ภาคผนวก

โปรแกรมภาษาซีใช้ควบคุมไมโครคอนโทรลเลอร์

- บอร์ดหลัก

```
#include <reg51.h>
#include <stdio.h>
#define  XTAL 11059200L
#define  Baud_Rate 9600L
#define  BLINK 150
code unsigned char Reload =256-(unsigned char)(XTAL/(32L*12L*Baud_Rate));
sbit TX_En   =  P3^2;
sbit LED     =  P1^7;
sbit sw4     =  P1^3;
sbit sw3     =  P1^2;
sbit sw2     =  P1^1;
sbit sw1     =  P1^0;
unsigned char Time=0,Buffer[5],Index=,Address=0,Press=0;
bit  sw_A=1,sw_B=1,sw_C=1,sw_D=1;
void delay_ms (unsigned int count )
{
unsigned int i;
while (count)
{
i=115;
while(i>0) i--;
count--;
}
}
void Time_0_Int (void) interrupt 1
{
static unsigned char Time=0;
TR0=0;
```

```
TH0=0x4b;
TL0=0xfd;
TR0=1;
Time ++;
if (Time > 20)
{
Time=0;
if (!press)
LED=!LED;
}
}
void Recieve (void) interrupt 4
{
RI=0;
}
char putchar (unsigned char c)
{
TX_En=1;
delay_ms(1);
ES=0;
SBUF=c;
while(TI);
TI=0;
RI=0;
ES=0;
delay_ms(1);
TX_En=0;
return(c);
}
void main(void)
{
LED=1;
```

```
TX_En=0;
TMOD=0x21;
SCON=0x50;
TH0=0x4B;
TL0=0xFE;
ET0=1;
TH1=Reload;
TR0=1;
TR1=1;
EA=1;
while(1)
{
//sw1
sw1=1;
if(!sw1)
{
delay_ms(5);
while(!sw1);
delay_ms(5);
if (sw_A)
{
//ON
sw_A=0;
putchar('A');
putchar('1');
putchar('1');
putchar(13);
}
else
{
//OFF
sw_A=1
```

```
putchar('A');
putchar('1');
putchar('0');
putchar(13);
}
}
sw1=sw_A;
//.....
//sw2
sw2=1;
if(!sw2)
{
delay_ms(5);
while(!sw2);
delay_ms(5);
if (sw_B)
{
//ON
sw_B=0;
putchar('A');
putchar('2');
putchar('1');
putchar(13);
}
else
{
//OFF
sw_B=1;
putchar('A');
putchar('2');
putchar('0');
putchar(13);
```

```
}
}
sw2=sw_B;
//.....
//sw3
sw3=1;
if(!sw3)
{
delay_ms(5);
while(!sw3);
delay_ms(5);
if (sw_C)
{
//ON
sw_C=0;
putchar('A');
putchar('3');
putchar('1');
putchar(13);
}
else
{
//OFF
sw_C=1;
putchar('A');
putchar('3');
putchar('0');
putchar(13);
}
}
sw3=sw_C;
//.....
```

```
//sw4
sw4=1;
if(!sw4)
{
delay_ms(5);
while(!sw4);
delay_ms(5);
if (sw_D)
{
//ON
sw_D=0;
putchar('A');
putchar('4');
putchar('1');
putchar(13);
}
else
{
//OFF
sw_D=1;
putchar('A');
putchar('4');
putchar('0');
putchar(13);
}
}
sw4=sw_D;
//.....
};
}
```

- บอร์ดลูก

Slave A

```
#include <reg51.h>
#define XTAL 11059200L
#define Baud_Rate 9600L
#define ID1      '1'
#define ID2      '2'
#define  ON              1
#define  OFF             0
code unsigned char Reload = 256-(unsigned char)(XTAL/(32L * 12L * Baud_Rate));
bit      sw_A=0,sw_B=0,sw_C=0,sw_D=0;
sbit  sw1 = P1^7;
sbit  sw2 = P1^6;
sbit RELAY1 = P1^5;
sbit RELAY2 = P1^4;
sbit TX_En = P3^2;
sbit LED = P3^7;
unsigned char Time=0,Buffer[5],Index=0;
void delay_ms (unsigned int count)
{
 unsigned int i;
 while (count)
{
i = 115;
while (i>0) i--;
count--;
}
```

```
}
void Timer_0_Int (void) interrupt 1
{
EA = 0;
ET0 = 0;
TR0 = 0;
TH0 = 0x4b;
TL0 = 0xfd;
Time += 1;
if (Time > 20)
{
Time = 0;
LED = !LED;
}
TR0 = 1;
ET0 = 1;
EA = 1;
}
void Recieve (void) interrupt 4
{
RI = 0;
if (SBUF != 13)
{
Buffer[Index] = SBUF;
Index++;
Buffer[Index] = 0;
if (Index >= 5) Index = 0;
}
else
{
if ((Buffer[0]=='A') && (Buffer[1]==ID1))
{
```

```
if (Buffer[2]=='1')
{
RELAY1 = ON;
sw_A = ON;
}
if (Buffer[2]=='0')
{
RELAY1 = OFF;
sw_A = OFF;
}
}
if ((Buffer[0]=='A') && (Buffer[1]==ID2))
{
if (Buffer[2]=='1')
{
RELAY2 = ON;
sw_B = ON;
}
if (Buffer[2]=='0')
{
RELAY2 = OFF;
sw_B = OFF;
}
}
Buffer[0] = 0;
Buffer[1] = 0;
Buffer[2] = 0;
Index = 0;
}
}
char putchar(unsigned char c)
{
```

```
TX_En = 1;
delay_ms(1);
ES = 0;
SBUF = c;
while(!TI);
TI = 0;
RI = 0;
ES = 1;
delay_ms(1);
TX_En = 0;
return(c);
}
void    main(void)
{

RELAY1 = OFF;
RELAY2 = OFF;
LED = OFF;
TX_En = 0;
TMOD = 0x21;
SCON = 0x50;
TH0 = 0x4B;
TL0 = 0xFE;
ET0 = 1;
TH1 = Reload;
TR0 = 1;
TR1 = 1;
ES = 1;
EA = 1;
while(1)
{
//-------------------------------------------------------
```

```
// sw1
if (!sw1)
{
delay_ms(5);
while(!sw1);
delay_ms(5);
if (sw_A)
{
// ON
sw_A = 0;
}
else
{
// OFF
sw_A = 1;
}
}
 RELAY1 = sw_A;
//-------------------------------------------------
//-------------------------------------------------
// sw2
if (!sw2)
{
delay_ms(5);
while(!sw2);
delay_ms(5);
if (sw_B)
{
// ON
sw_B = 0;
}
else
```

```
{
// OFF
sw_B = 1;
}
}
 RELAY2 = sw_B;
//-----------------------------------------------------
};
}
```

Slave B

```
#include <reg51.h>
#define XTAL 11059200L
#define Baud_Rate 9600L
#define ID1      '3'
#define ID2      '4'
#define  ON              1
#define  OFF             0
code unsigned char Reload = 256-(unsigned char)(XTAL/(32L * 12L * Baud_Rate));
bit      sw_A=0,sw_B=0,sw_C=0,sw_D=0;
sbit sw1 = P1^6;
sbit sw2 = P1^7;
sbit RELAY1 = P1^5;
sbit RELAY2 = P1^4;
sbit TX_En = P3^2;
sbit LED = P3^7;
unsigned char Time=0,Buffer[5],Index=0;
void delay_ms (unsigned int count)
{
```

```
unsigned int i;
while (count)
{
i = 115;
while (i>0) i--;
count--;
}
}
void Timer_0_Int (void) interrupt 1
{
EA = 0;
ET0 = 0;
TR0 = 0;
TH0 = 0x4b;
TL0 = 0xfd;
Time += 1;
if (Time > 20)
{
Time = 0;
LED = !LED;
}
TR0 = 1;
ET0 = 1;
EA = 1;
}
void Recieve (void) interrupt 4
{
RI = 0;
if (SBUF != 13)
{
Buffer[Index] = SBUF;
Index++;
```

```
Buffer[Index] = 0;
if (Index >= 5) Index = 0;
}
else
{
if ((Buffer[0]=='A') && (Buffer[1]==ID1))
{
if (Buffer[2]=='I')
{
RELAY1 = ON;
sw_A = ON;
}
if (Buffer[2]=='0')
{
RELAY1 = OFF;
sw_A = OFF;
}
}
if ((Buffer[0]=='A') && (Buffer[1]==ID2))
{
if (Buffer[2]=='I')
{
RELAY2 = ON;
sw_B = ON;
}
if (Buffer[2]=='0')
{
RELAY2 = OFF;
sw_B = OFF;
}
}
Buffer[0] = 0;
```

```
Index = 0;
}
char putchar(unsigned char c)
{
TX_En = 1;
delay_ms(1);
ES = 0;
SBUF = c;
while(!TI);
TI = 0;
RI = 0;
ES = 1;
delay_ms(1);
TX_En = 0;
return(c);
}
void    main(void)
{
RELAY1 = OFF;
RELAY2 = OFF;
LED = OFF;
TX_En = 0;
TMOD = 0x21;
SCON = 0x50;
TH0 = 0x4B;
TL0 = 0xFE;
ET0 = 1;
TH1 = Reload;
TR0 = 1;
TR1 = 1;
ES = 1;
EA = 1;
```

```
putchar('B');
while(1)
{
//-------------------------------------------------------
// sw1
if (!sw1)
{
delay_ms(5);
while(!sw1);
delay_ms(5);
if (sw_A)
{
// ON
sw_A = 0;
}
else
{
// OFF
sw_A = 1;
}
}
RELAY1 = sw_A;
//-------------------------------------------------------
//-------------------------------------------------------
// sw2
if (!sw2)
{
delay_ms(5);
while(!sw2);
delay_ms(5);
if (sw_B)
{
```

```
// ON
sw_B = 0;
}
else
{
//  OFF
sw_B = 1;
}
}
RELAY2 = SW_B;
//---------------------------------------------------------
};
}
```