CPE301 – FALL 2019

Design Assignment 3B

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

Directory: <https://github.com/kirkster96/submission_da/tree/master/DesignAssignment/DA3_b>

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

Atmega328PB

Hilelgo Multi-Function Shield Module for Arduino

No pins were used for this solution

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

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\* \DA3\_a Cameron Kirk

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\* \This is a AVR C program that will use the LM35 to print temperatur to the terminal

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#define *F\_CPU* 16000000UL

#define BAUD\_RATE 9600

#include <avr/io.h>

#include <util/delay.h>

#include <stdlib.h>

#include <string.h>

void usart\_init ();

void usart\_send (unsigned char ch);

void usart\_print (char\* str);

int main (void)

{

//initialize the usart

usart\_init ();

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

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

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

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

(0<<MUX1)| //ADC4 (PC4 PIN27)

(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);

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;

usart\_send((c/100) + '0');

c = c % 100;

usart\_send((c/10) + '0');

c = c % 10;

usart\_send((c) + '0');

usart\_send('\r');

*\_delay\_ms*(100);

}

return 0;

}

void usart\_init(void){

UCSR0B = (1<<TXEN0);

UCSR0C = (1<<UCSZ01)|(1<<UCSZ00);

UBRR0L = *F\_CPU*/16/BAUD\_RATE-1;

}

void usart\_send( unsigned char ch){

while(! (UCSR0A & (1<<UDRE0))); //wait until UDR0 is empty

UDR0 = ch; //transmit ch

}

void usart\_print(char\* str){

int i = 0;

while(str[i] != 0){

usart\_send(str[i]);

i++;

}

}

1. **VIDEO LINKS OF EACH DEMO**

AVR C Task 1 Demo

<https://drive.google.com/file/d/1ChhhaeJcUnkEgydgR2AGWhKEmRNUhxPv/view?usp=sharing>

1. **GITHUB LINK OF THIS DA**

<https://github.com/kirkster96/submission_da/tree/master/DesignAssignment/DA3_b>

**Student Academic Misconduct Policy**

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

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

Cameron Kirk