Lab 5

TCC0

→ interrupt to change the frequency of the tone produced. How often to update?

TCD0

→ output tone

PortD.5

? frequencies, how many, ?2k0Hz - 1kHz

TCD1

→ PWM signal

PortD.4

? In TCC0's ISR, how to update? Simple increment sounds wrong - no jumps, no pops, smooth up & down sine sound - don't use array, but algorithm (small & fast)

? For TCD1, how fast should the PWM signal be (Hz, kHz, MHz?) - Aim for good sound - ? duty cycle for reasonable volume

There should be no interference with previously used pins

Procedure:
- Understand what we are trying to do
- Make a tone, observe on scope
- Make the interrupt source
- Make a PWM signal x 30% duty cycle
- Make it work together

Extensively use iox16avr.h to make your code reusable (7.3kLOC)
You will need scope signals and listen to the tones

AVR1306 is very helpful
AV Manual pg 162 for TCC0/1
Xmeagba4u has 5 16-bit counter/timers
- Allocated across ports A, D, E
- Port C has 1, TC0 + 1 TC1
- Port D has 1, TC0 + 1 TC1
- Port E has 1, TC0

Pin allocations:
- Port C: TC0 → OC0A e PC0
  OC0B e PC1
  OC0C e PC2
  OC0D e PC3

- Port D: TC0D → OC0A e PD0
  OC0B e PD1
  OC0C e PD2
  OC0D e PD3

- Port E: TC0E → OC0A e PE0
  OC0B e PE1
  OC0C e PE2
  OC0D e PE3

Figure 16-1. Overview of a Timer/Counter and closely related peripherals.

PORTC and PORTD each has one Timer/Counter 0 and one Timer/Counter 1. PORTE has one Timer/Counter 0. Notation of these are TCC0 (Timer/Counter 0), TCC1, TCC0, TCD0, and TCE0, respectively.

Finding registers in lox16ba4u.h: use the prefix eg:

TCD1 yields TCD1_CTRLA
TCD1_CTRLB