CPE301 – SPRING 2019
Design Assignment 3A

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Directory: DA3A

1. COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS

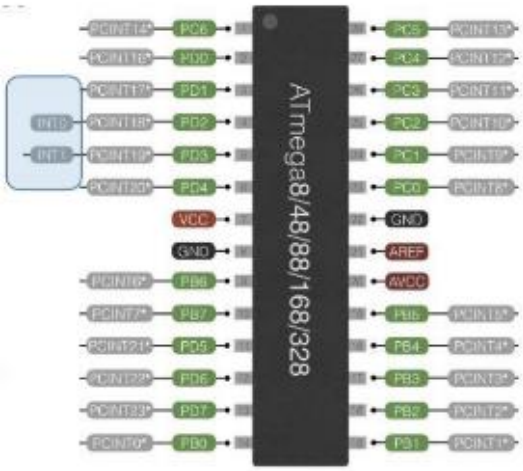
- Xplained mini board
- Micro usb
- ATMega329p

2. DEVELOPED CODE OF TASK 1/A in C

```
 * Author : YKengne
 */

#define F_CPU 16000000UL
#define BAUD 9600

#include <avr/io.h>
#include <util/delay.h>
#include <avr/interrupt.h>
#include <stdio.h>

void USART_tx_string( char* data); //prototype for printing string
void USART_init( void ); //prototype for USART_init function
void USART_send(char val); //prototype fo send function

char str[] = "Hello World!"; //holds the array of characters
char outs[20];  //number of character spaces
volatile float tmp = 3.141593;//floating point value


int main(void)
{
    TCCR1B = 5; //sets the prescaler to 1024
    TIMSK1 = (1<<TOIE1); //enables overflow interrupt
    TCNT1 = 49911; //TCNT1 value the counter counts up to

    USART_init(); //call function

    sei();//enables the interrupt


    while(1)
    {

    }
}
```

```
ISR(TIMER1_OVF_vect)
{
    USART_tx_string(str); //pass string to function
    USART_tx_string("\n"); //line feed
    USART_send('5'); //sends the value to the terminal
    USART_tx_string("\n"); //line feed
    snprintf(outs,sizeof(outs),"%f\r\n", tmp);//prints the floating point value
    USART_tx_string(outs); //pass array to function
    USART_tx_string("\n"); //linefeed

    TCNT1 = 49911; //reset tcnt
}

void USART_init( void )
{
    UBRR0H = 0; //set lower bits
    UBRR0L = F_CPU/16/BAUD - 1; //BAUD prescaler
    UCSR0C = _BV(UCSZ01) | _BV(UCSZ00); /* 8-bit data */
    UCSR0B = _BV(RXEN0) | _BV(TXEN0);    //enable rx and tx
}


//sends the data to the serial port
void USART_tx_string(char *data)
{
    while((*data != '\0'))
    {
        while(!(UCSR0A & (1<<UDRE0)));
            UDR0 = *data;
                data++;
    }
}

void USART_send(char val)
{

    while(!(UCSR0A & (1<<UDRE0)));
     UDR0 = val;
}
```

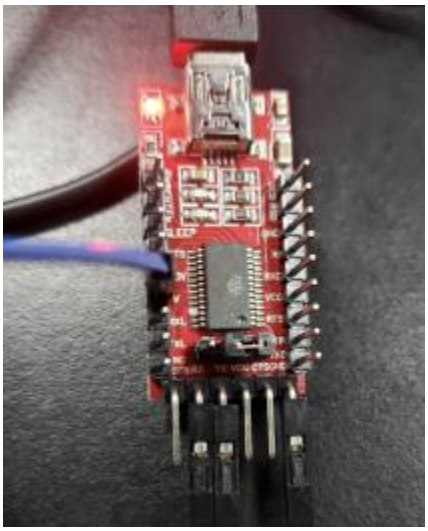
3. SCHEMATICS



4. SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)

```
Hello World!
5
3.141593
Hello World!
5
3.141593
Hello World!
5
3.141593
Hello World!
5
3.141593
Hello World!
5
3.141593
```

5. SCREENSHOT OF EACH DEMO (BOARD SETUP)



6. VIDEO LINKS OF EACH DEMO

https://www.youtube.com/watch?v=YlnVg12VXHh4

7. GITHUB LINK OF THIS DA

Vasty1995/submission_da

Student Academic Misconduct Policy

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

"*This assignment submission is my own, original work*". Yannick Kengne Tatcha