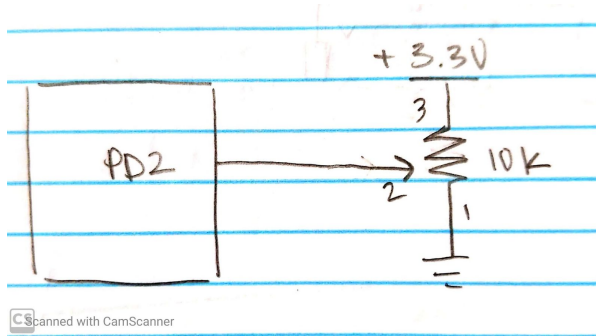


1.



2.

Watch 1		
Name	Value	Type
Data	0x000000A7	uint
PlotImage	<cannot evaluate>	uchar
Data	167	uint
OutDectime	3576	uint
ADCtime	129	uint
<Enter expression>		

3.

Position (0.01 cm)	ADC Sample	Analog Input
10	67	0.02
40	570	0.471
80	1594	1.244
120	2554	2.131
140	3092	2.516

#### 4. ADC.c (part c)

```
15 void ADC_Init(void){
16     SYSCTL_RCGCADC_R |= 0x1;
17     SYSCTL_RCGCGPIO_R |= 0x8;
18     while((SYSCTL_PRGPIO_R & 0x8) != 0x8){};
19     GPIO_PORTD_DIR_R &= ~0x4;
20     GPIO_PORTD_AFSEL_R |= 0x4;
21     GPIO_PORTD_DEN_R &= ~0x4;
22     GPIO_PORTD_AMSEL_R |= 0x4;
23     ADC0_PC_R &= ~0xF;
24     ADC0_PC_R |= 0x1;
25     ADC0_SSPRI_R = 0x0123;
26     ADC0_ACTSS_R &= ~0x8;
27     ADC0_EMUX_R &= ~0xF000;
28     ADC0_SSMUX3_R &= ~0xF;
29     ADC0_SSMUX3_R += 0x5;
30     ADC0_SSCTL3_R = 0x6;
31     ADC0_IM_R &= ~0x8;
32     ADC0_ACTSS_R |= 0x8;
33 }
34
35 //-----ADC_In-----
36 // Busy-wait Analog to digital conversion
37 // Input: none
38 // Output: 12-bit result of ADC conversion
39 // measures from PD2, analog channel 5
40 uint32_t ADC_In(void){
41     uint32_t result;
42     ADC0_PSSI_R = 0x8;
43     while((ADC0_RIS_R & 0x8) == 0){};
44     result = ADC0_SSFIPO3_R & 0xFFF;
45     ADC0_ISC_R = 0x8;
46     return result;
47 }
```

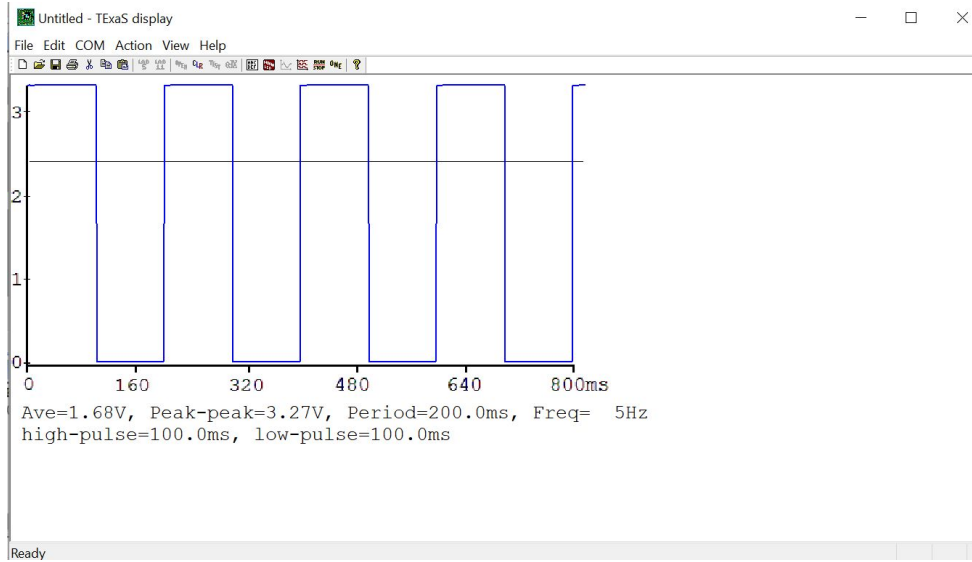
#### Lab8.c (part e,f,g,h)

```

46 //Part e
47 // your function to convert ADC sample to distance (0.01cm)
48 uint32_t Convert(uint32_t input){
49     return 173*input/4096+12;
50 }
51
52 //Part f
53 void SysTick_Init(void){
54     NVIC_ST_CTRL_R = 0;
55     NVIC_ST_RELOAD_R = 8000000;
56     NVIC_ST_CURRENT_R = 0;
57     NVIC_ST_CTRL_R = 7;
58 }
59 //Part G
60 uint32_t ADCMail; // 0 to 4095
61 uint32_t ADCStatus; // 1 means new data
62 void SysTick_Handler(void){
63     GPIO_PORTF_DATA_R ^= 0x02; // toggle PF1
64     ADCMail = Convert(ADC_In()); // Sample ADC
65     ADCStatus = 1; // Synchronize with other threads
66 }
67
68 //Part H
69 uint32_t Sample;
70
71 int main(void){
72     Texas_Init();
73     ST7735_Init(INITR_REDTAB);
74     PortF_Init();
75     ADC_Init();
76     SysTick_Init();
77
78     while(1){
79         if(ADCStatus == 1){
80             Sample = ADCMail;
81             ADCStatus = 0;
82             LCD_OutFix(Sample);
83             ST7735_OutString(" cm");
84             ST7735_SetCursor(0,0);
85
86         }
87     }
88 }
89

```

5.



6. Average accuracy (with units in cm) = 0.020 cm

True position	Measured Position	Error
$x_{ti}$	$x_{mi}$	$x_{ti} - x_{mi}$
0.3 cm	0.27 cm	0.030 cm
0.5 cm	0.48 cm	0.020 cm
1 cm	1.00 cm	0 cm
1.3 cm	1.32 cm	-0.020 cm
1.5 cm	1.53 cm	-0.030 cm