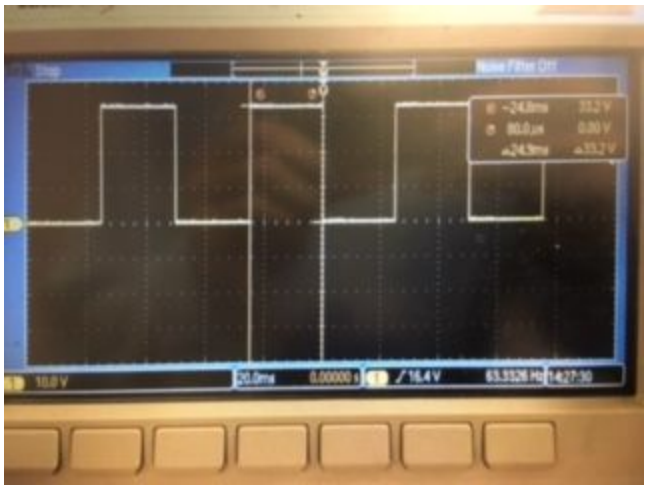
Lab 8 Deliverables

Average accuracy (with units in cm) = -.295

True position Xti	Measured Position Xmi	Error Xti - Xmi
0.5	0.562	-0.062
1.0	1.079	-.079
1.5	1.582	-0.082
2.0	1.981	0.019
1.75	1.806	-0.56



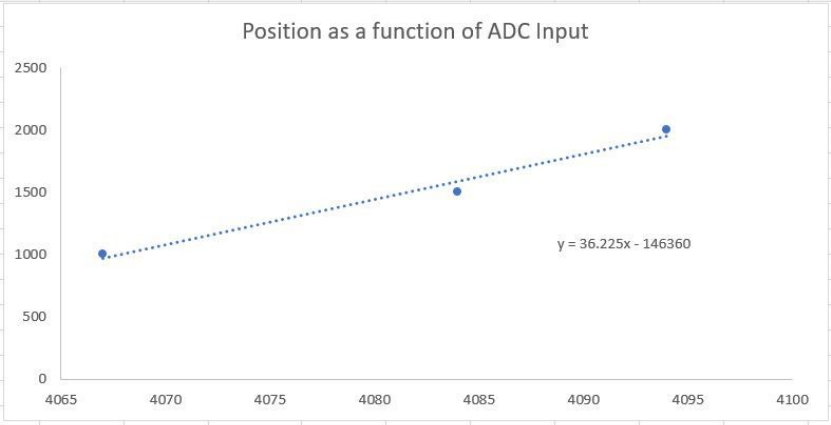
Code:

```
int
delay
;

        SYSCTL_RCGC2_R |= 0x10;                    //enable port E clock
        while((SYSCTL_PRGPIO_R&0x10) == 0){};
        GPIO_PORTE_DIR_R &= 0xFB;           //Port E pin 2 is set to input
        GPIO_PORTE_AMSEL_R |= 0x04;                        //
        GPIO_PORTE_DEN_R &= 0xFB;           //clear bits to enable analog

        SYSCTL_RCGCADC_R |= 0x01;           //enable ADC clock
        delay = SYSCTL_RCGCADC_R;       // extra time to stabilize
 delay = SYSCTL_RCGCADC_R;       // extra time to stabilize
 delay = SYSCTL_RCGCADC_R;       // extra time to stabilize
 delay = SYSCTL_RCGCADC_R;

        ADC0_PC_R |= 0x01;                                      //Set ADC
conversion speed to 125kHz
        ADC0_SSPRI_R = 0x0123;                    //set sequencer priority
        ADC0_ACTSS_R &= (~0x123);                          //zero bit 3 to disable
selected sequence
        ADC0_EMUX_R &= ~0xF000;             //set software start trigger event
        ADC0_SSMUX3_R |= 0x01;                     //since we are using PE2
(channel 1) write 1 to [3:0]
        ADC0_SSCTL3_R = 0x0006;                            //this line sets [3:0]
to "0110"
        ADC0_IM_R &= (~0x0008);                                 //clear bit 3 to
disable interrupts
        ADC0_ACTSS_R  |= 0x0008;                  //set bit 3 to enable selected
sequencer 3
```

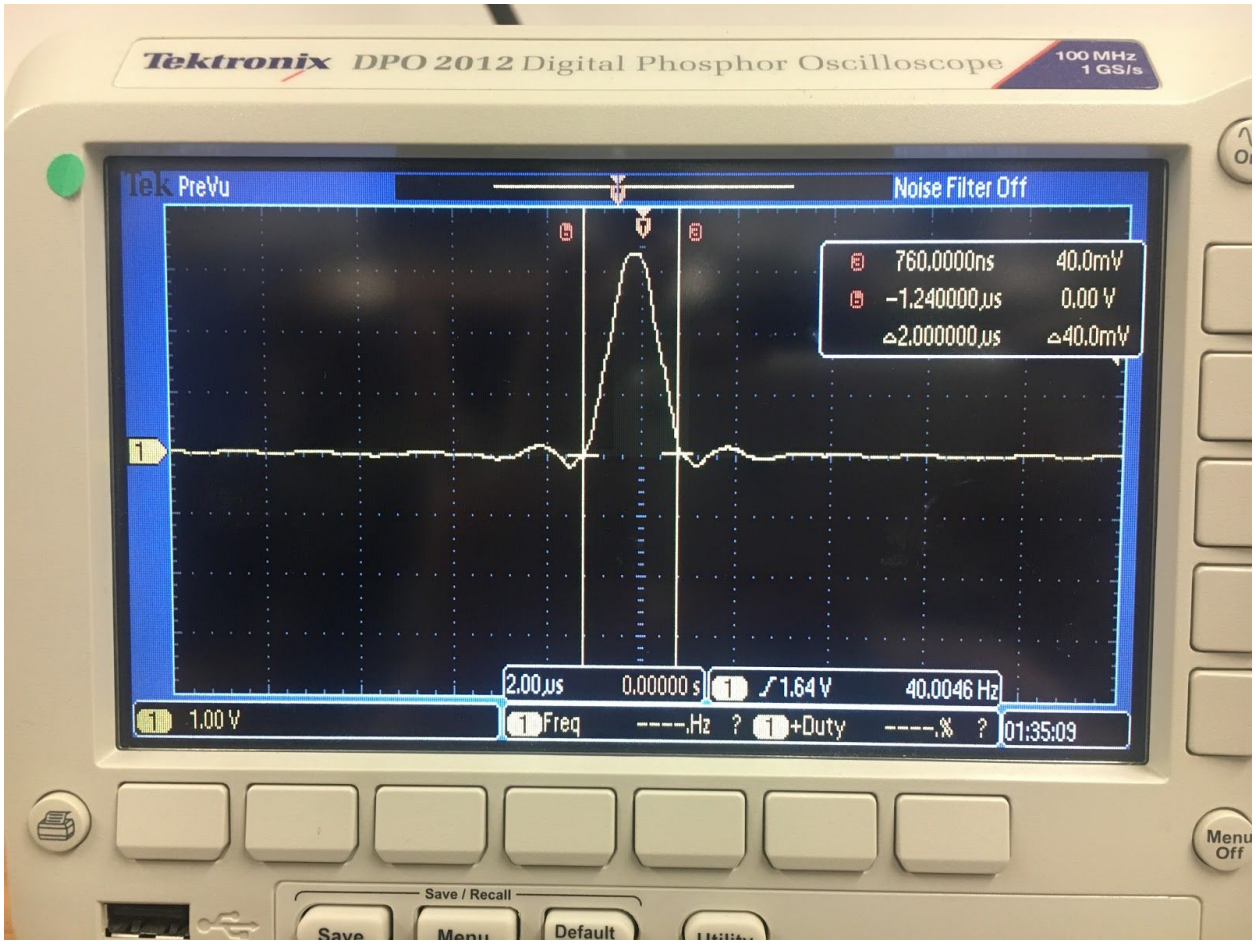
```
        ADC0_SAC_R = 0x04;  // 16) enable hardware oversampling; A N means 2^N (16
here) samples are averaged; 0<=N<=6



uint32
_t
ADC_In
(void)
{
        //initiate capture
        //RIS (SAR)
        //read captured value from fifo buffer
        //clear ris flag using icr reg
        //return
        //******check this function output- data should be 12 bits.
 uint32_t local_data;

        ADC0_PSSI_R = 0x0008;

        while ((ADC0_RIS_R & 0x08) == 0) {
        };
                //wait for conversion

        local_data = (ADC0_SSFIFO3_R & 0xFFF);
        //retrieve data from fifo buffer
        ADC0_ISC_R = 0x0008;

        return (local_data);

 }
```

```
int
main(void){

                        //initialize the PLL, LCD


                DisableInterrupts();
                        TExaS_Init();
                        PortF_Init();
                        SysTick_Init();
                        ADC_Init();
                        ST7735_InitR(INITR_REDTAB);
                        EnableInterrupts();
                        while (1){
                                while (ADCStatus == 1){


                                Data = ADCMail;
                                ADCStatus = 0;
                                Position = Convert(Data);
                                ST7735_SetCursor(0,0);
                                LCD_OutFix(Position);
                                ST7735_OutString("cm");
                                PF2 ^= 0x02;
                                }
                        }
                }
```

ADC Samp	Position
4055	500
4067	1000
4084	1500
4094	2000
4095	2400



Position	Analog input	ADC sample	Correct Fixed-point	Measured Fixed-point Output
0.50 cm	0.584	538	50	49
1.00cm	1.024	1145	1000	470
1.50 cm	1.542	1534	1500	942
1.75 cm	1.742	3102	1750	1703
2.0 cm	2.102	3532	2000	1985


Tektronix DPO 2012 Digital Phosphor Oscilloscope
100 MHz
1 GS/s
Tek PreVu
Noise Filter Off
760.0000ns 40.0mV
−1.240000µs 0.00 V
Δ2.000000µs Δ40.0mV
2.00µs 0.00000 s
1.64 V 40.0046 Hz
1.00 V
Freq ----.Hz ?
+Duty ----.% ?
01:35:09
Save / Recall
Save
Menu
Default
Menu Off