.include "m8def.inc"

.cseg

.org 0

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

; Reset and Interrupt vector ;VNr. Beschreibung

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

.org 0x000

rjmp main

.org INT0addr ; External Interrupt0 Vector Address

reti

.org INT1addr ; External Interrupt1 Vector Address

reti

.org OC2addr ; Output Compare2 Interrupt Vector Address

reti

.org OVF2addr ; Overflow2 Interrupt Vector Address

reti

.org ICP1addr ; Input Capture1 Interrupt Vector Address

reti

.org OC1Aaddr ; Output Compare1A Interrupt Vector Address

rjmp TIMER

.org OC1Baddr ; Output Compare1B Interrupt Vector Address

reti

.org OVF1addr ; Overflow1 Interrupt Vector Address

reti

.org OVF0addr ; Overflow0 Interrupt Vector Address

reti

.org SPIaddr ; SPI Interrupt Vector Address

reti

.org URXCaddr ; USART Receive Complete Interrupt Vector Address

reti

.org UDREaddr ; USART Data Reg. Empty Interr. Vector Address

reti

.org UTXCaddr ; USART Transmit Complete Interrupt Vector Address

reti

.org ADCCaddr ; ADC Interrupt Vector Address

reti

.org ERDYaddr ; EEPROM Interrupt Vector Address

reti

.org ACIaddr ; Analog Comparator Interrupt Vector Address

reti

.org TWIaddr ; Irq. vector address for Two-Wire Interface

reti

.org INT\_VECTORS\_SIZE

.equ XTAL = 3686400;H

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

; Start, Power ON, Reset

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

main: ldi r16, LOW(RAMEND) ; Stackpointer initialisieren

out SPL, r16

ldi r16, HIGH(RAMEND)

out SPH, r16

ldi r16, high( 7200 - 1 )

out OCR1AH, r16

ldi r16, low( 7200 - 1 )

out OCR1AL, r16

ldi r16, ( 1 << WGM12 ) | ( 1 << CS12 )

out TCCR1B, r16

ldi r16, 1 << OCIE1A ; OCIE1A: Interrupt bei Timer Compare

out TIMSK, r16

sei

ldi r16,0

sts B100,r16

sts B001,r16

sts B002,r16

sts B003,r16

cbi DDRD,2 ;Eingang "Quittierung"

sbi PORTD,2 ;Pull Up

cbi DDRD,3 ;Eingang "Auslösen"

sbi PORTD,3 ;Pull Up

cbi DDRD,4 ;Eingang "Überwachung"

sbi PORTD,4 ;Pull Up

cbi DDRD,5 ;Eingang "Extern-Error"

sbi PORTD,5 ;Pull Up

cbi DDRD,6 ;Eingang "Extern-Ein/Aus"

sbi PORTD,6 ;Pull Up

sbi DDRB,0 ;Ausgang "Steuerspannung"

sbi DDRB,1 ;Ausgang "Zeitmessungs-LED"

sbi DDRB,2 ;Ausgang "Betriebsbereit"

sbi DDRB,3 ;Ausgang "Störungs LED"

sbi DDRB,4 ;Ausgang "Taster-LED"

sbi DDRB,5 ;Ausgang " Test "

cbi PORTB,0 ;schalte "Steuerspannung" ein

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

mainloop:

rcall Zeitmessung

rcall Output

rcall Futterpause

rjmp mainloop

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

Zeitmessung:lds r16,B100

lds r17,B001

lds r18,B002

sbis PIND,4 ; Messeingang wenn 1,

rjmp A\_03 ; dann spring zu A\_03

sbis PIND,2 ; Quittiertaste wenn betätigt wird,

andi r17,0b11111110 ; dann lösche Time out bit

sbis PIND,2 ; Quittiertaste wenn betätigt wird,

ldi r18,0 ; dann lösche Timerregister

A\_03: sbic PIND,4 ; Messeingang wenn nicht 1,

ldi r18,0 ; dann setze Timer(Zähler) zurück

sbrc r17,0 ; Wenn Time out bit gesetzt,

rjmp A\_01 ; dann spring zu A\_01

sbis PIND,3 ; Auslösetaste auf Patine wenn betätigt,

ori r17,0b00000001 ; dann setze Time out bit

sbis PIND,3

andi r17,0b11110111

sbic PIND,4 ; Überwachungseingang wenn 0,

rjmp A\_01 ; dann spring zu A\_01

sbrs r16,0 ; Timer bit 0 (0,5sec Takt) 0,

rjmp A\_01 ; dann sping zu A\_01

sbrc r17,1 ; Flankenauswertung für Timer

rjmp A\_01

ori r17,0b00000010

inc r18 ; Timer wird je sec um 1 erhöht

A\_01: sbrs r16,0 ; Flankenauswertung für Timer

andi r17,0b11111101

cpi r18,240 ; Zähler wird ausgewertet (240sec.)

brne A\_02 ; Wenn nicht 240, spirng zu A\_02

ori r17,0b00000001

andi r17,0b11110111

ldi r18,0

A\_02: sts B001,r17

sts B002,r18

ret

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

Output: lds r16,B100

lds r17,B001

sbrc r17,1 ; Zeitmessungs LED

sbi PORTB,1 ; "

sbrs r17,1 ; "

cbi PORTB,1 ; "

sbrc r17,0

rjmp B\_01

sbi PORTB,2

sbrs r17,3

cbi PORTB,0

rjmp B\_02

B\_01: cbi PORTB,2

sbi PORTB,0

B\_02: sbis PIND,2

cbi PORTB,3

sbrs r17,0

rjmp B\_03

sbrs r16,0

cbi PORTB,3

sbrc r16,0

sbi PORTB,3

B\_03: sbrc r17,0

cbi PORTB,4

sbrc r17,0

rjmp B\_04

sbrs r17,3

rjmp B\_04

sbrs r16,0

cbi PORTB,4

sbrc r16,0

sbi PORTB,4

B\_04:

sts B001,r17

ret

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

Futterpause:lds r16,B100

lds r17,B001

lds r18,B003

sbic PIND,6

rjmp C\_01

sbrc r17,0

andi r17,0b11110111

sbrc r17,0

rjmp C\_01

rcall wait\_1ms

sbrc r17,2

rjmp C\_01

ori r17,0b00000100

sbrs r17,3

rjmp C\_02

andi r17,0b11110111

cbi PORTB,3

cbi PORTB,4

rjmp C\_01

C\_02: ori r17,0b00001000

sbi PORTB,0

sbi PORTB,3

C\_01: sbis PIND,6

rjmp C\_03

sbrs r17,2

rjmp C\_03

rcall wait\_1ms

andi r17,0b11111011

C\_03: sbrs r17,3

rjmp C\_04

sbrs r16,2

rjmp C\_04

sbrc r17,4

rjmp C\_04

ori r17,0b00010000

inc r18

C\_04: sbrs r16,2

andi r17,0b11101111

C\_05: cpi r18,150

brne C\_06

ldi r18,0

andi r17,0b11110111

cbi PORTB,3

cbi PORTB,4

C\_06:

sts B001,r17

sts B003,r18

ret

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

wait\_1ms: push r16

push r17

wait\_1ms\_1: inc r16

brne wait\_1ms\_1

inc r17

cpi r17,5

brne wait\_1ms\_1

ldi r17,0

pop r17

pop r16

ret

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

TIMER: push r16

lds r16,B100

inc r16

sts B100,r16

pop r16

reti

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

.dseg

B100: .byte 1 ; wird im Interrupt behandelt

B001: .byte 1 ; Statusregister 1

; Bit 0: time out Messung oder Test von Taster

; Bit 1: Zeitmessungsflanke und LED Zeitmessung

; Bit 2: Flankenauswertung Taster Futterpause

; Bit 3: Futterpause und Störungs LED ein bei 1

; Bit 4: Flankenauswertung Timer 10min.

; Bit 5:

; Bit 6:

; Bit 7:

B002: .byte 1 ; Timerregister 60sec.

B003: .byte 1 ; Timerregister 10min.