Source code file of Stepper Motor controller

```
;*******************************************************
;
;               Stepper Motor controller
;
;                                 Author : Seiichi Inoue
;*******************************************************

        list            p=pic16f84a
        include         p16f84a.inc
        __config _hs_osc & _wdt_off & _pwrte_on & _cp_off

;****************  Label Definition  ********************
        cblock  h'0c'
mode                            ;Operation mode
                                ;0=stop 1=right 2=left
count1                          ;Wait counter
count2                          ;Wait counter(for 1msec)
        endc

rb0     equ     0               ;RB0 of PORTB
rb1     equ     1               ;RB1 of PORTB
rb2     equ     2               ;RB2 of PORTB
rb5     equ     5               ;RB5 of PORTB
rb7     equ     7               ;RB7 of PORTB

;****************  Program Start  ***********************
        org     0               ;Reset Vector
        goto    init
        org     4               ;Interrupt Vector
        clrf    intcon          ;Clear Interruption reg

;****************  Initial Process  *********************
init
        bsf     status,rp0      ;Change to Bank1
        clrf    trisa           ;Set PORTA all OUT
        movlw   b'00100111'     ;RB0,1,2.5=IN RB7=OUT
        movwf   trisb           ;Set PORTB
        movlw   b'10000000'     ;RBPU=1 Pull up not use
        movwf   option_reg      ;Set OPTION_REG
        bcf     status,rp0      ;Change to Bank0
        clrf    mode            ;Set mode = stop
        clrf    count1          ;Clear counter
        clrf    count2          ;Clear counter
        movlw   b'00000101'     ;Set PORTA initial value
        movwf   porta           ;Write PORTA
        bsf     portb,rb7       ;Set RB7 = 1
        btfsc   portb,rb5       ;RB5 = 0 ?
        goto    $-1             ;No. Wait

start
;*************  Check switch condition  *****************
        btfsc   portb,rb1       ;RB1(stop key) = ON ?
        goto    check1          ;No. Next
        clrf    mode            ;Yes. Set stop mode
        goto    drive           ;No. Jump to motor drive
check1
        btfsc   portb,rb2       ;RB2(right key) = ON ?
        goto    check2          ;No. Next
        movlw   d'1'            ;Yes. Set right mode
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060         movwf   mode            ;Save mode
061         goto    drive           ;No. Jump to motor drive
062 check2
063         btfsc   portb,rb0       ;RB0(left key) = ON ?
064         goto    drive           ;No. Jump to motor drive
065         movlw   d'2'            ;Yes. Set left mode
066         movwf   mode            ;Save mode
067
068 ;********************  Motor drive  *********************
069 drive
070         movf    mode,w          ;Read mode
071         bz      start           ;mode = stop
072         bsf     portb,rb7       ;Set RB7 = 1
073         btfsc   portb,rb5       ;RB5 = 0 ?
074         goto    $-1             ;No. Wait
075         movlw   d'5'            ;Set loop count(5msec)
076         movwf   count1          ;Save loop count
077 loop    call    timer           ;Wait 1msec
078         decfsz  count1,f        ;count - 1 = 0 ?
079         goto    loop            ;No. Continue
080         bcf     portb,rb7       ;Set RB7 = 0
081         btfss   portb,rb5       ;RB5 = 1 ?
082         goto    $-1             ;No. Wait
083         movf    porta,w         ;Read PORTA
084         sublw   b'000000101'    ;Check motor position
085         bnz     drive2          ;Unmatch
086         movf    mode,w          ;Read mode
087         sublw   d'1'            ;Right ?
088         bz      drive1          ;Yes. Right
089         movlw   b'00001001'     ;No. Set Left data
090         goto    drive_end       ;Jump to PORTA write
091 drive1
092         movlw   b'00000110'     ;Set Right data
093         goto    drive_end       ;Jump to PORTA write
094 ;-------
095 drive2
096         movf    porta,w         ;Read PORTA
097         sublw   b'000000110'    ;Check motor position
098         bnz     drive4          ;Unmatch
099         movf    mode,w          ;Read mode
100         sublw   d'1'            ;Right ?
101         bz      drive3          ;Yes. Right
102         movlw   b'00000101'     ;No. Set Left data
103         goto    drive_end       ;Jump to PORTA write
104 drive3
105         movlw   b'00001010'     ;Set Right data
106         goto    drive_end       ;Jump to PORTA write
107 ;-------
108 drive4
109         movf    porta,w         ;Read PORTA
110         sublw   b'000001010'    ;Check motor position
111         bnz     drive6          ;Unmatch
112         movf    mode,w          ;Read mode
113         sublw   d'1'            ;Right ?
114         bz      drive5          ;Yes. Right
115         movlw   b'00000110'     ;No. Set Left data
116         goto    drive_end       ;Jump to PORTA write
117 drive5
118         movlw   b'00001001'     ;Set Right data
119         goto    drive_end       ;Jump to PORTA write
120 ;-------
121 drive6
122         movf    porta,w         ;Read PORTA
123         sublw   b'000001001'    ;Check motor position
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        bnz     drive8          ;Unmatch
        movf    mode,w          ;Read mode
        sublw   d'1'            ;Right ?
        bz      drive7          ;Yes. Right
        movlw   b'00001010'     ;No. Set Left data
        goto    drive_end       ;Jump to PORTA write
drive7
        movlw   b'00000101'     ;Set Right data
        goto    drive_end       ;Jump to PORTA write
;-------
drive8
        movlw   b'00000101'     ;Compulsion setting

drive_end
        movwf   porta           ;Write PORTA
        goto    start           ;Jump to start

;*************  1msec Timer Subroutine  *****************
timer
        movlw   d'200'          ;Set loop count
        movwf   count2          ;Save loop count
tmlp    nop                     ;Time adjust
        nop                     ;Time adjust
        decfsz  count2,f        ;count - 1 = 0 ?
        goto    tmlp            ;No. Continue
        return                  ;Yes. Count end

;*******************************************************
;             END of Stepper Motor controller
;*******************************************************

        end
```

Listing file of Stepper Motor controller

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MPASM 02.50.02 Intermediate      STEP.ASM   3-9-2001  23:52:45         PAGE  1


LOC  OBJECT CODE     LINE SOURCE TEXT
  VALUE

                     00001 ;*****************************************************
                     00002 ;
                     00003 ;               Stepper Motor controller
                     00004 ;
                     00005 ;                                 Author : Seiichi In
                     00006 ;*****************************************************
                     00007
                     00008         LIST            P=PIC16F84A
                     00009         INCLUDE         P16F84A.INC
                     00001         LIST
                     00002 ; P16F84A.INC  Standard Header File, Version 2.00'(mc
                     00134         LIST
2007   3FF2          00010         __CONFIG _HS_OSC & _WDT_OFF & _PWRTE_ON & _CP
                     00011
                     00012 ;***************  Label Definition  ***************
                     00013         CBLOCK  H'0c'
  0000000C           00014 MODE                            ;Operation mode
                     00015                                 ;0=stop 1=right 2=lef
  0000000D           00016 COUNT1                          ;Wait counter
```

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  0000000E            00017 COUNT2                          ;Wait counter(for 1ms
                      00018         ENDC
                      00019
  00000000            00020 RB0     EQU     0               ;RB0 of PORTB
  00000001            00021 RB1     EQU     1               ;RB1 of PORTB
  00000002            00022 RB2     EQU     2               ;RB2 of PORTB
  00000005            00023 RB5     EQU     5               ;RB5 of PORTB
  00000007            00024 RB7     EQU     7               ;RB7 of PORTB
                      00025
                      00026 ;****************  Program Start  *******************
0000                  00027         ORG     0               ;Reset Vector
0000   2805           00028         GOTO    INIT
0004                  00029         ORG     4               ;Interrupt Vector
0004   018B           00030         CLRF    INTCON          ;Clear Interruption r
                      00031
                      00032 ;****************  Initial Process  *****************
0005                  00033 INIT
0005   1683           00034         BSF     STATUS,RP0      ;Change to Bank1
0006   0185           00035         CLRF    TRISA           ;Set PORTA all OUT
0007   3027           00036         MOVLW   B'00100111'     ;RB0,1,2.5=IN RB7=OUT
0008   0086           00037         MOVWF   TRISB           ;Set PORTB
0009   3080           00038         MOVLW   B'10000000'     ;RBPU=1 Pull up not u
000A   0081           00039         MOVWF   OPTION_REG      ;Set OPTION_REG
000B   1283           00040         BCF     STATUS,RP0      ;Change to Bank0
000C   018C           00041         CLRF    MODE            ;Set mode = stop
000D   018D           00042         CLRF    COUNT1          ;Clear counter
000E   018E           00043         CLRF    COUNT2          ;Clear counter
000F   3005           00044         MOVLW   B'00000101'     ;Set PORTA initial va
0010   0085           00045         MOVWF   PORTA           ;Write PORTA
0011   1786           00046         BSF     PORTB,RB7       ;Set RB7 = 1
0012   1A86           00047         BTFSC   PORTB,RB5       ;RB5 = 0 ?
0013   2812           00048         GOTO    $-1             ;No. Wait
                      00049
0014                  00050 START
```



```
LOC  OBJECT CODE     LINE SOURCE TEXT
  VALUE

                      00051 ;*************  Check switch condition  *************
0014   1886           00052         BTFSC   PORTB,RB1       ;RB1(stop key) = ON ?
0015   2818           00053         GOTO    CHECK1          ;No. Next
0016   018C           00054         CLRF    MODE            ;Yes. Set stop mode
0017   2821           00055         GOTO    DRIVE           ;No. Jump to motor dr
0018                  00056 CHECK1
0018   1906           00057         BTFSC   PORTB,RB2       ;RB2(right key) = ON
0019   281D           00058         GOTO    CHECK2          ;No. Next
001A   3001           00059         MOVLW   D'1'            ;Yes. Set right mode
001B   008C           00060         MOVWF   MODE            ;Save mode
001C   2821           00061         GOTO    DRIVE           ;No. Jump to motor dr
001D                  00062 CHECK2
001D   1806           00063         BTFSC   PORTB,RB0       ;RB0(left key) = ON ?
001E   2821           00064         GOTO    DRIVE           ;No. Jump to motor dr
001F   3002           00065         MOVLW   D'2'            ;Yes. Set left mode
0020   008C           00066         MOVWF   MODE            ;Save mode
                      00067
                      00068 ;*******************  Motor drive  *****************
0021                  00069 DRIVE
0021   080C           00070         MOVF    MODE,W          ;Read mode
0022   1903 2814      00071         BZ      START           ;mode = stop
0024   1786           00072         BSF     PORTB,RB7       ;Set RB7 = 1
0025   1A86           00073         BTFSC   PORTB,RB5       ;RB5 = 0 ?
0026   2825           00074         GOTO    $-1             ;No. Wait
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0027   3005           00075         MOVLW   D'5'            ;Set loop count(5msec
0028   008D           00076         MOVWF   COUNT1          ;Save loop count
0029   2062           00077 LOOP    CALL    TIMER           ;Wait 1msec
002A   0B8D           00078         DECFSZ  COUNT1,F        ;count - 1 = 0 ?
002B   2829           00079         GOTO    LOOP            ;No. Continue
002C   1386           00080         BCF     PORTB,RB7       ;Set RB7 = 0
002D   1E86           00081         BTFSS   PORTB,RB5       ;RB5 = 1 ?
002E   282D           00082         GOTO    $-1             ;No. Wait
002F   0805           00083         MOVF    PORTA,W         ;Read PORTA
0030   3C05           00084         SUBLW   B'000000101'    ;Check motor position
0031   1D03 283B      00085         BNZ     DRIVE2          ;Unmatch
0033   080C           00086         MOVF    MODE,W          ;Read mode
0034   3C01           00087         SUBLW   D'1'            ;Right ?
0035   1903 2839      00088         BZ      DRIVE1          ;Yes. Right
0037   3009           00089         MOVLW   B'00001001'     ;No. Set Left data
0038   2860           00090         GOTO    DRIVE_END       ;Jump to PORTA write
0039                  00091 DRIVE1
0039   3006           00092         MOVLW   B'00000110'     ;Set Right data
003A   2860           00093         GOTO    DRIVE_END       ;Jump to PORTA write
                      00094 ;-------
003B                  00095 DRIVE2
003B   0805           00096         MOVF    PORTA,W         ;Read PORTA
003C   3C06           00097         SUBLW   B'000000110'    ;Check motor position
003D   1D03 2847      00098         BNZ     DRIVE4          ;Unmatch
003F   080C           00099         MOVF    MODE,W          ;Read mode
0040   3C01           00100         SUBLW   D'1'            ;Right ?
0041   1903 2845      00101         BZ      DRIVE3          ;Yes. Right
0043   3005           00102         MOVLW   B'00000101'     ;No. Set Left data
0044   2860           00103         GOTO    DRIVE_END       ;Jump to PORTA write
```



```
LOC  OBJECT CODE     LINE SOURCE TEXT
  VALUE

0045                  00104 DRIVE3
0045   300A           00105         MOVLW   B'00001010'     ;Set Right data
0046   2860           00106         GOTO    DRIVE_END       ;Jump to PORTA write
                      00107 ;-------
0047                  00108 DRIVE4
0047   0805           00109         MOVF    PORTA,W         ;Read PORTA
0048   3C0A           00110         SUBLW   B'000001010'    ;Check motor position
0049   1D03 2853      00111         BNZ     DRIVE6          ;Unmatch
004B   080C           00112         MOVF    MODE,W          ;Read mode
004C   3C01           00113         SUBLW   D'1'            ;Right ?
004D   1903 2851      00114         BZ      DRIVE5          ;Yes. Right
004F   3006           00115         MOVLW   B'00000110'     ;No. Set Left data
0050   2860           00116         GOTO    DRIVE_END       ;Jump to PORTA write
0051                  00117 DRIVE5
0051   3009           00118         MOVLW   B'00001001'     ;Set Right data
0052   2860           00119         GOTO    DRIVE_END       ;Jump to PORTA write
                      00120 ;-------
0053                  00121 DRIVE6
0053   0805           00122         MOVF    PORTA,W         ;Read PORTA
0054   3C09           00123         SUBLW   B'000001001'    ;Check motor position
0055   1D03 285F      00124         BNZ     DRIVE8          ;Unmatch
0057   080C           00125         MOVF    MODE,W          ;Read mode
0058   3C01           00126         SUBLW   D'1'            ;Right ?
0059   1903 285D      00127         BZ      DRIVE7          ;Yes. Right
005B   300A           00128         MOVLW   B'00001010'     ;No. Set Left data
005C   2860           00129         GOTO    DRIVE_END       ;Jump to PORTA write
005D                  00130 DRIVE7
005D   3005           00131         MOVLW   B'00000101'     ;Set Right data
005E   2860           00132         GOTO    DRIVE_END       ;Jump to PORTA write
```

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                    00133 ;-------
005F                00134 DRIVE8
005F   3005         00135         MOVLW   B'00000101'     ;Compulsion setting
                    00136
0060                00137 DRIVE_END
0060   0085         00138         MOVWF   PORTA           ;Write PORTA
0061   2814         00139         GOTO    START           ;Jump to start
                    00140
                    00141 ;*************  1msec Timer Subroutine  *************
0062                00142 TIMER
0062   30C8         00143         MOVLW   D'200'          ;Set loop count
0063   008E         00144         MOVWF   COUNT2          ;Save loop count
0064   0000         00145 TMLP    NOP                     ;Time adjust
0065   0000         00146         NOP                     ;Time adjust
0066   0B8E         00147         DECFSZ  COUNT2,F        ;count - 1 = 0 ?
0067   2864         00148         GOTO    TMLP            ;No. Continue
0068   0008         00149         RETURN                  ;Yes. Count end
                    00150
                    00151 ;***************************************************
                    00152 ;             END of Stepper Motor controller
                    00153 ;***************************************************
                    00154
                    00155         END
MPASM 02.50.02 Intermediate      STEP.ASM   3-9-2001  23:52:45         PAGE  4

Label list has been deleted.


MEMORY USAGE MAP ('X' = Used,  '-' = Unused)

0000 : X---XXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX
0040 : XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXX------- ----------------
2000 : -------X-------- ---------------- ---------------- ----------------

All other memory blocks unused.

Program Memory Words Used:   102
Program Memory Words Free:   922


Errors   :     0
Warnings :     0 reported,     0 suppressed
Messages :     0 reported,     0 suppressed
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step_source.zip
step_hex.zip