# Electronic Clock DIY Kit

## 1.Description:

YCL-6 makes the full use of the single-chip resources which is featured with the function of alarm clock, countdown clock, stopwatch and counter.

## 2.Features:

1>.Alarm clock
2>.Stopwatch
3>.Countdown
4>.Counter
5>.Pure work welding
6>.Integrated practice area and functional test area
7>.LED demonstration exercise results
8>.Easy operation

## 3.Parameters:

1>.Product Name:6Bit Electronic Clock DIY Kit
2>.Work Voltage:DC 3.0V-12.0V
3>.Work Temperature:-40℃~85℃
4>.Work Humidity:0%~95%RH
5>.Size(Installed):92*49mm

## 4.Components Listing:

| NO. | Component Name | PCB Marker | Parameter | QTY |
|---|---|---|---|---|
| 1 | Metal Film Resistor | R2~R15 | 1K | 14 |
| 2 | Metal Film Resistor | R16~R17 | 2K | 2 |
| 3 | Metal Film Resistor | R18 | 5.1K | 1 |
| 4 | Metal Film Resistor | R1 | 10K | 1 |
| 5 | Ceramic Capacitor | C2,C3 | 30PF | 2 |
| 6 | Ceramic Capacitor | C4,C5 | 0.1uF 104 | 2 |
| 7 | Electrolytic Capacitor | C1 | 10uF/25V | 1 |
| 8 | Electrolytic Capacitor | C6 | 100uF/16V | 1 |
| 9 | Red LED | D1~D4 | 3mm | 4 |
| 10 | 4Bit Red Digital Tube | DS1~DS3 | Common Anode | 3 |
| 11 | Active Buzzer | U3 | 5V | 1 |
| 12 | S8550 Transistor | Q1~Q7 | TO-92 | 7 |
| 13 | AT89C2051 | U1 | DIP-20 | 1 |
| 14 | 78L05 Voltage Regulator | U2 | TO-92 | 1 |
| 15 | Crystal Oscillator | Y1 | 12MHz | 1 |
| 16 | XH2.54mm-2P Socket Right Angle | J2 | 2.54mm | 1 |

| | | | | |
|---|---|---|---|---|
| 17 | XH2.54mm-2P Socket | J1 | 2.54mm | 1 |
| 18 | Button | S1~S3 | 6*6*4.3mm | 3 |
| 19 | IC Socket | U1 | DIP-20 | 1 |
| 20 | XH2.54mm-2P Power Wire | J2 | 150mm | 1 |
| 21 | PCB | | 92*49mm | 1 |
| NOTE:Users can complete the installation according to the PCB silk screen and component list. | | | | |

## 5.Note:

1>.User needs to prepare the welding tool first.

2>.This DIY installation is more difficult to be installed, 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>.Users can complete installation by PCB silk screen and component listing.

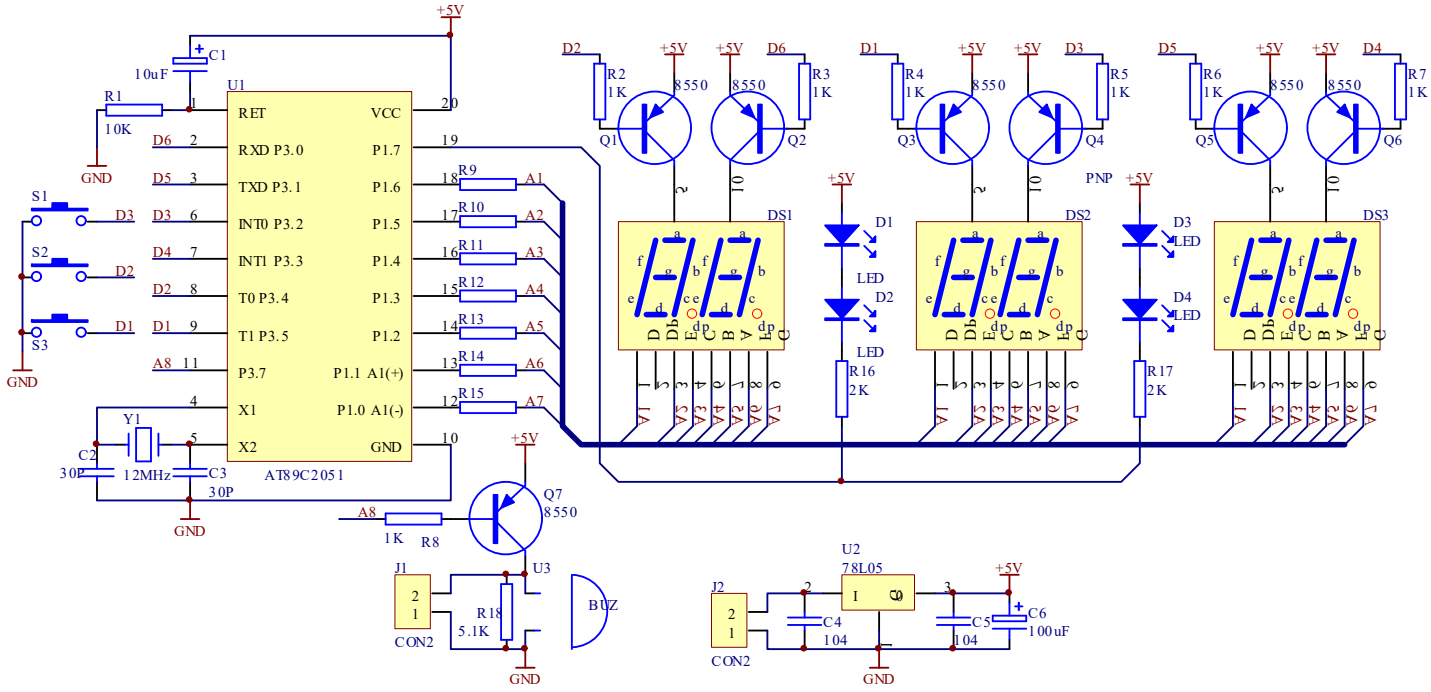
8>.User must install the LED according to the specified rules.Otherwise some LED will not light.

9>.Install complex components preferentially;

10>.Pay attention to the installation direction of components.

11>.It is strongly recommended to read the installation manual before starting installation.

## 6.Schematic:




## 7.Principle:

The circuit is mainly composed by the single-chip circuit, display circuit, keyboard input, signal ringing circuit and power circuit.

1>.Single-chip circuit: It's based on AT89C2051 which including the Power-on Reset and clock circuit.

2>.Display Circuit: The main component is 2-bit digital tube in red. The driver uses the PNP transistor and it's equipped with current-limiting resistance at every port. It's with scanning-driven way and uses P1.0~P1.6. The colon part use four pieces of diode in 3mm red with scanning-driven way. And it uses P1.7.

3>.Keyboard input: The key S1~S3 are with reused function which reused with the display part of P3.5， P3.4 and P3.2. And here is the operating principle: Output high level at the related PIN to read out the status of keys and debounce via single-chip system to give the keys with corresponding value.

4>.Signal Ringing circuit: It's composed by buzzer and PNP transistor. And the operating principle is that the buzzer will send sound in fixed frequency after the PNP transistor turns on. It's with independent port-driven way and uses P3.7. J1 is used for connecting the external control equipment which will output the low level when there is no ringing signal, or high level with ringing signal.

5>.Power Circuit: It's composed by three terminal integrated circuit which will supply the whole system with the stable voltage.

## 8.Operating Specification:

8.1>.Specification of function Keys:

S3 is for function choosing key , S2 for function expansion and the S1 for adding the value with one.

8.2>.Operating:

It works well if all the components are welded in the right way. And the operating DC voltage is 7V--12V. Please be noted the polarity when connect the power. During the operation, below six functions can be chosen to work, if press the S3 continuously in a short time. And the interval is less than 1 second. Or it goes to the clock function if press the S3 for more than 2 seconds.

8.3>.Clock Function: It displays 10:10:00 when it's on.

8.4>.Time checking Function: The time and colon start flashing after Press the S3 for a short time. Press S2 to add one hour and Press S1 to add 1 minute. But the second time can not be adjustable.

8.5>.Alarming Function: It displays 22:10:00 and the colon lights after press S3 twice in a short time. Press S2 to add one hour and Press S1 to add 1 minute. But the second time can not be adjustable. When the value of hour is over 23:00pm, it displays --:--:-- which is the function for turn off the alarming function.

8.6>.Countdown Function: It displays O and the colon is in dark after press S3 three times in a short time. The hour time is added after pressing S2 and 1 minute is added after pressing S1. It'll start to countdown when press S2 for the sixth time. The time can be adjusted again after pressing S2 for one more time. And the countdown function is off.

8.7>.Stopwatch Function: It displays 00:00:00 and the colon lights after press S3 four times in a short time. It starts clocking with the stopwatch after pressing S2. And if press S2 one more time, the clocking will be end. And the stopwatch goes to reset status after pressing S1 at this time.

8.8>.Counter Function: It displays 00:00:00 and the colon is in dark after press S3 five times in a short time. Press S2 to add the value with one for counter and Press S1 to let the counter in reset status.

## 9.Installation Steps:

Step 1:Install 14pcs 1K Metal Film Resistor at R2~R15.

Step 2:Install 2pcs 2K Metal Film Resistor at R16~R17.

Step 3:Install 1pcs 5.1K Metal Film Resistor at R18.

Step 4:Install 1pcs 12MHz Crystal Oscillator at Y1.

Step 5:Install 1pcs DIP-20 IC Socket at U1. Pay attention to the installation direction.

Step 6:Install 2pcs 30pF Ceramic Capacitor at C2,C3.

Step 7:Install 4pcs 3mm Red LED at D1~D4.Pay attention to the installation direction and the shorter pin is negative pins.

Step 8:Install 2pcs 0.1uF Ceramic Capacitor at C4,C5.

Step 9:Install 1pcs XH2.54mm-2P Socket Right Angle Socket at J2.

Step 10:Install 1pcs XH2.54mm-2P Socket at J1.

Step 11:Install 3pcs 6*6*4.3mm button at S1~S3.

Step 12:Install 1pcs 10K Metal Film Resistor at R1.

Step 13:Install 1pcs 100uF/16V Electrolytic Capacitor at C6.Pay attention to the installation direction and the shorter pin is negative pins.

Step 14:Install 1pcs 10uF/25V Electrolytic Capacitor at C1.Pay attention to the installation direction and the shorter pin is negative pins.

Step 15:Install 1pcs TO-92 78L05 Voltage Regulator at U2.

Step 16:Install 7pcs TO-92 S8550 Transistor at Q1~Q7.

Step 17:Install 3pcs 4Bit Red Common Anode Digital Tube at DS1~DS3.

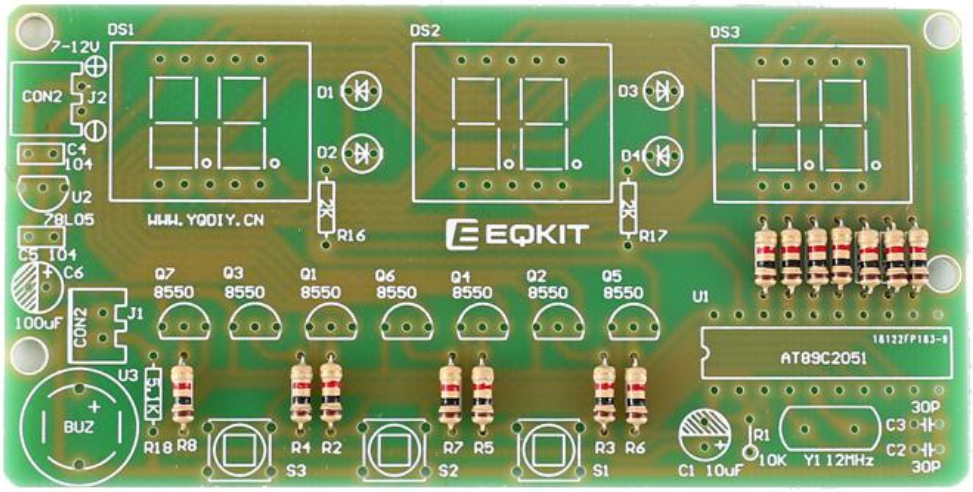
Step 18:Install 1pcs Active Buzzer at U3.Pay attention to the installation direction.

Step 19:Install 1pcs AT89C2051 on DIP-20 IC Socket.Pay attention to the installation direction.

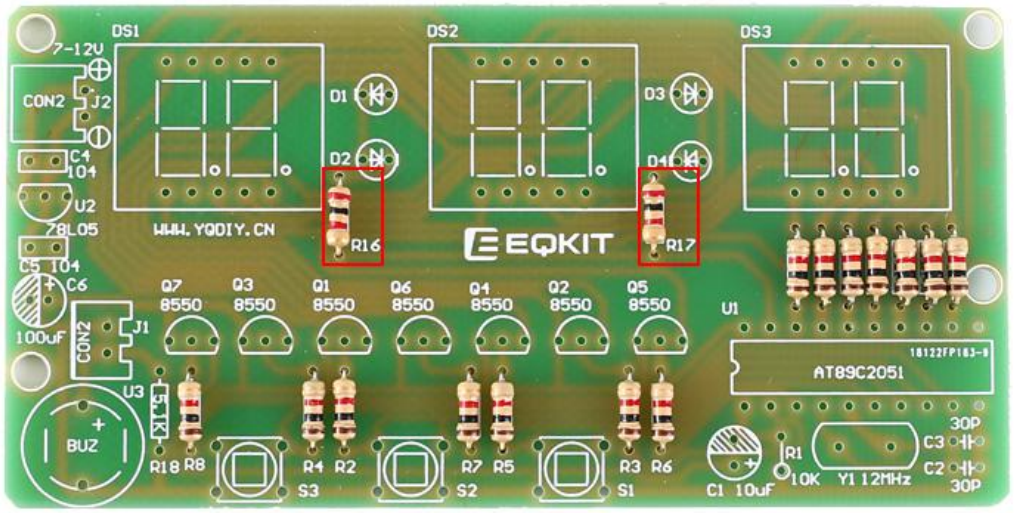
Step 20:Connect power wire to do a test.

## 10.Install shown steps:

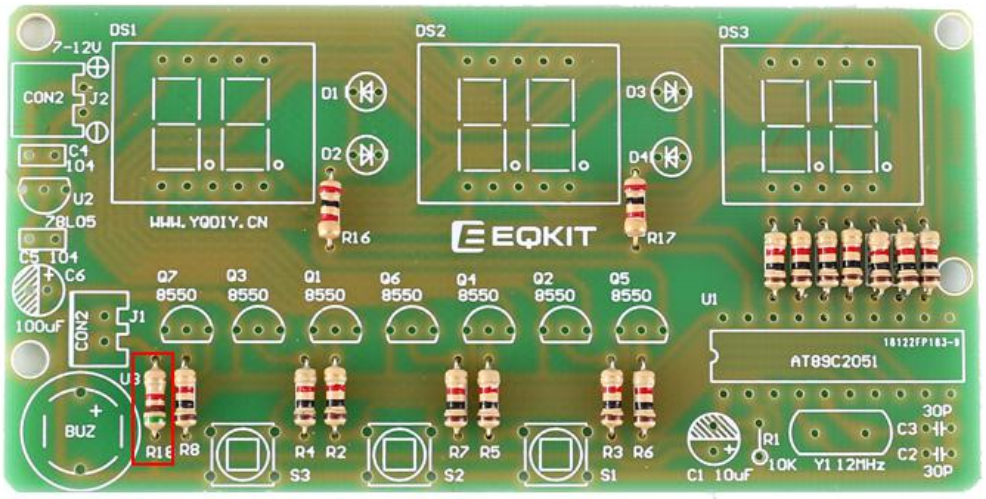
Step 1:Install 14pcs 1K Metal Film Resistor at R2~R15.



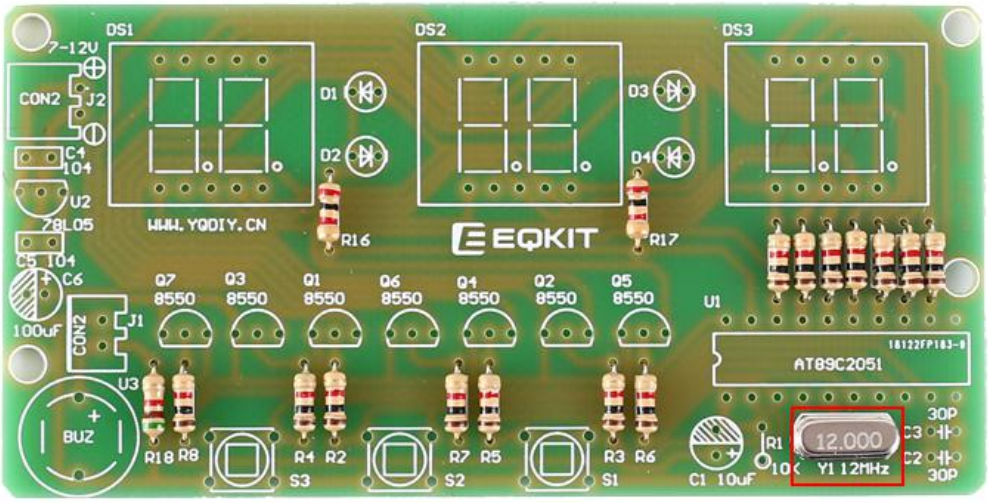
## Step 2:Install 2pcs 2K Metal Film Resistor at R16~R17.



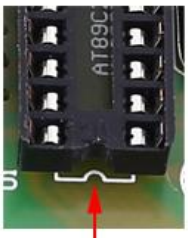

## Step 3:Install 1pcs 5.1K Metal Film Resistor at R18.

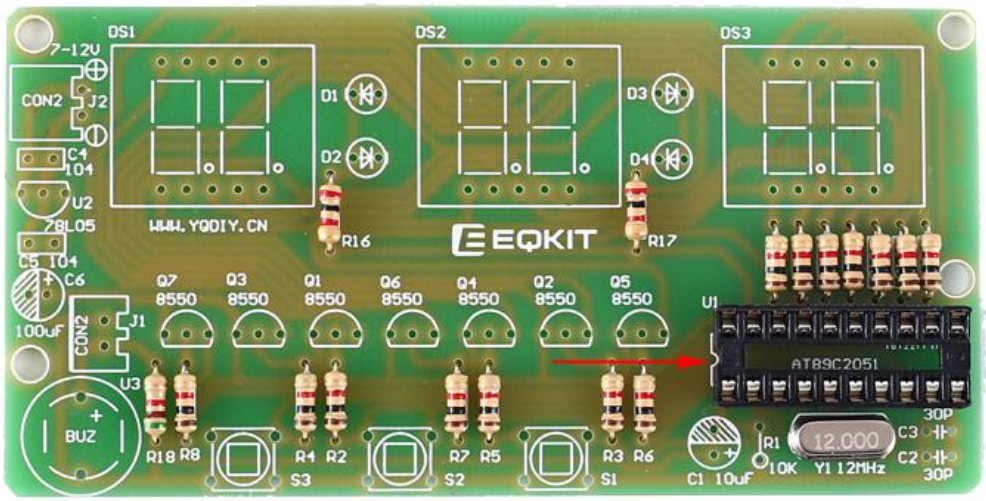


## Step 4:Install 1pcs 12MHz Crystal Oscillator at Y1.

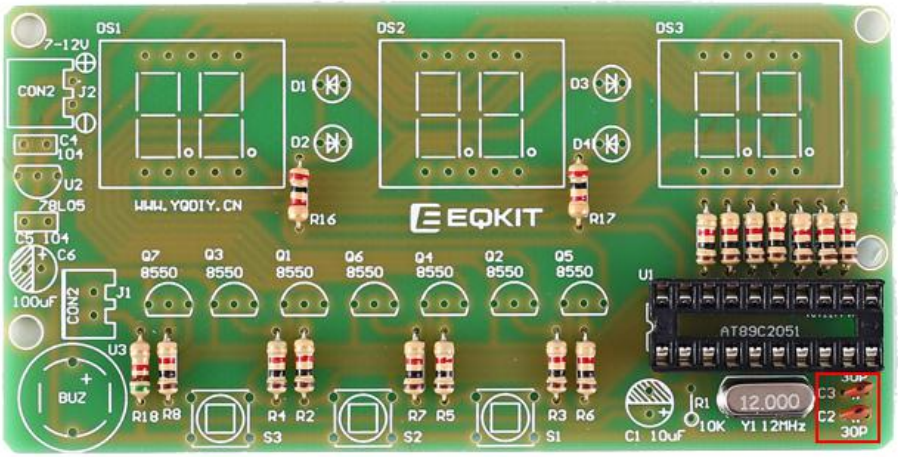



## Step 5:Install 1pcs DIP-20 IC Socket at U1. Pay attention to the installation direction.

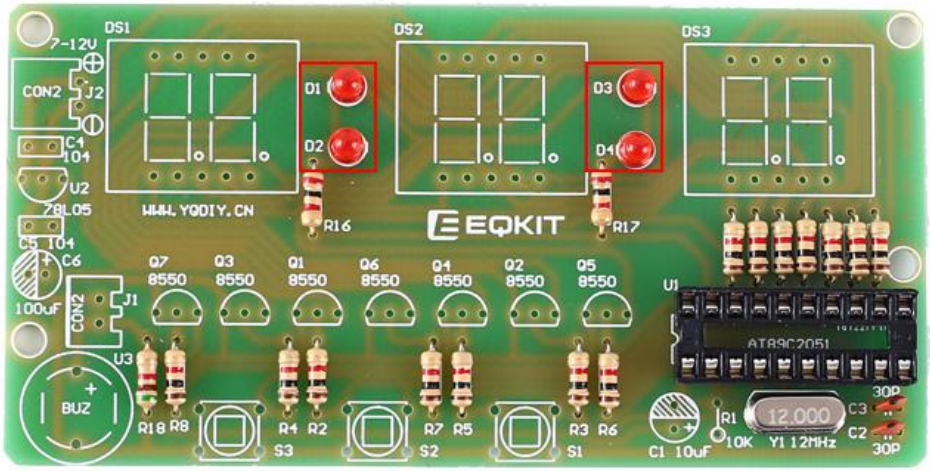




## Step 6:Install 2pcs 30pF Ceramic Capacitor at C2,C3.

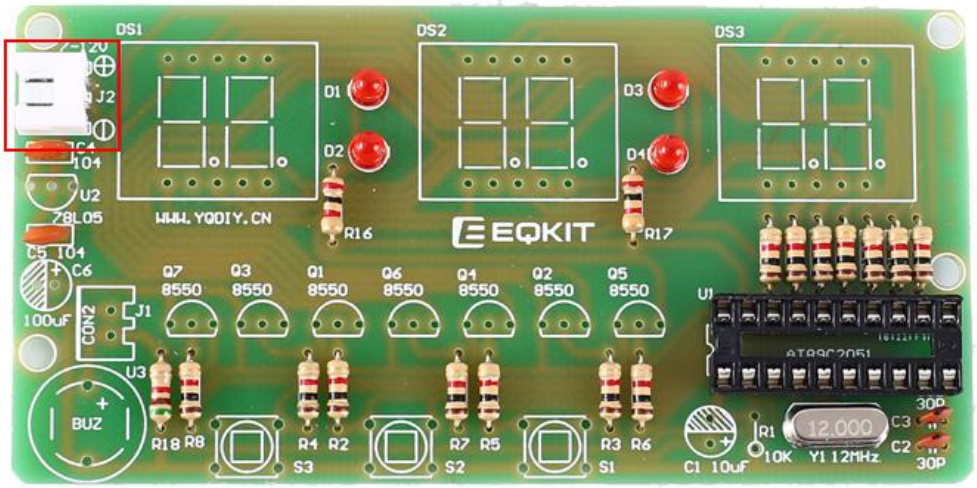



## Step 7:Install 4pcs 3mm Red LED at D1~D4.Pay attention to the installation direction and the shorter pin is negative pins.

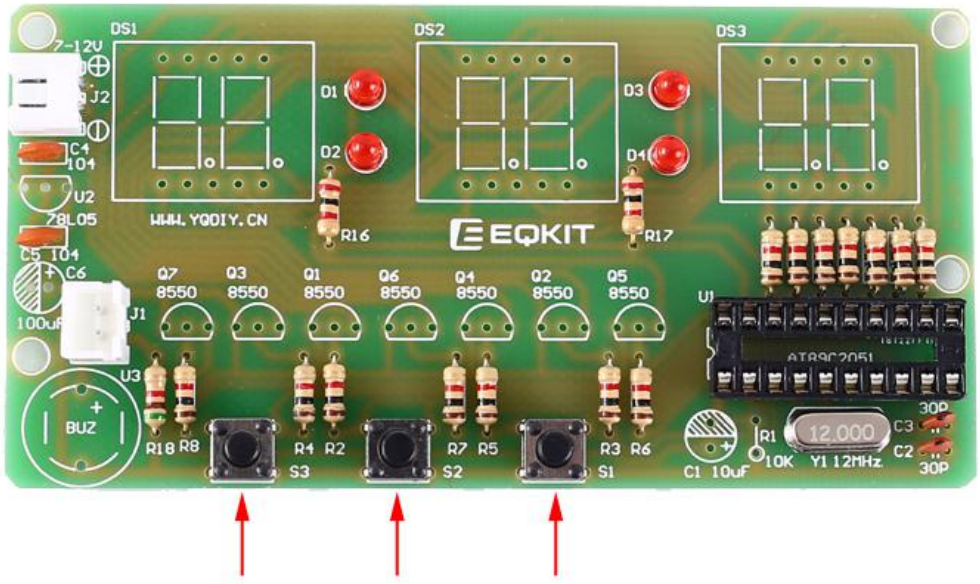
## Step 8:Install 2pcs 0.1uF Ceramic Capacitor at C4,C5.


## Step 9:Install 1pcs XH2.54mm-2P Socket Right Angle Socket at J2.



## Step 10:Install 1pcs XH2.54mm-2P Socket at J1.


## Step 11:Install 3pcs 6*6*4.3mm button at S1~S3.



## Step 12:Install 1pcs 10K Metal Film Resistor at R1.



## Step 13:Install 1pcs 100uF/16V Electrolytic Capacitor at C6.Pay attention to the installation direction and the shorter pin is negative pins.

## Step 14:Install 1pcs 10uF/25V Electrolytic Capacitor at C1.Pay attention to the installation direction and the shorter pin is negative pins.


## Step 15:Install 1pcs TO-92 78L05 Voltage Regulator at U2.


## Step 16:Install 7pcs TO-92 S8550 Transistor at Q1~Q7.



## Step 17:Install 3pcs 4Bit Red Common Anode Digital Tube at DS1~DS3.

## Step 18:Install 1pcs Active Buzzer at U3. Pay attention to the installation direction.


## Step 19:Install 1pcs AT89C2051 on DIP-20 IC Socket.Pay attention to the installation direction.

## Step 20:Connect power wire to do a test.