```
;* Keyboard2Leds.asm
;*
;* KEYPAD TO PORTB
;* The 4x4 keypad is conected to PortB pins (PB0-PB7)
;* PB0,PB1,PB2,PB3 είναι είσοδοι στηλών COL1-4,
    PB4,PB5,PB6,PB7 είναι έξοδοι γραμμών ROW1-4
;* Όταν μία γραμμή ενεργοποιείται γράφοντας '0' σε ένα εκ των PB4-PB7, τότε ένα time delay θα πρέπει να ακολουθήσει
;* ώστε να μείνει ενεργοποιημένη η γραμμή για να (to settle prior to)
;* αναγνωστεί το COLUMN στα PB0-PB3
;*
;
;*!!!!!!!!!!!!!!!! Processor @ 1MHz !!!!!!!!!!!!!!
;**********************************************************************
;

.include "m32def.inc"


;***** Global register variables

.def      timeout  =R17                ;Timeout value passed to subroutine
.def      longtime =R19                ;Long timer for powerup
.def      temp     =R20
.def      time     =R21                ;Time register
.def      endeixi  =R22


;====================================================================

reset:                                 ;Main program entry point on reset
          ldi      temp, high(RAMEND)
          out       SPH, temp          ;Set Stack Pointer to top of RAM
          ldi      temp, low(RAMEND)
          out      SPL, temp


          ldi      temp,0b11111111  ;PA0,1,2,3 outputs, PA4,5,6,7 outputs (STK500 LEDs)
          out      DDRA,temp
          out      PORTA,temp

          ldi      temp, 0b11110000 ;PB0,1,2,3 inputs, PB4,5,6,7 outputs for external keypad
          out       DDRB, temp
          ldi      temp, 0b00001111 ;enable internal pull-ups on PB0-PB3 (needed for keypad)
          out      PORTB, temp

;====================================================================
; Check all keys (1-16).
; The comments from the first 4 keys are the same with all other keys.
;====================================================================

check_keys:

          ldi      temp, 0b11101111 ;Enable first row…
          out      PORTB,temp
          rcall    delay

          sbic     PINB,PB0          ; Pressed key No1 ?
          rjmp     key2              ; if Not, check next key
          ldi      endeixi,0x01      ; if yes...
          rjmp     disp_no_of_key    ; goto type it to LEDs
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key2:    sbic    PINB, PB1              ; Pressed key No2 ?
         rjmp  key3                    ; if Not, check next key
         ldi  endeixi,0x02             ; if yes...
         rjmp disp_no_of_key           ; goto type it to LEDs

key3:    sbic    PINB, PB2              ; Pressed key No3 ?
         rjmp      key4                ; if Not, check next key
         ldi       endeixi,0x03        ; if yes...
         rjmp      disp_no_of_key      ; goto type it to LEDs

key4:    sbic    PINB ,PB3             ; Pressed key No4 ?
         rjmp      key5                ; if Not, check next key
         ldi       endeixi,0x0A        ; if yes...
         rjmp      disp_no_of_key      ; goto type it to LEDs

key5:    ldi     temp, 0b11011111       ; Disable the first row...
         out       PORTB,temp          ; and enable the second
         rcall     delay

         sbic      PINB,PB0            ; Pressed key No5 ?
         rjmp      key6                ; if Not...
         ldi       endeixi,0x04
         rjmp      disp_no_of_key

key6:    sbic    PINB, PB1             ; Pressed key No6 ?
         rjmp      key7                ; if Not...
         ldi       endeixi,0x05
         rjmp      disp_no_of_key

key7:    sbic    PINB, PB2             ; Pressed key No7 ?
         rjmp      key8                ; if Not...
         ldi       endeixi,0x06
         rjmp      disp_no_of_key

key8:    sbic    PINB, PB3             ; Pressed key No8 ?
         rjmp      key9                ; if Not...
         ldi       endeixi,0x0B
         rjmp      disp_no_of_key

key9:    ldi       temp, 0b10111111
         out       PORTB,temp
         rcall     delay

         sbic      PINB, PB0           ; Pressed key No9 ?
         rjmp      key10               ; if Not...
         ldi       endeixi,0x07
         rjmp      disp_no_of_key

key10:   sbic    PINB,PB1             ; Pressed key No10 ?
         rjmp      key11               ; if Not...
         ldi       endeixi,0x08
         rjmp      disp_no_of_key

key11:   sbic    PINB, PB2            ; Pressed key No11 ?
         rjmp      key12               ; if Not...
         ldi       endeixi,0X09
         rjmp      disp_no_of_key
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key12:    sbic      PINB, PB3                    ; Pressed key No12 ?
          rjmp      key13                        ; if Not...
          ldi       endeixi,0x0C
          rjmp      disp_no_of_key

key13:    ldi       temp,0b01111111
          out       PORTB,temp
          rcall     delay

          sbic      PINB, PB0          ; Pressed key No13 ?
          rjmp      key14              ; if Not...
          ldi       endeixi,0x0E
          rjmp      disp_no_of_key

key14:    sbic      PINB, PB1                    ; Pressed key No14 ?
          rjmp      key15                        ; if Not...
          ldi       endeixi,0xF0
          rjmp      disp_no_of_key

key15:    sbic      PINB, PB2                    ; Pressed key No15 ?
          rjmp      key16                        ; if Not...
          ldi       endeixi,0x0F
          rjmp      disp_no_of_key

key16:    sbic      PINB,PB3                     ; Pressed key No16 ?
          rjmp      check_keys                   ; if Not...
          ldi       endeixi,0x0D
          rjmp      disp_no_of_key

;====================================================================
;         Here is typed the message to LEDs
;====================================================================

disp_no_of_key:
          ldi       temp, 0xff
          eor       endeixi, temp
          out        PORTA, endeixi

longdelay:
          ldi       longtime,20
loop1:
          rcall     delay
          dec       longtime
          brne      loop1
          ret

;***** Delay n*64 microseconds using timer 0, delay time passed in timeout ******

          ldi       timeout,255
delay:
          ldi       time,64

again:    dec       time
          brne      again
          dec       timeout
          brne      delay
          ret
```