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;
;           Leilani Electronics
;   program written & tested by William E. Nickles
;           PM09704 OLED test circuit
;           "Bonnies office open/closed"
;           rev.3 9/6/2014
;

list      p=16f723
__config  2007h,  h'38f4'
__config  2008h,  h'3fff'
radix     hex
status    equ     0x03
porta     equ     0x05
portb     equ     0x06
portc     equ     0x07
intcon    equ     0x0b
option_reg equ     0x81
trisa     equ     0x85
trisb     equ     0x86
trisc     equ     0x87
oscccon   equ     0x90
wpub      equ     0x95
ansela    equ     0x185
anselb    equ     0x186
count0    equ     0x21
count1    equ     0x22
count2    equ     0x23
color     equ     0x24
;
c          equ     0           ; status bits
z          equ     2
rp0        equ     5
rp1        equ     6
;   porta
wr#        equ     1           ; write data
dc         equ     2           ; data/command
aux        equ     3           ; auxillary input
vdd        equ     5           ; power supply +3.3v
swl        equ     6           ; message input
;
;   portb
;off       equ     0           ; power off oled
rst        equ     4           ; oled reset
cs         equ     5           ; oled enable/disable
;
;   portc
;   rc0-rc1=do-d7, parallel data  input
;
org        0x00
goto      start
;
org        0x04
goto      turn_off
;
start      bcf      status,c    ; clear status register
          nop
          bcf      status,z
          nop
          bcf      status,rp0
          nop
          bcf      status,rp1   ; stay in bank0
          bsf      intcon,4     ; configure int's
          nop
          bcf      intcon,1
          nop
          bsf      intcon,7
          clrf     porta       ; clear ports
          clrf     portb
          clrf     portc
          clrf     color
          bsf      status,rp0   ; goto bank1

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movlw 0xd9      ; configure i/o ports
movwf trisa
movlw 0x01
movwf trisb
movlw 0x00
movwf trisc
movlw 0x88
movwf option_reg
clrf wpub
movlw 0x1c
movwf osccon
bsf status,rp0
nop
bsf status,rp1 ; goto bank3
clrf ansela    ; all digital i/o's
clrf anselb
bcf status,rp0 ; goto bank0
nop
bcf status,rp1

;
bcf porta,vdd  ; turn off oled power
nop
bsf portb,cs   ; disable oled module
nop
bsf portb,rst  ; reset line idles high
nop
bsf porta,wr#  ; write line idles high
nop
bcf porta,dc   ; commands
call wait     ; brief wait...
bsf porta,vdd  ; turn on oled power
call wait     ; wait for power to stablize...
bcf portb,cs   ; enable oled module
nop
nop
nop
nop
nop
bcf portb,rst  ; reset oled module
nop
nop
nop
nop
nop
bsf portb,rst
nop
nop
nop
nop
nop
nop
;
; option oled module
;
movlw 0xae     ; turn off oled panel
call write
call wait
movlw 0xad     ; enable int dc/dc converter
call write
movlw 0x8b
call write
call wait     ; brief wait...
movlw 0xa4     ; normal display
call write
movlw 0x26     ; horizontal scroll setup
call write
movlw 0x02
call write
movlw 0xb5
call write
movlw 0x00
call write

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movlw 0xb6
call write
movlw 0x40      ; set display start line
call write
movlw 0x81      ; set constrast
call write
movlw 0xf0
call write
;

movlw 0x82      ; set brightness
call write
movlw 0xf0
call write
;

movlw 0xa1      ; set segment re-map
call write
movlw 0xa6      ; set normal display
call write
movlw 0xa8      ; set mux ratio
call write
movlw 0x3f
call write
movlw 0xc0      ; set com output scan
call write
movlw 0xd3      ; set display offset
call write
movlw 0x00
call write
movlw 0xd5      ; set display clock
call write
movlw 0xf1
call write
movlw 0xd9      ; set pre-charge period
call write
movlw 0x33
call write
movlw 0xdb      ; set vcom deselect
call write
movlw 0x35
call write
;

movlw 0xb0      ; set page0 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear      ; clear page0
movlw 0xb1      ; set page1 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear      ; clear page1
movlw 0xb2      ; set page2 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear      ; clear page2
movlw 0xb3      ; set page3 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear      ; clear page3
movlw 0xb4      ; set page4 address
call write

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```

movlw 0x00
call write
movlw 0x10
call write
call clear ; clear page4
movlw 0xb5 ; set page5 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear ; clear page5
movlw 0xb6 ; set page6 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear ; clear page6
movlw 0xb7 ; set page7 address
call write
movlw 0x00
call write
movlw 0x10
call write
call clear ; clear page7
;

movlw 0xb0 ; start display on page0
call write
movlw 0x00
call write
movlw 0x12
call write
;

movlw 0xaf ; turn on display
call write
call wait ; brief wait...
;

bsf porta,dc ; oled data
call let_b ; 'B'
call wait
call spaced
call let_o ; 'O'
call wait
call spaced
call let_n ; 'N'
call wait
call spaced
call let_n ; 'N'
call wait
call spaced
call let_i ; 'I'
call wait
call spaced
call let_e ; 'E'
call wait
call spaced
call let_ap ; ''
call wait
call spaced
call let_s ; 'S'
call wait
;

bcf porta,dc ; commands
movlw 0xb2 ; goto page2
call write
movlw 0x07
call write
movlw 0x12
call write
bsf porta,dc ; oled data

```

```

call    let_o      ; 'O'
call    wait
call    spaced
call    let_f      ; 'F'
call    wait
call    spaced
call    let_f      ; 'F'
call    wait
call    spaced
call    let_i      ; 'I'
call    wait
call    spaced
call    let_c      ; 'C'
call    wait
call    spaced
call    let_e      ; 'E'
call    wait
;
    bcf     porta,dc    ; commands
    movlw   0xb5
    call    write
    movlw   0x00
    call    write
    movlw   0x10
    call    write
    call    clear      ; clear page5
    movlw   0xb6
    call    write
    movlw   0x00
    call    write
    movlw   0x10
    call    write
    call    clear      ; clear page6
;
bonnie    btfss    porta,sw1
          goto     bonnie1
          call     open
          call     wait1
          call     scroll
check_o    btfsc    porta,sw1
          goto     check_o
          call     stop
          goto     bonnie
bonnie1    call     closed
          call     wait1
          call     scroll
check_c    btfss    porta,sw1
          goto     check_c
          call     stop
          goto     bonnie
;
spaced    movlw   0x00      ; " "   space
          call    write
          return
clear     bsf     porta,dc    ; clear entire page
          movlw   0x83
          movwf   count2
clear0    call    spaced
          decfsz  count2,f
          goto    clear0
          bcf     porta,dc
          return
write     movwf   portc      ; write data/command
          nop
          nop
          nop
          nop
          nop
          bcf     porta,wr#
          nop
          nop

```

```

    nop
    nop
    nop
    bsf     porta,wr#
    nop
    nop
    nop
    return
;   0.20 seconds
wait    movlw 0xff
        movwf count0
again   movlw 0xff
        movwf count1
loop    decfsz count1,f
        goto  loop
        decfsz count0,f
        goto  again
        return
;   1 second
wait1   call  wait
        call  wait
        call  wait
        call  wait
        call  wait
        return
scroll  bcf     porta,dc    ; start scrolling...
        movlw 0x2f
        call  write
        bsf     porta,dc
        return
stop    bcf     porta,dc    ; stop scrolling...
        movlw 0x2e
        call  write
        bsf     porta,dc
        return
;
;   characters
let_b   movlw 0xff          ; 'B'
        call  write
        movlw 0x89
        call  write
        movlw 0x89
        call  write
        movlw 0x89
        call  write
        movlw 0x89
        call  write
        movlw 0x89
        call  write
        movlw 0x89
        call  write
        movlw 0xdf
        call  write
        movlw 0x76
        call  write
        return
let_o   movlw 0x7e          ; 'O'
        call  write
        movlw 0xc3
        call  write
        movlw 0x81
        call  write
        movlw 0x81
        call  write
        movlw 0x81
        call  write
        movlw 0x81
        call  write
        movlw 0x81
        call  write
        movlw 0x81
        call  write
        movlw 0xc3
        call  write
        movlw 0x7e

```

```

    call    write
    return
let_n    movlw  0xff      ; 'N'
    call    write
    movlw  0x02
    call    write
    movlw  0x06
    call    write
    movlw  0x0c
    call    write
    movlw  0x18
    call    write
    movlw  0x30
    call    write
    movlw  0x60
    call    write
    movlw  0xff
    call    write
    return
let_i    movlw  0x81      ; 'I'
    call    write
    movlw  0x81
    call    write
    movlw  0x81
    call    write
    movlw  0xff
    call    write
    movlw  0x81
    call    write
    movlw  0x81
    call    write
    movlw  0x81
    call    write
    movlw  0x81
    call    write
    return
let_e    movlw  0xff      ; 'E'
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x81
    call    write
    movlw  0x81
    call    write
    return
let_s    movlw  0x46      ; 'S'
    call    write
    movlw  0xcf
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0x89
    call    write
    movlw  0xdb
    call    write
    movlw  0x72
    call    write
    return
let_f    movlw  0xff      ; 'F'
    call    write
    movlw  0x09
    call    write
    movlw  0x09

```

```

call    write
movlw   0x09
call    write
movlw   0x09
call    write
movlw   0x01
call    write
movlw   0x01
call    write
return
let_c    movlw   0x7e          ; 'C'
call    write
movlw   0xc3
call    write
movlw   0x81
call    write
movlw   0x81
call    write
movlw   0x81
call    write
movlw   0x81
call    write
movlw   0xc3
call    write
movlw   0x42
call    write
return
let_ap    movlw   0x01          ; '
call    write
movlw   0x03
call    write
movlw   0x02
call    write
return
;
;   "open" page5
;
open      bcf     porta,dc
movlw    0xb5
call     write
movlw    0x00
call     write
movlw    0x10
call     write
call     clear
movlw    0x0e
call     write
movlw    0x11
call     write
bsf      porta,dc
movlw    0xff          ; o
call     write
movlw    0xff
call     write
movlw    0x0f
call     write
movlw    0x07
call     write
movlw    0xe3
call     write
movlw    0xf3
call     write
movlw    0xf3
call     write
movlw    0xf3
call     write
movlw    0xf3
call     write
movlw    0xf3

```



```

call    write
movlw   0xf3
call    write
movlw   0xe3
call    write
movlw   0x07
call    write
movlw   0x0f
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0x03      ; p
call    write
movlw   0x03
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0x63
call    write
movlw   0x07
call    write
movlw   0x0f
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0x03      ; e
call    write
movlw   0x03
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0x03      ; n
call    write
movlw   0x03
call    write
movlw   0xc7
call    write

```

```

movlw 0x8f
call write
movlw 0x1f
call write
movlw 0x3f
call write
movlw 0x7f
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0x03      ; ""
call write
movlw 0x03
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xc3
call write
movlw 0x03
call write
movlw 0x03
call write
movlw 0xc3
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xc3
call write
movlw 0x03
call write
movlw 0x03
call write
movlw 0xc3
call write
movlw 0xff
call write
movlw 0xff
call write
; "open" page6
bcf porta,dc
movlw 0xb6
call write
movlw 0x00
call write
movlw 0x10
call write
call clear
movlw 0x0e
call write
movlw 0x11
call write
bsf porta,dc
movlw 0xff      ; o
call write
movlw 0xff
call write
movlw 0xf0
call write
movlw 0xe0
call write
movlw 0xc7
call write
movlw 0xcf

```



```

movlw 0xff
call write
movlw 0xc0          ; n
call write
movlw 0xc0
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xfe
call write
movlw 0xfc
call write
movlw 0xf8
call write
movlw 0xf1
call write
movlw 0xe3
call write
movlw 0xc0
call write
movlw 0xc0
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xcf          ; ""
call write
movlw 0x84
call write
movlw 0x84
call write
movlw 0xcf
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xcf
call write
movlw 0x84
call write
movlw 0x84
call write
movlw 0xcf
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xff
call write
return
;
; "closed" page5
;
closed    bcf      porta,dc
movlw 0xb5
call write
movlw 0x00
call write
movlw 0x10
call write
call clear
movlw 0x01
call write
movlw 0x11
call write
bsf      porta,dc

```



```

call    write
movlw   0xf3
call    write
movlw   0xe3
call    write
movlw   0x07
call    write
movlw   0x0f
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0x8f      ; s
call    write
movlw   0x07
call    write
movlw   0x23
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0xe3
call    write
movlw   0xe7
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0x03      ; e
call    write
movlw   0x03
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0x73
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xf3
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0x03      ; d
call    write
movlw   0x03
call    write
movlw   0xf3
call    write

```

```

movlw 0xf3
call write
movlw 0xf3
call write
movlw 0xf3
call write
movlw 0xf3
call write
movlw 0xf3
call write
movlw 0xf3
call write
movlw 0xe3
call write
movlw 0x07
call write
movlw 0x0f
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xc3      ; !!
call write
movlw 0x03
call write
movlw 0x03
call write
movlw 0xc3
call write
movlw 0xff
call write
movlw 0xff
call write
movlw 0xc3
call write
movlw 0x03
call write
movlw 0x03
call write
movlw 0xc3
call write
movlw 0xff
call write
movlw 0xff
call write
;
; "closed" page6
;
    bcf     porta,dc
    movlw 0xb6
    call write
    movlw 0x00
    call write
    movlw 0x10
    call write
    call clear
    movlw 0x01
    call write
    movlw 0x11
    call write
    bsf     porta,dc
    movlw 0xff      ; c
    call write
    movlw 0xff
    call write
    movlw 0xf0
    call write
    movlw 0xe0
    call write
    movlw 0xc7

```

```

call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xc7
call    write
movlw   0xe7
call    write
movlw   0xf7
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0xc0           ; 1
call    write
movlw   0xc0
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0xf0           ; 0
call    write
movlw   0xe0
call    write
movlw   0xc7
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xcf
call    write
movlw   0xc7
call    write
movlw   0xe0
call    write
movlw   0xf0
call    write

```



```

call    write
movlw   0xcf
call    write
movlw   0xc7
call    write
movlw   0xe0
call    write
movlw   0xf0
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0xcf           ; ""
call    write
movlw   0x84
call    write
movlw   0x84
call    write
movlw   0xcf
call    write
movlw   0xff
call    write
movlw   0xff
call    write
movlw   0xcf
call    write
movlw   0x84
call    write
movlw   0x84
call    write
movlw   0xcf
call    write
movlw   0xff
call    write
movlw   0xff
call    write
return

;
;  power down oled module
;
turn_off    bcf      intcon,7
            nop
            bcf      intcon,1
            bcf      porta,dc
            movlw    0xae
            call     write
            call     wait
            movlw    0xad
            call     write
            movlw    0x8a
            call     write
            call     wait
            bcf      porta,vdd
            call     wait
            bsf      intcon,7
done         nop
            nop
            nop
            goto     done
            retfie
            end

```