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› Gikfun DIY SMD SMT Soldering Practice Board EK7028 User Manual

Gikfun EK7028

Gikfun DIY SMD SMT Soldering Practice Board EK7028 User Manual

Brand: Gikfun | Model: EK7028

1. INTRODUCTION

The Gikfun DIY SMD SMT Soldering Practice Board EK7028 is designed to enhance your surface mount device (SMD) and surface mount technology (SMT) soldering skills. This kit provides a practical platform for practicing soldering various component sizes, culminating in a functional blue LED water lamp circuit. It is suitable for hobbyists and students looking to improve their precision soldering techniques.

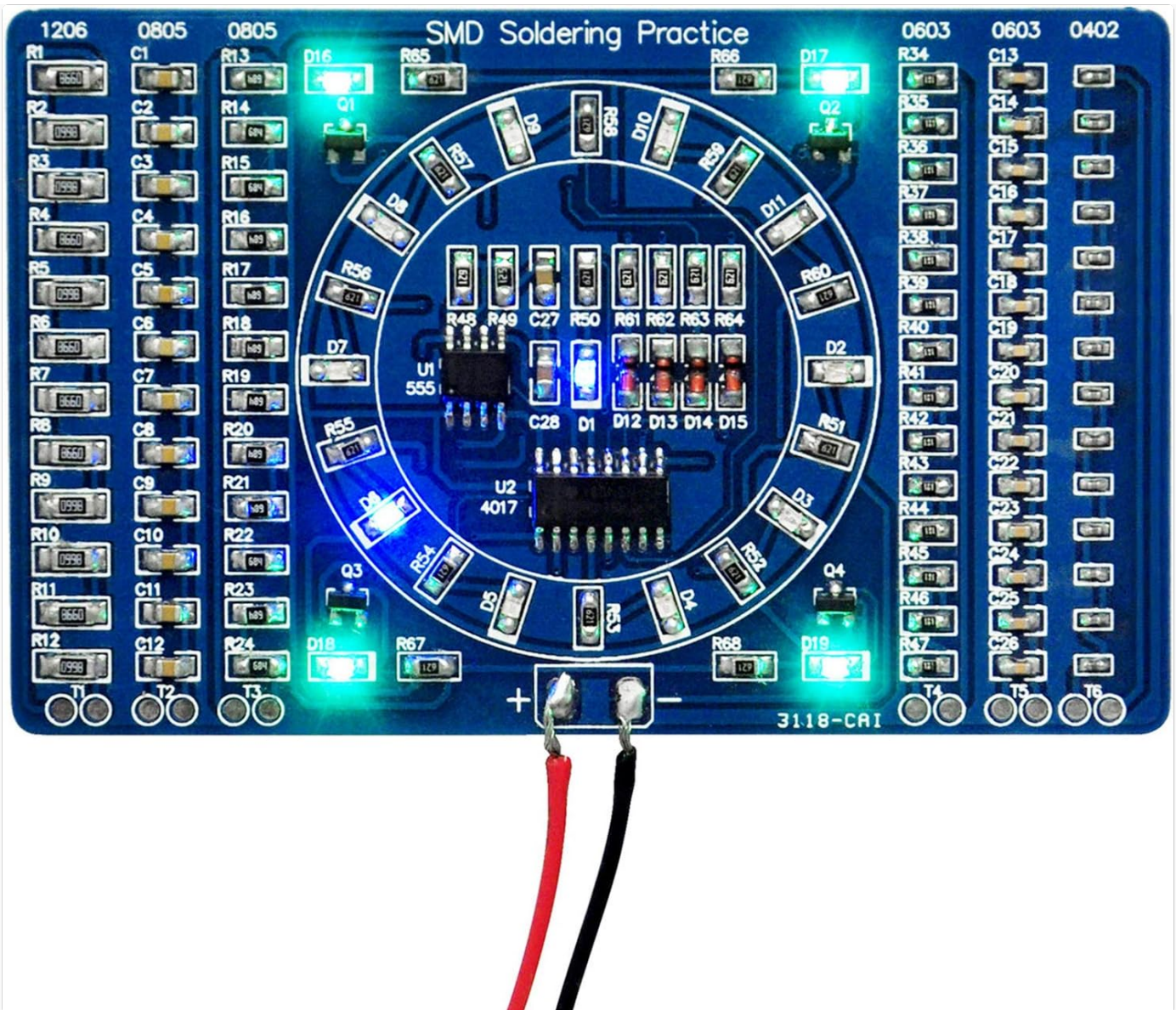


Figure 1: Gikfun DIY SMD SMT Soldering Practice Board EK7028

2. SAFETY GUIDELINES

Always prioritize safety when working with soldering equipment. Adhere to the following guidelines:

- Work in a well-ventilated area to avoid inhaling solder fumes.
- Wear appropriate eye protection (safety glasses) to shield against splashes or flying debris.
- Use a soldering iron stand to prevent accidental burns and keep the hot iron secure.
- Avoid touching the hot tip of the soldering iron or recently soldered components.
- Keep flammable materials away from your work area.
- Ensure proper disposal of solder waste and electronic components.
- Disconnect power to the soldering iron when not in use.

3. PACKAGE CONTENTS

The Gikfun DIY SMD SMT Soldering Practice Board EK7028 kit includes the following items:

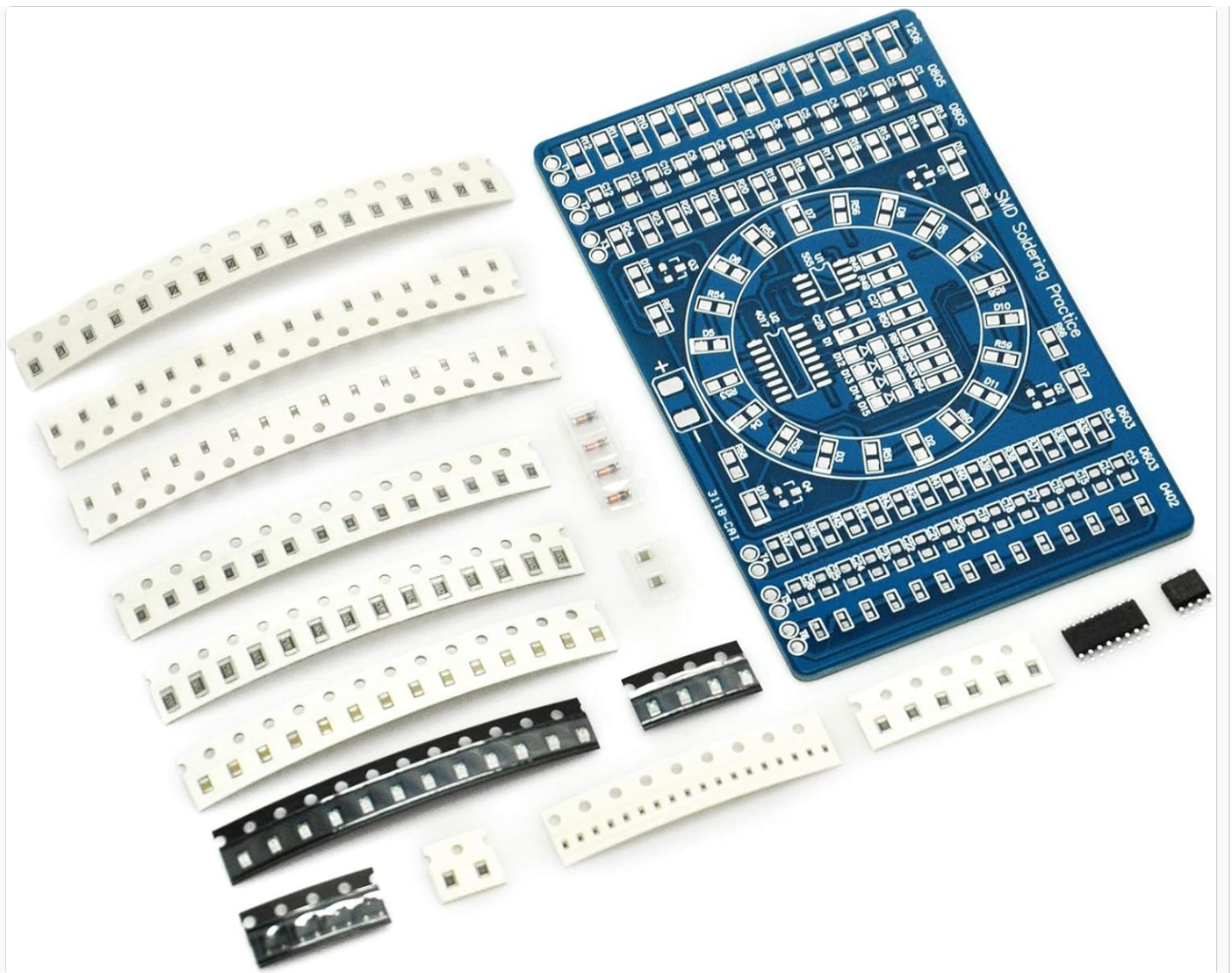


Figure 2: Contents of the Gikfun Soldering Practice Kit

Refer to the Bill of Materials for a detailed list of components:

Bill of Materials

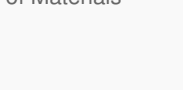
No	SMD package	Designator	Model	Qty	Corresponding Physical Diagram
1	1206	R1-R12	random	12	
2	0805	C1-C12	random	12	
3	0805	R13-R24	random	12	
4	0603	R34-R47	random	14	
5	0603	C13-C26	random	14	
6	0402		random	14	
7	0805	R50-R60 R65-R68	200-1K	15	
8	0805	D1-D11	Red/Blue	11	
9	0805	D16-D19	Emerald Green	4	
10	SOT23	Q1-Q4	J3Y	4	
11	LL34	D12-D15	4148	4	
12	0805	R48 R61-R64	10K	5	
13	0805	R49	1M	1	
14	0805	C27 C28	0.1uF	2	
15	SOP08	U1	555	1	
16	SOP16	U2	4017	1	

Figure 3: Bill of Materials

Table 1: Bill of Materials Summary

No.	SMD Package	Designator	Item Name	Qty
1	1206	R1-R12	Resistor	12
2	0805	C1-C12	Capacitor	12
3	0805	R13-R24	Resistor	12
4	0603	R34-R47	Resistor	14
5	0603	C13-C26	Capacitor	14
6	0402	random	Resistor/Capacitor	14
7	0805	R50-R60, R65-R68	Resistor (200-1K)	15
8	0805	D1-D11	LED (Red/Blue)	11
9	0805	D16-D19	LED (Emerald Green)	4
10	SOT23	Q1-Q4	Transistor (J3Y)	4
11	LL34	D12-D15	Diode (4148)	4
12	0805	R48, R61-R64	Resistor (10K)	5
13	0805	R49	Resistor (1M)	1
14	0805	C27, C28	Capacitor (0.1uF)	2
15	SOP08	U1	IC (555)	1
16	SOP16	U2	IC (4017)	1

4. BOARD LAYOUT OVERVIEW

The practice board features clearly marked areas for different component sizes and a central circuit for the LED water lamp. The back of the board includes useful measurement tools and component footprint references.

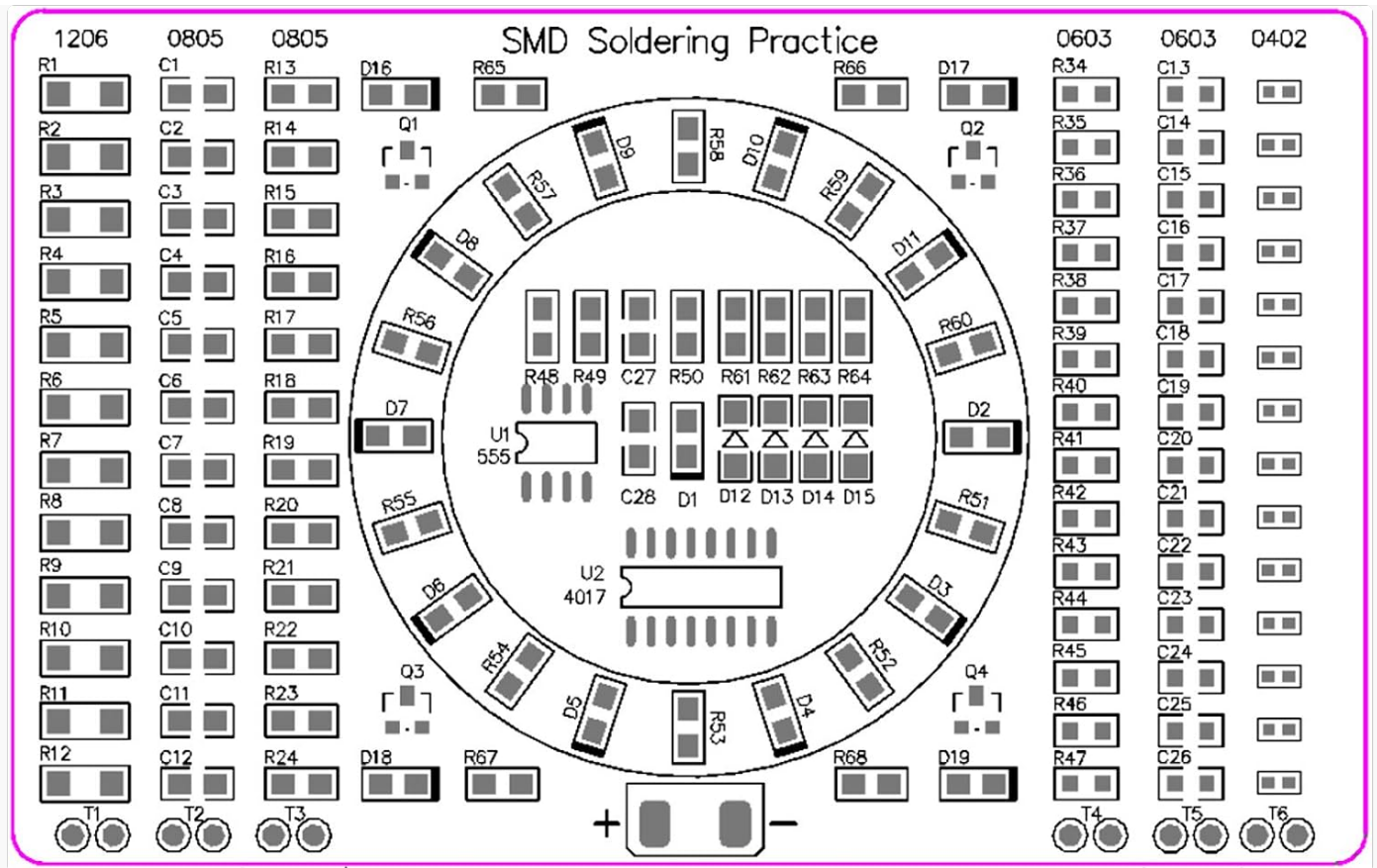


Figure 4: Front view of the practice board with component outlines

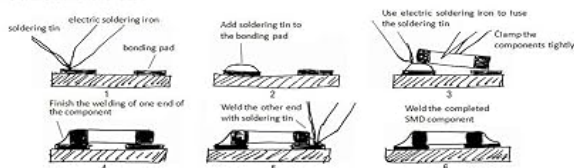
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Instructions for the use of welding exercise plate of SMD components

1. Try to choose soldering tin wire with the diameter of 0.6mm and 63% content of soldering tin, and select the pointed or knife edge electric soldering iron with 20W-30W for welding.
2. Welding steps:
 - a. weld the 1206 packaged components (R1-R12);
 - b. weld the 0805 packaged components (C1-C12, R13-R24);
 - c. weld the 0603 packaged components (R34-R47, C13-C26);
 - d. weld the 0402 packaged components (the list on the rightmost);
 - e. weld the components within the circle area in the middle .

The three lists on the left and the three lists on the right are areas for welding practice, there is no requirement about the model, but it requires the correctness of the component size. The circle part in the middle is the area for practical operation, only the welding with specific component models can make sure the fulfillment of its functions.

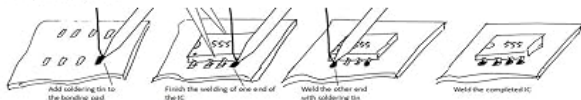
3. The methods for components welding are shown in figure. Firstly, add soldering tin to the welding spot, clamp the component with tweezer and weld one end of the component, and then weld the other end later.



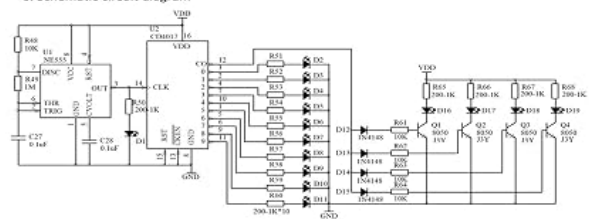
4. The differences of the positive and negative electrode of LED and 1N4148 are as shown in figure.



5. IC welding is shown as the figure: face to the IC characters, the left bottom is 1 pin, and the order of the pin starts from the 1 pin in anticlockwise. Facing the notch or dot to the notch or dot on the circuit board.



6. Schematic circuit diagram



7. Components list

Serial number	Packaging	Item Name	Model number	Quantity	Mark number
1	1206	Resistor	Random	12	R1-R12
2	0805	Capacitor	Random	12	C1-C12
3	0805	Resistor	Random	12	R13-R24
4	0603	Resistor	Random	14	R34-R47
5	0603	Capacitor	Random	14	C13-C26
6	0402	Capacitor or Resistor	Random	14	the list on the rightmost
7	0805	Resistor	200 Ω-1k Ω	15	R51-R60, R50, R65-R68
8	0805	LED		11	D2-D11, D1
9	0805	LED		4	D16-D19
10	SOT23	Triode	J3Y	4	Q1-Q4
11	1L34	Diode	4148	4	D12-D15
12	0805	Resistor	10k(103)	5	R48, R61-R64
13	0805	Resistor	1M(105)	1	R49
14	0805	Capacitor	0.1uF	2	C27, C28
15	S008	IC	555	1	U1
16	S016	IC	4017	1	U2

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Figure 5: Back view of the practice board with measurement tools

5. ASSEMBLY INSTRUCTIONS

5.1. Preparation

- Gather necessary tools: fine-tip soldering iron, fine solder wire (e.g., 0.6mm diameter), flux pen or syringe, fine-point

tweezers, multimeter, and magnification (e.g., USB microscope or headband magnifier).

- Organize components by size and type, referring to the Bill of Materials (Figure 3). Keep components in their tape strips until ready to solder to prevent loss.
- Ensure your workspace is clean, well-lit, and well-ventilated.

5.2. Soldering Practice Areas

The board is designed for progressive skill development, starting with larger components and moving to smaller ones. Begin with the largest components (1206) and proceed to 0805, 0603, and finally 0402. This allows you to gain confidence before tackling the smallest parts.

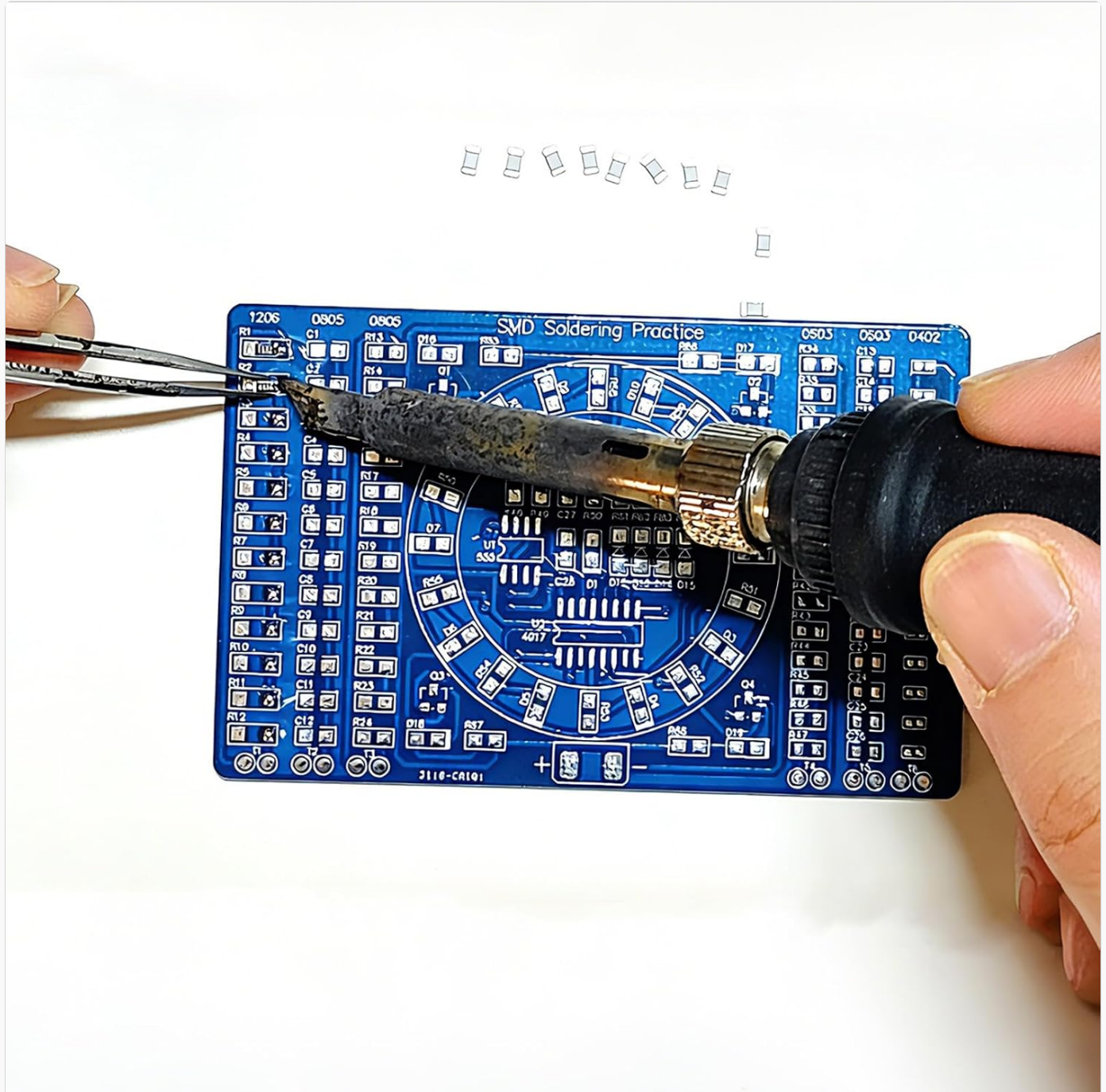


Figure 6: Soldering a component onto the board

1. **Apply Flux:** Apply a small amount of flux to the solder pads where the component will be placed.
2. **Tin One Pad:** Apply a small amount of solder to one of the pads for the component.
3. **Place Component:** Using tweezers, carefully place the component onto the pads, aligning it correctly. Heat the tinned pad with your soldering iron and gently push the component into the molten solder. Remove the iron and hold the component in place until the solder solidifies.

4. **Solder Second Pad:** Solder the opposite pad, ensuring a good connection. If necessary, re-heat the first pad and add more solder for a strong joint.
5. **Inspect:** Visually inspect each solder joint for proper formation (shiny, smooth fillets). Use a multimeter to check for continuity if desired.

5.3. Main Circuit Assembly (LED Water Lamp)

After practicing on the side strips, proceed to assemble the central LED water lamp circuit. This circuit uses a NE555 timer (U1) and a CD4017 decade counter (U2) to create a sequential lighting effect.

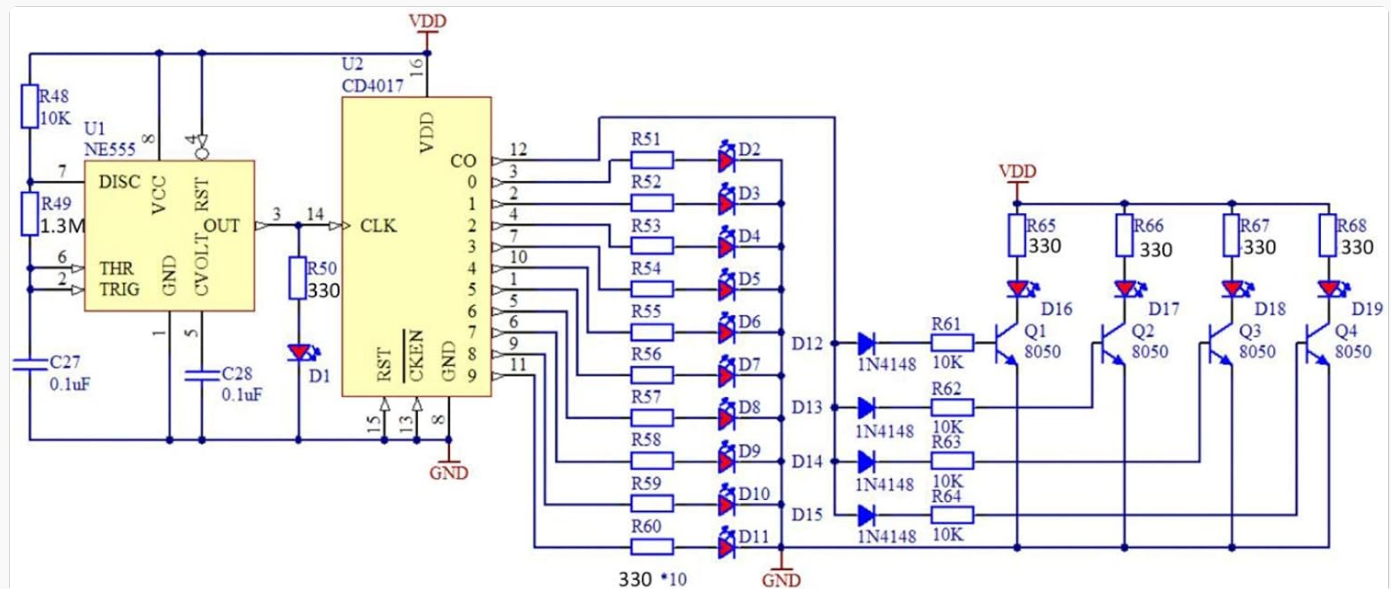


Figure 7: Schematic Diagram of the LED Water Lamp Circuit

1. **Identify Components:** Carefully identify each component for the central circuit using the Bill of Materials (Figure 3) and the board's silkscreen markings. Pay close attention to polarity for diodes (LEDs) and integrated circuits (ICs).
2. **Solder ICs (U1, U2):** Solder the NE555 (U1) and CD4017 (U2) ICs first. Ensure correct orientation; the notch or dot on the IC should align with the marking on the PCB.
3. **Solder Resistors and Capacitors:** Solder the remaining resistors (R48-R68) and capacitors (C27, C28) as indicated on the board.
4. **Solder Transistors (Q1-Q4):** Solder the SOT23 transistors (Q1-Q4). Note their orientation.
5. **Solder Diodes (D12-D15):** Solder the LL34 diodes (D12-D15). The band on the diode should match the band marking on the PCB.
6. **Solder LEDs (D1-D11, D16-D19):** Solder the LEDs. The longer lead of the LED typically indicates the anode (+), and the shorter lead indicates the cathode (-). On the PCB, the square pad usually indicates the anode (+), and the round pad indicates the cathode (-). Verify with a multimeter in diode test mode if unsure.

6. OPERATING INSTRUCTIONS

Once all components are soldered, the board is ready for testing.

1. **Connect Power:** Connect a DC power supply (3-12V) to the designated '+' and '-' terminals on the board. Ensure correct polarity.
2. **Observe LED Sequence:** The blue LEDs in the central circuit should light up in a sequential

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