

Lab 05

LC Sensor Measurement

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CSE 4355- Section 001

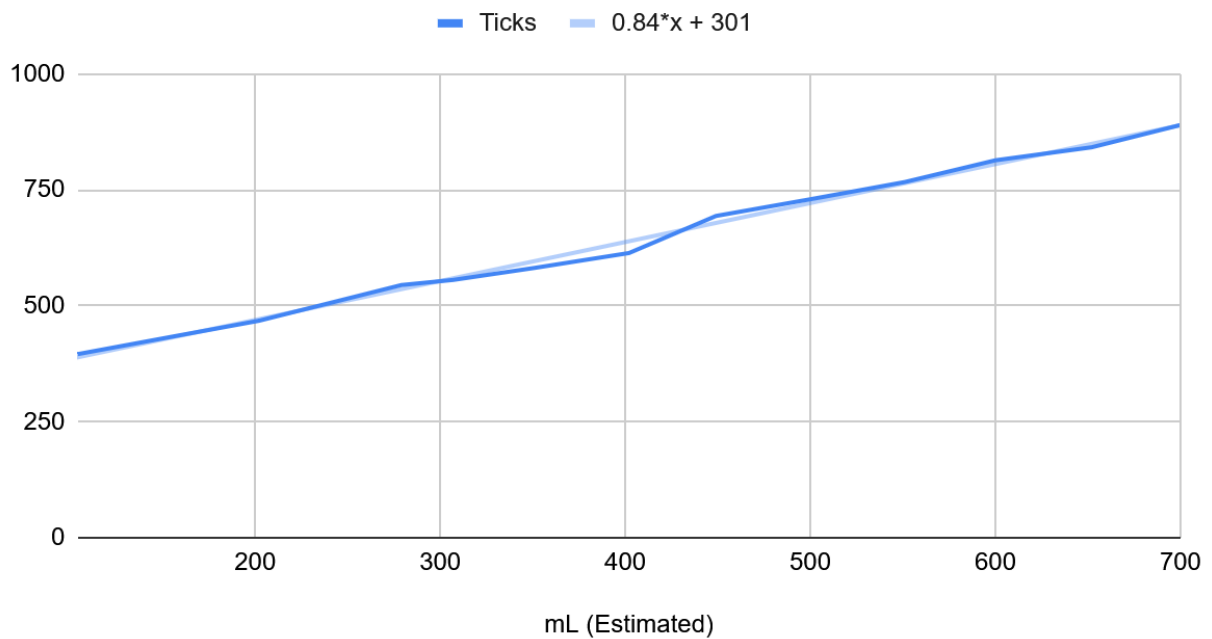
Dr. Jason Losh

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Liquid Level Measurement

mL (Estimated)	Ticks	Capacitance (uF)
104	396	0.000096
157	435	0.000109
202	468	0.000117
279	545	0.000133
307	556	0.000136
351	582	0.000145
402	614	0.000163
449	694	0.000173
500	730	0.000184
551	767	0.000194
600	814	0.000205
652	842	0.00021
700	890	0.000214

Ticks and Capacatance (uF)



Main Driver Functions

```
uint32_t tm = 0;
void comp1_ISR(void)
{
    COMP_ACMIS_R = COMP_ACMIS_IN1;
    tm = WTIMER1_TAV_R;    // read timer input
    DISCHARGE = 1;
    //
    GREEN_LED ^= 1;
}
```

```

while(1)
{
    putsUart0("\033[2J\033[H"); //clear terminal
    putsUart0("\r\n--- Lab 5 - LC Sensors ---\r\n");

    uint16_t adc_raw = readAdc0Ss3();
    float adc_volts = adc_raw * (3.3 / 4096);

    float cap = (0.000000250601) * tm;
    float vol = (0.9700604902) * tm - 230;

    if(adc_volts < 0.3 && DISCHARGE)
    {
        DISCHARGE = 0;
        WTIMER1_TAV_R = 0;
    }

    putsUart0("ADC: ");
    ftoa(adc_volts, buff, 2);
    putsUart0(buff);
    putsUart0(" V\r\n");

    putsUart0("time: ");
    ftoa(tm, buff, 2);
    putsUart0(buff);
    putsUart0(" ticks\r\n");

    putsUart0("cap: ");
    ftoa(cap, buff, 6);
    putsUart0(buff);
    putsUart0(" uF\r\n");

    putsUart0("Volume: ");
    ftoa(vol, buff, 6);
    putsUart0(buff);
    putsUart0(" mL\r\n");

    waitMicrosecond(10000);
}

```

Metal Detector

Main Driver Functions

```
while(1)
{
    putsUart0("\033[2J\033[H"); //clear terminal
    putsUart0("\r\n--- Lab 5 - LC Sensors ---\r\n");

    float f = get_frequi();

    if(170e3 > f && f > 150e3)
    {
        GREEN_LED ^= 1;
    }
    else if(115e3 > f && f > 105e3)
    {
        RED_LED ^= 1;
    }
    else if(130e3 > f && f > 120e3)
    {
        BLUE_LED ^= 1;
    }
    else
    {
        all_tLED_OFF();
    }

    putsUart0("Frequency: ");
    ftoa(f, buff, 2);
    putsUart0(buff);
    putsUart0(" Hz\n\r");

    waitMicrosecond(50000);
}
```

Changes color of onboard LED based on the frequency detected (used for item identification)