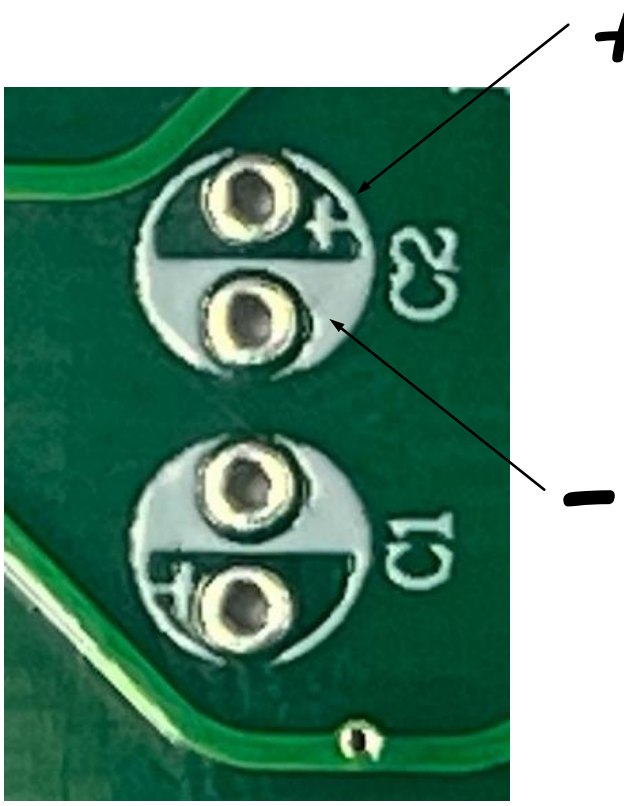


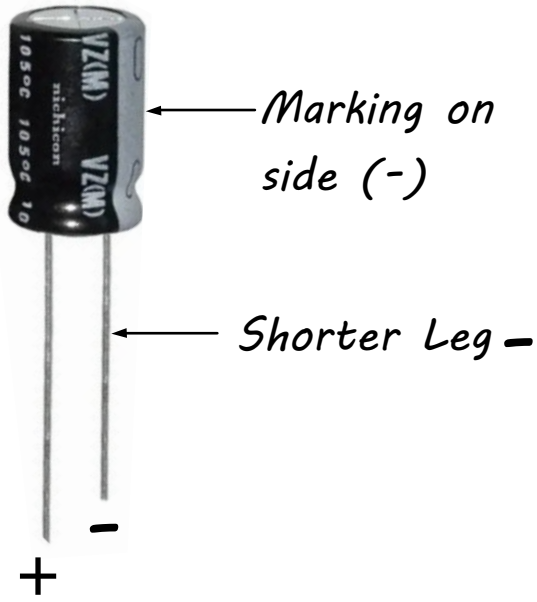




Step 2 - Soldering Capacitors

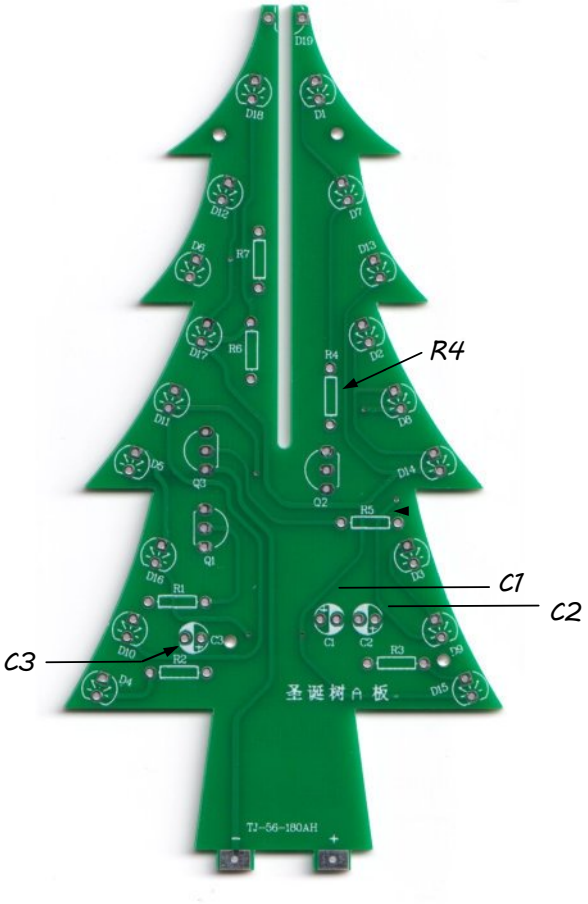
Important !!!! Electrolytic capacitors are polarized and must be installed with the correct orientation.

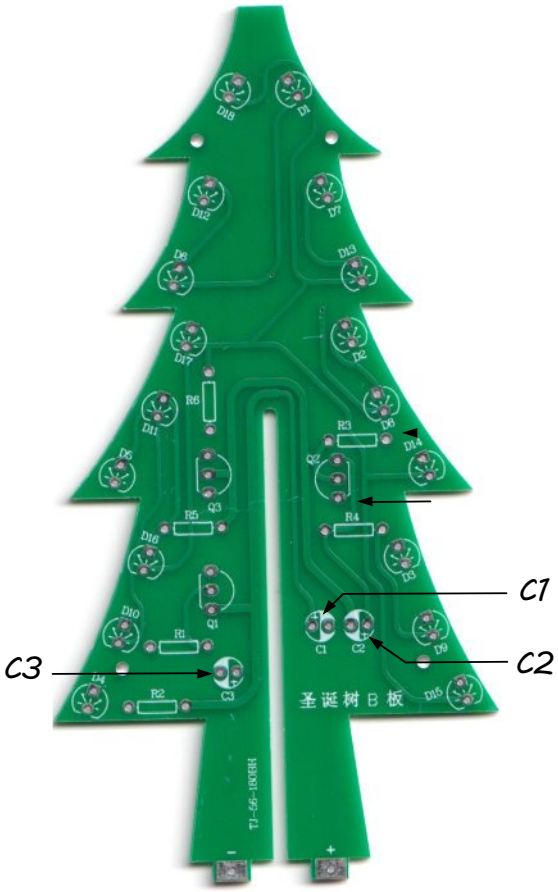


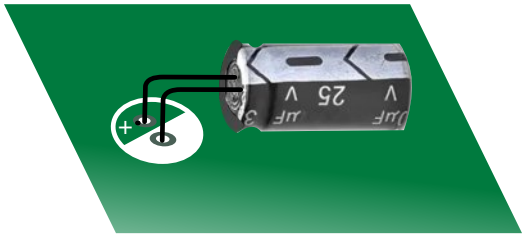


Name	Value	Identifier
Capacitor	47uF 	C1 / C2 / C3

Soldering Capacitors (Special Note)



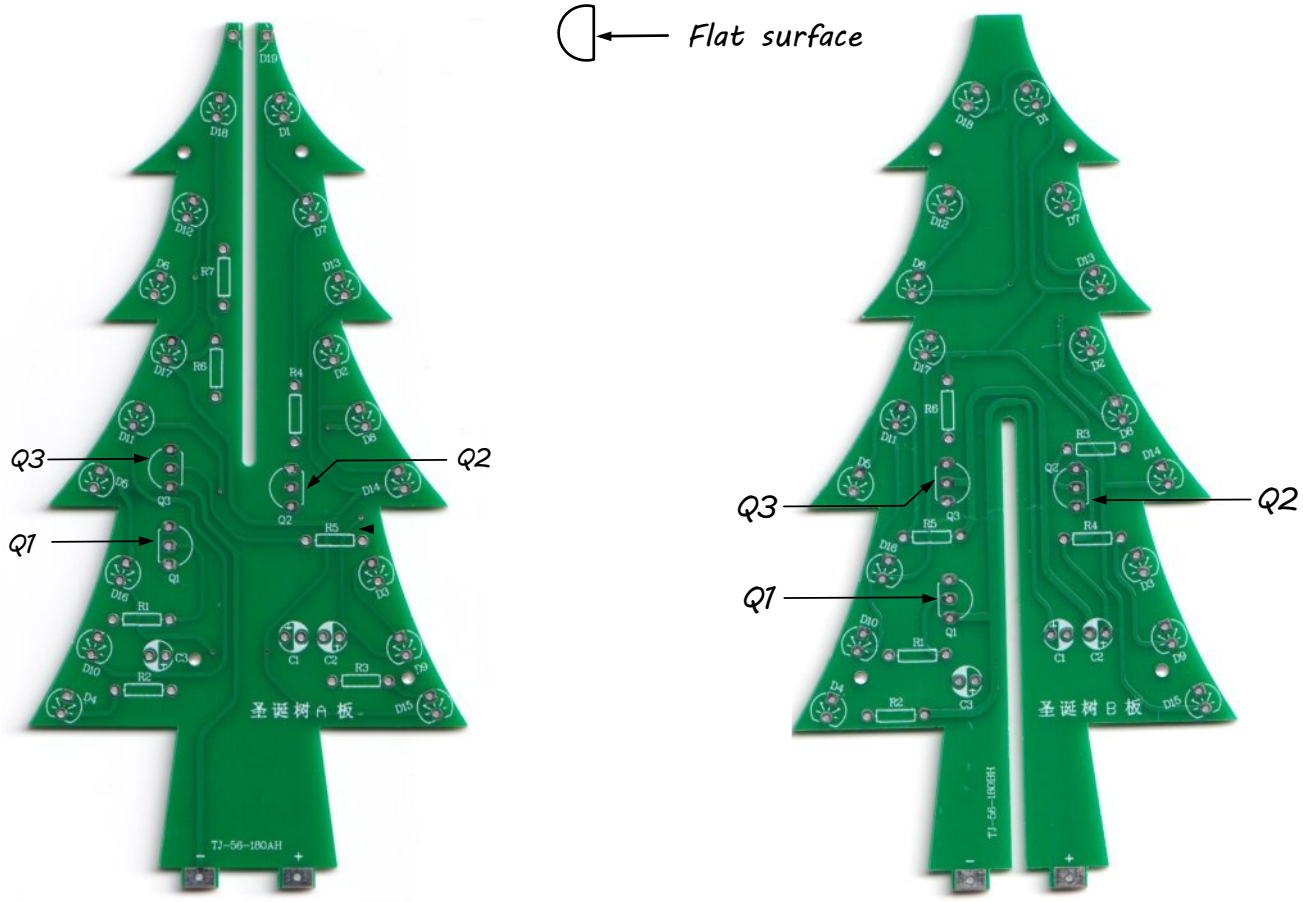




Important !!!! Capacitors C1 and C2 must be mounted horizontally to ensure all componets clear on final assembly

Step 3 - Soldering Transistor (Q1, Q2, Q3)

Ensure that the transistor's flat face is aligned with the corresponding flat marking on the PCB silkscreen.

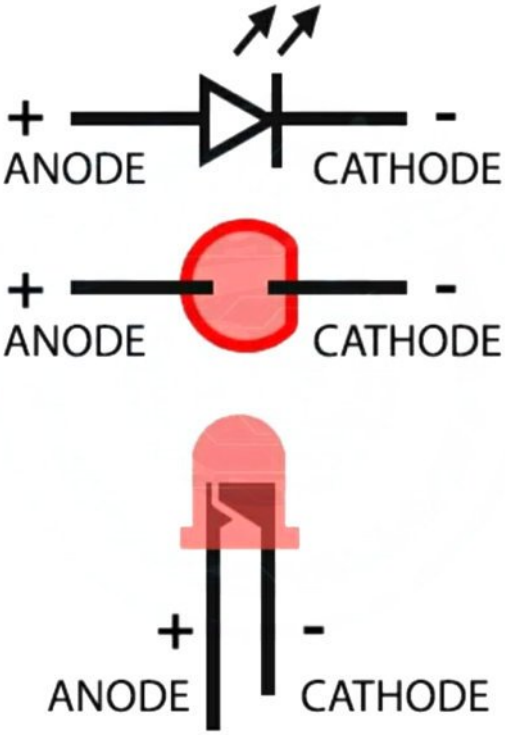


Component Values

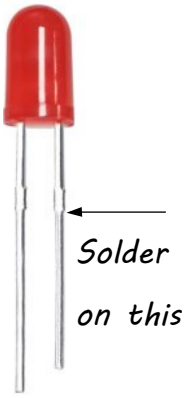
Name	Value	Identifier
Transistor	9014 	Q1 / Q2 / Q3

Step 4 - Soldering LED

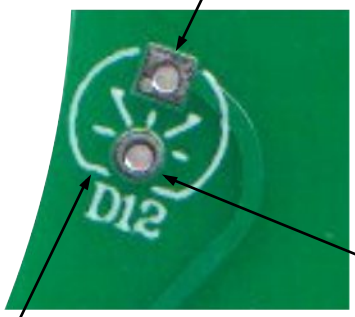
LEDs must be soldered in the correct orientation. Each LED has a positive ide (anode) and a negative side (cathode).



Hint on soldering LED's



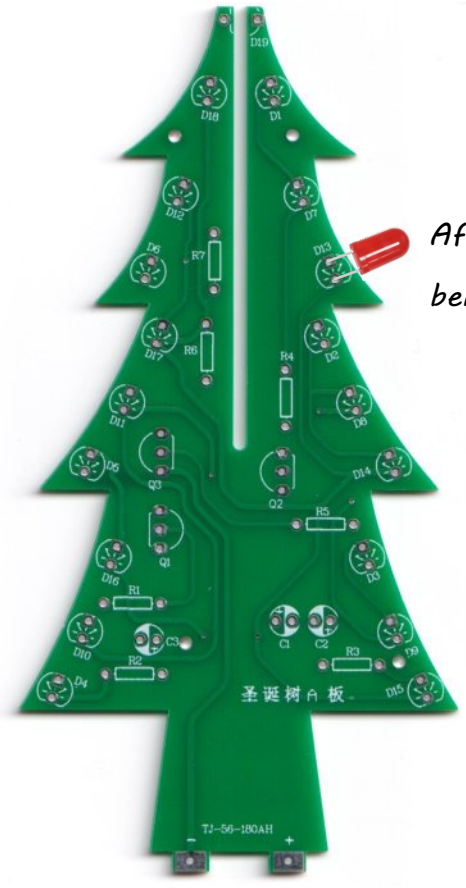
Solder LED on this height



Square Pad (+)

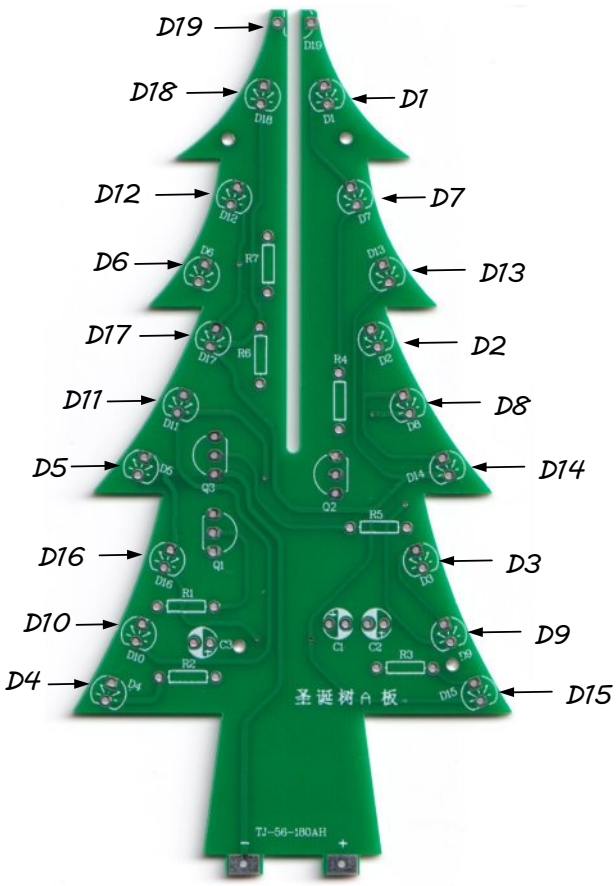
Round Pad (-)

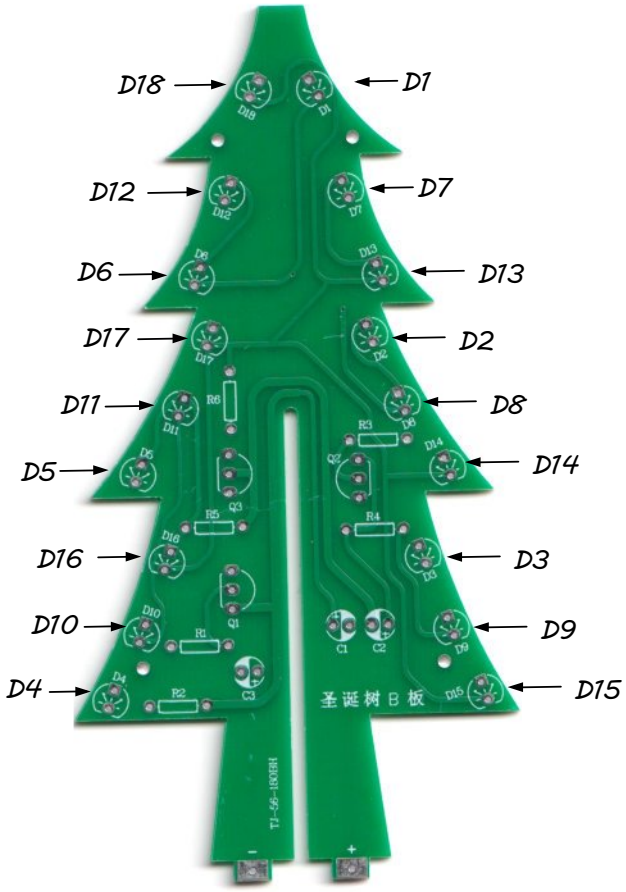
Flat Surface (-)



After LED was soldered bend LED outwards

Step 4 - Soldering LED (continue)





Component Values

Name	Value	Identifier	Quantity
LED	RED	D1 - D6	6
LED	GREEN	D7 - D12	6
LED	YELLOW	D13 - D18	6
LED	RED OR GREEN	D19	1

Step 5 - Final Assembly

Slide the tree PCB's together and solder in the Base Plate

Important - The Base plate orientation must be correctly aligned with the tree (+ with +) and (- with -)

Solder LED D19 on top of the Tree, solder Micro USB \ connector and Switch S1

ON / Off switch

Micro USB

Connect Micro USB to any usb port or Battery input to any 5V Battery Source

Original Manual

TJ-56-180 型立体圣诞树说明书

一、套件参数 供电电压：DC5V　外形尺寸：113*58*58mm

二、产品说明

18 只 LED 被分成 3 组，每当电源接通时，3 只三极管会争先导通，但由于元器件存在差异，只会有 1 只三极管最先导通，这里假设 Q1 最先导通，则 D1-D6 这一组点亮，由于 Q1 导通，其集电极电压下降使得电容 C1 左端下降，接近 0V，由于电容两端的电压不能突变，因此 Q2 的基极也被拉到近似 0V，Q2 截止，故接在其集电极的 D7-D12 这一组熄灭。此时 Q2 的高电压通过电容 C2 使 Q3 基极电压升高，Q3 也将迅速导通，D13-D18 这一组点亮。因此在这段时间里，Q1、Q3 的集电极均为低电平，D1-6 和 D13-D18 这两组被点亮，D7-D12 这一组熄灭，但随着电源通过电阻 R3 对 C1 的充电，Q2 的基极电压逐渐升高，当超过 0.7V 时，Q2 由截至状态变为导通状态，集电极电压下降，D7-D12 这一组点亮。与此同时，Q2 的集电极下降的电压通过电容 C2 使 Q3 的基极电压也降低，Q3 由导通变为截止，其集电极电压升高，D13-D18 这一组熄灭。接下来，电路按照上面叙述的过程循环，3 组 18 只 LED 便会被轮流点亮，同一时刻有 2 组共 12 只 LED 被点亮。这些 LED 被交叉排列圣诞树边缘，不断的循环闪烁发光，达到动感显示的效果。

三、元件清单

圣诞树 A 板

名称	型号	编号	数量	名称	型号	编号	数量
电阻	100R	R2/R4/R6/R7	4	LED	红	D1-D6	6
电阻	4.7K	R1/R3/R5	3	LED	绿	D7-D12 D19	7
电容	47uf	C1/C2/C3	3	LED	黄	D13-D18	6
三极管	9014	Q1/Q2/Q3	3	PCB 板	TJ-56-180A	圣诞树 A 板	1

TJ-56-180 3D Christmas Tree – User Manual (English Translation)

1. Specifications

Input Voltage: DC 5V

Dimensions: 113 × 58 × 58 mm

2. Product Description

The 18 LEDs in this product are divided into three groups. When power is applied, one of the three transistors will conduct first. Because of slight component tolerances, only one transistor (Q1, Q2, or Q3) will start conducting before the others.

Assume trnsistor Q1 turns on first:

When Q1 conducts, LEDs D1–D6 (Group 1) will light. As Q1 turns on, the voltage across capacitor C1 drops, causing the capacitor to discharge toward 0V. When Q1 is fully on, the base voltages of the other two transistors (Q2 and Q3) rise. As C1 charges again, Q1's base voltage drops, eventually cutting off Q1. When Q1 stops conducting, Q2 starts conducting.

When Q2 conducts:

LEDs D7–D12 (Group 2) turn on. The voltage at transistor Q3's base will rise after Q2 conducts.
After this, Q2 will turn off when its capacitor finishes charging, and Q3 will turn on next.

When Q3 conducts:

LEDs D13–D18 (Group 3) turn on. When Q3 switches off, the cycle repeats again from Q1 → Q2 → Q3.
This continuous switching between the three LED groups creates a cyclic flashing
effect, where each set of LEDs lights in rotation.
The effect simulates the appearance of a constantly sparkling Christmas tree.

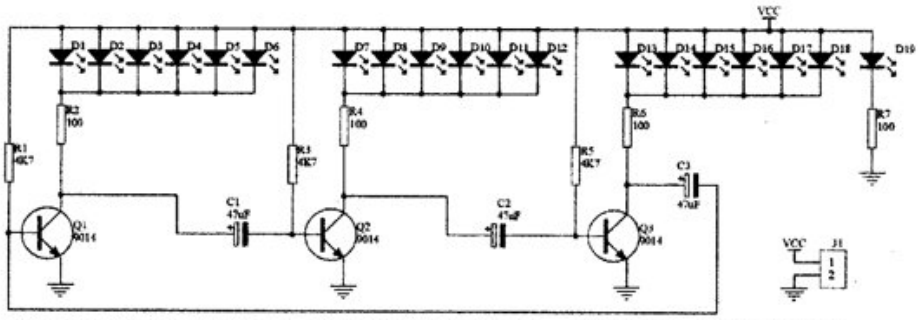
圣诞树 B 板

名称	型号	编号	数量	名称	型号	编号	数量
电阻	100R	R2/R4/R6	3	LED	红	D1-D6	6
电阻	4.7K	R1/R3/R5	3	LED	绿	D7-D12	6
电容	47uf	C1/C2/C3	3	LED	黄	D13-D18	6
三极管	9014	Q1/Q2/Q3	3	PCB 板	TJ-56-180B	圣诞树 B 板	1

圣诞树底板

名称	型号	编号	数量	名称	型号	编号	数量
开关	自锁	S	1	电源座	microUSB 座	P1	1
PCB 板	TJ-56-180C	圣诞树 C 板	1				

四、电路图



安装图文教程
下载密码：sdslt

上图为圣诞树 A 板电路图，圣诞树 B 板与其类似，只是少了一个 R7 和 D19。

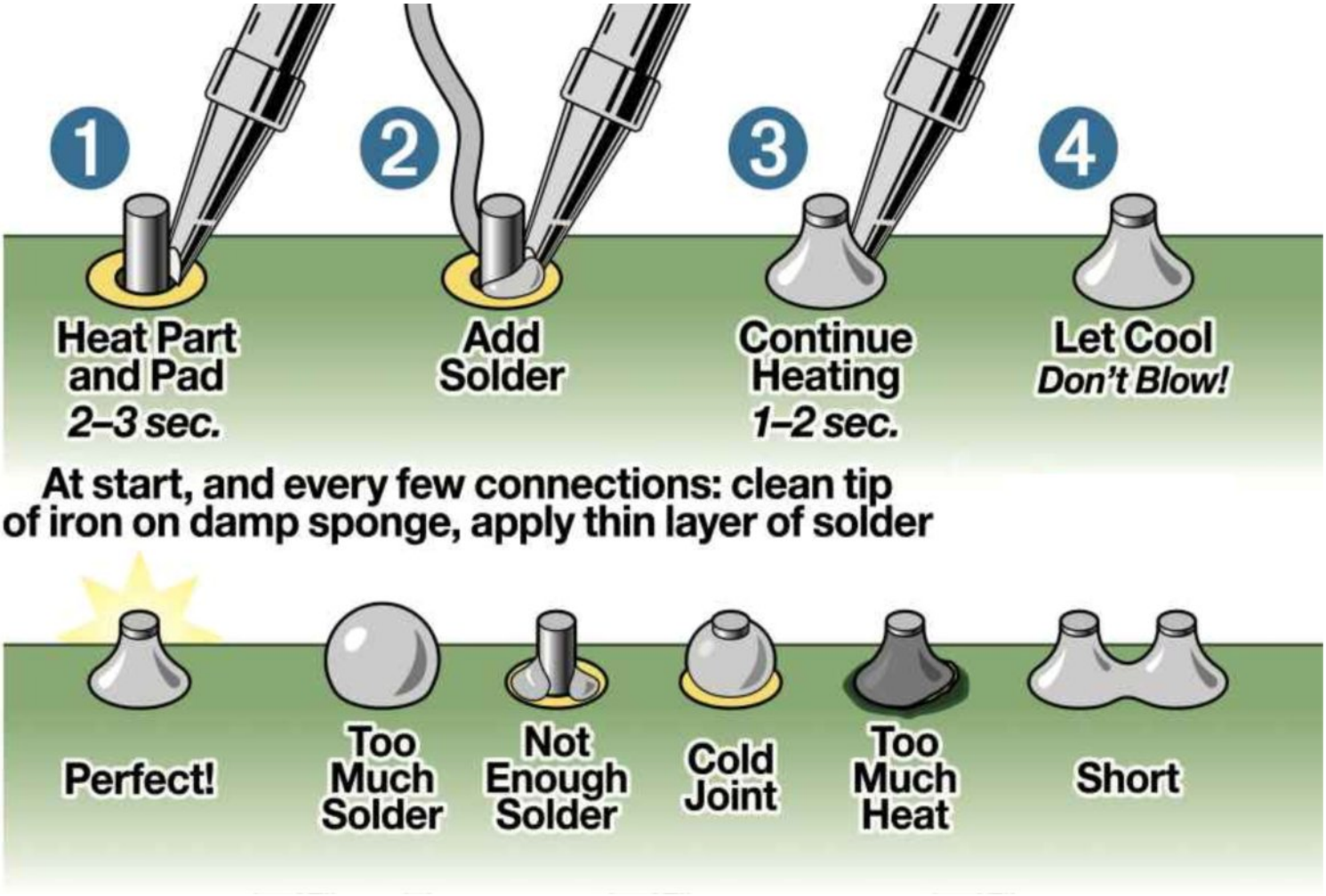
Component Values

Name	Value	Identifier	Quantity
Resistor	100R	R2 / R4 / R6	3
Resistor	4K7	R1 / R3 / R5	3
Capacitor	47uF	C1 / C2 / C3	3
Transistor	9014	Q1 / Q2 / Q3	3

Name	Value	Identifier	Quantity
LED	RED	D1 - D6	6
LED	GREEN	D7 - D12	6
LED	YELLOW	D13 - D18	6
LED	RED OR GREEN	D19	1

Name	Value	Identifier	Qty
Switch	Self Locking	S	1
USB	Micro USB	P1	1
PCB	PC Boards		3

Solder technique



Heat the joint (lead + pad)

Place the soldering iron tip so it touches both the metal lead and the pad at the same time. Hold it there briefly (1-2 seconds) so both surfaces heat evenly.

Apply solder to the joint—not the iron

Feed solder to the heated joint, not directly to the iron tip. When the joint is hot enough, solder will melt and flow smoothly around the lead and pad.