

① Write the following program

- When the button connected to RA1 is pressed the number displayed at SS is incremented
- Numbers start from 0 and goes up to 9.
i.e, count sequence is 0, 1, 2, ..., 9, 0, 1, ...

S/n:

List p=16f84A

include "p16f84A.inc"

-config -CP-OFF & -WDT-OFF & -XT-Osc
Counter equ 0x0c; & -PWRTE-ON

clrf PORTB; → clear PORTB

bsf STATUS, RBO, → goto BANK1

clrf TRISB, → PORT B output

movlw 0xFF, → (W) ← 0xFF

movwf TRISA, → PORTA is input

bcf STATUS, RBO, → goto BANK0

clrf PORTB; → clear PORTB,

movlw 0xFF, ← (W) ← 0xFF
movwf Counter, (~~Counter~~) ← (W)

test-RA1 btfsc PORTA, RA1, btfsc PORTA, 1

goto test-RA1, check RA1

call delay-02-sec → call delay

incf Counter, F; ← increment Counter

movf Counter, W;

sublw 0x0A;

btfss STATUS, Z;

goto display-at-SS,

movlw 0x00, orclw

movwf Counter,

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```
goto display-at-SS;  
goto test-RA1;
```

display-at-SS

```
movf Counter, W;  
andlw 0x0F;  
call look-up-Table;  
movwf PORTB,  
goto test-RA1;
```

look-up-Table

```
addwf PCL, F;  
retlw 0x3F;  
retlw 0x06;  
retlw 0x5B;  
retlw 0x4F;  
retlw 0x66;  
retlw 0x6D;  
retlw 0x7D;  
retlw 0x07;  
retlw 0x7F;  
retlw 0x6F;
```

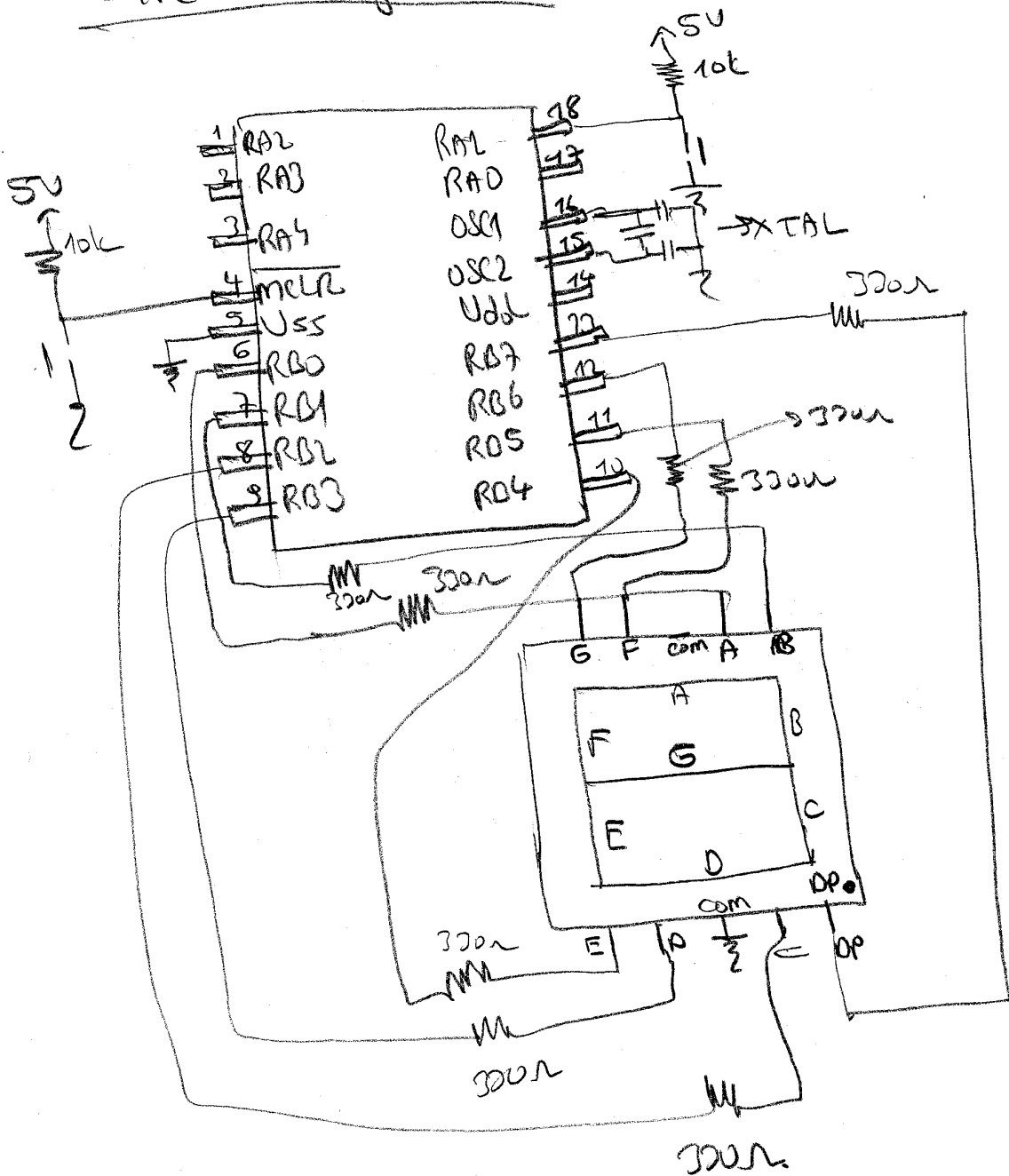
delay-02-sec

```
count1 equ 0x0B;  
count2 equ 0x0E;  
movlw 0xFF,  
movwf count1,  
loop1 movlw 0xFF,  
movwf count2,
```

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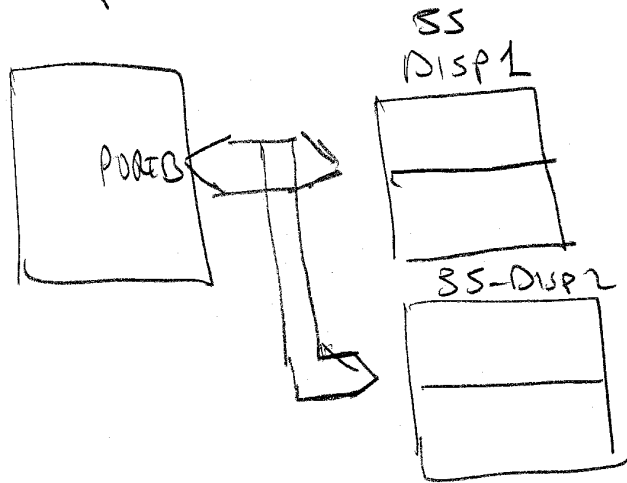
```
loop2 decfsz counter2, F,  
      goto counter2,  
      decfsz counter1, F,  
      goto loop1,  
      return;
```

Circuit Diagrams

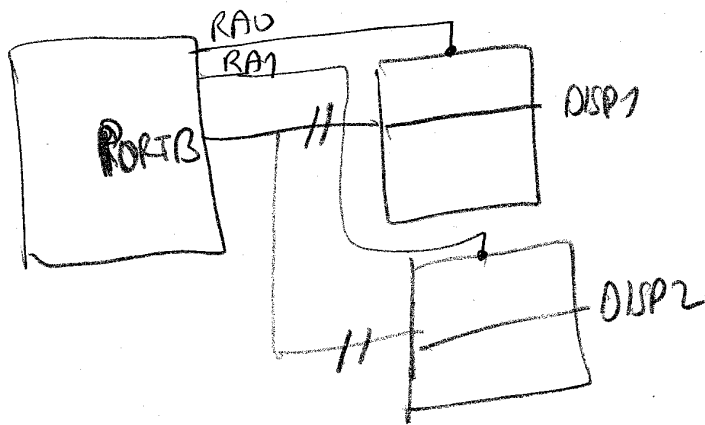


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Two Displays are connected to PORTB in parallel



RA0 is used to activate deactivate DISP1
RA1 " " " " " " " " DISP2



46 → number is to be displayed using two SS

The algorithm for this program should be as follows

loop

activate DISP1

PORTB ← 4

delay 5ms; OR delay 15ms;

deactivate DISP1;

activate DISP2;

PORTB ← 5;

delay 5ms, OR delay 15ms

deactivate DISP2;

goto loop;

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Hence the program can be written as

PORTB \leftrightarrow output

RA0, RA1 \oplus output

loop

movlw 0x01; \rightarrow

movwf PORTA; \rightarrow Display 1 is ON

movlw 0x66; } \rightarrow 4 is displayed

movwf PORTB } at SS DISPLAY

call delay_05msec; wait 0.5msec such that SS can display integer 4

(i.e. phosphor inside SS display is activated)

movlw 0x02; } Display 1 is OFF

movwf PORTA } Display 2 is ON

movlw 0x7D; } 6 is displayed

movwf PORTB } at SS DISPLAY

call delay_05msec;

goto loop;