

*Текст программы контроллера управления шаговым двигателем*

```
#pragma language=extended
```

```
// Global variable
```

```
// 0-protiv chasovoi, 1- po chasovoi
```

```
int discret=0;
```

```
char zero=0;
```

```
char inc=0;
```

```
unsigned char timer0_OVF=0;
```

```
struct
```

```
{ char A : 1;
```

```
  char B : 1;
```

```
  char C : 1;
```

```
  char D : 1;
```

```
  char : 0;
```

```
}Timeflag ;
```

```
struct
```

```
{ char napravl : 1;
```

```
  char start_stop : 1; //start- 1; stop- 0
```

```
  char pozition : 1; //pozition on- 1; pozition off- 0
```

```
  char razgon : 1;
```

```
  char transmit : 1;
```

```
  char : 0;
```

```
  unsigned int steep ;
```

```
  unsigned int n_speed ;
```

```
  unsigned int accelerate ;
```

```
} stateKSM;
```

```
struct
```

```
{ char gotov : 1;
```

```
  char start_stop : 1;
```

```
  char : 0;
```

```
  unsigned int steep ;
```

```
  unsigned int speed ;
```

```
} ansverKSM;
```

|      |      |             |         |      |                   |  |  |  |  |      |
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```

#include "io2313.h"
#include <ina90.h>
#include <comp_a90.h>

#define FA PORTD=0x10; PORTB=0x00
#define FB PORTD=0x00; PORTB=0x02
#define FC PORTD=0x00; PORTB=0x01
#define FD PORTD=0x40; PORTB=0x00

#define FA_B PORTD=0x10; PORTB=0x02
#define FB_C PORTD=0x00; PORTB=0x02||0x01
#define FC_D PORTD=0x40; PORTB=0x01
#define FD_A PORTD=0x40||0x10; PORTB=0x00

#define COMPUT 3125
#define TIME_TRANSMIT 10000
#define TEST if (1) for(;;)
#define BAUD232 71

void init(void)
{ TCCR0=(1<<CS00); // prescaler /8
  TIMSK1=(1<<TOIE0);
  SREGI=0x80;
  DDRB=0xFF;
  DDRD=0xFF;
  PORTD=0x00;
  UBRR=(char) (BAUD232);
  UCR=(1<<RXEN)|(1<<TXEN); // enable transmitter receiver
}

void UART_TX(char data,char data2,char data3,char data4,char data5)
{ while(!(USR&(1<<UDRE)));
  UDR=data;
  while(!(USR&(1<<UDRE)));
  UDR=data2;
  while(!(USR&(1<<UDRE)));
  UDR=data3;
  while(!(USR&(1<<UDRE)));
  UDR=data4;
  while(!(USR&(1<<UDRE)));
  UDR=data5;
};

char UART_RX(void)
{ while(!(USR&(1<<RXC)));
  return UDR; };

```

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```

void comand_RX (void) // read
{ if (USR&(1<<RXC))
  { switch (UDR)
    { case 0x73: stateKSM.start_stop=1; break; // "s"
      case 0x61: stateKSM.start_stop=0; break; // "a"
      case 0x32: stateKSM.n_speed-=100; break; // "2" down
      case 0x38: stateKSM.n_speed+=100; break; // "8" up
      case 0x74: stateKSM.transmit=1; break; // "t"
      case 0x72: stateKSM.transmit=0; break; // "r"
      case 0x34: stateKSM.napravl=0; break; // "4" left
      case 0x36: stateKSM.napravl=1; break; // "6" right
      default: break ;
    }
  }
};

int period (int vr)
{ int T=0;
  if (!vr) zero=1; // dividi overflov
  else { T=39062 /vr;
        zero=0;
      }
  return T;
};

void faza (char npr)
{ static char i=0;
  if (npr) i+=1; // steep analiz napravlenia stateKSM.napravl
  else i-=1; // resteeper
  if (i>8) i=1; // Kalco
  if (!i) i=8;
  switch (i)
  { case 1: FA; break ;
    case 2: FA_B; break ;
    case 3: FB; break ;
    case 4: FB_C; break ;
    case 5: FC; break ;
    case 6: FC_D; break ;
    case 7: FD; break ;
    case 8: FD_A; break ;
    default: break ;
  }
}

```

```

void main(void)
{
    init();
    stateKSM.n_speed=0;
    stateKSM.accelerate=30;
    stateKSM.napravl=1;
    stateKSM.start_stop=1;
    stateKSM.pozition = 0;
    stateKSM.steep =1000;
    stateKSM.razgon =1;

    for (;;)
    {
        if (timer0_OVF) //overflow TIMERO
        {
            timer0_OVF=0;
            if (Timeflag.A)
            {
                Timeflag.A=0;
                if (stateKSM.start_stop) // start or stop
                    faza (stateKSM.napravl); // GENERAL FAZA (napravl)
                if (stateKSM.pozition)
                {
                    stateKSM.steep--;
                    answerKSM.gotov=0;
                    if (!stateKSM.steep)
                    {
                        stateKSM.start_stop=0;
                        answerKSM.gotov=1;
                    }
                }
            }
        };
        if (Timeflag.B)
        {
            static int vc=0;
            Timeflag.B=0;
            if (stateKSM.razgon)
            {
                if (!(vc==stateKSM.n_speed))
                {
                    if (vc<stateKSM.n_speed) vc=vc+stateKSM.accelerate;
                    else vc=vc-stateKSM.accelerate;
                }
                else answerKSM.gotov=1;
            }
            else
            {
                vc=stateKSM.n_speed;
                answerKSM.gotov=1;
            }
            discret=period(vc); // vichislenie period iz speed
        };
        if (Timeflag.C)
        {
            Timeflag.C =0;
            if (stateKSM.transmit)
                UART_TX(stateKSM.start_stop,stateKSM.pozition,stateKSM.razgon,stateKSM.transmit,0xFF);
            // inc++
            comand_RX(); // stateKSM
        };
    } } }

```

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```

#pragma vector=TIMER0_OVFO_vect
__interrupt void TIMER0_OVFO_interrupt(void) // Overflow TIMER 0
{ static unsigned int shetA=0;
  static unsigned long int shetB=0;
  static unsigned long int shetC=0;

  timer0_OVF=1;
  if (!(shetA--))
    { shetA=discret;
      if (!(zerol)) Timeflag.A=1; // dividi overflow
    };
  if (!(shetB--))
    { shetB=COMPUT;
      Timeflag.B=1;
    };
  if (!(shetC--))
    { shetC=TIME_TRANSMIT;
      Timeflag.C=1;
    }
}

```

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