

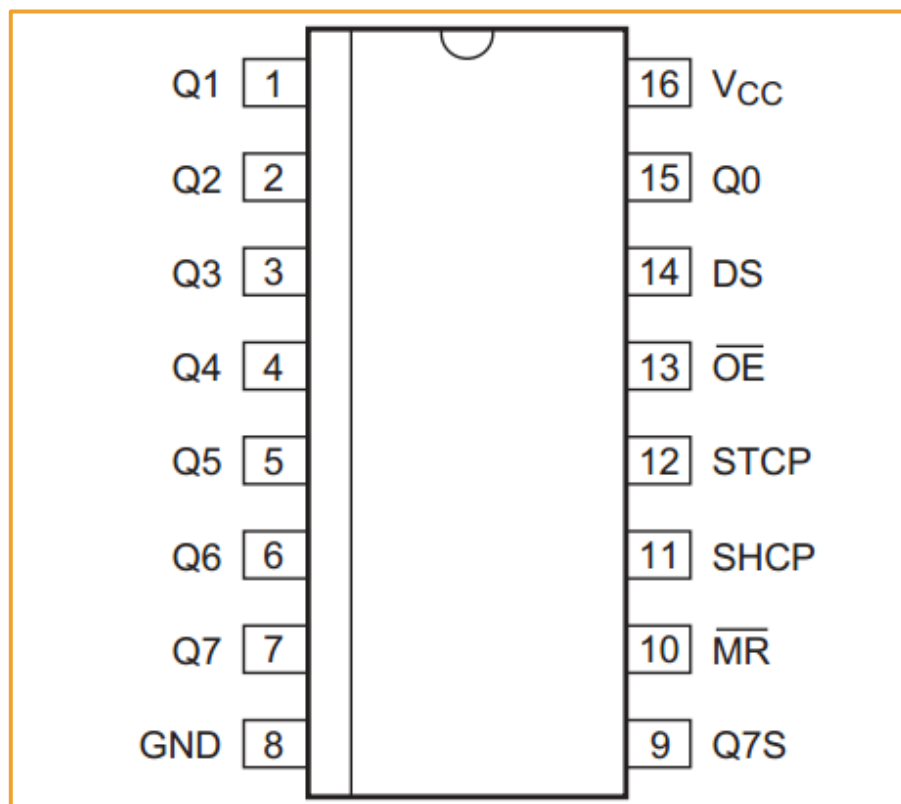
SN74HC595 drives 4-digit digital tube Experiment

74HC595 Introduction

The 74HC595 is a CMOS shift register containing 8-bit serial input and parallel open-drain output that provides data to a register with three-state output. Shift register and storage register, respectively, have an independent clock respectively, the shift register 74 hc595 are needed with the highest priority (SRCLR) directly in the end, serial input (DS) used to cascade of serial output at the next higher level, when the output enable (OE) is a high end, 74 hc595 are needed in parallel in a high impedance state, output for the low level is enabled for parallel output.

Both the shift register clock SHCP and the storage register clock STCP are raised edge triggers.

Pinning information



Pin description

Symbol	Pin	Description
Q0	15	parallel data output 0
Q1	1	parallel data output 1
Q2	2	parallel data output 2
Q3	3	parallel data output 3
Q4	4	parallel data output 4
Q5	5	parallel data output 5
Q6	6	parallel data output 6
Q7	7	parallel data output 7
GND	8	ground(0V)
Q7S	9	serial data output
MR	10	master reset(active low)
SHCP	11	shift register clock input
STCP	12	storage register clock input
OE	13	output enable input(active low)
DS	14	serial data input
Vcc	16	supply voltage

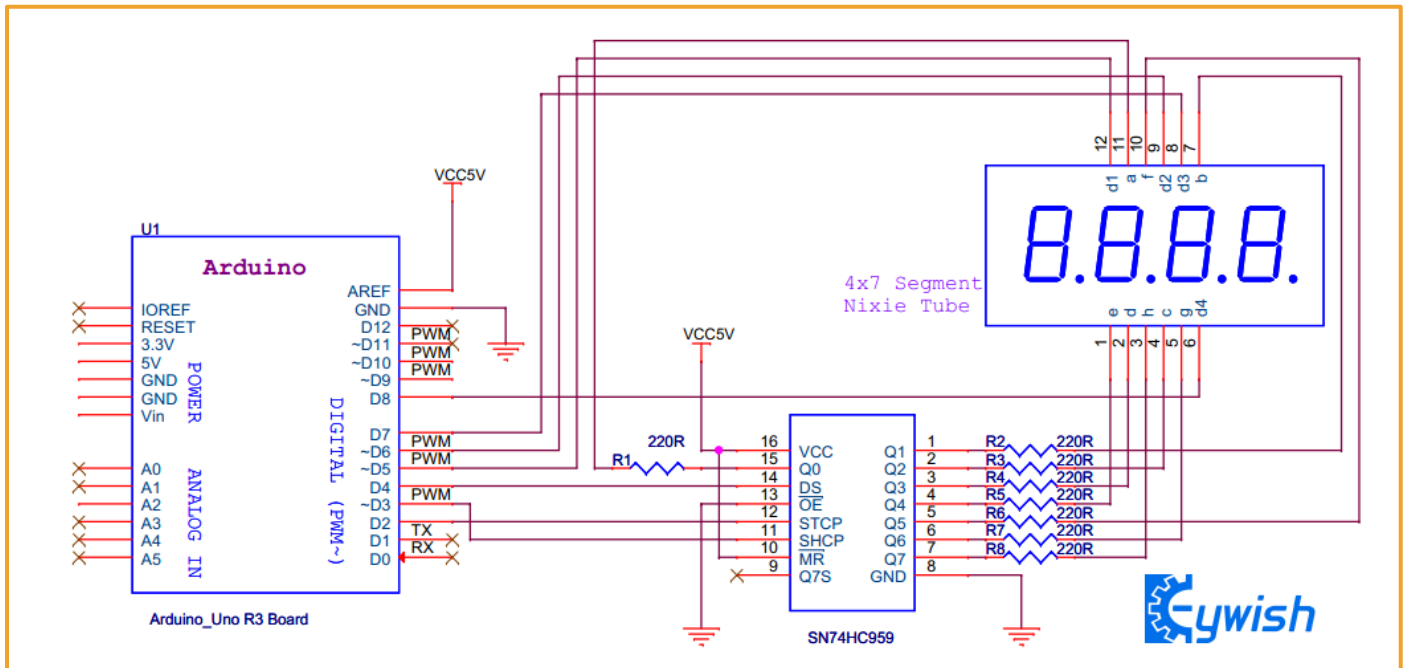
Experiment Purpose

In this experiment, we used Arduino to drive the serial output to 74HC595, and then the parallel port of 74HC595 to drive a common cathode four-digit digital tube. Then driven directly by the Arduino digital tube of a foot, this experiment using eight 220 Ω resistance limit current role, let the dynamic display of digital tube digital has been reduced to 0 from 9.

Component List

- ◆ Keywish Arduino UNO R3 mainboard
- ◆ 4-7Segment cathode tube * 1
- ◆ SN74HC595 * 1
- ◆ 220 Ω resistor* 8
- ◆ Several jumper wires

Schematic Diagram

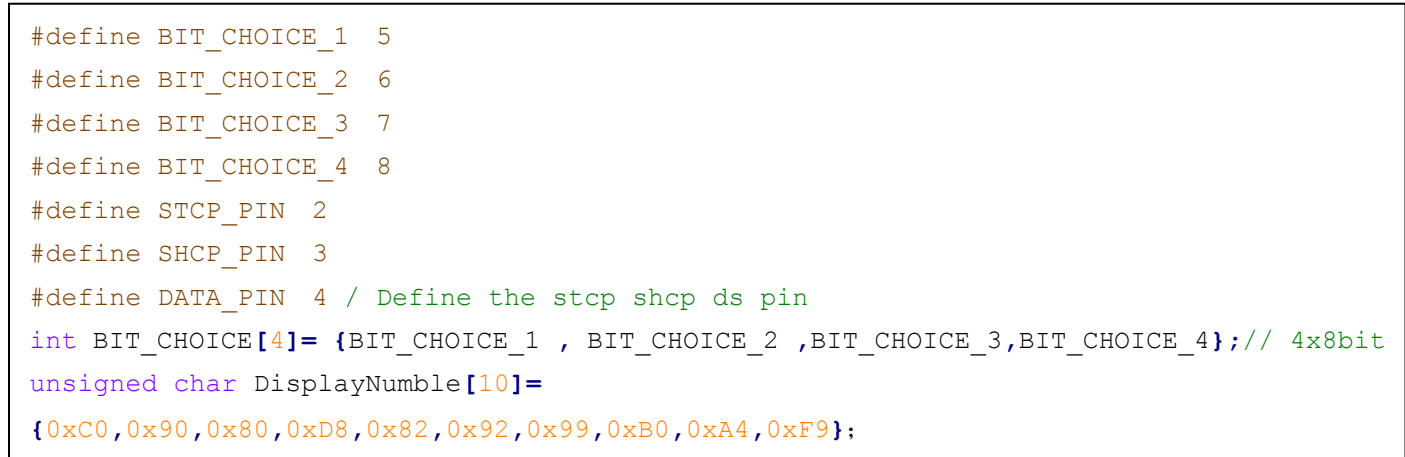


Wiring of Circuit

arduino Uno	SN74HC595
2	12(STCP)
3	11(SHCP)
4	14(DS)

arduino Uno	7 Segment nixie tube
5	12
6	9
7	8
8	6

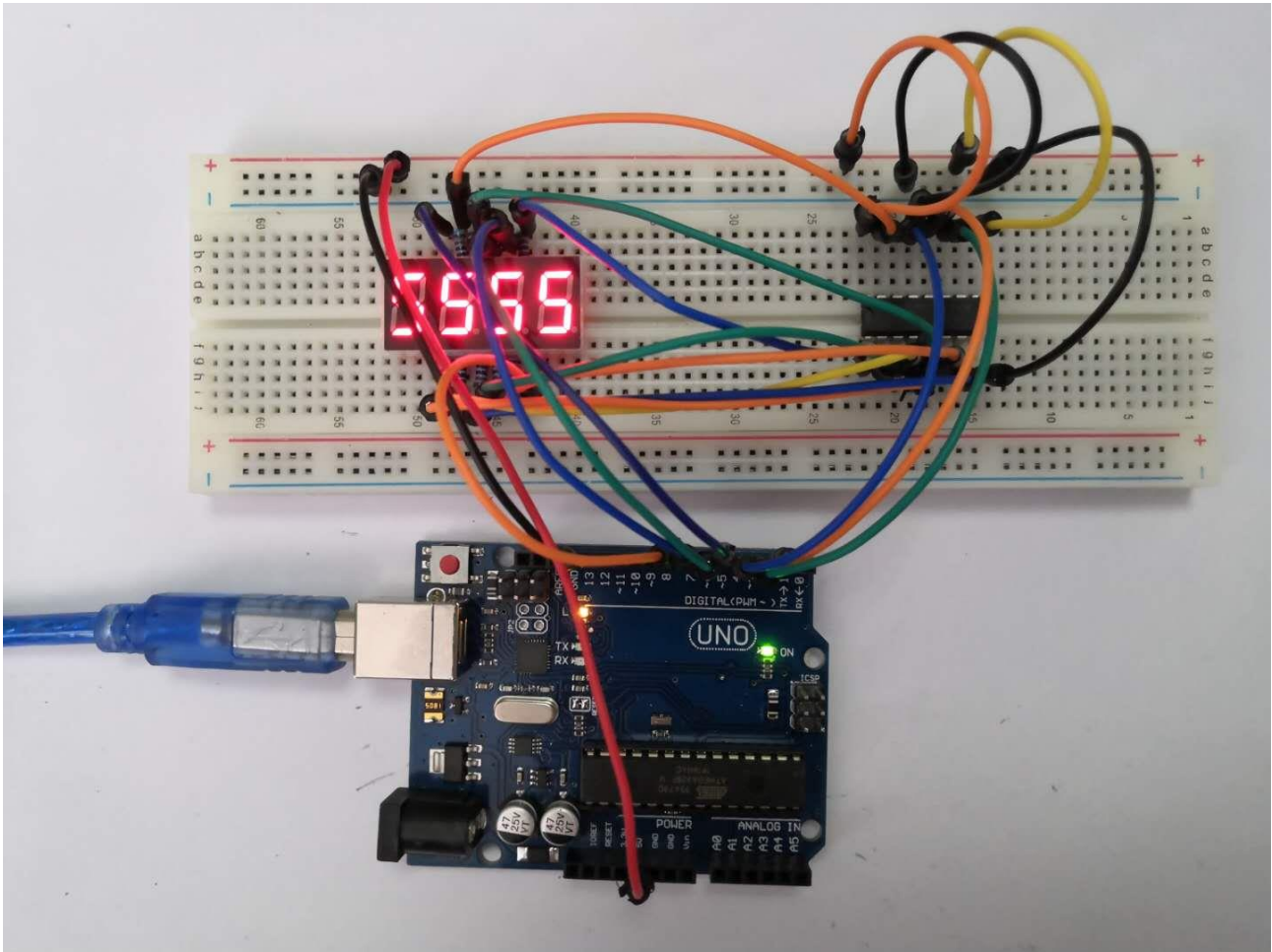
SN74HC595	7 Segment nixie tube
15	11
1	7
2	5
3	2
4	1
5	10
6	5
7	3



```
void setup()
{
    pinMode(STCP_PIN, OUTPUT);
    pinMode(SHCP_PIN, OUTPUT);
    pinMode(DATA_PIN, OUTPUT); // Set the stcp shcp ds pin to output mode
    for (int i=0;i<4;i++)
    {
        pinMode(BIT_CHOICE[i], OUTPUT);
        digitalWrite(BIT_CHOICE[i], HIGH);
    }
}

void loop()
{
    int i=0;
    for (i = 9; i>=0 ;i-- )
    // numble 9-> 0 down Cycle 9 times, cycle to light up segment eight segment digital
    tube belt and dot
    {
        for (int i=0;i<4;i++)
        {
            digitalWrite(BIT_CHOICE[i], HIGH);
        }
        digitalWrite(STCP_PIN, LOW);
        shiftOut(DATA_PIN,SHCP_PIN,MSBFIRST, DisplayNumbler[i]);
        // Move left to display numbers
        digitalWrite(STCP_PIN, HIGH);
        for(int i=0;i<4; i++)
        {
            digitalWrite(BIT_CHOICE[i], LOW);
        }
        delay(1000); // Delay for one second
    }
}
```

Experiment Result



Mixly programming program

```

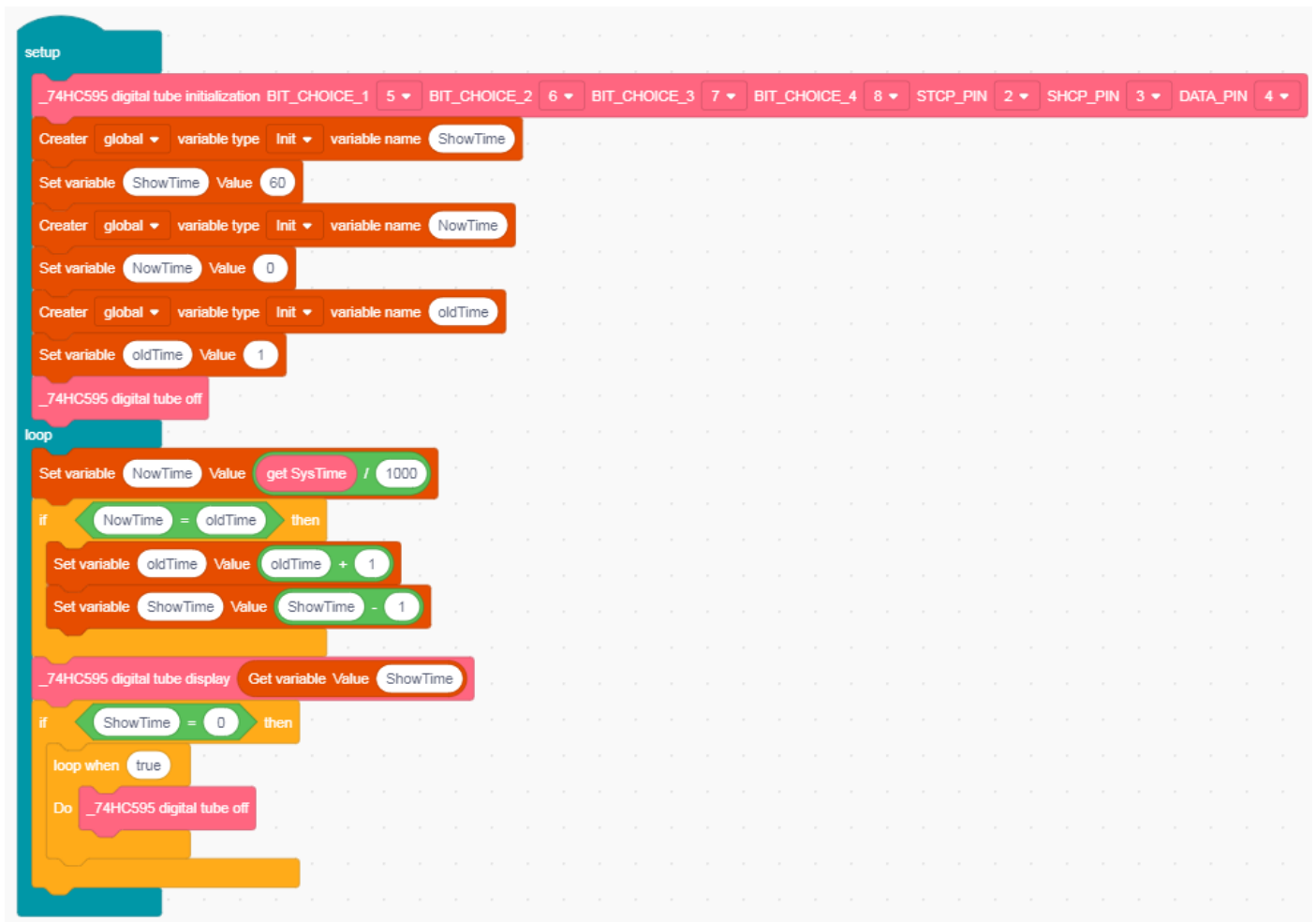
_74HC595 digital tube initialization BIT_CHOICE_1 5 BIT_CHOICE_2 6 BIT_CHOICE_3 7 BIT_CHOICE_4 8 STCP_PIN 2 SHCP_PIN 3 DATA_PIN 4
Declare ShowTime as int value 60
Declare NowTime as long value 0
Declare oldTime as long value 1

setup
  _74HC595 digital tube off

NowTime = System running time ms + 1000
if NowTime = oldTime
do
  oldTime = oldTime + 1
  ShowTime = ShowTime - 1
_74HC595 digital tube display ShowTime
if ShowTime = 0
do
  repeat while true
  do _74HC595 digital tube off

```

MagicBlock programming program



```

setup
  _74HC595 digital tube initialization BIT_CHOICE_1 5 BIT_CHOICE_2 6 BIT_CHOICE_3 7 BIT_CHOICE_4 8 STCP_PIN 2 SHCP_PIN 3 DATA_PIN 4
  Creator global variable type Init variable name ShowTime
  Set variable ShowTime Value 60
  Creator global variable type Init variable name NowTime
  Set variable NowTime Value 0
  Creator global variable type Init variable name oldTime
  Set variable oldTime Value 1
  _74HC595 digital tube off

loop
  Set variable NowTime Value get SysTime / 1000
  if NowTime = oldTime then
    Set variable oldTime Value oldTime + 1
    Set variable ShowTime Value ShowTime - 1
  _74HC595 digital tube display Get variable Value ShowTime
  if ShowTime = 0 then
    loop when true
    Do _74HC595 digital tube off
  
```

The image shows a MagicBlock programming interface with a grid background. The code is organized into two main sections: 'setup' and 'loop'. The 'setup' section initializes three global variables: 'ShowTime' (value 60), 'NowTime' (value 0), and 'oldTime' (value 1). It also configures the 74HC595 digital tube initialization with specific pin choices and turns the tube off. The 'loop' section calculates 'NowTime' from 'get SysTime / 1000'. It then checks if 'NowTime' equals 'oldTime'. If true, it increments 'oldTime' by 1 and decrements 'ShowTime' by 1. It then displays 'ShowTime' on the 74HC595 digital tube. Finally, it checks if 'ShowTime' equals 0. If true, it enters a 'loop when true' block where it turns the 74HC595 digital tube off.