

```

...e\intr_driven_bit_toggle\Debug\intr_driven_bit_toggle.lss 1
1
2 AVRASM ver. 2.2.7 E:\ESE_280\MyDocuments$\Atmel Studio\7.0\lab_10  ↗
   \intr_driven_bit_toggle\intr_driven_bit_toggle\main.asm Tue Nov 10 18:21:32  ↗
   2020
3
4 E:\ESE_280\MyDocuments$\Atmel Studio\7.0\lab_10\intr_driven_bit_toggle  ↗
   \intr_driven_bit_toggle\main.asm(9): Including file 'C:/Program Files (x86)  ↗
   \Atmel\Studio\7.0\Packs\atmel\ATmega_DFP\1.3.300\avrasm\inc\m4809def.inc'
5 E:\ESE_280\MyDocuments$\Atmel Studio\7.0\lab_10\intr_driven_bit_toggle  ↗
   \intr_driven_bit_toggle\main.asm(9): Including file 'C:/Program Files (x86)  ↗
   \Atmel\Studio\7.0\Packs\atmel\ATmega_DFP\1.3.300\avrasm\inc\m4809def.inc'
6
7
8 ; intr_driven_bit_toggle.asm
9 ;
10 ; Created: 11/10/2020 4:50:58 PM
11 ; Author : Judah Ben-Eliezer
12 ;
13
14 .list
15
16
17 .equ PERIOD_EXAMPLE_VALUE = 325 ;40.06  ↗
   Hz
18
19 reset:
20 000000 940c 0010 jmp start
21
22 .org TCA0_OVF_vect
23 00000e 940c 0023 jmp toggle_pin_ISR
24
25 start:
26 000010 9a81 sbi VPORTE_DIR, 1
27
28 ;configure TCA0
29 000011 e000 ldi r16, TCA_SINGLE_WGMODE_NORMAL_gc  ↗
   ;WGMODE normal
30 000012 9300 0a01 sts TCA0_SINGLE_CTRLB, r16
31
32 ;enable overflow interrupt
33 000014 e001 ldi r16, TCA_SINGLE_OVF_bm
34 000015 9300 0a0a sts TCA0_SINGLE_INTCTRL, r16
35
36 ;load period low byte then high byte
37 000017 e405 ldi r16, LOW(PERIOD_EXAMPLE_VALUE)
38 000018 9300 0a26 sts TCA0_SINGLE_PER, r16
39 00001a e001 ldi r16, HIGH(PERIOD_EXAMPLE_VALUE)
40 00001b 9300 0a27 sts TCA0_SINGLE_PER + 1, r16
41

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42                                     ;set clock and start timer
43 00001d e00d                         ldi r16, TCA_SINGLE_CLKSEL_DIV256_gc | ↗
    TCA_SINGLE_ENABLE_bm
44 00001e 9300 0a00                     sts TCA0_SINGLE_CTRLA, r16
45
46 000020 9478                         sei          ;enable global interrupts
47
48                                     main_loop:
49 000021 0000                         nop
50 000022 cffe                         rjmp main_loop
51
52                                     toggle_pin_ISR:
53 000023 930f                         push r16
54 000024 b70f                         in r16, CPU_SREG
55 000025 930f                         push r16
56 000026 931f                         push r17
57
58 000027 e012                         ldi r17, $02      ;toggle PE1
59 000028 b301                         in r16, VPORTE_OUT
60 000029 2701                         eor r16, r17
61 00002a bb01                         out VPORTE_OUT, r16
62
63 00002b e001                         ldi r16, TCA_SINGLE_OVF_bm ;clear OVF flag
64 00002c 9300 0a0b                     sts TCA0_SINGLE_INTFLAGS, r16
65
66 00002e 911f                         pop r17
67 00002f 910f                         pop r16
68 000030 bf0f                         out CPU_SREG, r16
69 000031 910f                         pop r16
70
71
72
73 RESOURCE USE INFORMATION
74 -----
75
76 Notice:
77 The register and instruction counts are symbol table hit counts,
78 and hence implicitly used resources are not counted, eg, the
79 'lpm' instruction without operands implicitly uses r0 and z,
80 none of which are counted.
81
82 x,y,z are separate entities in the symbol table and are
83 counted separately from r26..r31 here.
84
85 .dseg memory usage only counts static data declared with .byte
86
87 "ATmega4809" register use summary:
88 x : 0 y : 0 z : 0 r0 : 0 r1 : 0 r2 : 0 r3 : 0 r4 : 0
89 r5 : 0 r6 : 0 r7 : 0 r8 : 0 r9 : 0 r10: 0 r11: 0 r12: 0
```

```

90 r13:  0 r14:  0 r15:  0 r16: 21 r17:  4 r18:  0 r19:  0 r20:  0
91 r21:  0 r22:  0 r23:  0 r24:  0 r25:  0 r26:  0 r27:  0 r28:  0
92 r29:  0 r30:  0 r31:  0

```

93 Registers used: 2 out of 35 (5.7%)

94

95 "ATmega4809" instruction use summary:

```

96 .lds : 0 .sts : 0 adc : 0 add : 0 adiw : 0 and : 0
97 andi : 0 asr : 0 bclr : 0 bld : 0 brbc : 0 brbs : 0
98 brcc : 0 brcs : 0 break : 0 breq : 0 brge : 0 brhc : 0
99 brhs : 0 brid : 0 brie : 0 brlo : 0 brlt : 0 brmi : 0
100 brne : 0 brpl : 0 brsh : 0 brtc : 0 brts : 0 brvc : 0
101 brvs : 0 bset : 0 bst : 0 call : 0 cbi : 0 cbr : 0
102 clc : 0 clh : 0 cli : 0 cln : 0 clr : 0 cls : 0
103 clt : 0 clv : 0 clz : 0 com : 0 cp : 0 cpc : 0
104 cpi : 0 cpse : 0 dec : 0 des : 0 eor : 1 fmul : 0
105 fmul : 0 fmul : 0 icall : 0 ijmp : 0 in : 2 inc : 0
106 jmp : 2 ld : 0 ldd : 0 ldi : 7 lds : 0 lpm : 0
107 lsl : 0 lsr : 0 mov : 0 movw : 0 mul : 0 muls : 0
108 mul : 0 neg : 0 nop : 1 or : 0 ori : 0 out : 2
109 pop : 3 push : 3 rcall : 0 ret : 0 reti : 1 rjmp : 1
110 rol : 0 ror : 0 sbc : 0 sbci : 0 sbi : 1 sbic : 0
111 sbis : 0 sbiw : 0 sbr : 0 sbrc : 0 sbrs : 0 sec : 0
112 seh : 0 sei : 1 sen : 0 ser : 0 ses : 0 set : 0
113 sev : 0 sez : 0 sleep : 0 spm : 0 st : 0 std : 0
114 sts : 6 sub : 0 subi : 0 swap : 0 tst : 0 wdr : 0

```

115

116 Instructions used: 13 out of 114 (11.4%)

117

118 "ATmega4809" memory use summary [bytes]:

119 Segment	Begin	End	Code	Data	Used	Size	Use%
120 -----							
121 [.cseg]	0x000000	0x000066	78	0	78	49152	0.2%
122 [.dseg]	0x002800	0x002800	0	0	0	6144	0.0%
123 [.eseg]	0x000000	0x000000	0	0	0	256	0.0%

124

125 Assembly complete, 0 errors, 0 warnings

126