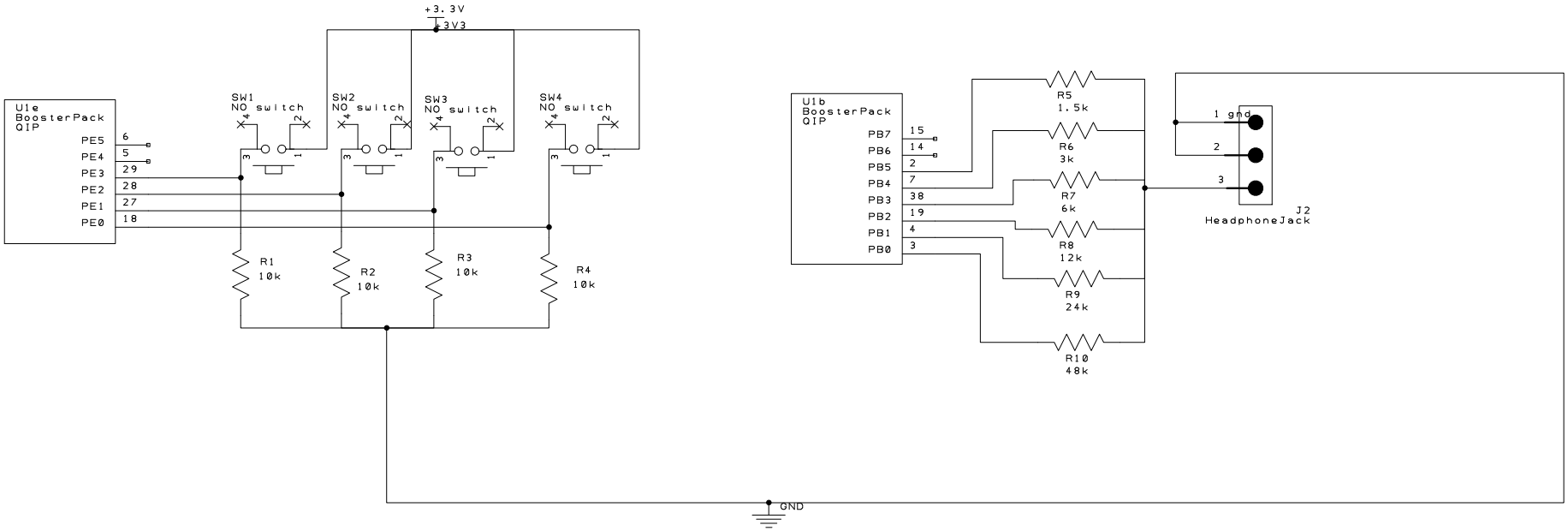
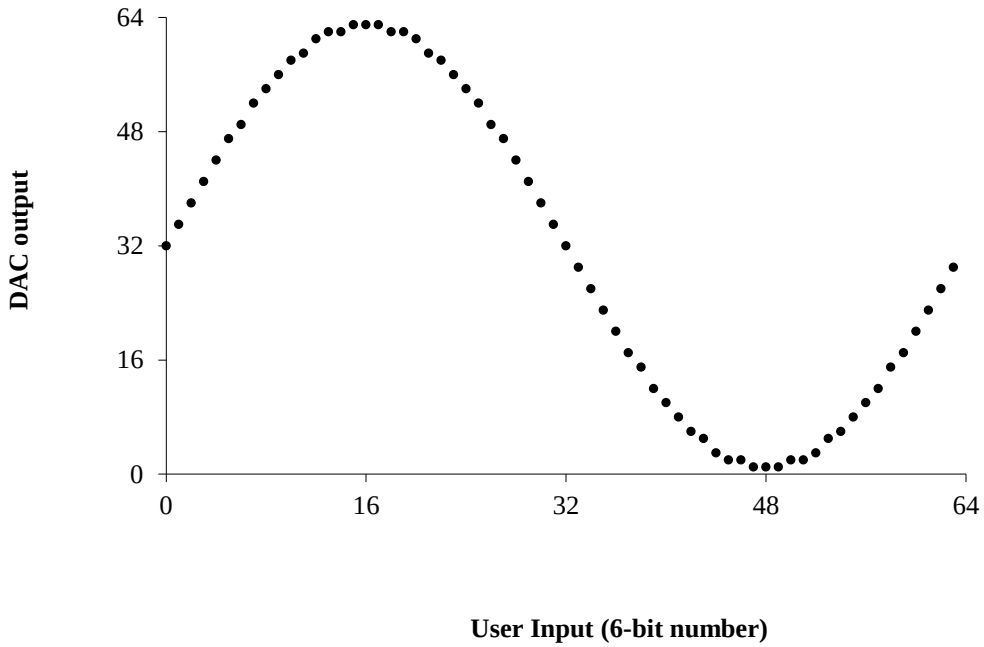


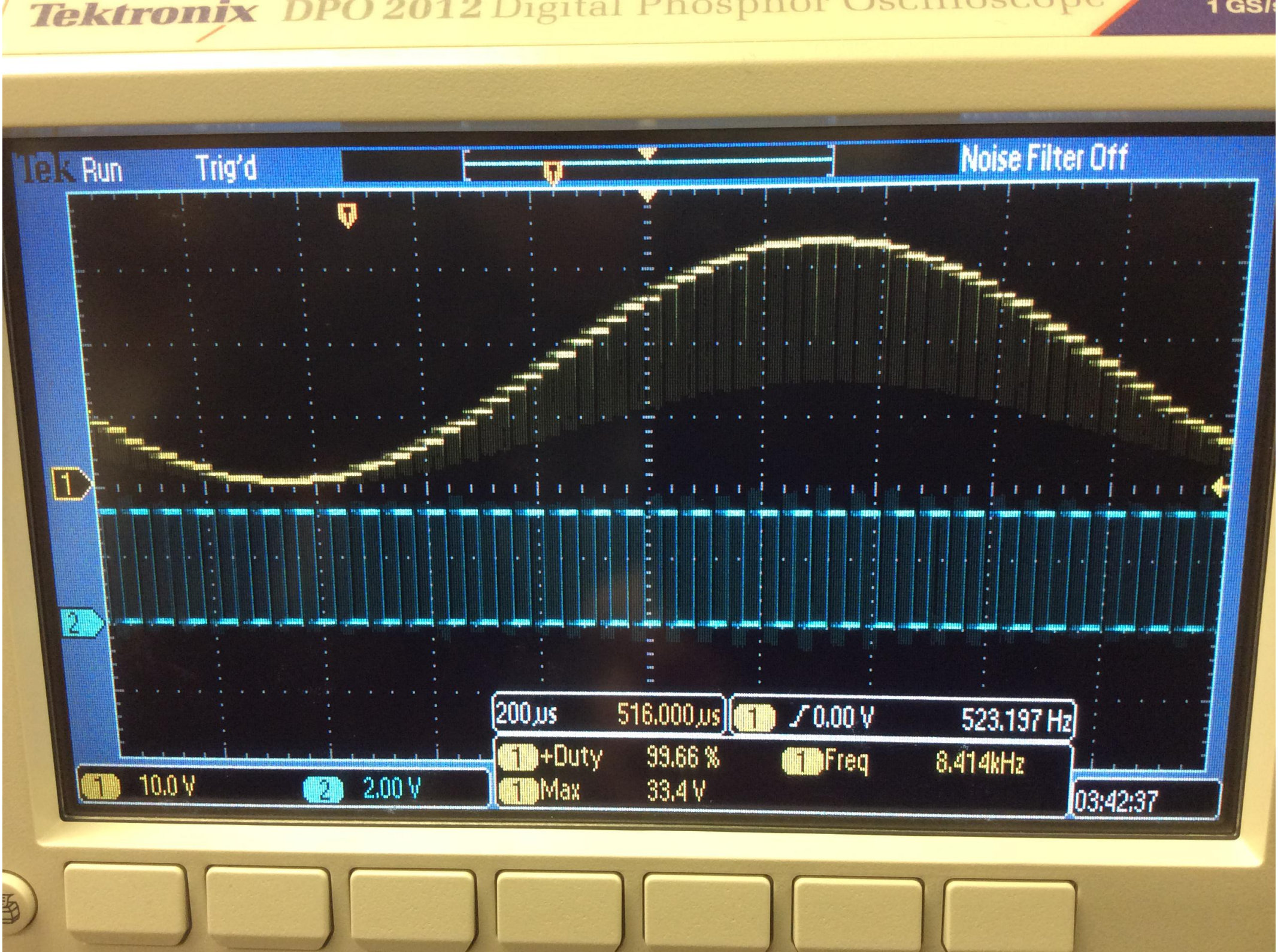
All resistors are 1/4 watt 5% carbon composition
C1 is ceramic Z5U
Switches are www.BGMicro.com SWT1043
Red LEDs, T1 3/4, 20mA Digikey 160-1087-ND
Yellow LEDs, T1 3/4, 20mA Digikey 160-1088-ND
Green LEDs, T1 3/4, 20mA Digikey 160-1089-ND
Slide pot, Bourns PTA2043-2015CPB103, Mouser 652-PTA20432015CPB10

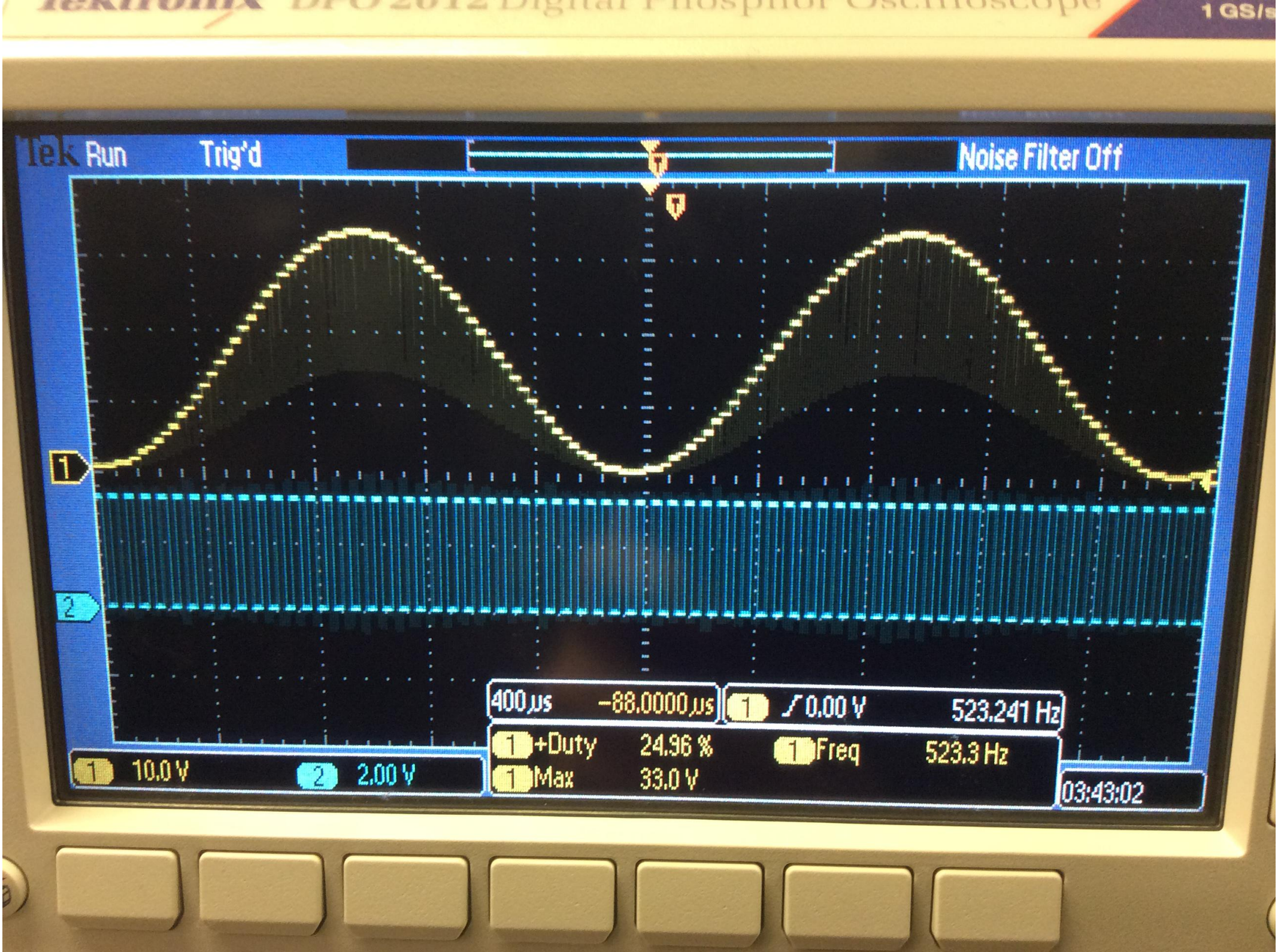
University Of Texas At Austin	
Schematic Name: EK-LM4F120XL or EK-TM4C123GXL	
Name(s): Aria Pahlavan and Khalid Qarryzada	
Date: March 24, 2015	**Semester:** Spring 2015

A1
frame



Each dot is a representation of a possible input value and its respective output voltage. This information is directly taken from the values given in the array.


Tektronix DPO 2012 Digital Phosphor Oscilloscope
Tek Run Trig'd
Noise Filter Off
200 µs 516.000 µs
/ 0.00 V 523.197 Hz
+Duty 99.66 %
Freq 8.414kHz
Max 33.4 V
10.0 V
2.00 V
03:42:37


Tek Run
Trig'd
Noise Filter Off
1
2
400 µs
-88.0000 µs
1 ƒ 0.00 V
523.241 Hz
1 +Duty
24.96 %
1 Freq
523.3 Hz
1 Max
33.0 V
1 10.0 V
2 2.00 V
03:43:02

Bit3 bit2 bit1 bit0	Theoretical DAC voltage	Measured DAC voltage
0	0 V	1 mV
1	0.052 V	0.053 V
7	0.366 V	0.370 V
8	0.419 V	0.422 V
15	0.786 V	0.792 V
16	0.838 V	0.841 V
17	0.890 V	0.893 V
18	0.943 V	0.947 V
31	1.623 V	1.63 V
32	1.676 V	1.66 V
33	1.729 V	1.72 V
47	2.462 V	2.46
48	2.514 V	2.50 V
49	2.567 V	2.56 V

62	3.248 V	3.24 V
63	3.300 V	3.29 V

Ideal Resolution: 3.3/(64-1) = 0.052

Actual Resolution: 3.289/(64-1) = 0.052

Ideal Range: 3.3 V- 0V = 3.3 V

Actual Range: 3.289 V- 0V = 3.289 V

Precision: 63 levels for 6-bits

Accuracy: (Actual range - Ideal range)/(Ideal range) = (3.289V- 3.3V)/(3.3 V) = -0.0033

6)

A. When does the interrupt trigger occur?

The trigger occurs whenever the SysTick timer gets to 0.

B. In which file is the interrupt vector?

In Sound.c

C. List the steps that occur after the trigger occurs and before the processor executes the handler.

1. The current instruction is completed.
2. The current context (state) is completed, and 8 registers, R0-R3, and R12-R15 are pushed onto the stack.
3. The value 0xFFFFFFF9 is written to the Link Register.
4. The address of the interrupt we wish to execute is written to the PC.
5. The interrupt number is written to the IPSR.
6. The BX LR instruction at the end of the subroutine pops all values originally pushed onto the stack back into the registers, which also returns PC to the previous location.

D. It looks like **`BX LR`** instruction simply moves LR into PC, how does this return from interrupt?

Because LR currently has the value 0xFFFFFFF9, when the BX LR instruction is executed, it actually pops the values that were previously pushed onto the stack back into the registers, setting PC to the value it was previously at.