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/* stepping motor controller */
/* PIC16F876A 使用 */
/* 2014/8/22 by T.Inoue */

#include<htc.h>
#include<stdio.h>
#include"688-skUARTlib.h"

__CONFIG(LVPDIS & BORDIS & UNPROTECT & PWRTEN & WDTDIS & HS);

#define _XTAL_FREQ 4000000 /* 4MHz */
#define JIKAN 3 /* msec */
#define rest 100 /* msec */
#define n 25 /*bunkatsu*/

signed char p[31][3]={ /*数値の差異は 2 以上とすること*/
{0,0,0},{-13,-9,-5},{-8,-22,-5},{-11,-13,0},{4,-10,-5},
{2,-10,0},{-2,-21,-5},{-20,-24,0},{13,-17,-5},{-4,-21,0},
{-4,-30,-5},{-11,-26,0},{-16,-35,-5},{6,-24,-5},{10,-35,-5},
{16,-13,-5}, {32,-10,-5},{21,2,0},{23,-3,-5},{15,-5,0},
{28,-2,-5},{24,-11,-5},{17,-4,0},{19,-13,-5},{28,-10,0},
{21,-20,-5},{30,-17,0},{20,-27,-5},{32,-23,0},{20,-35,-5},
{0,0,0}
};/*岳彦*/

signed char *q;
unsigned char r=31;
unsigned char i,j;
signed char b,k,m,u,v;
signed char xe,ye,ze,sx,sy,sz,xe0,xe1,ye0,ye1,ze0,ze1;

ioport0;
timng0;
stop_x0;
stop_y0;
stop_z0;
clw_x0;
uclw_x0;

```

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clw_y0;
uclw_y0;
clw_z0;
uclw_z0;
run_px0;
run_mx0;
run_py0;
run_my0;
run_pxpy0;
run_mxmy0;
run_mxpy0;
run_pxmy0;
run_pz0;
run_mz0;
genten0;
limit_chk0;
dw_line0;
act_st0;
usart_RT0;

main0{

    ioport0;

    RC4=1;

    genten0;                /*スタート 原点調整*/

    limit_chk0;            /*Limit チェック*/

    while(1){
        act_st0;          /*USB 受信・押しボタン開始選択*/
        RC4=1;

        q=p;
        xe0=*q;           /*初期始点*/
        ye0=*(++q);
        ze0=*(++q);
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for(i=r;i>1;i--){ /*補間数繰り返し*/
    xe1=*(++q);          /*次の点読み込み*/
    ye1=*(++q);
    ze1=*(++q);

    xe=xe1-xe0;
    ye=ye1-ye0;
    ze=ze1-ze0;

    dw_line0;          /*直線補間*/

    limit_chk0;

    xe0=xe1;          /*始点数値の置き換え*/
    ye0=ye1;
    ze0=ze1;
}
RC4=0;          /*一時終了*/
RC5=0;
}
}

ioport0{

    TRISA = 0x3F;          /* b00111111 */
    TRISB = 0x00;          /* b00000000 */
    TRISC = 0x80;          /* b10000000 */

    PCFG1 = 1;
    PCFG2 = 1;
    PCFG3 = 0;
}

timng0{
    __delay_ms(JIKAN);
}

stop_x0{          /* stop x */

```



```

RB7=RB5=0;RB6=RB4=1;      /*0101*/
timng0;
RB7=RB4=0;RB6=RB5=1;      /*0110*/
timng0;
RB7=RB5=1;RB6=RB4=0;      /*1010*/
timng0;
RB7=RB4=1;RB6=RB5=0;      /*1001*/
}

```

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uclw_y0{                    /*y 逆転*/

```

```

timng0;
RB7=RB5=0;RB6=RB4=1;      /*0101*/
timng0;
RB7=RB4=1;RB6=RB5=0;      /*1001*/
timng0;
RB7=RB5=1;RB6=RB4=0;      /*1010*/
timng0;
RB7=RB4=0;RB6=RB5=1;      /*0110*/
}

```

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clw_z0{                      /* z 正転 */

```

```

timng0;
RC0=RC2=1;RC1=RC3=0;      /*1010*/
timng0;
RC0=RC3=0;RC1=RC2=1;      /*0110*/
timng0;
RC0=RC2=0;RC1=RC3=1;      /*0101*/
timng0;
RC0=RC3=1;RC1=RC2=0;      /*1001*/
}

```

```

uclw_z0{                     /* z 逆転*/

```

```

timng0;
RC0=RC2=1;RC1=RC3=0;      /*1010*/
timng0;

```

```

        RC0=RC3=1;RC1=RC2=0;          /*1001*/
        timng0;
        RC0=RC2=0;RC1=RC3=1;          /*0101*/
        timng0;
        RC0=RC3=0;RC1=RC2=1;          /*0110*/

}

run_px0{
    for(k=sx;k>0;k--){
        for(u=n;u>0;u--) uclw_x0;
        stop_x0;
    }
}

run_mx0{
    for(k=sx;k<0;k++){
        for(u=n;u>0;u--) clw_x0;
        stop_x0;
    }
}

run_py0{
    for(k=sy;k>0;k--){
        for(u=n;u>0;u--) clw_y0;
        stop_y0;
    }
}

run_my0{
    for(k=sy;k<0;k++){
        for(u=n;u>0;u--) uclw_y0;
        stop_x0;
    }
}

run_pz0{
    for(k=sz;k>0;k--){                /*+z */

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```

        for(u=n;u>0;u--) clw_z0;
        stop_z0;
    }
}

run_mz0{
    for(k=sz;k<0;k++){          /*-z */
        for(u=n;u>0;u--) uclw_z0;
        stop_z0;
    }
}

run_pxpy0{
    for(k=sx;k>0;k--){          /*-x 逆転+y 正転*/
        for(u=n;u>0;u--) uclw_x0;
        stop_x0;
        for(v=m;v>0;v--) clw_y0;
        stop_y0;
    }
}

run_mxpy0{
    for(k=sx;k<0;k++){          /*x+y 正転*/
        for(u=n;u>0;u--) clw_x0;
        stop_x0;
        for(v=m;v>0;v--) clw_y0;
        stop_y0;
    }
}

run_pxmy0{
    for(k=sx;k>0;k--){          /*+x-y */
        for(u=n;u>0;u--) uclw_x0;
        stop_x0;
        for(v=m;v>0;v--) uclw_y0;
        stop_y0;
    }
}

```

```

run_mxmy(){
    for(k=sx;k<0;k++){          /*-x 逆転-y */
        for(u=n;u>0;u--) clw_x();
        stop_x();
        for(v=m;v>0;v--) uclw_y();
        stop_y();
    }
}

```

```

limit_chk(){
    while(!RA2){
        RC4^=1;
        __delay_ms(JIKAN);
        stop_x();
        stop_y();
        stop_z();
    }
}

```

```

dw_line()
{
    b=50/n;
    sx=xe*b;
    sy=ye*b;
    sz=ze*b;

    if(ze == 0){
        stop_z();
    }
    if(ze > 0){
        run_pz();
        RC5=0;
    }
    if(ze < 0){
        RC5=1;
        run_mz();
    }
    if(ye == 0){

```



```

        if(xe>0)run_px0;
        else if(xe<0)run_mx0;
        else stop_x0;
    }
    if(xe == 0){
        if(ye>0)run_py0;
        else if(ye<0)run_my0;
        else stop_y0;
    }
    if(xe>0){
        if (ye>0){
            m=n*ye/x;
            run_pxpy0;
        }

        else if(ye<0){
            m=-n*ye/x;
            run_pxmy0;
        }
    }
    if(xe<0){
        if(ye>0){
            m=-n*ye/x;
            run_mxpy0;
        }
        else if (ye<0){
            m=n*ye/x;
            run_mxmy0;
        }
    }
}

act_st0
{
    while(1){ /*開始*/
        if(RA1 == 0){
            usart_RT0; /*データ受信*/
            break;

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        }
        else if(RA5 == 0)break;
    }
}
```

genten0

```
{
    while(1){
        clw_z0;
        if(RA3 == 0)break;
    }
    stop_z0;
    __delay_ms(rest);

    while(1){
        uclw_x0;
        if(RA5 == 0) break;
    }
    stop_x0;
    __delay_ms(rest);

    while(1){
        uclw_y0;
        if(RA4 == 0) break;
    }
    stop_y0;
    __delay_ms(rest);

    while(1){
        clw_z0;
        if(RA3 == 0)break;
    }
    stop_z0;
    __delay_ms(rest);
    while(1){
        clw_x0;
        if(RA5 == 0) break;
    }
}
```

```
stop_x0;
__delay_ms(rest);
while(1){
    clw_y0;
    if(RA4 == 0) break;
}
stop_y0;
__delay_ms(rest);
while(1){
    uclw_z0;
    if(RA3 == 0)break;
}
stop_z0;
__delay_ms(rest);
}
```