CPE301 – FALL 2019

Design Assignment 4B

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Primary Github address: <https://github.com/kirkster96/submission_da>

Directory:L <https://github.com/kirkster96/submission_da/tree/master/DesignAssignment/DA4_b>

1. **COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS**

Atmega328PB

Potentiometer

Power HD 3001 HB Analog Servo motor

1. **AVR C DEVELOPED CODE OF TASK 1**
2. **AVR C DEVELOPED CODE OF TASK 2**

#define *F\_CPU* 16000000UL

#define BAUD\_RATE 9600

#define BAUD\_PRESCALE (((*F\_CPU* / (BAUD\_RATE \* 16UL))) - 1)

#include <avr/io.h>

#include <util/delay.h>

#include <avr/interrupt.h>

#include <stdlib.h>

#include <stdio.h>

int main (void)

{

//configure the PWM

//use mode 14 PWM timer 1 for more accurate Freq. OCR0A is top value. OCR0B is duty cycle

DDRB |= (1<<DDB1)|(1<<DDB2); //PB1 PB2 is now a output

ICR1 = 0x9C3F;

OCR1A = 0x0FA0;//set PWM for DUTY;

//set non-inverting mode

TCCR1A |= (1<<COM1A1)|(1<<COM1B1);

//set mode 14

TCCR1A |= (1<<WGM11);

TCCR1B |= (1<<WGM13)|(1<<WGM12);

//Set Prescale is 8

TCCR1B |=(1<<CS11);

//initialize the ADC

ADMUX = (0<<REFS1)| //Reference selection bits

(1<<REFS0)| //AVcc - external cap at AREF

(0<<ADLAR)| //Left adjust most significant bit

(0<<MUX2)| //Analog channel selection bits

(0<<MUX1)| //ADC0 (PC0 PIN23)

(0<<MUX0);

ADCSRA = (1<<ADEN)| // Enable ADC

(0<<ADSC)| //ADC start conversion

(0<<ADATE)| //ADC Autotrigger enable

(0<<ADIF)| //ADC Interrupt Flag

(0<<ADIE)| //ADC Interrupt Enable

(1<<ADPS2)| //ADC prescaler bits

(0<<ADPS1)|

(1<<ADPS0);

//PC0 as input for ADC conversion Pot value

PORTC |= (1<<0);

volatile unsigned char TEMP [4];

while(1){

ADCSRA |= (1<<ADSC); //start conversion

while((ADCSRA&(1<<ADIF))==0); //wait for conversion to complete

ADCSRA |= (1<<ADIF);

int c = ADCL;

c = c | (ADCH<<8);

c = (c/1024.0)\*5000/10;

c = 200.0\*(1.0-(c/499.0)) + (4000.0)\*(c/499.0);

//OCR1A = 0x0FA0 -> Duty Cycle 10%

//OCR1A = 0x00C8 -> Duty Cycle 5%

OCR1A = c;

}

}

1. **VIDEO LINKS OF EACH DEMO**

AVR C Task 1 Demo

AVR C Task 2 Demo

<https://drive.google.com/file/d/1GlWeGPZaBkbmLr_88zshV-7j7eC9VAs5/view?usp=sharing>

1. **GITHUB LINK OF THIS DA**

<https://github.com/kirkster96/submission_da/tree/master/DesignAssignment/DA4_b>

**Student Academic Misconduct Policy**

<http://studentconduct.unlv.edu/misconduct/policy.html>

“This assignment submission is my own, original work”.

Cameron Kirk