

Reference manual for 4-bit IN12 clock production

Notes in the production process:

1. Tools to be prepared in the production process: constant temperature electric soldering iron, soldering tin, vice, pointed nose pliers, diagonal pliers, tweezers small slotted screwdriver, art knife, ruler AB glue, marking pen, multimeter, flux
2. The clock is powered by a 12V/1A power supply. A power supply below 12V will cause the IN12 glow tube to not display. Do not use an unstable power supply (such as a computer host)
3. The copper wire made can be cut short before use and then clamped at both ends with pliers to straighten the wire.
4. Production sequence: Booster power supply section -5V voltage section - Button section - Clock section - Glow tube surrounding scaffolding - Neon circuit - Base processing - Power interface - Combination
5. After powering on, there is high voltage in the circuit. Please do not touch the high voltage part of the circuit after powering on. Debugging and use must be covered with a glass cover. (Please pay special attention if you carry medical electronic devices)

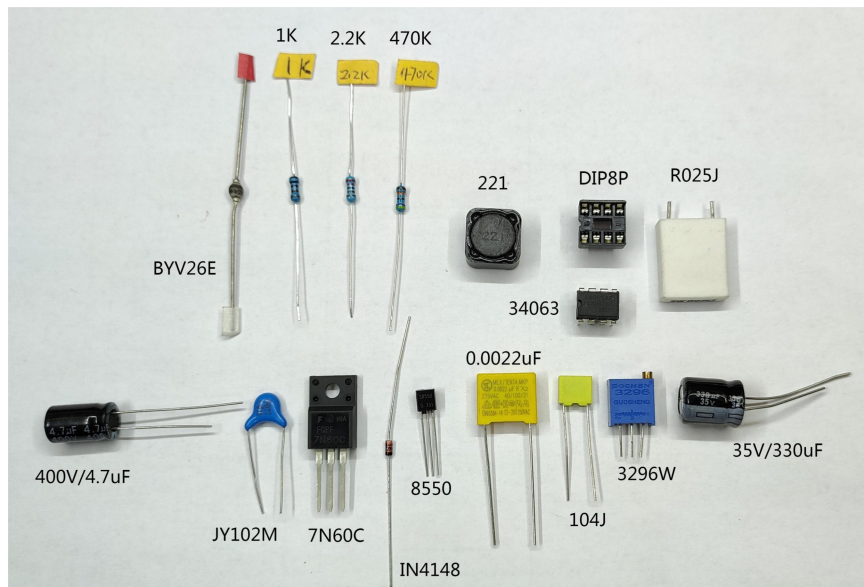
Method for setting button time:

1. Press the SET key once. The hour ten digit part of the time will start flashing, and press the plus or minus key to modify the hour ten digit.
2. Press the SET key again. The hour and digit parts of the time will start flashing. Press the plus or minus keys to modify the hour and digit parts.
3. Press the SET key again. The ten minute part of the time will start flashing, and press the plus minus key to modify the ten minute part.
4. Press the SET key again. The minutes and units of time will start flashing, and press the plus or minus keys to modify the minutes and units.
5. Press the SET button again to save, and the light will work normally.
6. Remote control time setting method:
 - a. Press the 'C' key once. The hour ten digit part of the time will start flashing. Press the hour ten digit, hour one digit, minute ten digit, and minute one digit numbers in sequence.

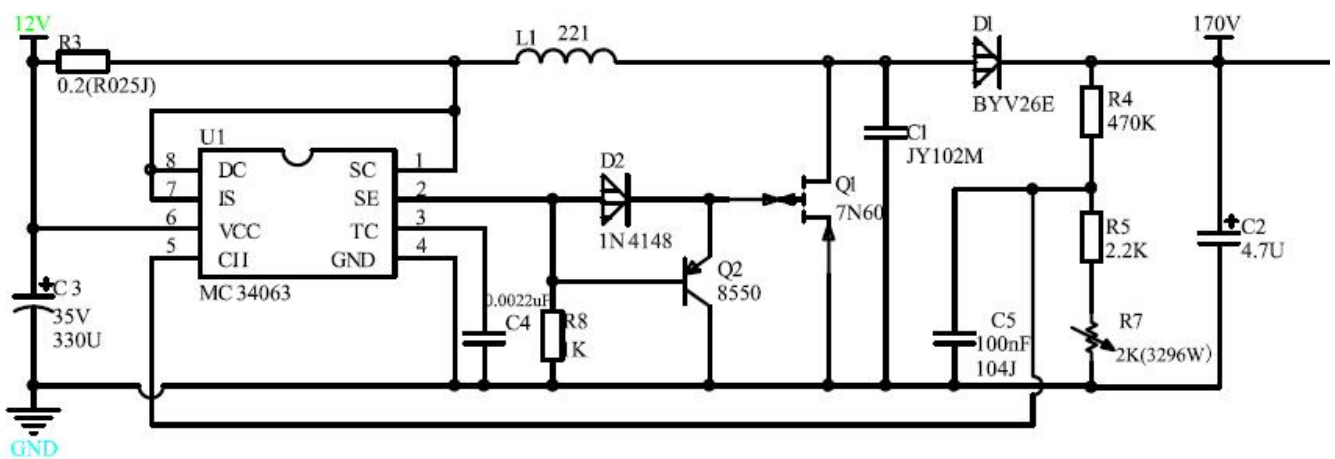
Production steps:

1. Booster power supply part: The power module inputs 12V and outputs 170V (168V-180V), please pay attention to safety. (When the voltage is incorrect, it can be adjusted by adjusting the adjustable resistor ADJ (3239W).)

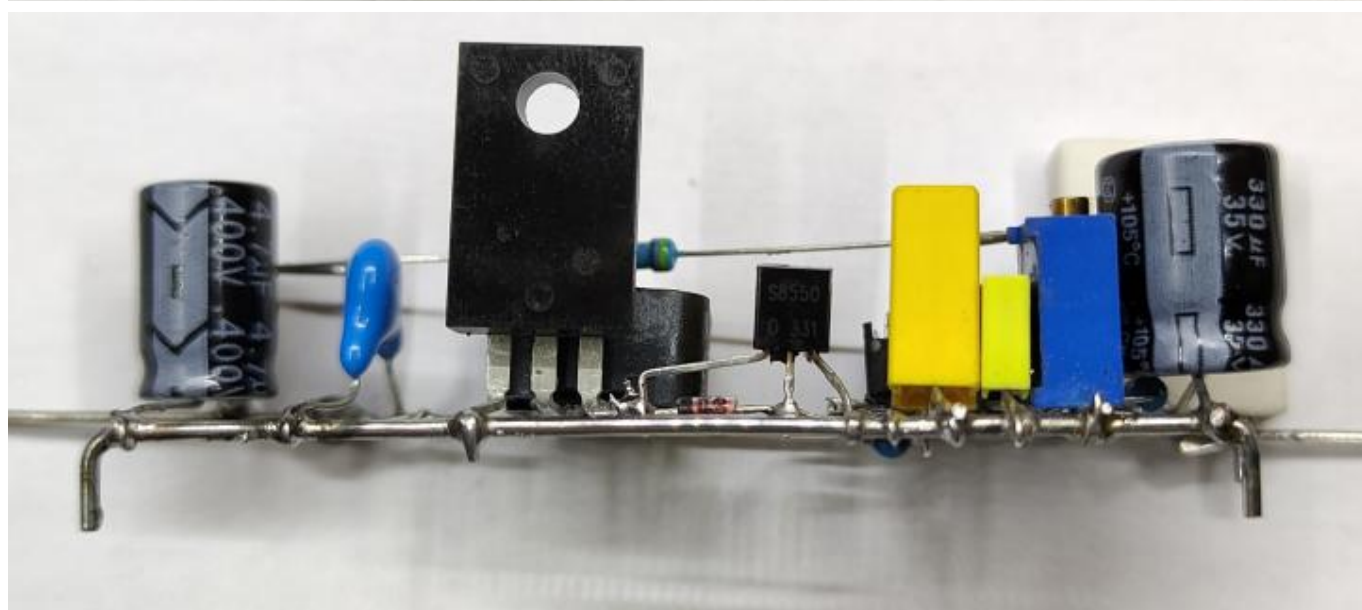
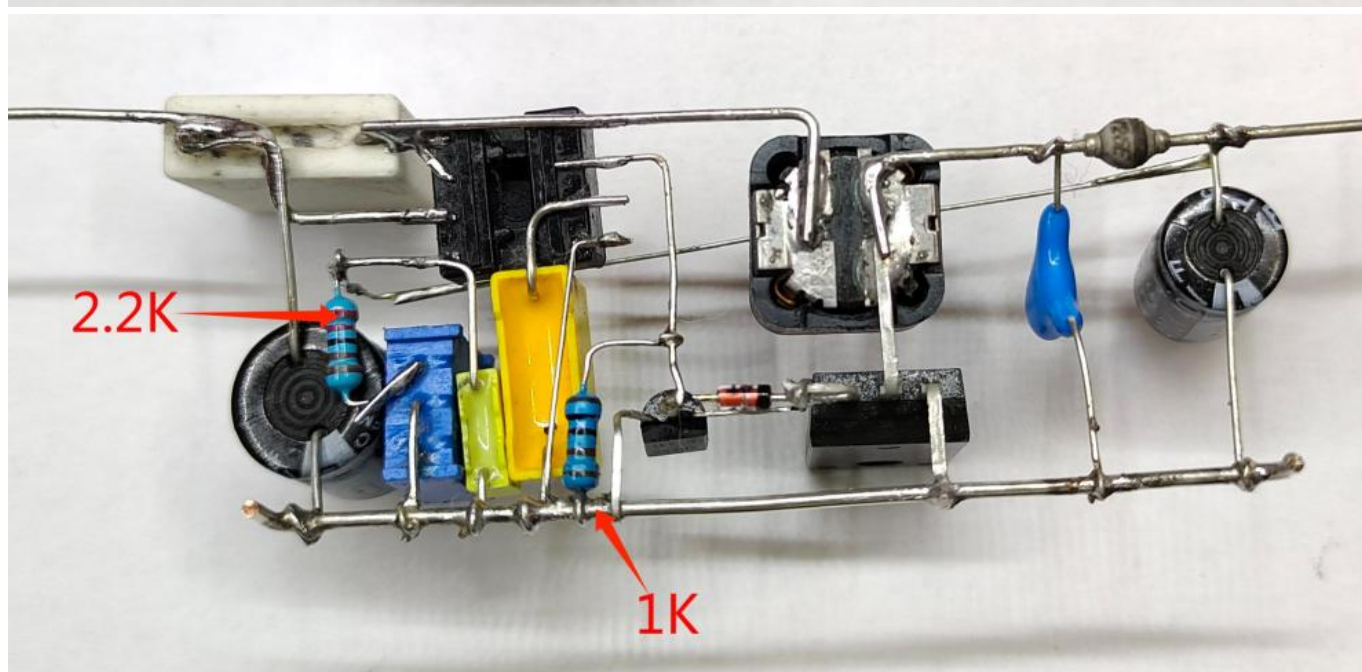
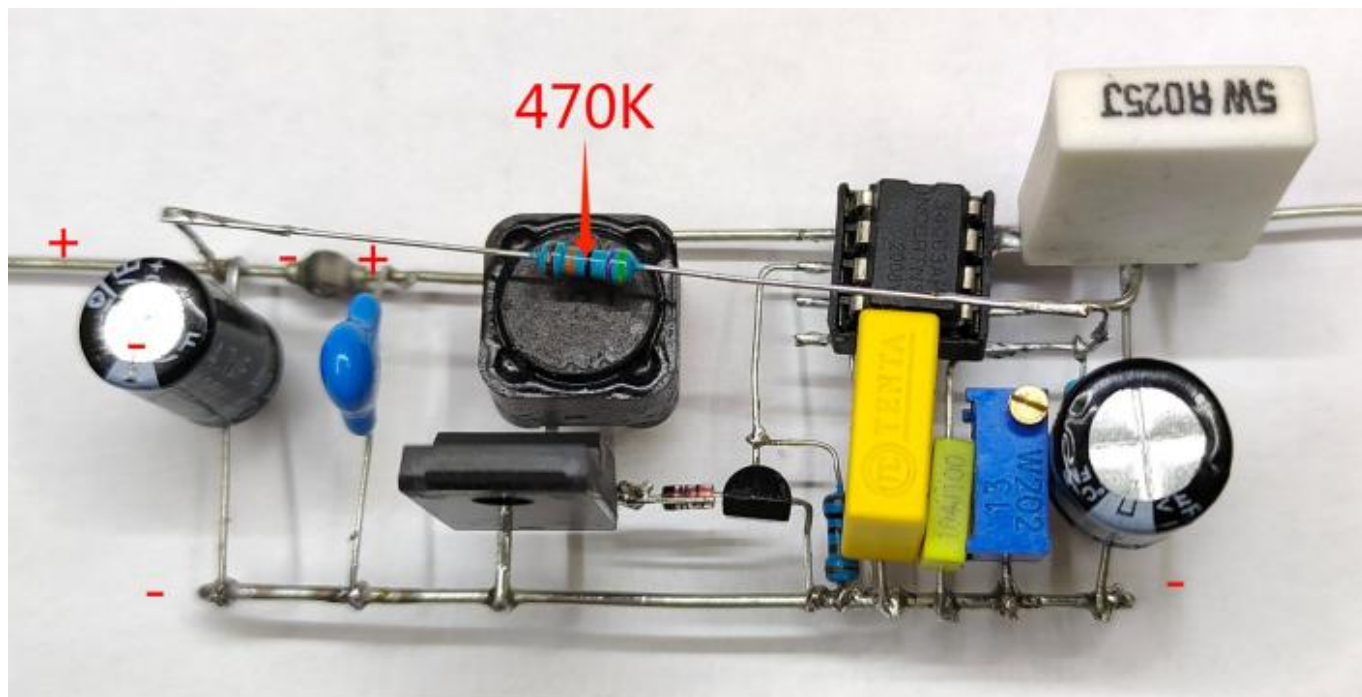
a. Components used:



b.Circuit diagram:

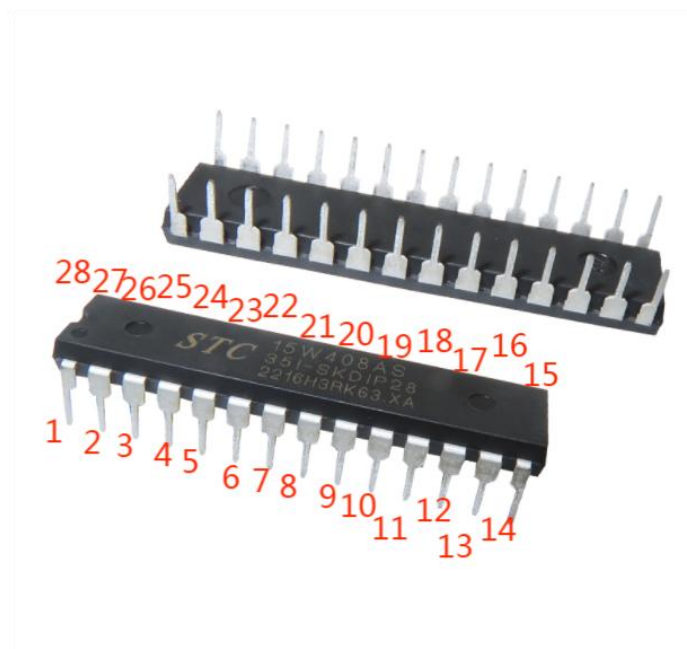
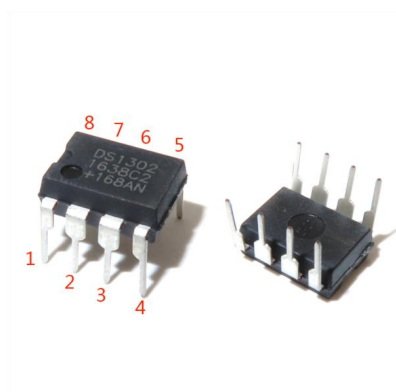
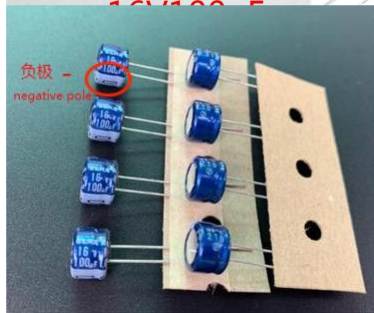
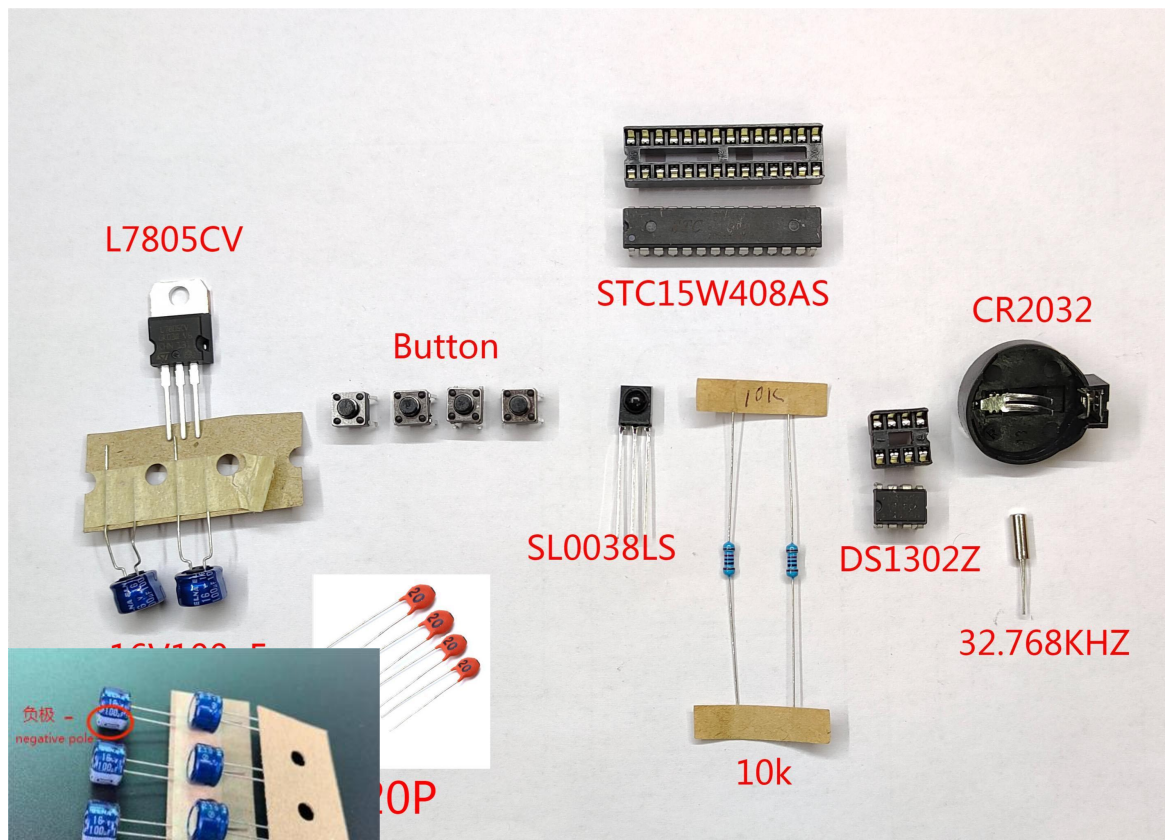


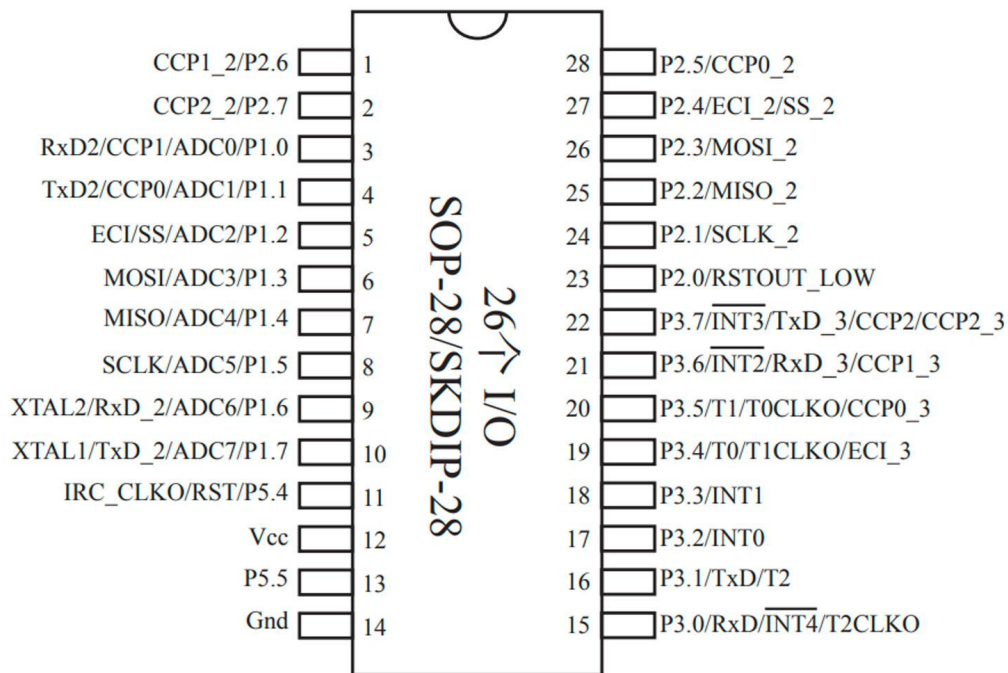
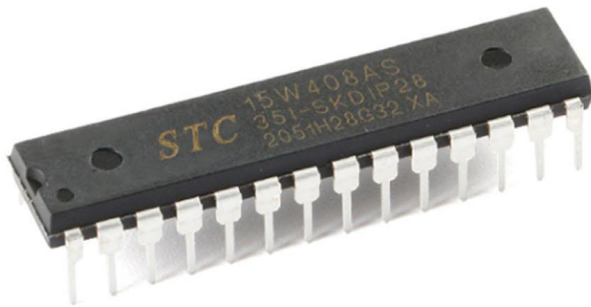
c. Actual welding surface:



2. 5V power module, button module, remote control module, battery module: power input 12V, output voltage 5V (VCC) and 3V (VCC2).

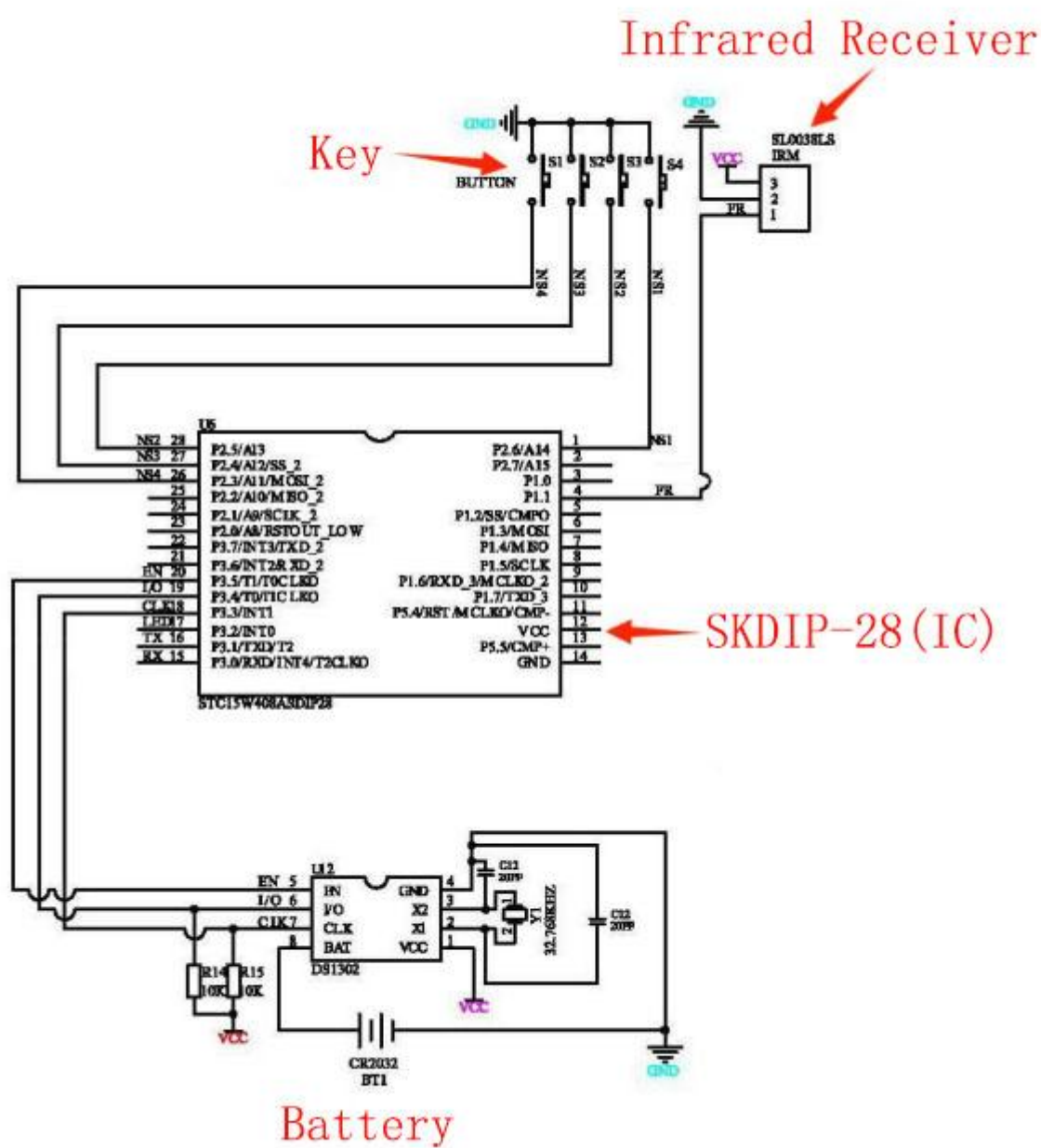
a. Components used:



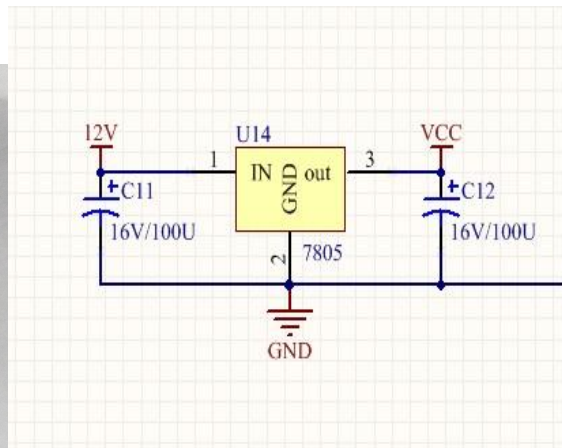
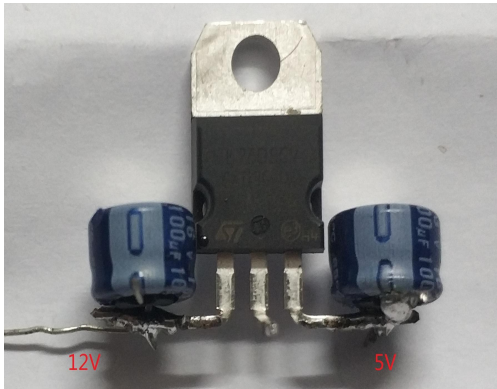


STC15W408AS-35I-SKDIP28

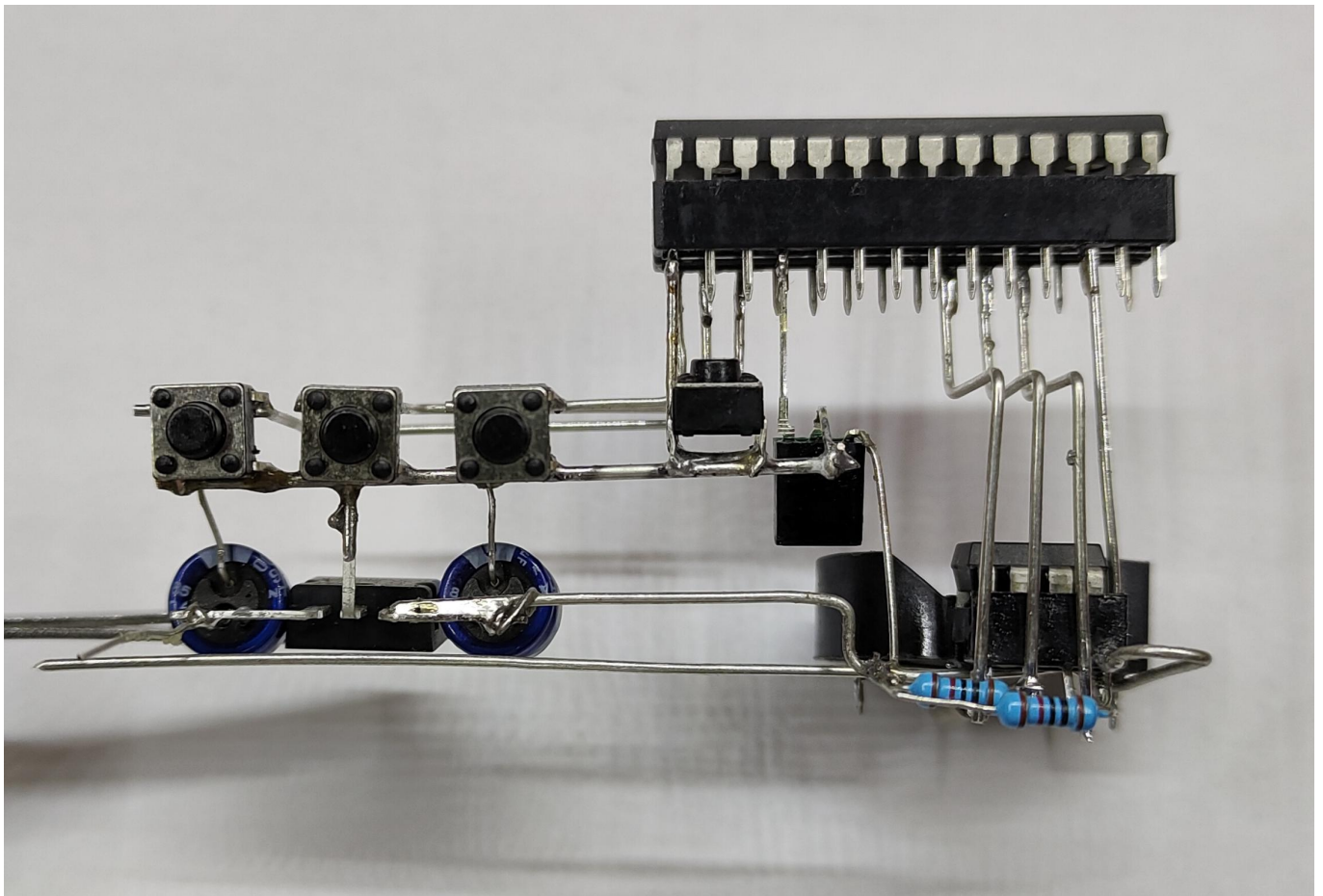
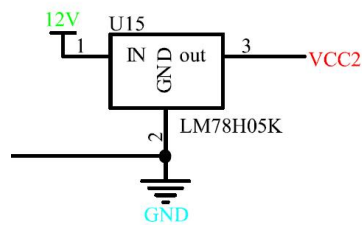
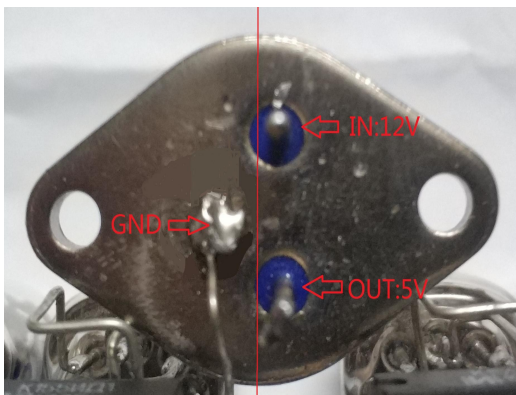
P26	1	P2.6/CCP1_3	P2.5/CCP0_3	28	P25
P27	2	P2.7/CCP2_3	P2.4/ECI_3/SS_2	27	P24
P10	3	P1.0/ADC0/CCP1	P2.3/MOSI_2	26	P23
P11	4	P1.1/ADC1/CCP0	P2.2/MISO_2	25	P22
P12	5	P1.2/ADC2/SS/ECI/CMP0	P2.1/SCLK_2	24	P21
P13	6	P1.3/ADC3/MOSI	P2.0/RSTOUT_LOW	23	P20
P14	7	P1.4/ADC4/MISO	P3.7/INT3/TxD_2/CCP2/CCP2_2	22	P37
P15	8	P1.5/ADC5/SCLK	P3.6/INT2/RxD_2/CCP1_2	21	P36
P16	9	P1.6/ADC6/RxD_3/XTAL2/MCLKO_2	P3.5/T0CLKO/CCP0_2	20	P35
P17	10	P1.7/ADC7/TxD_3/XTAL1	P3.4/T0/ECI_2	19	P34
P54	11	P5.4/RST/MCLKO/CMP-	P3.3/INT1	18	P33
VCC	12	Vcc	P3.2/INT0	17	P32
P55	13	P5.5/CMP+	P3.1/TxD/T2	16	P31
GND	14	Gnd	P3.0/RxD/INT4/T2CLKO	15	P30

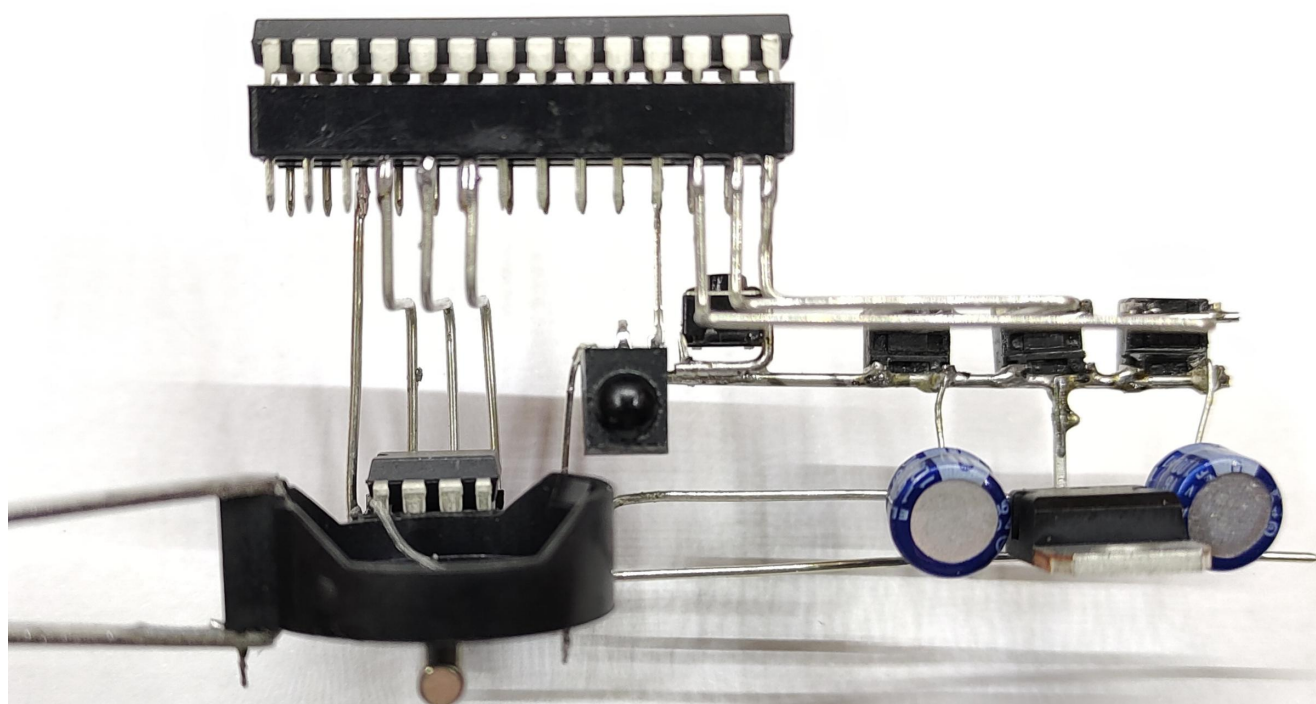
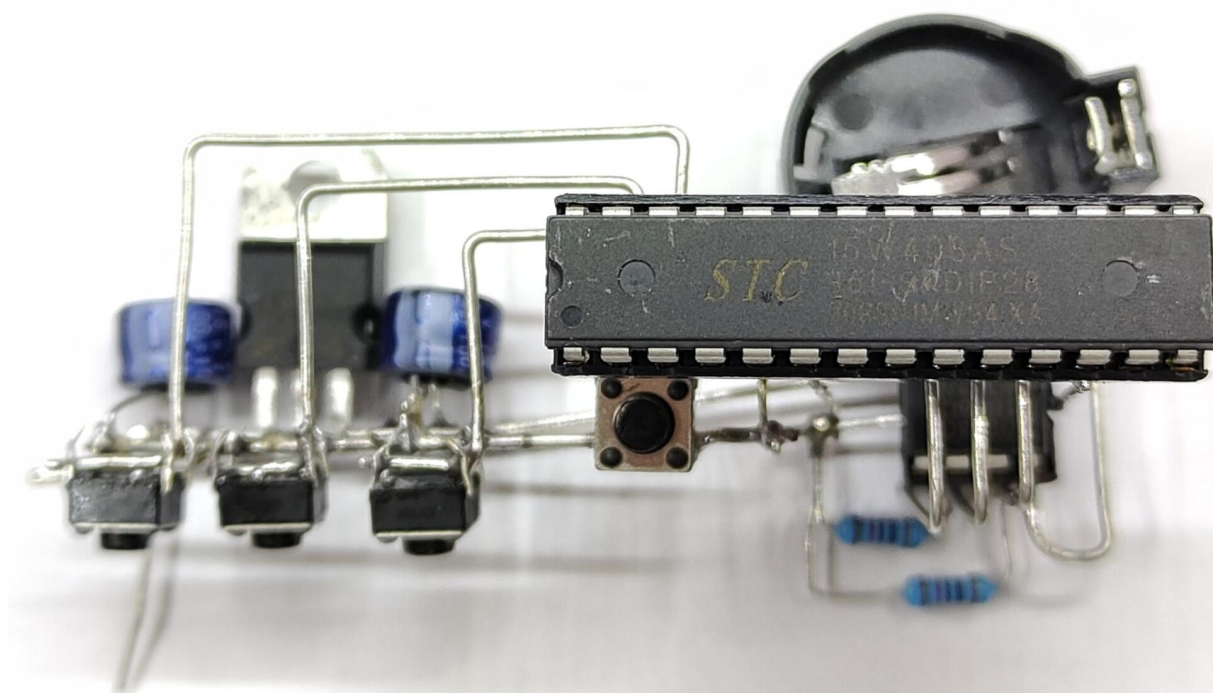


3. VCC voltage: 5V (VCC current is smaller than VCC2, and the two cannot be crossed or mixed during welding)



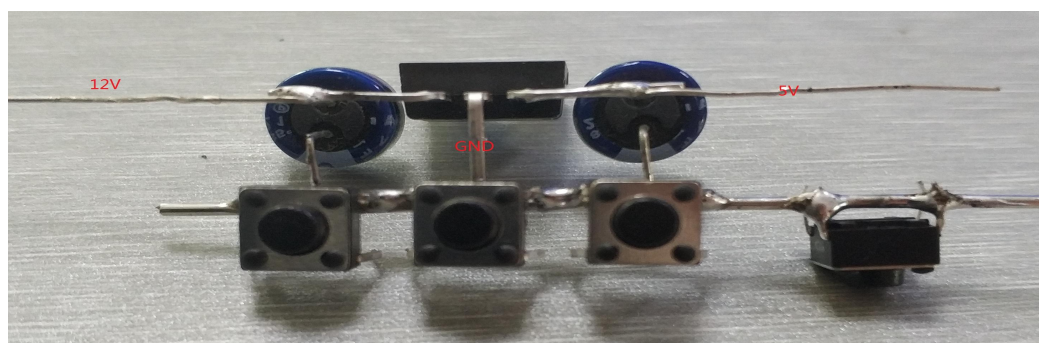
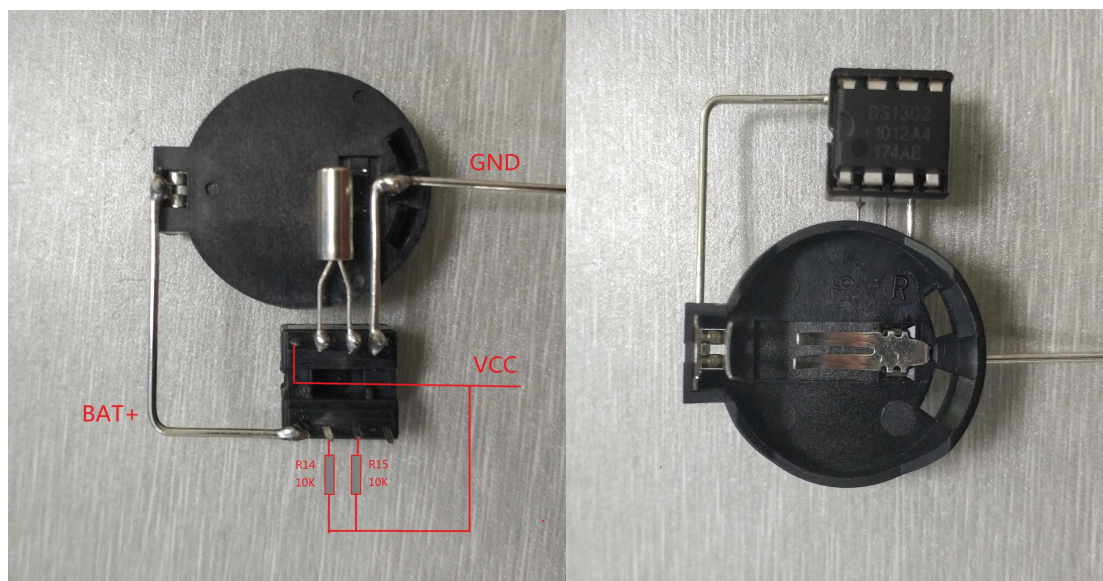
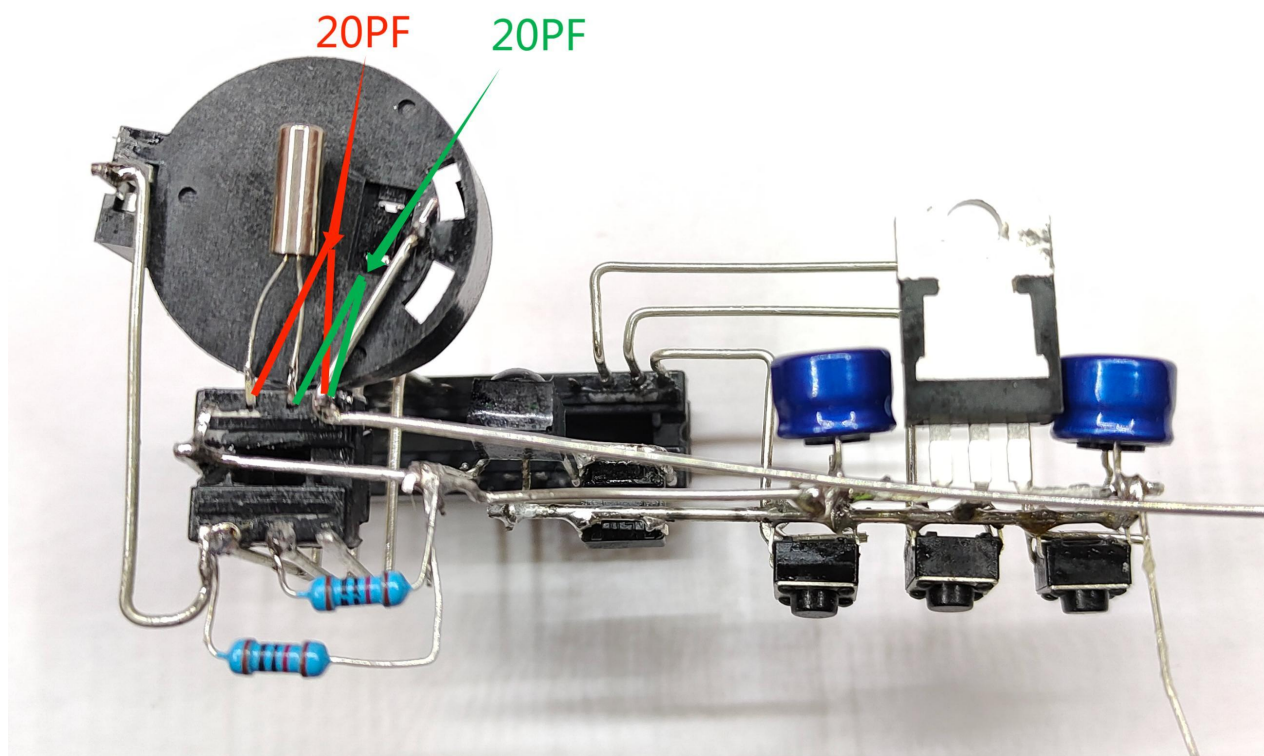
4. The metal three terminal voltage regulator is asymmetric, as shown in the figure, with differentiated pins. The voltage of VCC2 is 5V, (the current of VCC2 is greater than that of VCC).

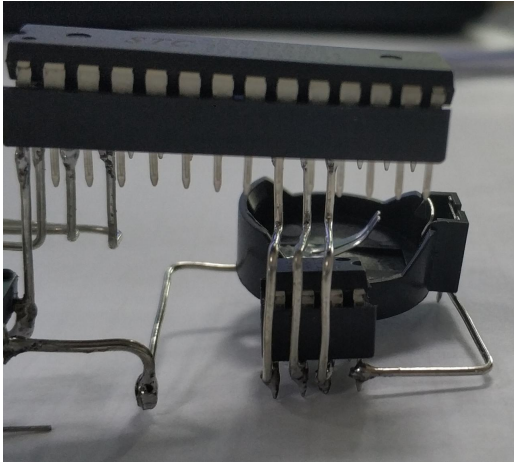




C. Clock chip

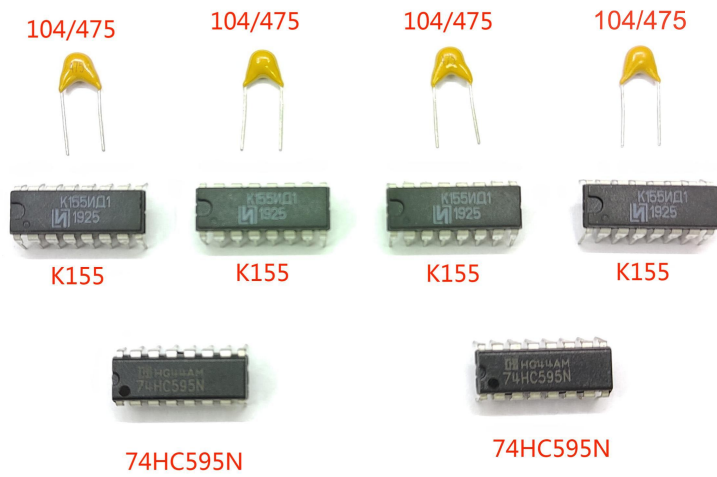
1. If the clock does not run on time, 20P capacitors can be added to pins 2, 3, and 4 of the clock chip (with the other pin of the capacitor grounded).
2. Connect the chip and MPU, and add 10K pull-up resistor to 6.7 pin of the clock chip.

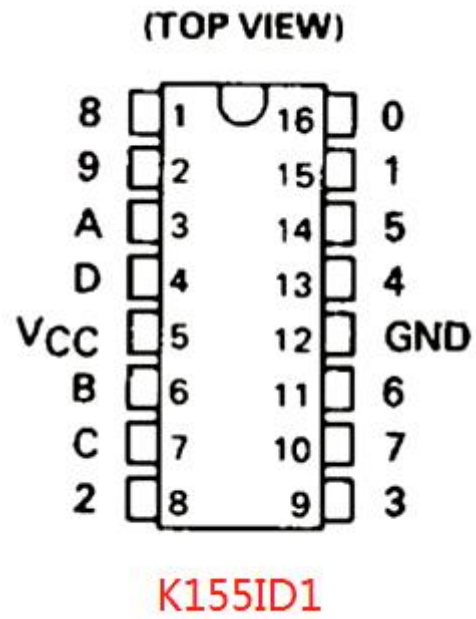
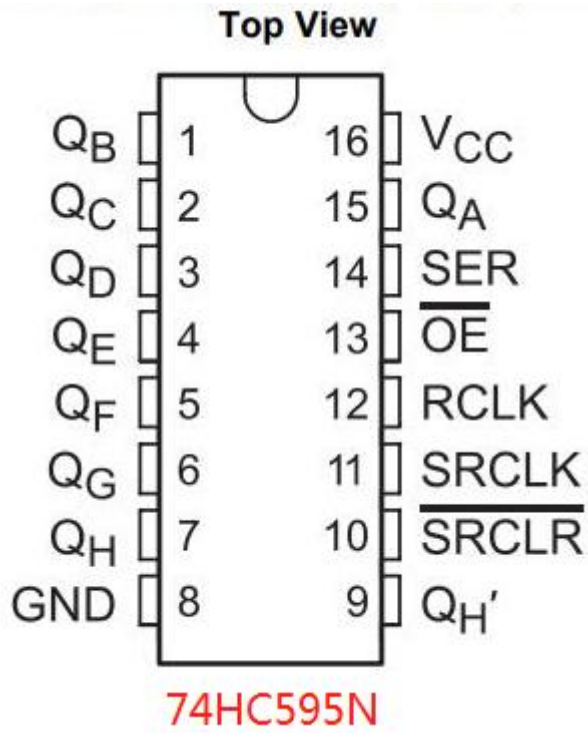




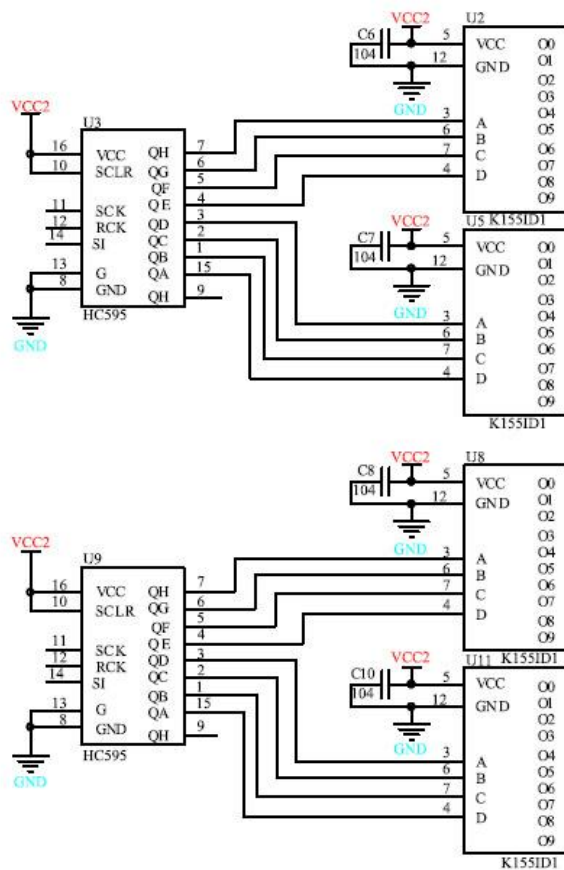
4. Drive part:

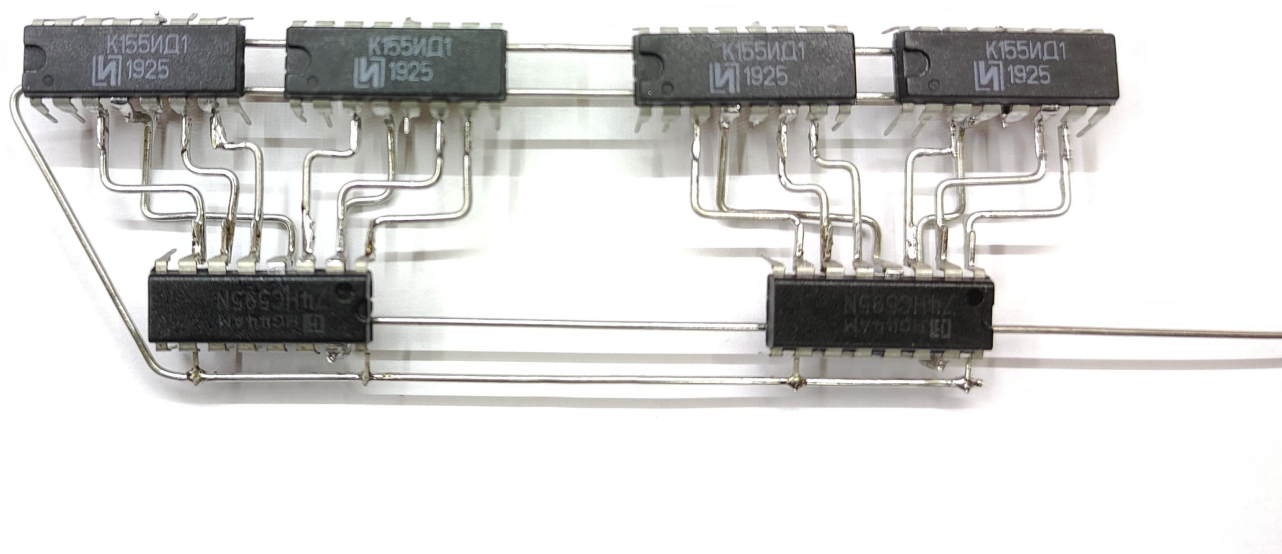
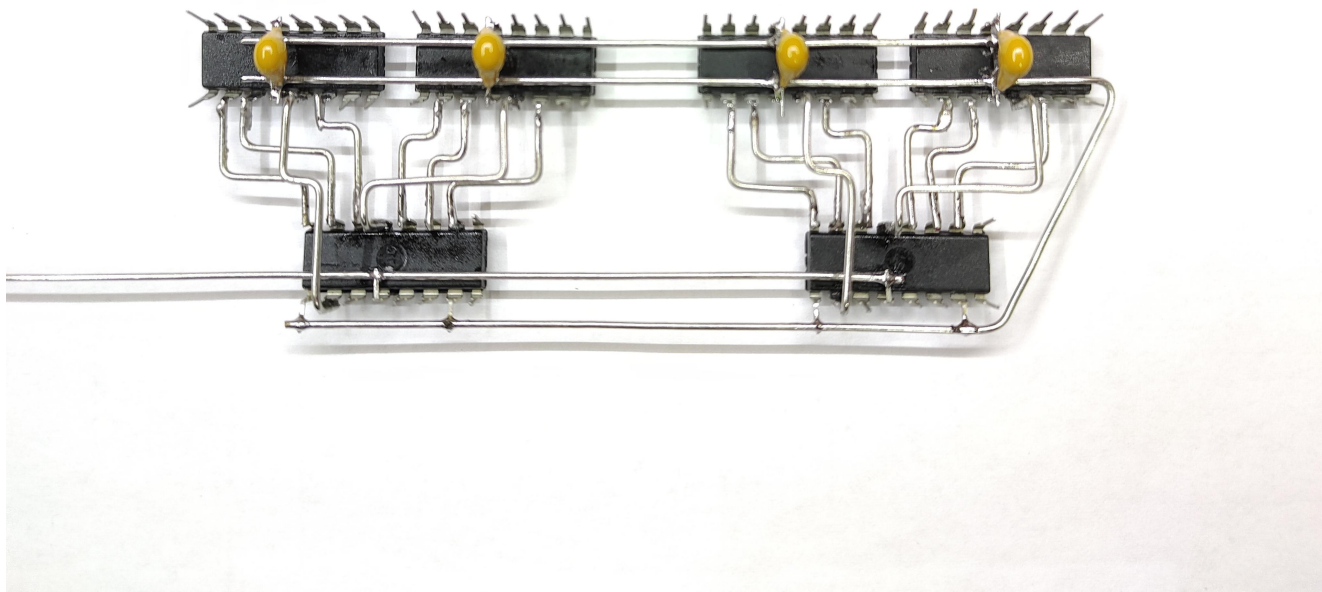
a. Components used:





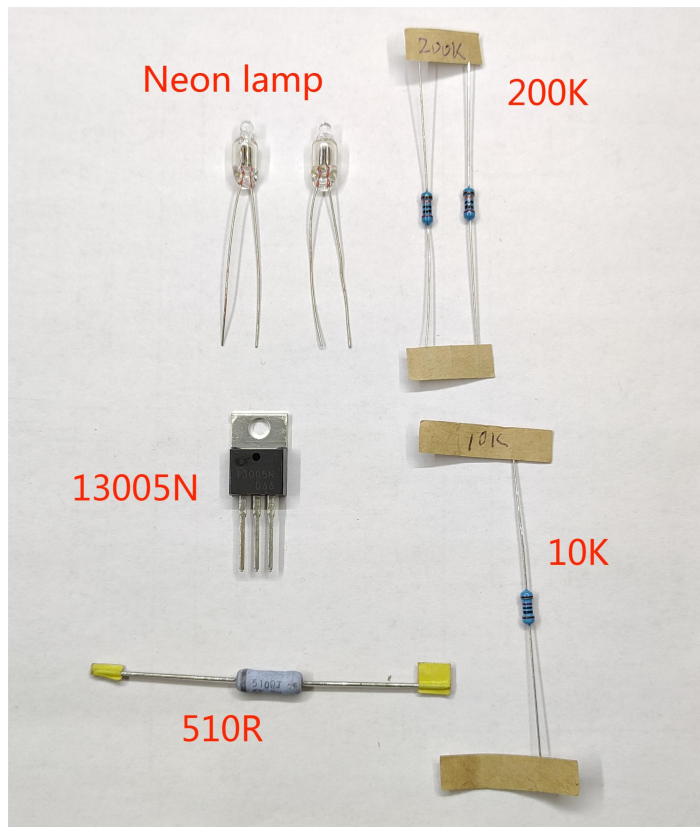
b. Circuit diagram:



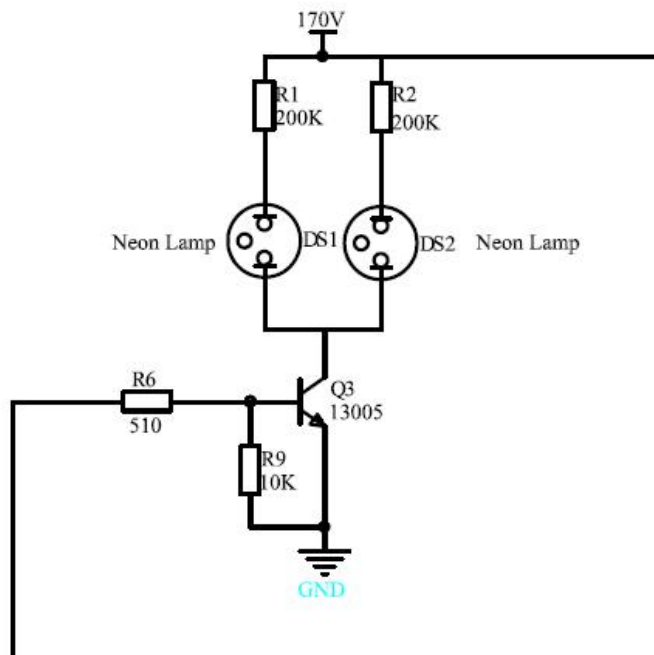


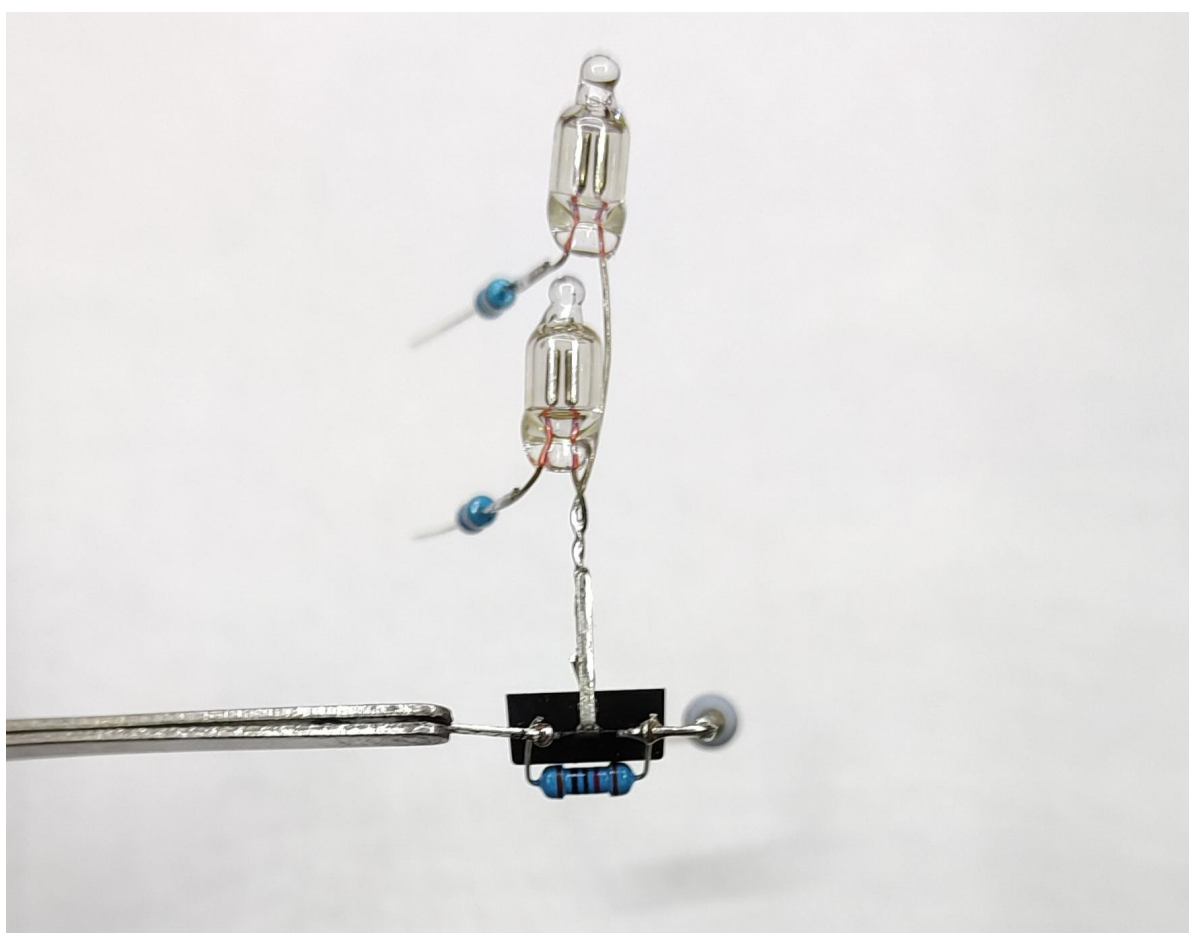
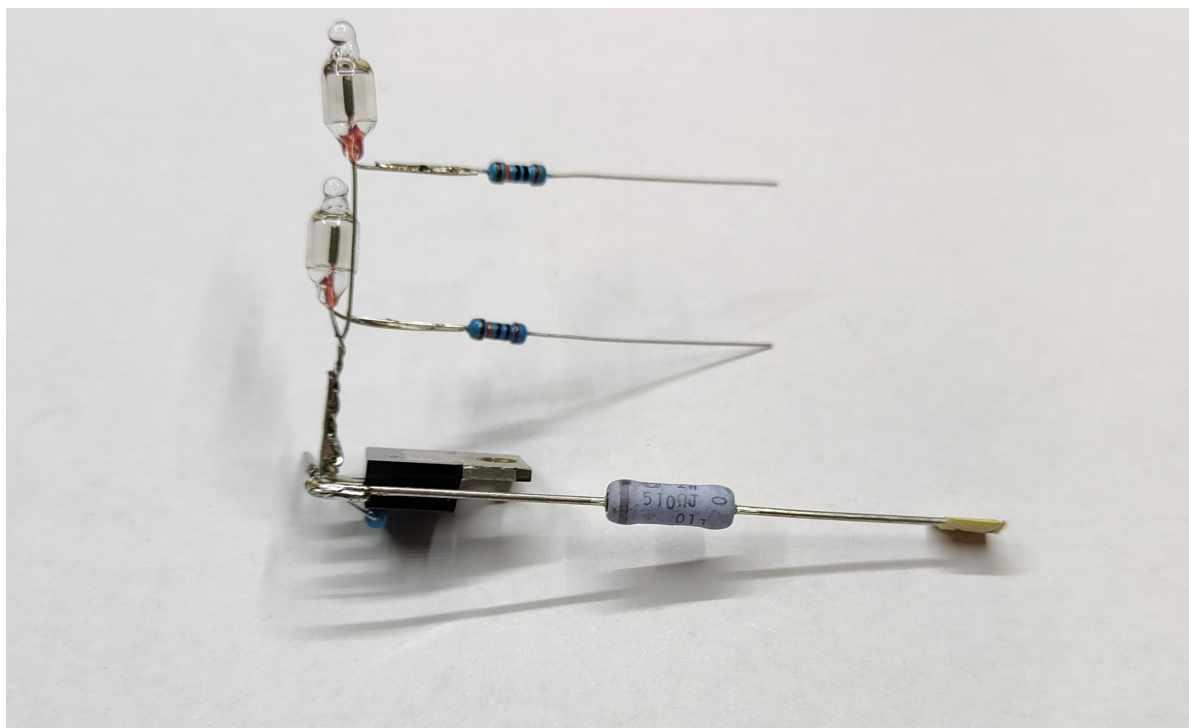
5. Neon lamp part: Neon lamp and resistor are not divided into positive and negative poles.

a. Components used:



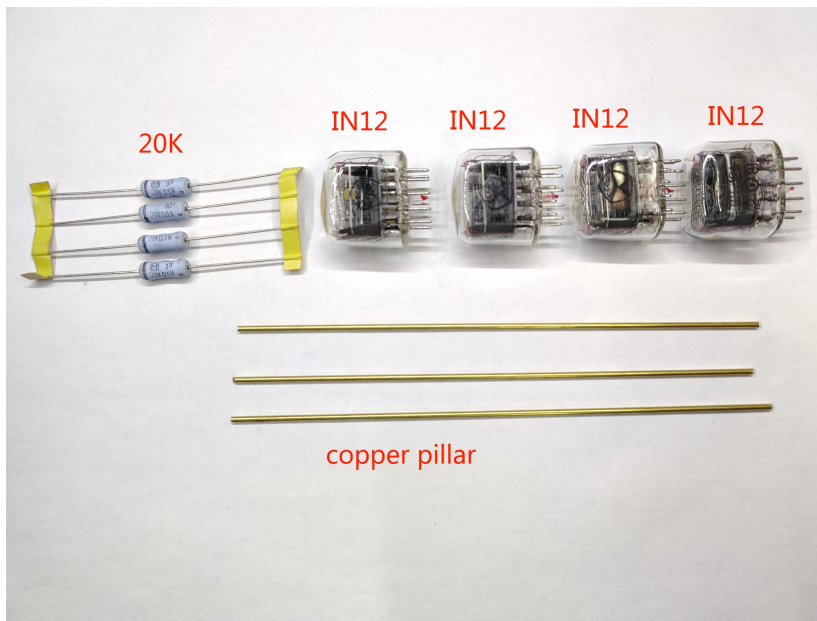
b. Circuit diagram:



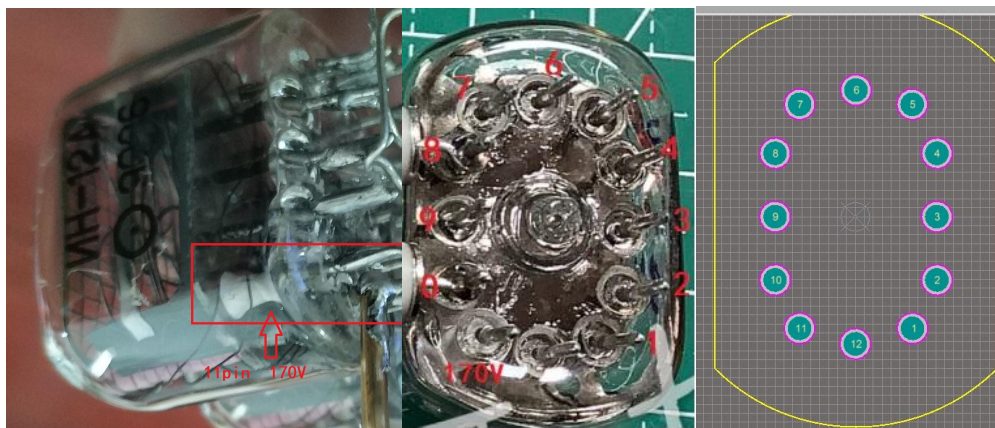


6. IN12 glow tube part:

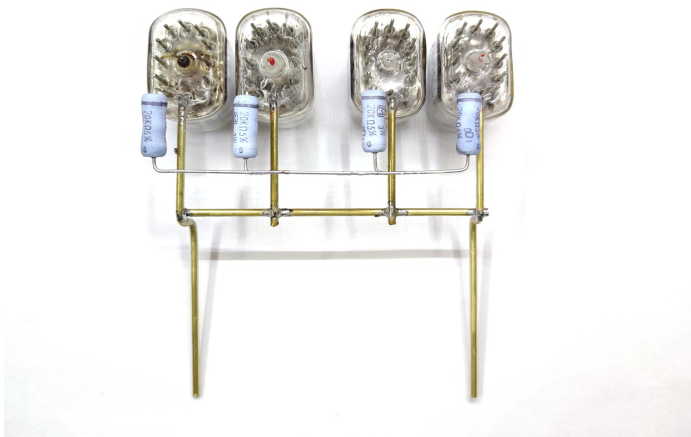
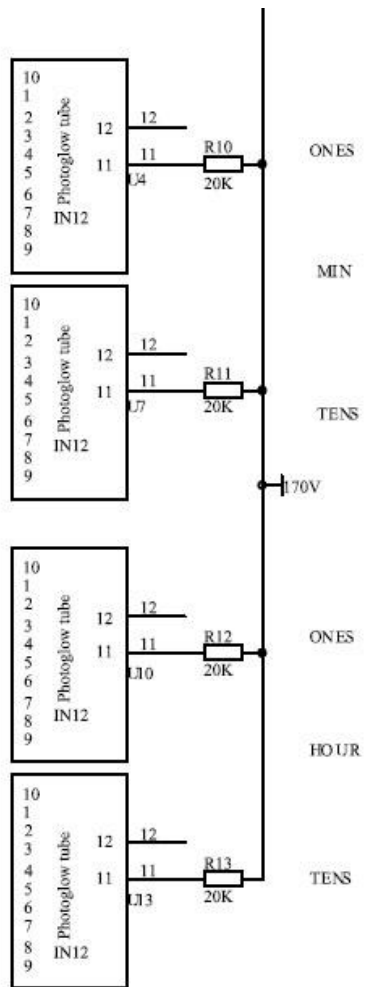
a. Components used:



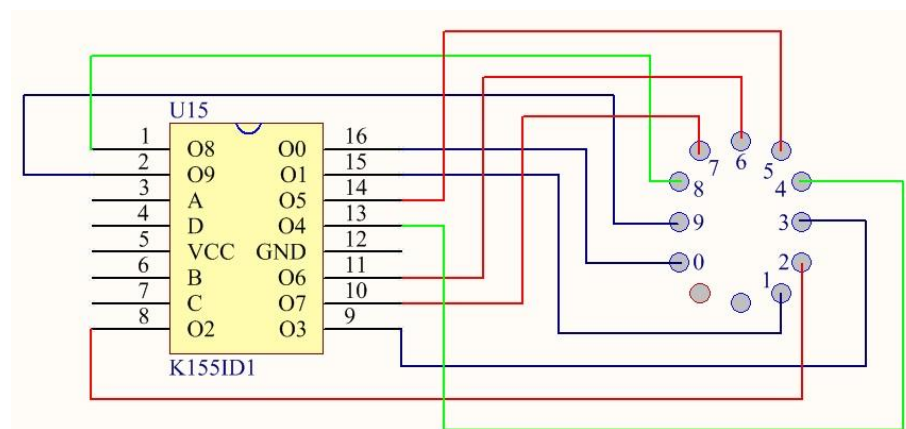
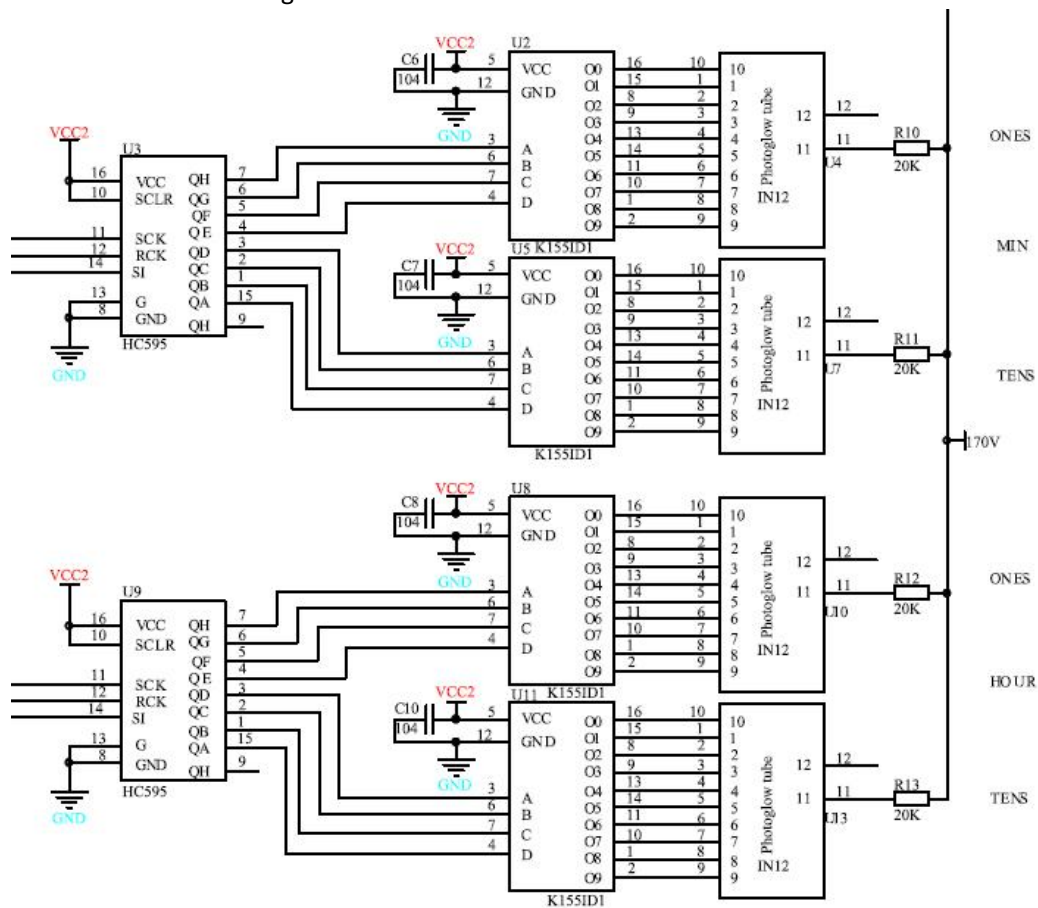
IN12 Glow Tube Pin Definition:

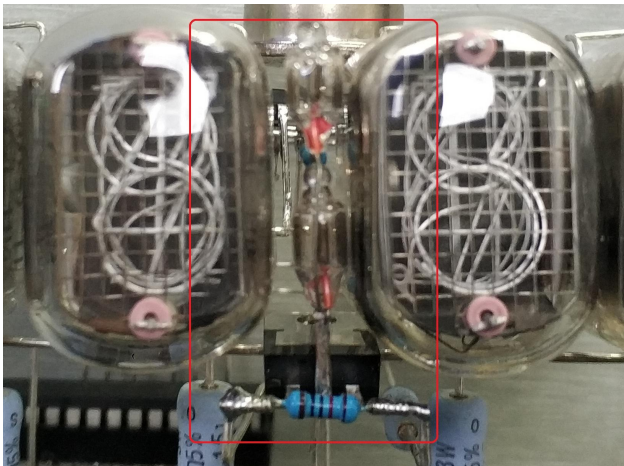


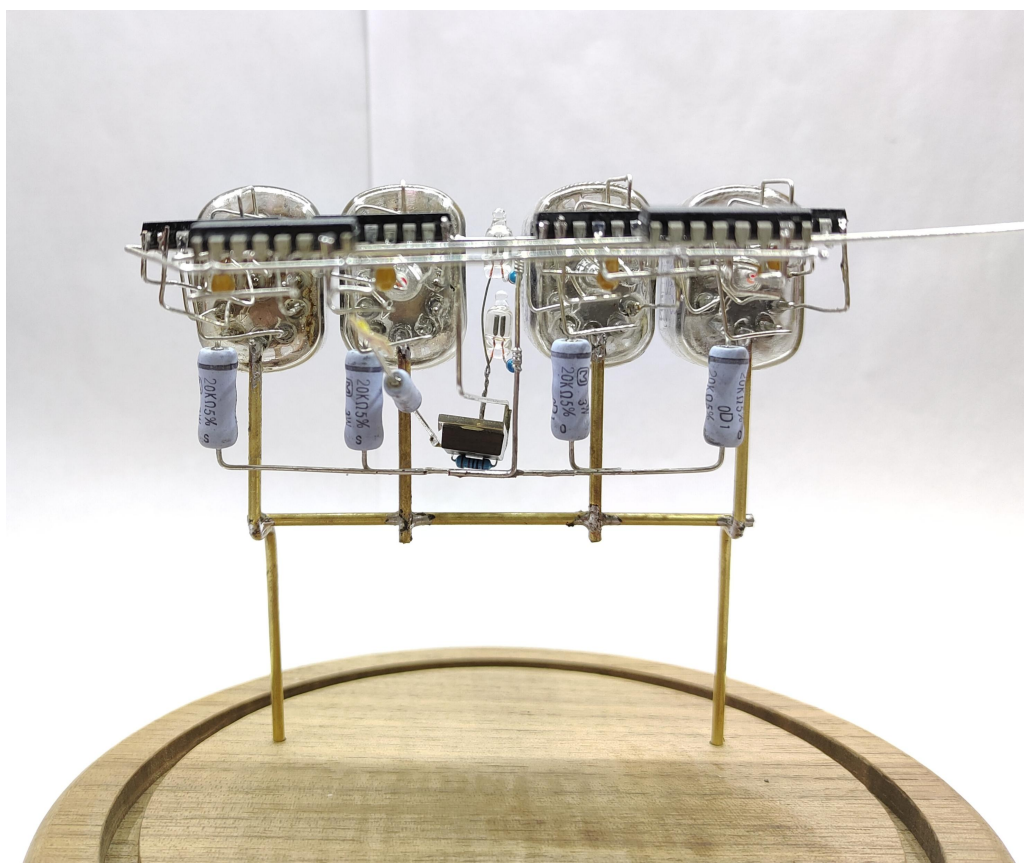
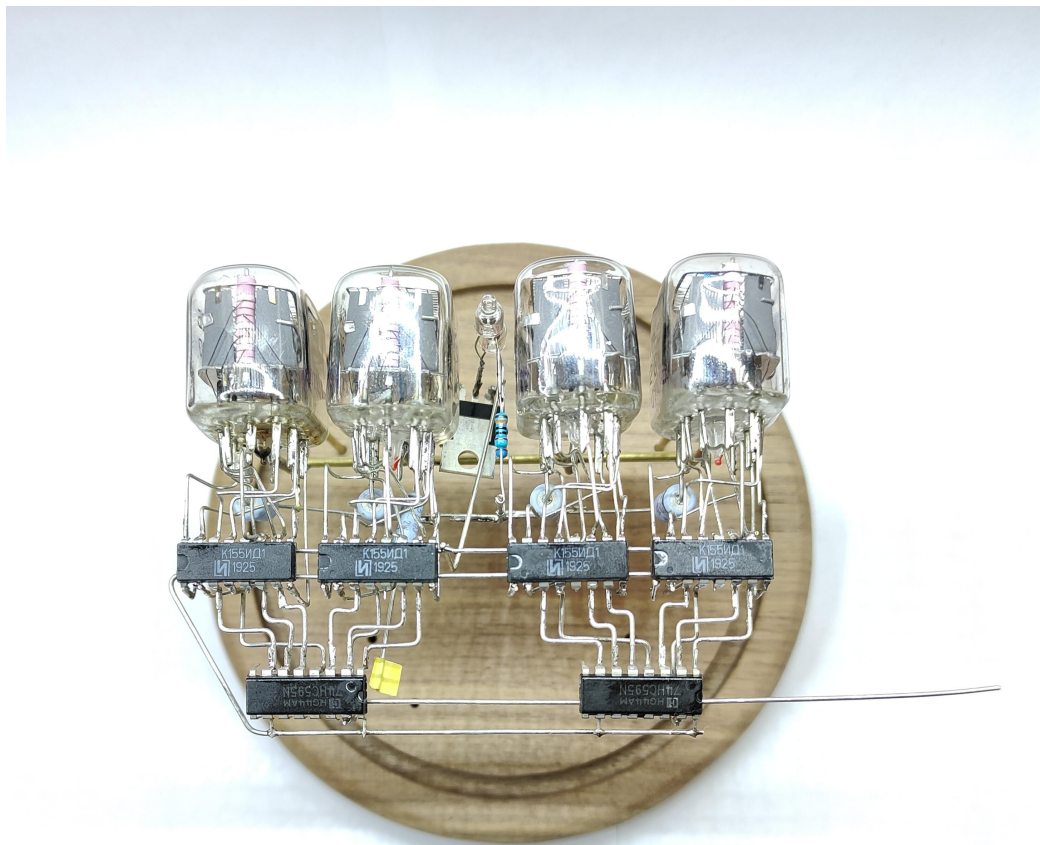
b. Circuit diagram:



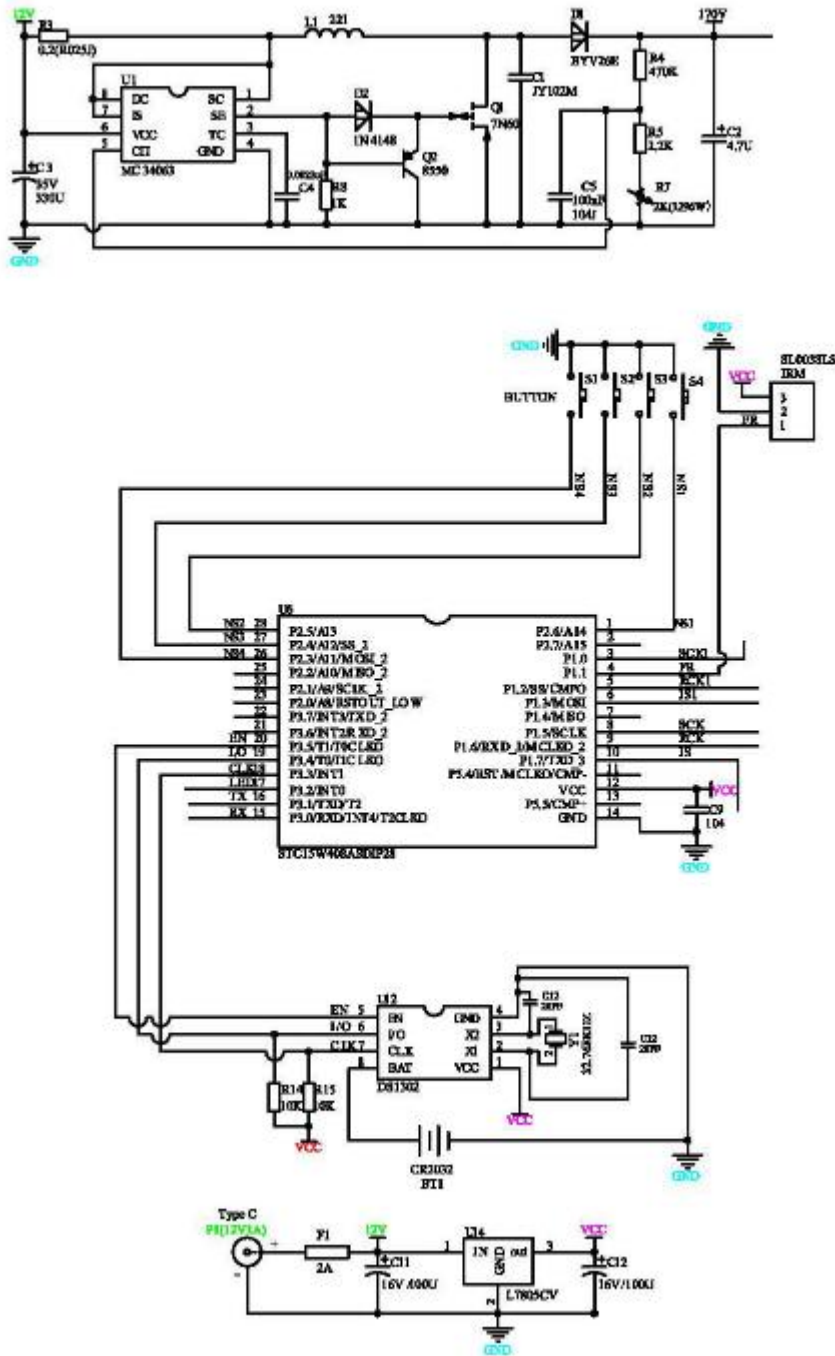
7. Combination of IN12 glow tube and driver module:

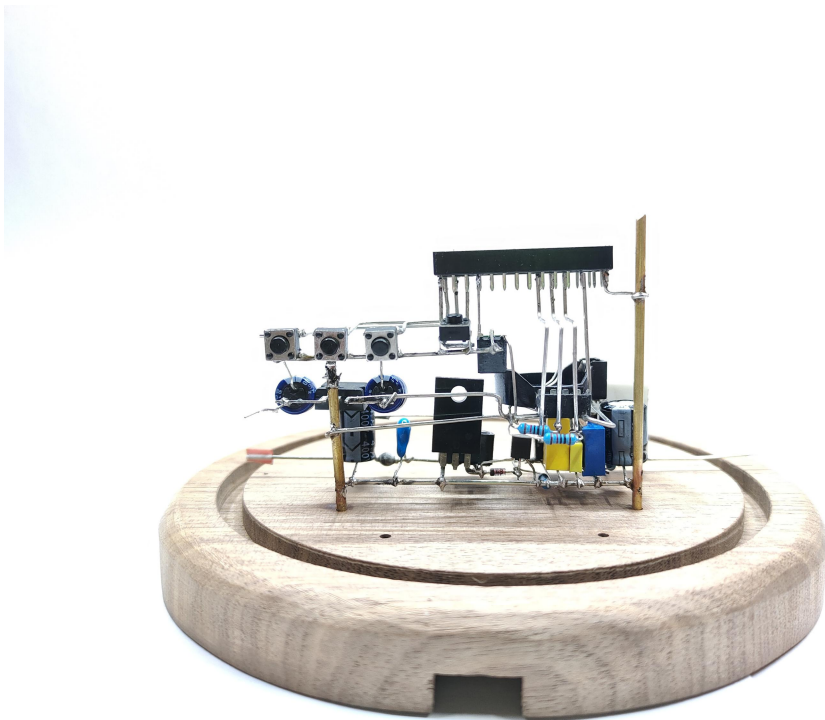
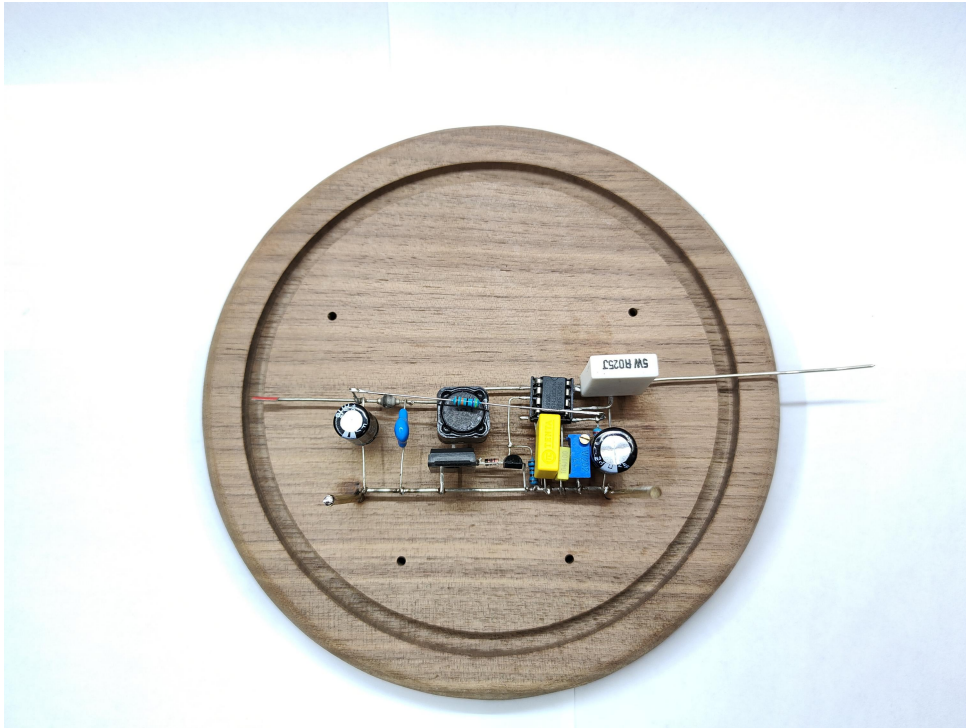


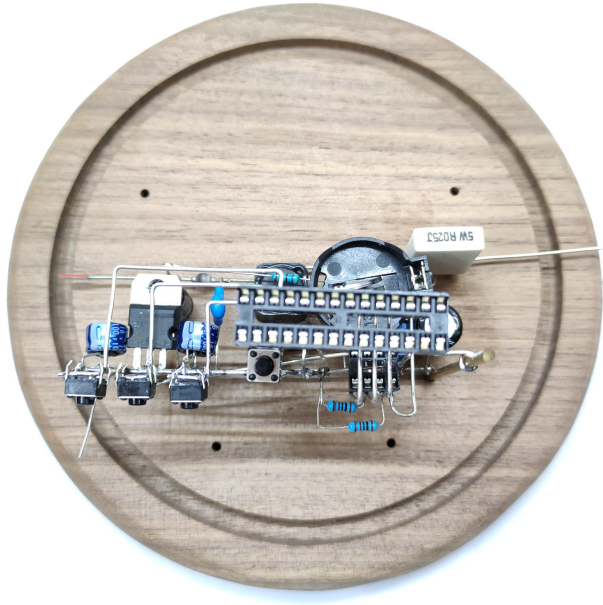




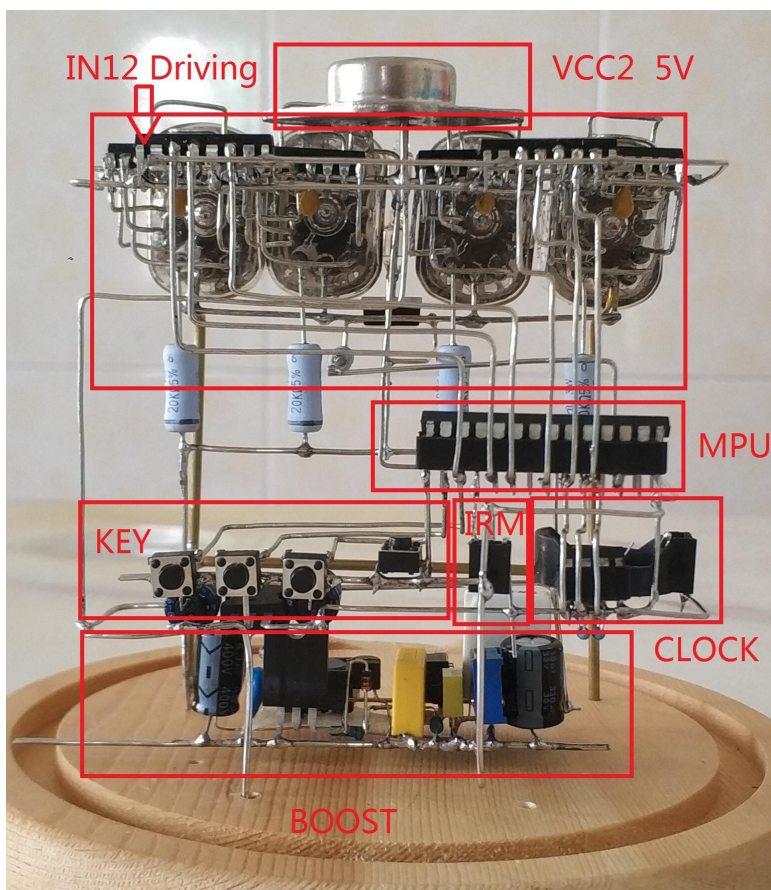
8. Base part combination:





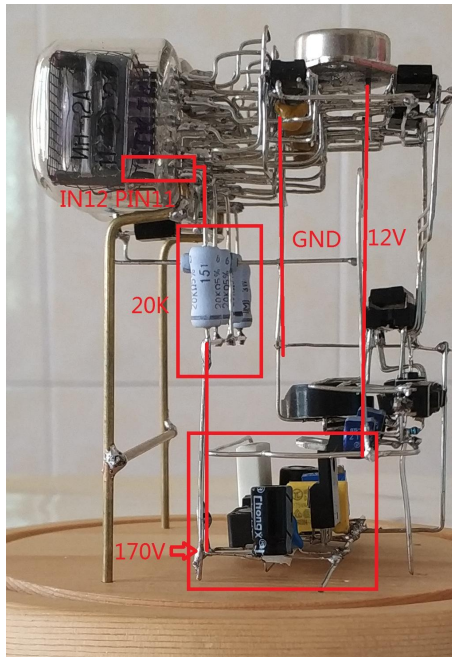
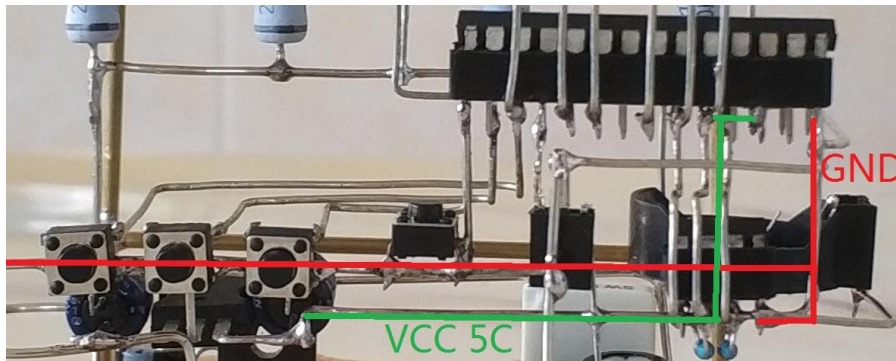


9. Combine all into a complete product:



a. Key, VCC_ 5V

1. Connect the buttons to pins 1, 26, 27, and 28 of the MPU chip.
 2. VCC-5V is connected to pin 12 of the MPU chip and pin 1 of the clock chip.
- External 12V power supply connected to 12V+GND.



a. Adding 104 capacitors to the MPU power supply pin can enhance stability



