```
; AFA v 0.7
;Morse Frequency Readout for NorCal 20
;By Don Cantrell, ND6T  8/1/15
; 192 bytes
;Pin 4: Button
;Pin 5,6: RF input
;Pin 7: Audio out
;*****************************************************************************
;
       list        P=12F675            ; list directive to define processor
       #include    P12F675.inc         ; processor specific variable definitions
       errorlevel  -302                ; suppress message 302 from list file
       errorlevel  -305                ; suppress message 305 from list file
;
  __CONFIG _CPD_OFF & _CP_OFF & _BODEN_OFF & _MCLRE_ON & _PWRTE_ON & _WDT_OFF & _XT_OSC

;*****************************************************************************
;Defines
;*****************************************************************************
       #define BANK1          banksel 80h    ;Select Bank1
       #define BANK0          banksel 0h     ;Select Bank0
       #define SPKR           GPIO,GP0       ;Pin 7
       #define GATE           GPIO,GP1       ;Pin 6
;*****************************************************************************
;General Purpose Registers (GPR's)
;*****************************************************************************
       #Define TEMP           20h
       #Define CNT            21h
       #Define HUNDREDS       22h
       #Define TENS           23h
       #Define DUR            24h
       #Define FREQ           25h
       #Define WAIT1          26h
       #Define WAIT2          27h
;*****************************************************************************
              ORG    0               ;Reset vector
;*****************************************************************************
INITIALIZE
              CLRF   TEMP
              CLRF   CNT
              CLRF   DUR
              CLRF   FREQ
              CLRF   WAIT1
              CLRF   WAIT2
              CLRF   GPIO
              CLRF   INTCON          ;Disable interrupts
              MOVLW  b'00000111'
              MOVWF  CMCON           ;Turn off comparator
              BANK1
              MOVLW  b'11100111'     ;External clock,disable WPU
              MOVWF  OPTION_REG      ;Rising edge triggering
              CLRF   VRCON           ;Disable internal volt ref
              CLRF   ANSEL           ;Digital inputs
              BANK0

;*****************************************************************************
MAIN                                 ;Gate a 1 millisecond RF sample and count it.
              CLRF   TMR0            ;Clear counter and prescaler
              MOVLW  .3              ;1 millisecond gate time
              MOVWF  WAIT1
              INCF   WAIT2
              BANK1                  ;Start frequency sample
              MOVLW  b'00000110'     ;Pin 4,5,6 input, others outputs
              MOVWF  TRISIO
              BANK0
              CALL   DELAY
              NOP                    ;Pad it out. 40 usec per NOP for 1 ms. sample time
              BANK1
              MOVLW  b'00000100'     ;End frequency sample. Keep gate for toggle
              MOVWF  TRISIO
              BANK0
              MOVF   TMR0,W          ;To avoid clearing prescaler, move to temp
              MOVWF  TEMP
```

```
TOG                                 ;Read prescaler by incrementing until output changes
               INCF    CNT          ;Compute how far we are from rolling over
               BCF     GATE         ;by counting how many fake input toggles it takes to fill
               BSF     GATE         ;up the remaining space in the prescaler.
               MOVF    TMR0,W
               SUBWF   TEMP,W
               BTFSC   STATUS,Z
               GOTO    TOG
               COMF    CNT          ;Toggle count complete. Determine initial prescaler value.
               MOVLW   .83          ;Correction factor
               SUBWF   CNT,F
               MOVF    CNT,W        ;This is the prescaler count
               MOVWF   TEMP

;*******************************************************************************
Convert                             ;Binary to BCD conversion

               CLRF    HUNDREDS     ;Zero digit registers
               CLRF    TENS
HUNSL
                MOVLW  .100          ;  Is Temp >= 100?
                SUBWF  TEMP,W
                BTFSS  STATUS,C      ;  Is there a Carry?, then "yes"
                GOTO   TENSL
                MOVWF  TEMP          ;  Save the Result
                INCF   HUNDREDS,F    ;  Increment the Number of 100s
                GOTO   HUNSL
TENSL
                MOVLW  .10           ;  Is Temp >= 10?
                SUBWF  TEMP,W
                BTFSS  STATUS,C      ;  Is there a Carry?, then "yes"
                GOTO   READ
                MOVWF  TEMP          ;  Save the Result
                INCF   TENS,F        ;  Increment the Number of 10s
                GOTO   TENSL
;*******************************************************************************
READ
               MOVF    HUNDREDS,F    ;Is it a zero?
               BTFSC   STATUS,Z
               GOTO    SUP           ;Yes, suppress it
               MOVF    HUNDREDS,W    ;Else go ahead and announce 100'S
               CALL    INDEX
SUP            MOVF    TENS,W        ;10'S
               CALL    INDEX
               MOVF    TEMP,W        ;Units
               CALL    INDEX
               SLEEP
;*******************************************************************************
INDEX
               ADDWF   PCL
               GOTO    ZERO
               GOTO    ONE
               GOTO    TWO
               GOTO    THREE
               GOTO    FOUR
               GOTO    FIVE
               GOTO    SIX
               GOTO    SEVEN
               GOTO    EIGHT
               GOTO    NINE



;*******************************************************************************
;CHARACTERS
ZERO
               CALL    DAH
               CALL    DAH
               CALL    DAH
               CALL    DAH
               CALL    DAH
               CALL    PAUSE
               RETURN
```

```
ONE
                CALL    DIT
                CALL    DAH
                CALL    DAH
                CALL    DAH
                CALL    DAH
                CALL    PAUSE
                RETURN
TWO
                CALL    DIT
                CALL    DIT
                CALL    DAH
                CALL    DAH
                CALL    DAH
                CALL    PAUSE
                RETURN
THREE
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    DAH
                CALL    DAH
                CALL    PAUSE
                RETURN
FOUR
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    DAH
                CALL     PAUSE
                RETURN
FIVE
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    PAUSE
                RETURN
SIX
                CALL    DAH
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    PAUSE
                RETURN
SEVEN
                CALL    DAH
                CALL    DAH
                CALL    DIT
                CALL    DIT
                CALL    DIT
                CALL    PAUSE
                RETURN
EIGHT
                CALL    DAH
                CALL    DAH
                CALL    DAH
                CALL    DIT
                CALL    DIT
                CALL    PAUSE
                RETURN
NINE
                CALL    DAH
                CALL    DAH
                CALL    DAH
                CALL    DAH
                CALL    DIT
                CALL    PAUSE
                RETURN
```

```
;*******************************************************************************
;ELEMENTS
DAH
               MOVLW   .168
               MOVWF   DUR
               CALL    BEEP            ;198 ms
               MOVLW   .2
               MOVWF   WAIT2           ;Add element space
               CALL    DELAY           ;62 ms
               RETURN
DIT
               MOVLW   .56             ;66 MS
               MOVWF   DUR
               CALL    BEEP
               MOVLW   .2
               MOVWF   WAIT2           ;Add element space
               CALL    DELAY
               RETURN
PAUSE                                  ; Character space
               MOVLW   .8
               MOVWF   WAIT2
               INCF    WAIT1
               CALL    DELAY
               RETURN
BEEP
               MOVLW   .6
               MOVWF   FREQ
               CALL    TONE
               DECFSZ  DUR
               GOTO    BEEP
               RETURN

;*******************************************************************************
TONE
               DECFSZ  FREQ
               GOTO    TONE
               BTFSS   SPKR
               GOTO    NO
               BCF     SPKR
               RETURN
NO             BSF     SPKR
               RETURN

;*******************************************************************************
DELAY                                  ; Variable delay routine
               DECFSZ  WAIT1
               GOTO    DELAY
               DECFSZ  WAIT2
               GOTO    DELAY
               RETURN

               END
```