

HU-054A Multi-Functional Calculator DIY Kit

1.Introduction:

HU-054A is Multi-Functional Calculator Electronic Soldering DIY Kit. It is powered by one CR2032 button battery, integrates two different computing functions, and uses 2 traditional 3bit digital tube display screen to display the calculation process and results in real-time.

It can not only be used as a DIY electronic welding kit that allows you to better understand the circuit and learn how to soldering, but also as a very suitable experimental workbench tool.

2.Feature:

- 1>.Basic Arithmetic Calculator
- 2>.Color Ring Resistance Calculator
- 3>.Memorable Working Mode
- 4>.6Bit LED digital tube Display Screen
- 5>.Transparent Matrix Keyboard
- 6>.Automatic power off without operation within 30 seconds
- 7>.DIY Hand Soldering

3.Parameter:

- 1>.Work voltage: DC 3V or 5V
- 2>.Display Color: Red Screen
- 3>.Power Type: USB or CR2032 Battery
- 4>.Shell Type: Acrylic Plate
- 5>.Work Temperature:-40°C~85°C
- 6>.Work Humidity:5%~95%RH
- 7>.Size(Installed):128*90*16mm

4.Use Methods:

1>.**Switch Calculator Mode:** Keep press ' MODE ' button 1 second to switch Basic Arithmetic Calculator and Color Ring Resistance Calculator.

1.1>.' 0 ' : Basic Arithmetic Calculator support ' + ', ' - ', ' * ', ' / ' arithmetic operation. Display ' --0-- ' during switching.

1.2>.' [' Color Ring Resistance Calculator for 4-Color or 5-Color Ring Resistor. Display ' --1-- ' during switching.

1.3>.At each startup, display the last selected working mode.

2>.Function-1: **Basic Decimal Arithmetic Calculator** with decimal point and minus sign.

2.1>.E.g: Calculate the result of ' 5*6 '. Steps:

2.1.1>.Press 'ON/C' button to power ON.

2.1.2>.Press the buttons ' 5 ', ' * ', ' 6 ' and ' = ' in sequence.

2.1.3>.Automatically Calculate and display Results 30

2.1.4>.Press 'ON/C' button can be cleared and display ' 0 '.

2.2>.E.g: Calculate the result of ' -8+2 '. Steps:

2.2.1>.Press 'ON/C' button to power ON.

2.2.2>.Press the buttons ' - ', ' 8 ', ' + ', ' 2 ' and ' = ' in sequence.

2.2.3>.Automatically Calculate and display Results - 6

2.2.4>.Press 'ON/C' button can be cleared and display ' 0 '.

2.3>.Supports up to 6-digit arithmetic operations.

2.4>.'ERROR' will be displayed when there is an input error such as ' 5 ÷ 0 '.

2.5>.Prompt ' LO ' within 1s and display the first 6 digits if the calculation result exceeds 6 bits with decimal point. Such as ' 0.1 ÷ 800 ', Its true result is 0.000125, but it just can display 6bit '0.00012'.

2.6>.Prompt ' LO ' within 1s and display result in scientific notation in 6bit if the calculation result exceeds 6 bits without decimal point. Such as ' 20000 * 100 ', Its result is 2000000, but it will display 6bit '2.000E6'. And it cannot continue with new operations before press ' ON/C ' to clear result.

3>.Function-2: 4-Color or 5-**Color Ring Resistance Calculator**. Input the color of the metal film resistor surface in sequence, then you can get resistor's resistance value and error value.

3.1>.E.g: 4-Color Ring Resistor within Green,Red,Yellow,Gold. Steps:

3.1.1>.Press 'ON/C' button to power ON.

3.1.2>.Press 'MODE' button to switch to ' [' display interface.

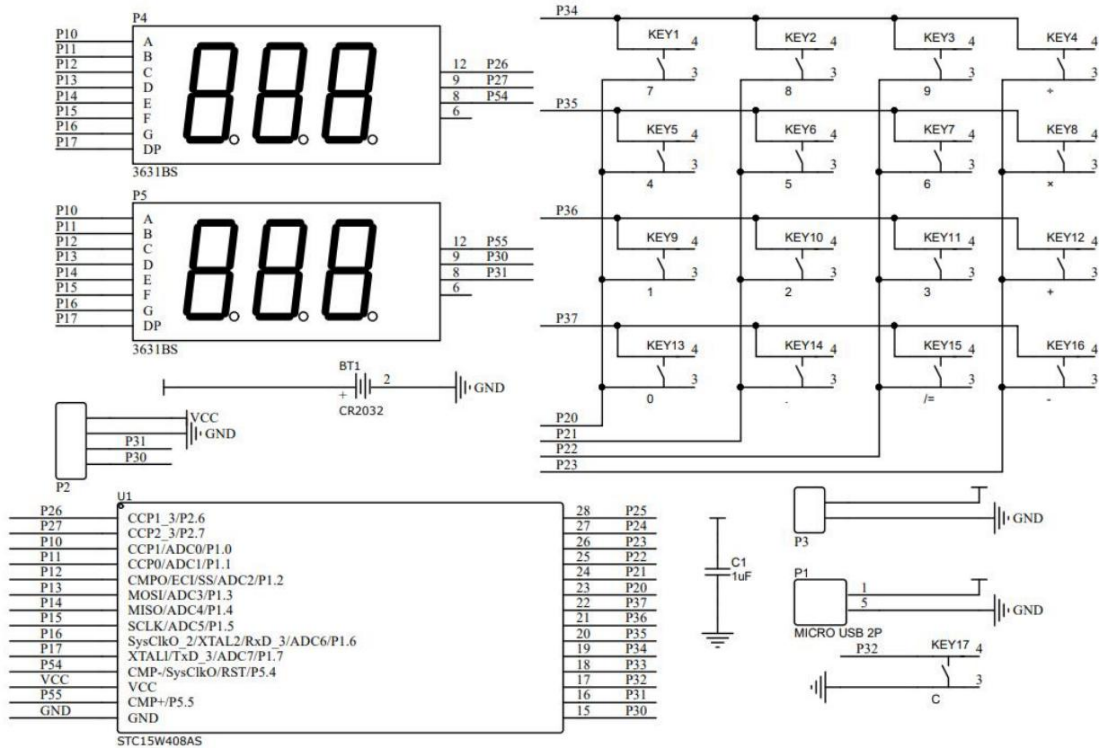
- 3.1.3>.Press the buttons 'Green', 'Red', 'Yellow', and 'Gold' in sequence.
- 3.1.4>.Automatically Calculate and display Results resistance value 520Kohm.
- 3.1.5>.Press 'ON/C' button can be cleared and display ' | '.
- 3.2>.E.g: 5-Color Ring Resistor within Yellow,Violet,Black,Brown,Gold. Steps:
 - 3.2.1>.Press 'ON/C' button to power ON.
 - 3.2.2>.Press 'MODE' button to switch to ' | ' display interface.
 - 3.2.3>.Press the buttons 'Yellow', 'Violet', 'Black', 'Brown' and 'Gold' in sequence.
 - 3.2.4>.Automatically Calculate and display Results resistance value 4700ohm.
 - 3.2.5>.Press 'ON/C' button can be cleared and display ' | '.
- 3.3>.Display result in scientific notation in 6bit if the calculation result exceeds 1Mohm (6bit) Such as '5100000', Its result is 5.1M, but it will display 6bit '5.100E6'.
- 3.4>.There is a significant error when the calculation result exceeds 1Mohm.
- 3.5>.The maximum measured resistance value is 4Mohm.
- 4>.Work Power: It can get work power from Micro USB or RC2032 battery. BUT it cannot connect USB and battery at the same time, otherwise, it will damage the battery.
- 5>.Note: When power by battery, due to limited battery capacity, frequent frequent use or prolonged standby may result in low battery power and inability to function properly. Please replace the batteries promptly.
- 6>.Automatic shutdown: Automatic power off without operation within 30 seconds.

5.Component Listing:

NO.	Component Name	PCB Marker	Parameter	QTY
1	Monolithic Capacitor	C1	1uF	1
2	CR2032 Battery	BT1	3V	1
3	CR2032 Battery Socket	BT1		1
4	Black-Yellow Button	KEY1-KEY17	12*12mm	17
5	White Button Cap	KEY1-KEY17		17
6	Transparent Button Cap	KEY1-KEY17		17
7	Micro USB Socket	P1		1
8	3Bit Digital Tube	P4,P5	Red	2
9	STC15W408AS Controller	U1	DIP-28	1
10	IC Socket	U1	DIP-28	1
11	Button Label Paper			1
12	Acrylic Board			6
13	M2*2+3mm Copper Pillar Screw			4
14	M2*20mm Screw			4
15	M2*4mm Screw			4
16	M2 Nut			8

Note:Users can complete the installation according to the PCB silk screen and component list.

6.Schematic Diagram:



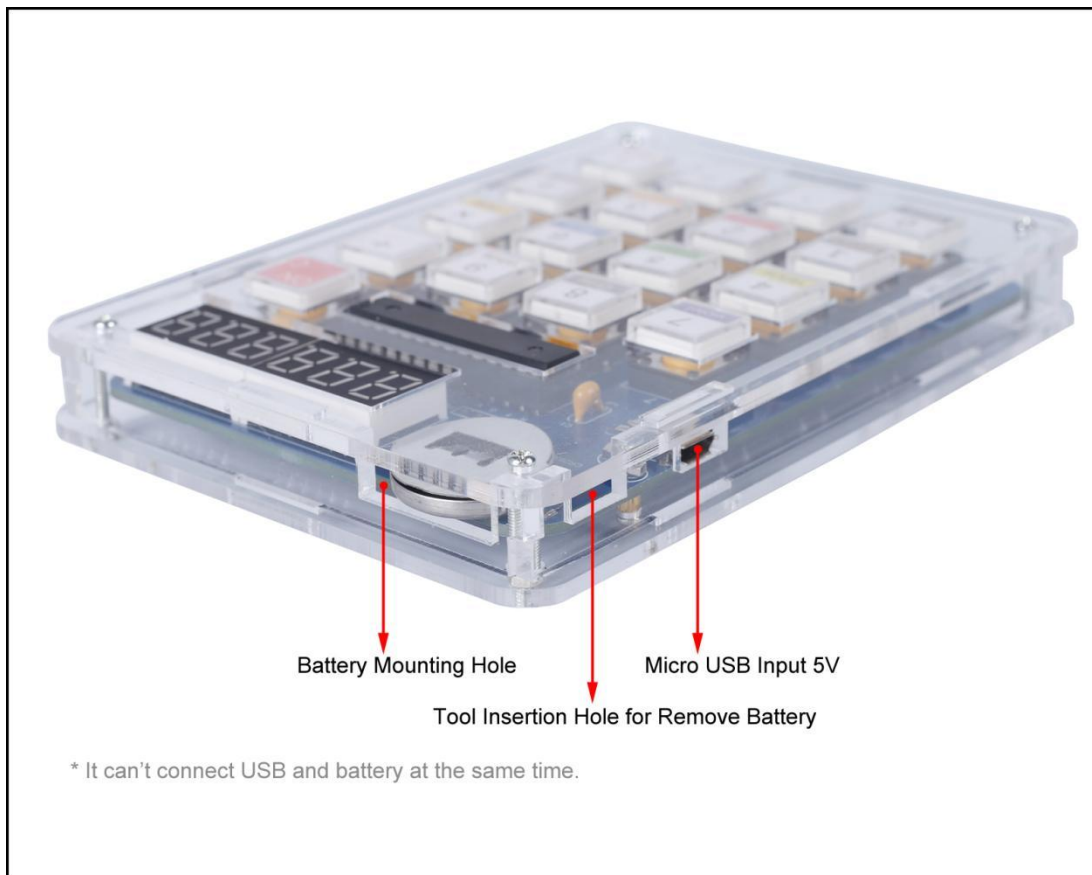
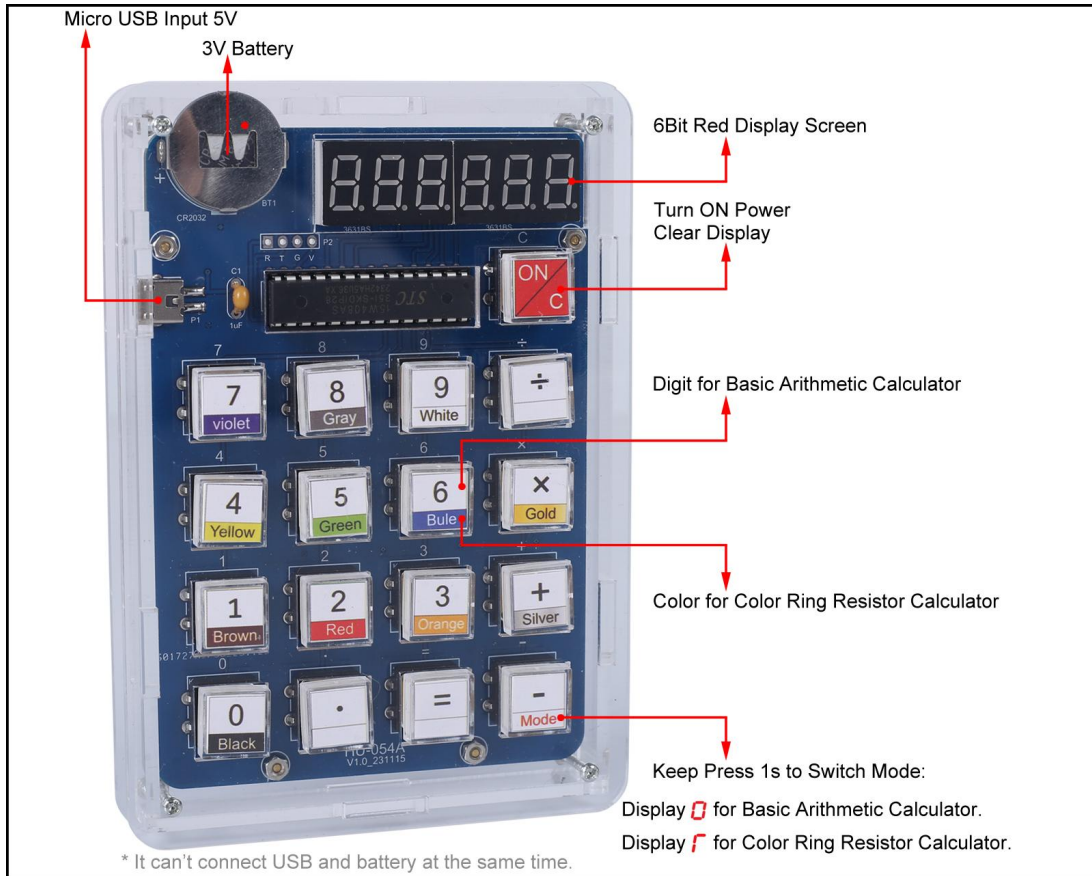
7.Application:

- 1>.Training welding skills
- 2>.Student school
- 3>.DIY production
- 4>.Project Design
- 5>.Electronic competition
- 6>.Gift giving
- 7>.Crafts collection
- 8>.Home decoration
- 9>.Souvenir collection
- 10>.Graduation design
- 11>.Holiday gifts

8.Installation Tips:

- 1>.User needs to prepare the welding tool at first.
 - 1.1>.Soldering iron (<50 Watt)
 - 1.2>.Rosin core ("radio") solder
 - 1.3>.Wire cutters
 - 1.4>.Wire strippers
 - 1.5>.Screwdriver
- 2>.Please be patient until the installation is complete.
- 3>.The package is DIY kit.It need finish install by user.
- 4>.The soldering iron can't touch the components for a long time(1.0 second), otherwise it will damage the components.
- 5>.Pay attention to the positive and negative of the components.
- 6>.Strictly prohibit short circuit.
- 7>.User must install the LED according to the specified rules.Otherwise some LED will not light.
- 8>.Install complex components preferentially.
- 9>.Make sure all components are in right direction and right place.
- 10>.It is strongly recommended to read the installation manual before starting installation!!!
- 11>.Please wear anti-static gloves or anti-static wristbands when installing electronic components.

9.Installation Steps(Please be patient install!!!):



Switch Calculator Mode:

Keep press **【MODE】** 1 second to switch Basic Arithmetic Calculator and Color Ring Resistance Calculator.
 Basic Arithmetic Calculator: Display **0** and support '+', '-', '*', '/' arithmetic operation.
 Display **--0--** and **0** in sequence when switch into this mode.
 Color Ring Resistance Calculator: Display **f** for 4-Color or 5-Color Ring Resistor.
 Display **--f--** and **f** in sequence when switch into this mode.

Function 1: Basic Decimal Arithmetic Calculator with decimal point and minus sign.

E.g: Calculate $5*6=30$ Steps: Press **【ON/C】** to starting up, then press **【5】**, **【X】**, **【6】**, **【=】** in turns.
 Get results = 30. Press **【ON/C】** button to clear and display '0'.
E.g: Calculate $-8+2=-6$ Steps: Press **【ON/C】** to starting up, press **【-】**, **【8】**, **【+】**, **【2】**, **【=】** in turns.
 Get results = -6. Press **【ON/C】** button to clear and display '0'.

LO will be displayed when there is an input error such as ' $5 \div 0$ ' **LO** will be displayed within 1s if the calculation result exceeds 6 bits.

Note:

- 1.Prompt 'LO' within 1s and display the first 6 digits if the calculation result exceeds 6 bits with decimal point. Such as ' $0.1 \div 800$ ', Its true result is 0.000125, but it just can display 6bit '0.00012'.
- 2.Prompt 'LO' within 1s and display result in scientific notation in 6bit if the calculation result exceeds 6 bits without decimal point. Such as ' $20000 * 100$ ', Its result is 2000000, but it will display 6bit '2.000E6'. And it cannot continue with new operations before press **【ON/C】** to clear result.

Function 2: 4-Color or 5-Color Ring Resistance Calculator. Input color in turn to get resistor value

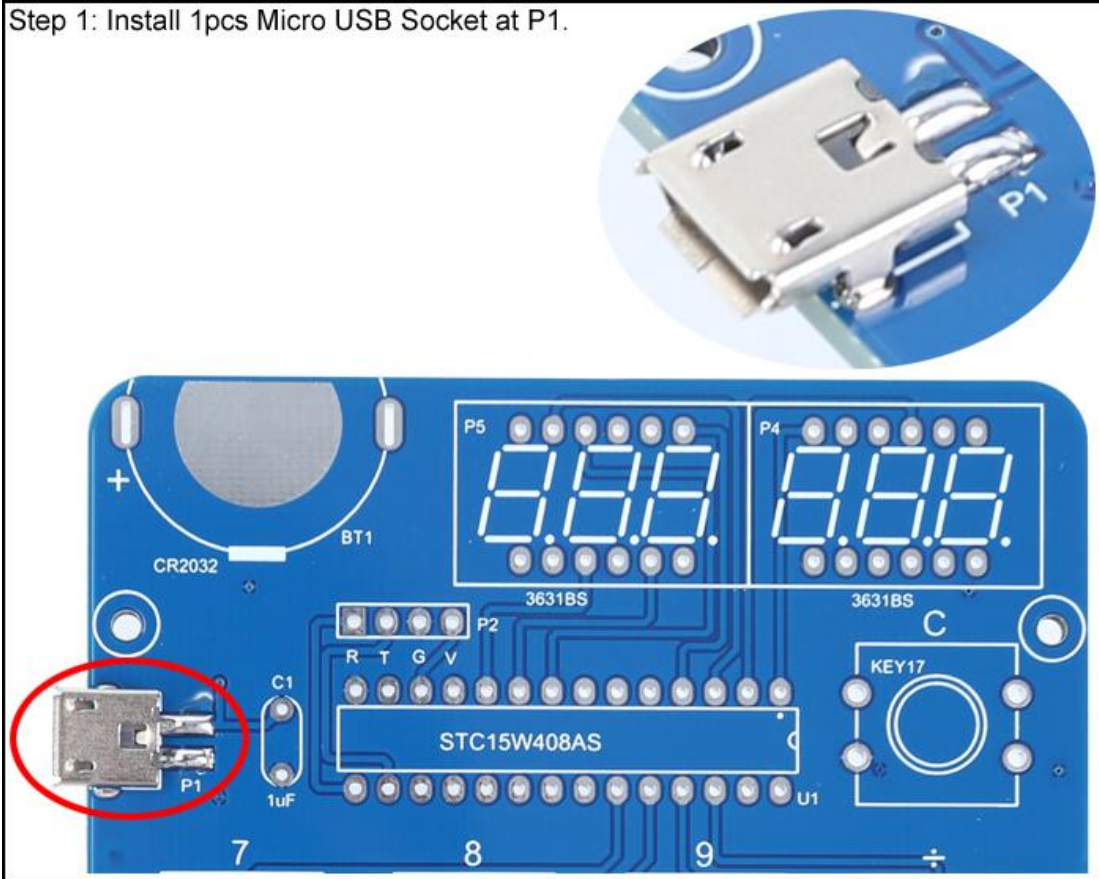
E.g: 5-Color Ring Resistor: Yellow,Violet,Black,Brown,Gold, Value is 4700Ω
 Steps: Press **【ON/C】** button to starting up, then press **【MODE】** to switch to '**f**' display interface.
 Then press **【Yellow】**, **【Violet】**, **【Black】**, **【Brown】**, **【Gold】** in turns.
 Get resistor value 4700Ω Press **【ON/C】** button to clear and display '**f**'.

E.g: 4-Color Ring Resistor: Green,Red,Yellow,Gold, Value is 520KΩ
 Steps: At '**f**' display interface, press **【Green】**, **【Red】**, **【Yellow】**, **【Gold】** buttons in turns.
 Get resistor value 520KΩ and error value 5%. Press **【ON/C】** button to clear and display '**f**'.

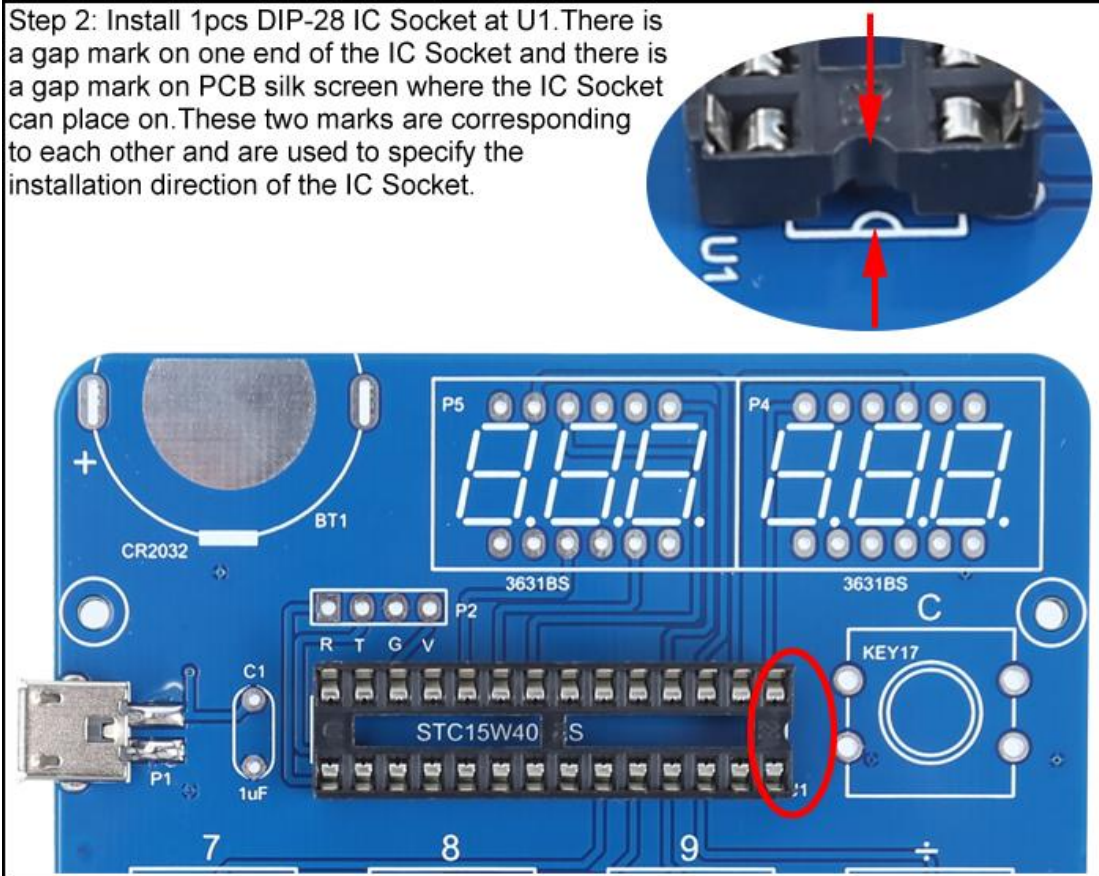
- Note:**
- 1.Display result in scientific notation in 6bit if result exceeds 1MohmSuch as ' 5100000 ', Its result is 5.1M, but it will display 6bit ' $5.100E6$ '.
 - 2.There is a significant error when result exceeds 1Mohm.
 - 3.The maximum measured value is 4Mohm.



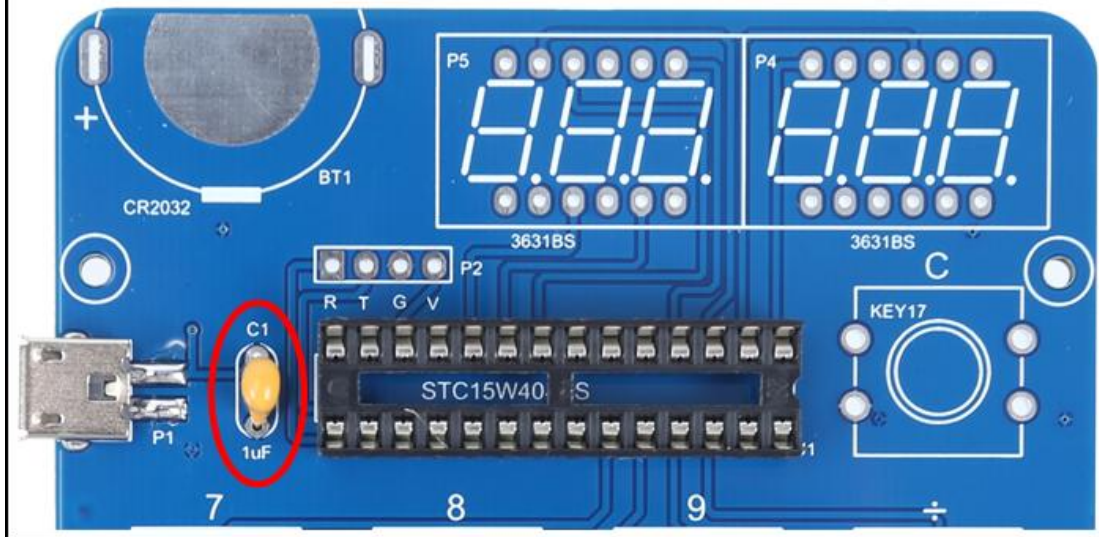
Step 1: Install 1pcs Micro USB Socket at P1.



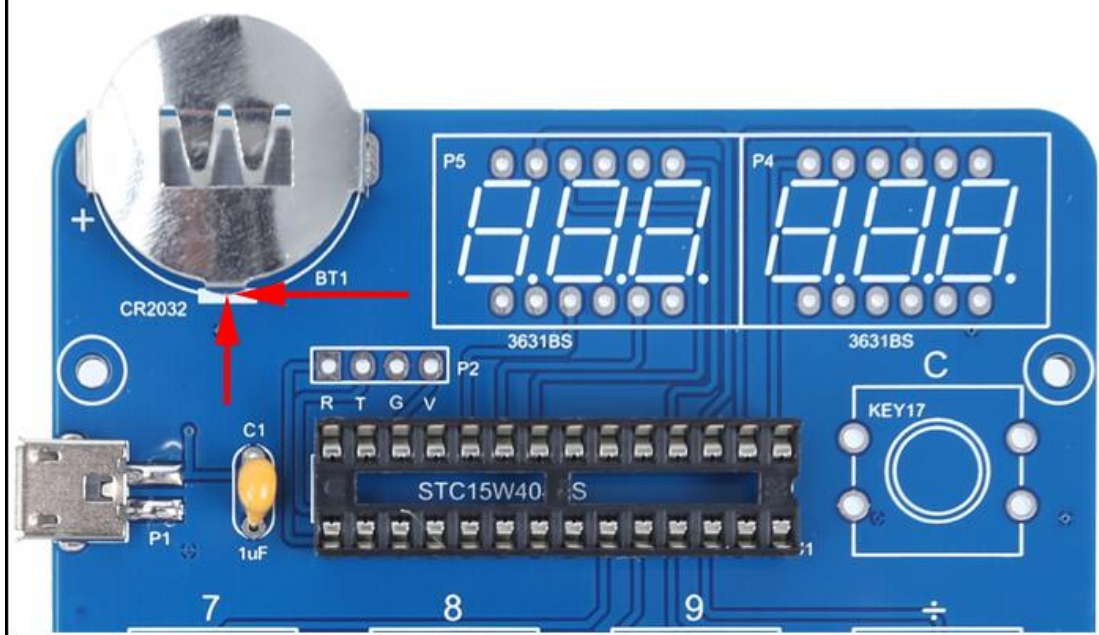
Step 2: Install 1pcs DIP-28 IC Socket at U1. There is a gap mark on one end of the IC Socket and there is a gap mark on PCB silk screen where the IC Socket can place on. These two marks are corresponding to each other and are used to specify the installation direction of the IC Socket.



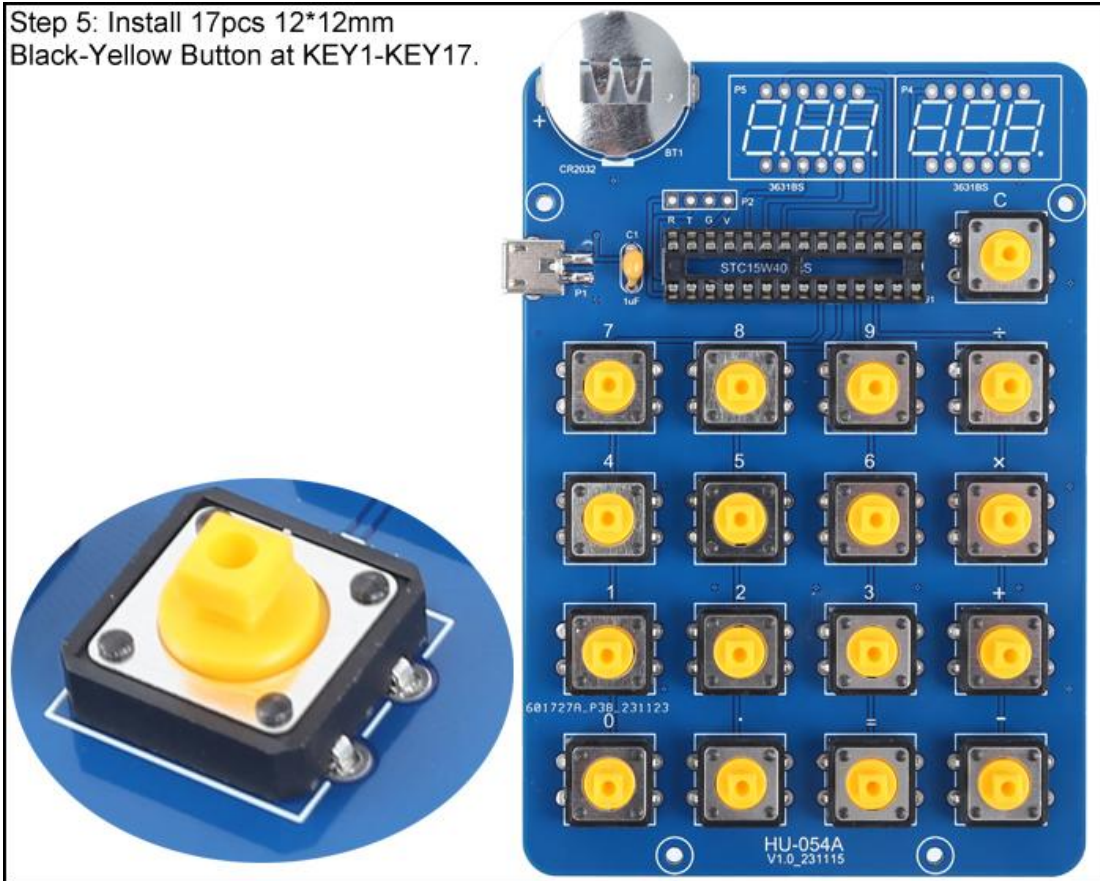
Step 3: Install 1pcs 1uF Monolithic Capacitor at C1.



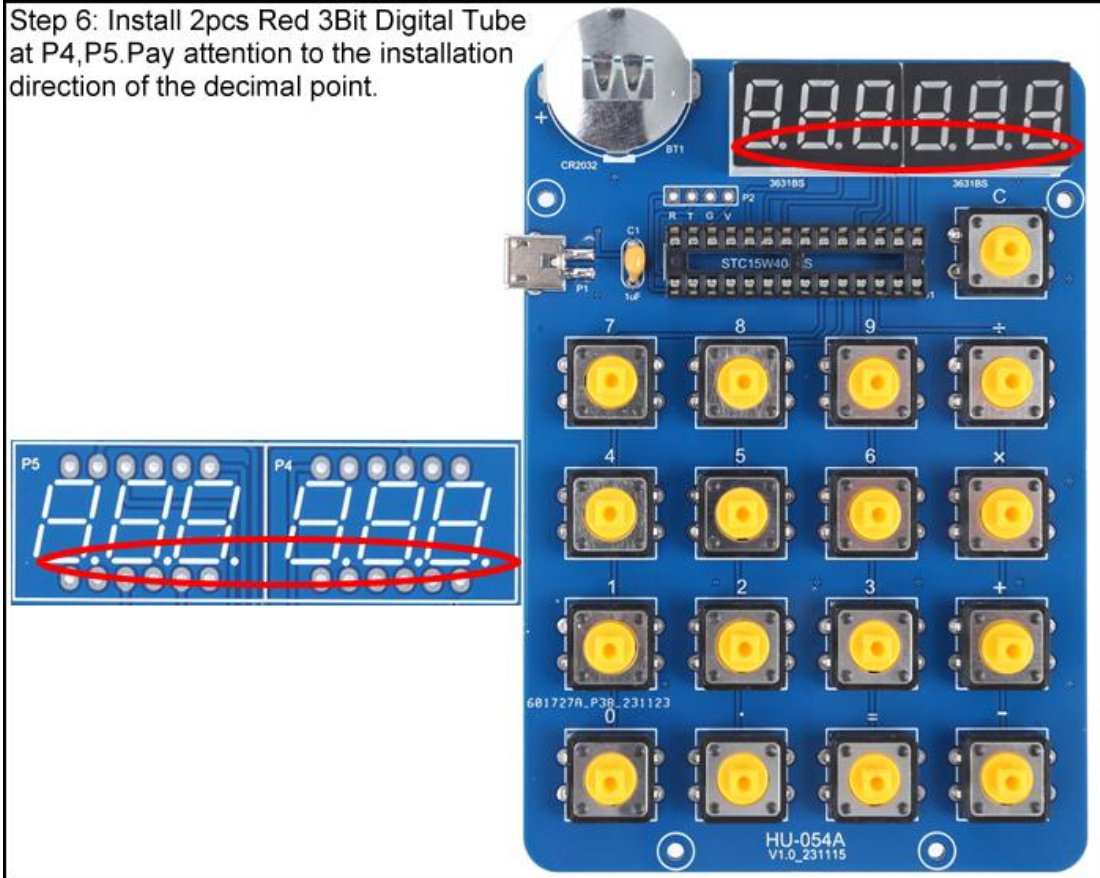
Step 4: Install 1pcs CR2032 Battery Socket. Pay attention to the installation direction.



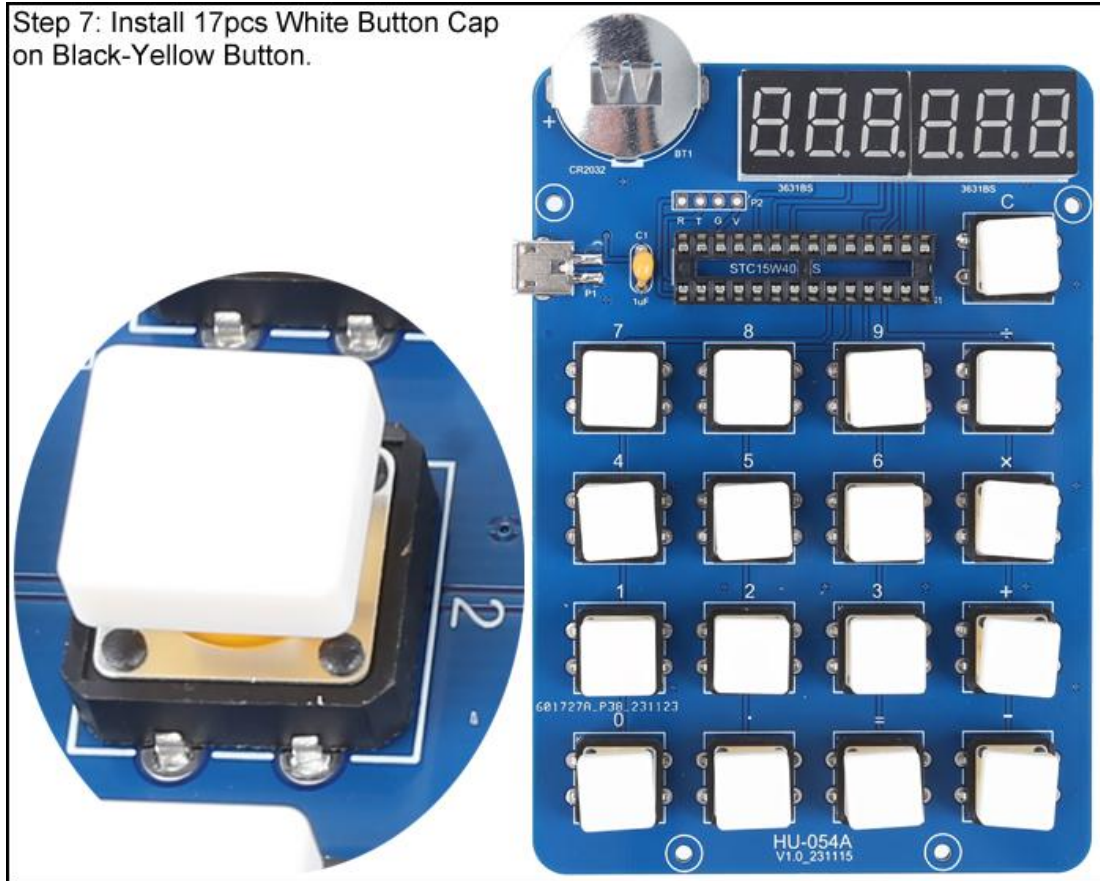
Step 5: Install 17pcs 12*12mm Black-Yellow Button at KEY1-KEY17.



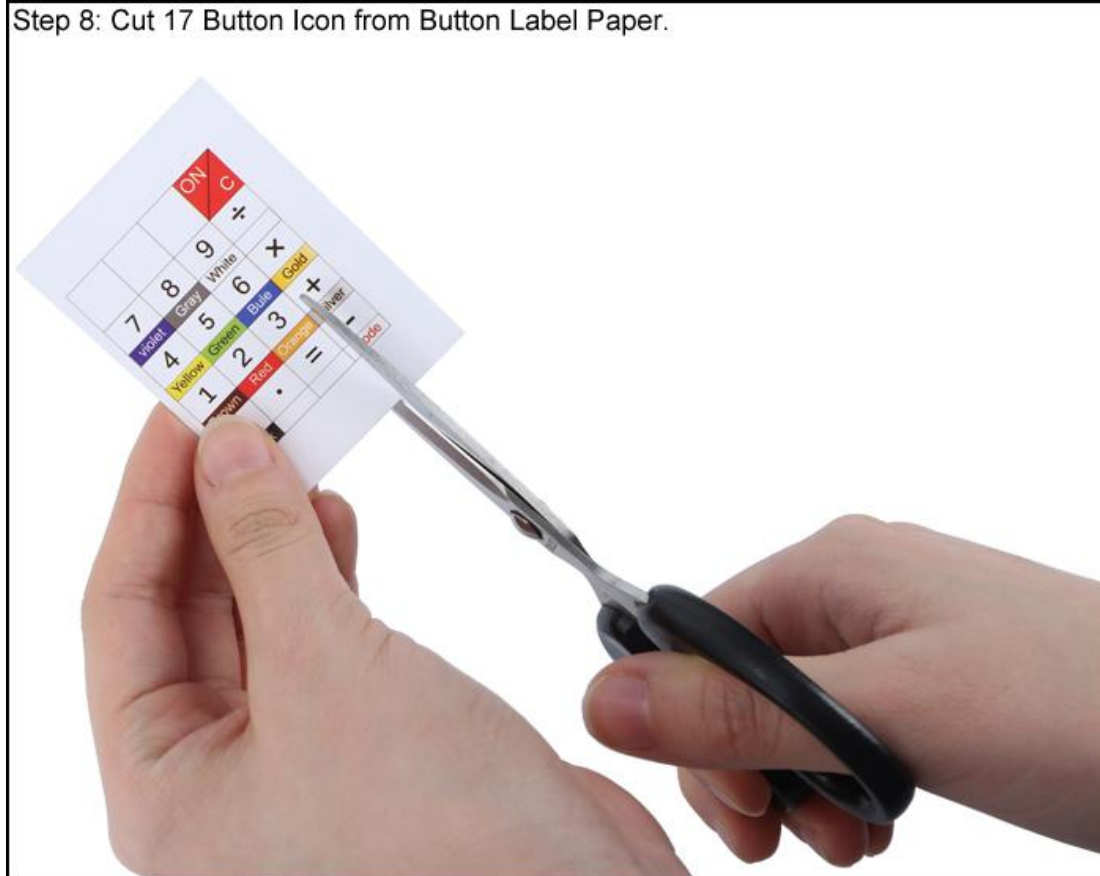
Step 6: Install 2pcs Red 3Bit Digital Tube at P4,P5. Pay attention to the installation direction of the decimal point.



Step 7: Install 17pcs White Button Cap on Black-Yellow Button.



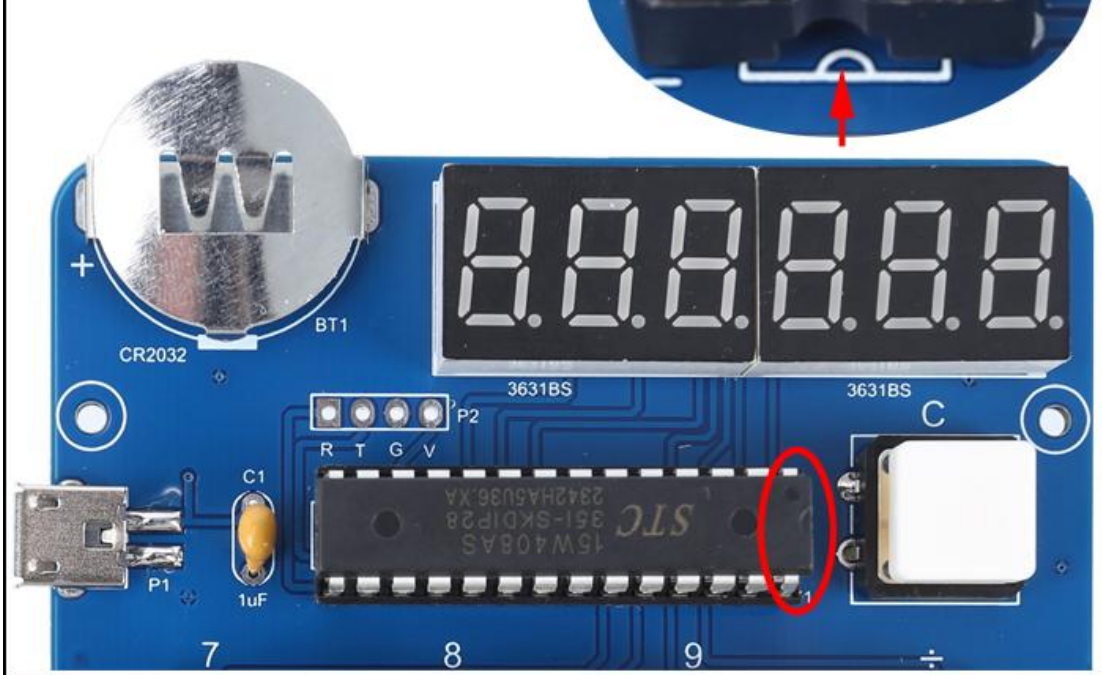
Step 8: Cut 17 Button Icon from Button Label Paper.



Step 9: Place the button icon in the transparent button cap. It can be inserted faster and more conveniently with the help of tweezers.



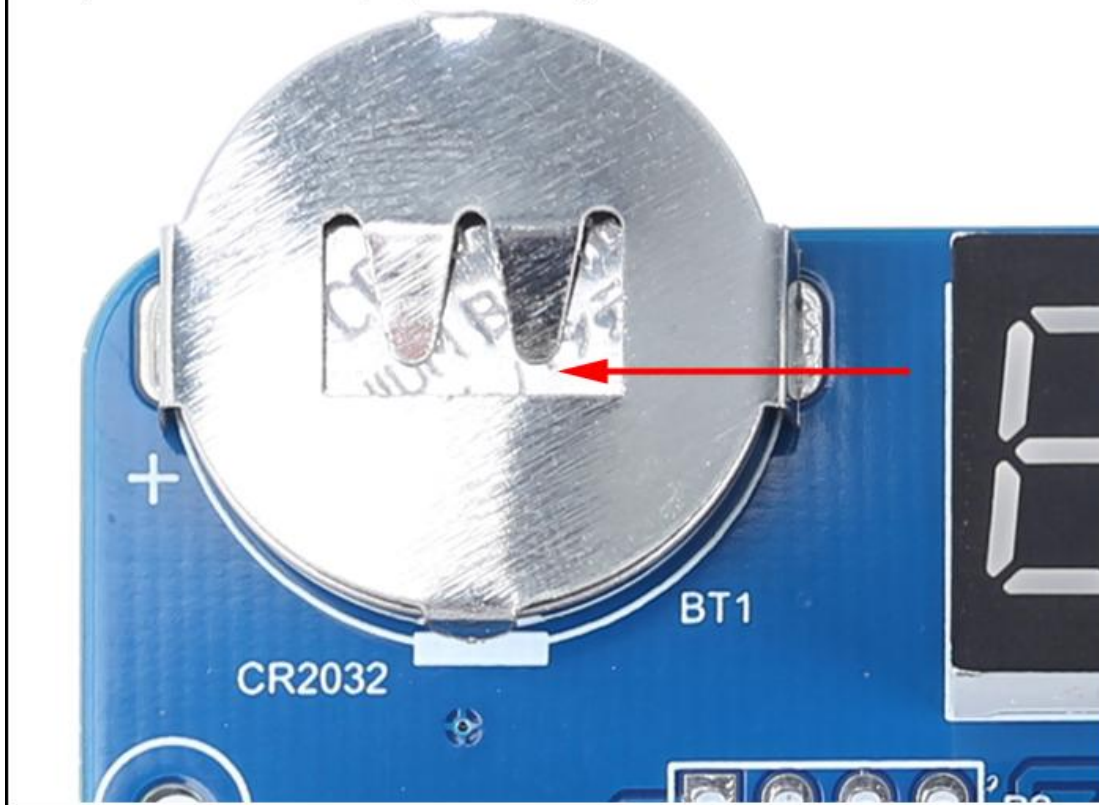
Step 10: Install 1pcs DIP-28 IC IAP15W408AS at U1. There is a gap mark on one end of the IC and there is a gap mark on DIP-28 IC Socket where the IC can place on. These two marks are corresponding to each other and are used to specify the installation direction of the IC.



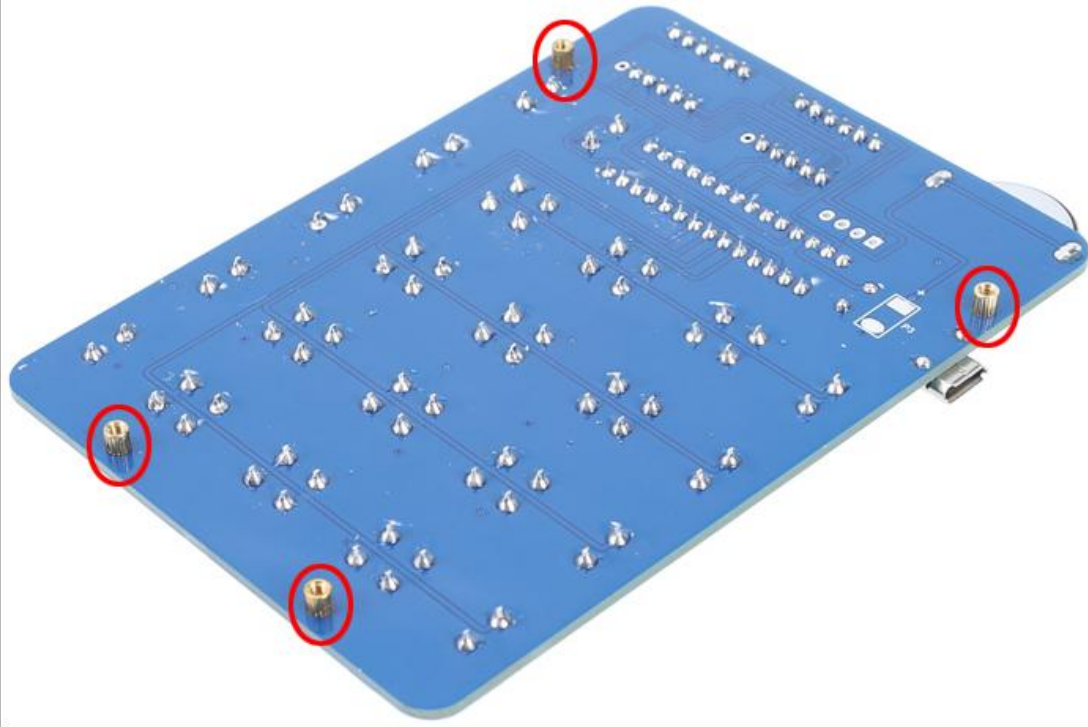
Step 11: Install the transparent button cap on Black-Yellow Button as shown. Be sure to place buttons with different icons in the specified positions.



Step 12: Install 1pcs CR2032 battery as shown. Note: The positive electrode of the battery contacts the metal spring of the battery holder.



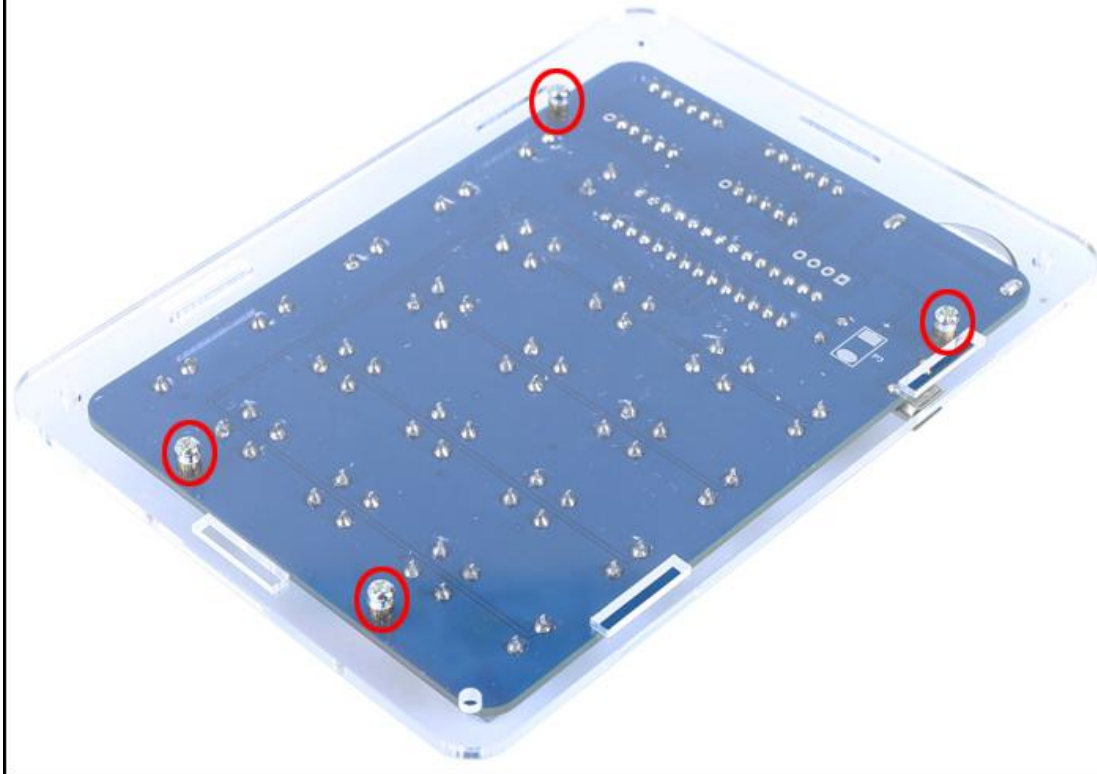
Step 13: Fix 4pcs M2*2+3mm Copper Pillar Screw on PCB by 4pcs M2 Nut.



Step 14: Tear off the protective film on the black acrylic surface.



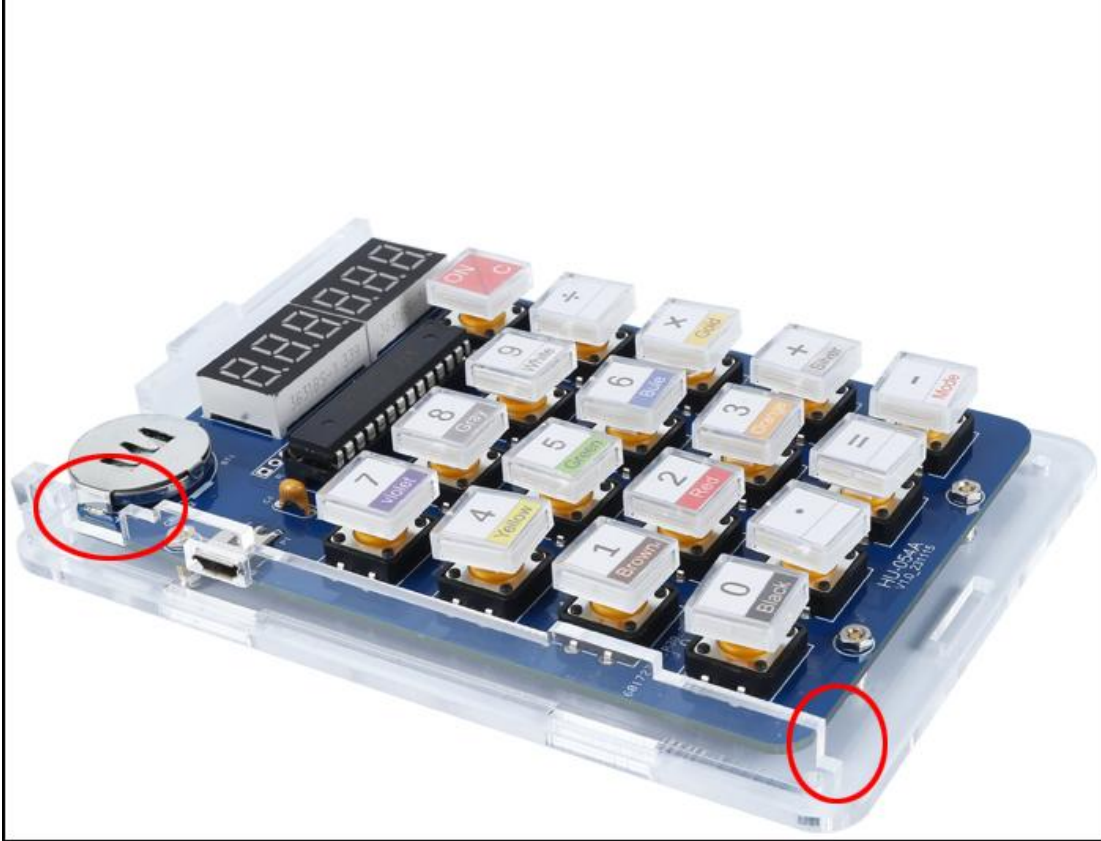
Step 15: Fix the bottom acrylic plate on PCB by 4pcs M2*4mm Screw.



Step 16: Install the battery acrylic plate as showing.



Step 17: Install the USB acrylic plate as showing.



Step 18: Install the other one side acrylic plate as showing.



Step 19: Install the last side acrylic plate as showing.



Step 20: Fix the top acrylic plate by 4pcs M2*2+3mm Copper Pillar Screw and M2 Nut.

