$NOMOD51 ; for Keil uVision - do not pre-define 8051 SFRs

$INCLUDE (MOD841) ; load this definition file instead

SOUND EQU P3.6 ; P3.6 will drive a transducer

LED EQU P3.4 ; P3.4 is red LED on eval board

CSEG

ORG 0000H ; set origin at start of code segment

JMP MAIN ; jump to start of main program

ORG 002BH ; Timer 2 overflow interrupt address

JMP TF2ISR ; jump to interrupt service routine

ORG 0060H ; set origin above interrupt addresses

MAIN:

; ------ Setup part - happens once only ----------------------------

MOV IE, #10100000B ; enable Timer 2 overflow interrupt

SETB T, R2 ; start Timer 2

; ------ Loop forever (in this example, doing nothing) -------------

LOOP: CPL LED

CALL DELAY ; call software delay routine

NOP ; this does nothing, uses 1 clock cycle

MOV A, P2 ; get value from switches

ANL A, #00000111B ; select 3 bits

MOV R2, A

MOV DPTR, #MYTABLELED ; load data pointer

MOVC A, @A+DPTR ; get value from table, put in A (replacing value from switches)

MOV P0, A

MOV A, R2

MOV DPTR, #MYTABLEHIGH ; load data pointer for high table

MOVC A, @A+DPTR ; get value from table, put in A (replacing value from switches)

MOV RCAP2H, A ; put high byte in reload register

MOV A, R2

MOV DPTR, #MYTABLELOW ; load data pointer for low table

MOVC A, @A+DPTR ; get value from table, put in A (replacing value from switches)

MOV RCAP2L, A ; put low byte in reload register

JMP LOOP ; repeat - waiting for interrupt

MYTABLEHIGH: DB 0F5H,0F6H,0F8H,0F7H,0FAH,0FAH,0F9H,0F9H

MYTABLELOW: DB 0AEH,0CEH,045H,0CFH,0D7H,088H,01DH,0DDH

MYTABLELED: DB 11111110B,11111101B,11110111B,11111011B,01111111B,10111111B,11101111B,11011111B

DELAY: MOV R5, #20 ; set delay length for 200 ms

DLY2: MOV R6, #144 ; middle loop repeats 144 times

DLY1: MOV R7, #255 ; inner loop repeats 255 times

DJNZ R7, $ ; inner loop 255 x 3 cycles = 765 cycles

DJNZ R6, DLY1 ; + 5 to reload, x 144 = 110880 cycles

DJNZ R5, DLY2 ; + 5 to reload = 110885 cycles = 10.0265 ms

RET ; return from subroutine

; ------ Interrupt service routine ---------------------------------

TF2ISR: ; Timer 2 overflow interrupt service routine

CPL SOUND ; change state of output pin

CLR TF2;

RETI ; return from interrupt

; ------------------------------------------------------------------

END