The principle of automatic door of microwave sensor

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Abstract

Timing switch can according to the former level to level after the equipment one by one order start power supply, close the power supply is shut down level by level to the first order all kinds of electric equipment, thus effectively unified management and control of all kinds of electric equipment, avoid the human error, and can reduce electrical equipment in the switch instantaneous impact to power grid, and avoids the impact of the induced current on the equipment, ensure the stability of the whole power system. In addition, we add SCM on this basis to control, in order to achieve human-computer interaction control switch sequence.

Keywords

Time sequence switch; logic control; serial port screen.

1. Introduction

Time sequence switch belongs to automatic control system of switch type, which occupies a certain market position in our life, such as conference room, background music system, karaoke business place, medium and low-grade disco bar, personal family entertainment system, small and medium-sized venues and so on. First of all, we add adjustable time of on-off on the original basis, in order to prevent human error Poor, we use double-click to start and enter the mode setting interface. In this setting interface, we use the serial port screen to display. Users can set it according to their preferences. At the same time, we have built-in four modes. Users can choose through the operation interface, and there is a humanized setting, that is, we have built-in power on memory Yes, the next boot will still maintain the last set mode. To sum up, our MCU automatic control timing switch will have a certain market prospect in the future.

2. Main function and performance index

2.1. Main functions:

(1) Press the key to control the relay switch;

(2) Infrared remote control;

(3) The LED lamp judges the working state of the circuit;

(4) The serial port screen displays the circuit status;

(5) Power on storage and power off protection;

2.2. Main performance indexes:

(1) Press the key to control the relay switch;

(2) After power down, the state of power on is stored;

3. Function introduction

We take the iap15f2k61s2 as the main body to control the switch and closing of the relay. Eight keys correspond to eight groups of relays and LED lights. The power key adopts the function of double-click switch to prevent false touch. In addition, our serial port screen can display the

current setting status, enter the time setting interface, and adjust the on-off time. We also add infrared to realize the on-off function.

4. Schematic diagram of time sequence switch
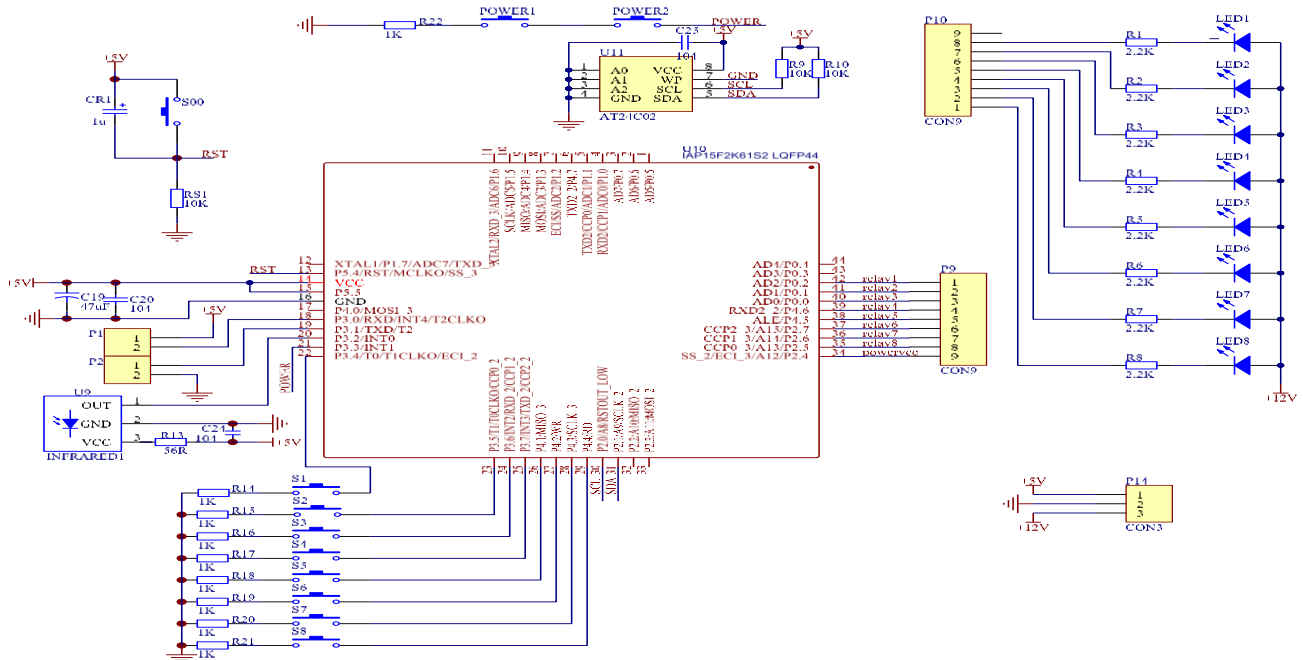
4.1. Main schematic diagram

Figure-1 main control schematic diagram

Through iap15f2k61s2 microcontroller, we use 8 keys to realize the relay switch and close. In the aspect of power on, we use double-click to realize, double-click press to take effect. In addition, we also use AT24C02 EEPROM to realize the storage of power on mode. The next power on can read the last mode, which is convenient for users to set frequently. We have built-in four modes. The first boot is from 0 to 8 by default. After that, users can set it according to their preferences。

4.2. Control panel single chip microcomputer control circuit

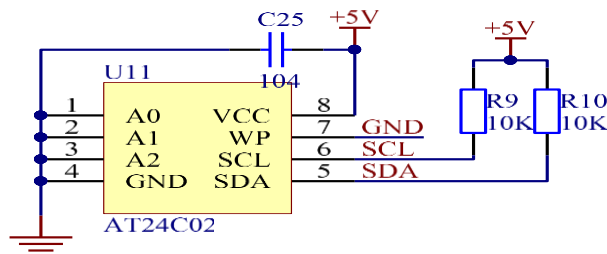4.2.1Control panel EEPROM module circuit

Figure - 2 AT24C02 memory module circuit

We use AT24C02 memory module for data storage. There are two reasons for using this chip. One is that we have used this chip before, and we will be familiar with its usage. The other is that this chip has a good feature that it only needs to be written in, and we don't need to erase it. During our power on and power off, we can store the data through this module. When we power on and power on, we can set the mode, and then the data will be stored in 24C02. The next time we power on, we will read the last data. The user can set it according to the specific situation.
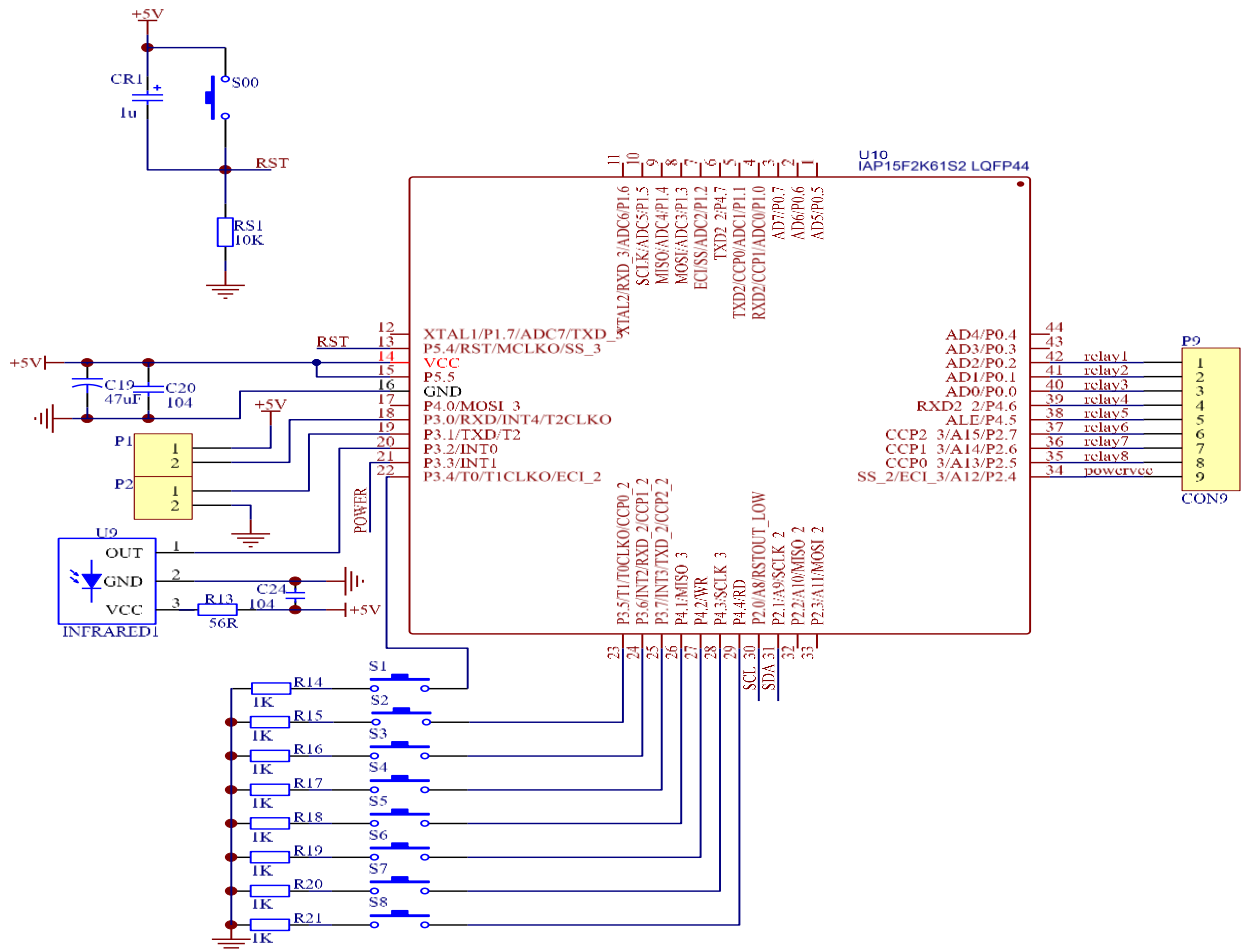
4.2.2 control module circuit

Figure 3 Single chip microcomputer control module

In the figure, we use iap15f2k61s2 microcontroller for relay control. Iap15f2k61s2 microcontroller is a commonly used microcontroller, and it is also an upgraded version of 8051 microcontroller. Its stability and anti-interference ability are also stronger. It has the following characteristics: 1. Large capacity 2048 bytes of on-chip RAM data memory; 3. Low power design; 3. Microcontroller without external reset 4. MCU 6.8/16/24/32/40/48/56/60/61k byte on-chip flash program memory without external crystal oscillator, more than 100000 times of erasure and writing, large capacity on-chip EEPROM function, more than 100000 times of erasure and writing;

As can be seen from the figure, we press the key, and then the corresponding relay will be relatively opened. The MCU is also connected with the serial screen and infrared module. When we press the key to control, the serial screen will display the mode we choose. At the same time, we can also control the opening of the relay through the infrared source.

4.3. Power board circuit

4.3.1 power module circuit

In the power supply module, we use 12V and 5V regulated power supply. In the figure, we use 22V AC power supply, which is rectified after transformer transformation. After rectification, we filter. In Figure C2 and C10, the voltage can be stable without big fluctuation to ensure that the voltage before stabilization is stable. In 5V, we use LM317 module to stabilize the voltage. In 12V, we use l78m12cd T to stabilize voltage, we supply 12V relay, 5V we supply MCU and serial screen. After the voltage is stabilized, we also add two filter capacitors, so the effect of voltage stabilization will be more stable. C12, C2 and C4 in the figure are the filter capacitors that we have stabilized.

Lm317t is a widely used power supply IC, which has the advantages of wide voltage regulation range, good voltage regulation performance, low noise and high ripple rejection ratio. At the same time, the output voltage range is adjustable from 1.2V to 37V, which can provide 1.5A current. At the same time, it also has output short-circuit protection, over-current protection and overheating protection. L78m12cdt is a 12V voltage regulator chip, it can output 0.5A current, and the circuit structure is simple, at the same time, it also has thermal overload protection and short circuit protection.
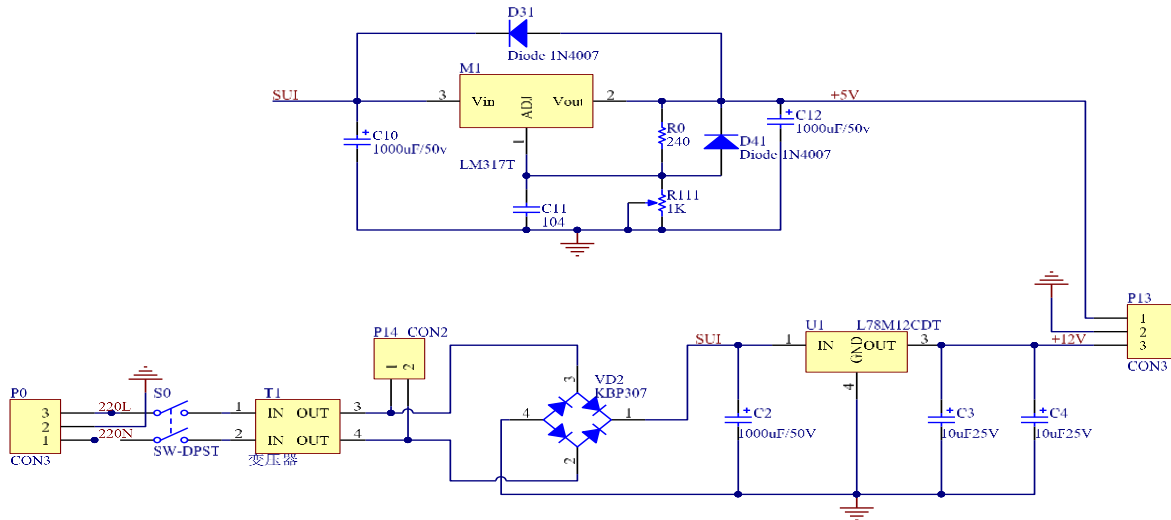

Figure 4 voltage stabilizing circuit
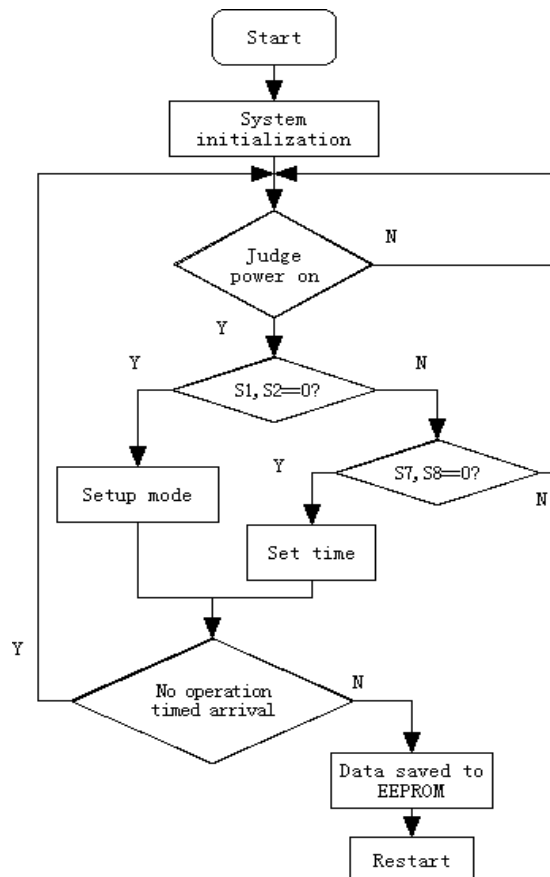
5. Explanation of procedure

Figure 6 program block diagram

5.1. Components of the procedure

The code consists of main function C, interrupt function (infrared), key module, timer, IIC module and serial function. By reading the key, the program starts to execute, and then sends the current display status to the serial port. Finally, according to the mode of the key, the corresponding display mode can be carried out, and the switch can be controlled by infrared.

5.2. Number of main processes

```
void main(void){
        Relay_Init();
        UartInit();
        t0_init(1);
        init_ext0();
        EA=1;
        UART_Send_END();
        mode=readEeprom(0x76);
        if(mode>4) mode=4;
        ms_500=readEeprom(0x77);
        UART_Send_Byte(ms_500);
        UART_Send_Byte(mode);
        while(1){
                power_on();
                power_off();
        }
}
```

5.3. Serial port module

```
void UART_Send_Byte(uchar byte){
        SBUF=byte;
        while(!TI);
        TI=0;
}
void UART_Send_Str(uchar *s)
{
 int i=0;
 while(s[i]!=0)
 {
        UART_Send_Byte(s[i]);
        i++;
 }
}
void UART_Send_END(void)
{
        UART_Send_Byte(0xFF);
        UART_Send_Byte(0xFF);
        UART_Send_Byte(0xFF);
}
```

```
void UartInit(void)
{
        SCON = 0x50;
        AUXR &= 0xBF;
        AUXR &= 0xFE;
        TMOD &= 0x0F;
        TL1 = 0xE8;
        TH1 = 0xFF;
        ET1 = 0;
        TR1 = 1;
}
void USART_int(void) interrupt 4{
        uchar b;
        if(RI){
         RI=0;
         b=SBUF;
         switch(b){
         }
        }
}
```

5.4. Timer module

```
uint ms=0;
void t0_init(uchar ms){
        TMOD&=0XF0;
        TL0=(65536-ms*11059/12);
        TH0=(65536-ms*11059/12)>>8;
        TF0=0;
        TR0=1;
        ET0=1;
}
void t0_int(void) interrupt 1{
        if(tim0_flag){
                ms++;
        }
}
```

6. Manual of automatic control timing switch

6.1. Key:

6.1.1 press the two power keys to switch the status of "on" and "off"

6.1.2 mode setting: 1.2 press the key at the same time to enter the setting interface; then press 3, 4, 5 and 6 to set four modes respectively; at the same time, press and hold to confirm the mode setting (if it is not confirmed for 15 seconds, it will be lost);

Key 3 corresponds to mode 1 (1-2-3-4-5-6-7-8 startup sequence)

Key 4 corresponds to mode 2 (8-7-6-5-4-3-2-1 boot in sequence)

Key 5 corresponds to mode 3 (1-3-5-7 sequential startup)

Key 6 corresponds to mode 4 (2-4-6-8 sequential startup)

6.1.3 Interval time setting - press 7.8 to enter the setting interface, 5 and 6 correspond to time addition and subtraction, and long press to confirm time setting:

Key 5 is time plus, short press is time plus 0.1, long press is time plus;

Press the key for 6 bit time minus, short press for time minus 0.1, long press for duration minus; 6,1,3.

6.2.   Infrared control:

6.2.1: press power, and then press the volume mute to turn on the machine; press the power key to turn off the machine;

6.2.2: press the mode key plus the setting key to enter the setting interface. Press the key 1-2-3-4 to select four modes, and then press the confirm key

Key 1 corresponds to mode 1 (1-2-3-4-5-6-7-8 startup sequence)

Key 2 corresponds to mode 2 (8-7-6-5-4-3-2-1 boot in sequence)

Key 3 corresponds to mode 3 (1-3-5-7 sequential startup)

Key 4 corresponds to mode 4 (2-4-6-8 sequential startup)

6.2.3: press clock to enter the time setting interface, press vol - decrease time, press Vol + increase time .

7. Conclusion

The emergence of sequential switch circuit, It has brought a lot of convenience to our life and production. First of all, it plays a very good control role in the conference room, background music system, karaoke business places, medium and low-end disco bar, personal family entertainment system, fixed installation of small and medium-sized venues, slow bar and other sound systems of some units. It does not need to operate artificially to avoid some security risks. It can be operated with one click To solve this problem, we have a humanized function, which can automatically store the mode, read the last mode after power on, and can set it by ourselves, so the appearance of timing switch not only protects the stable work of the power system, but also facilitates our daily life

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