

**CPE301 – SPRING 2019**  
**Design Assignment 3A**

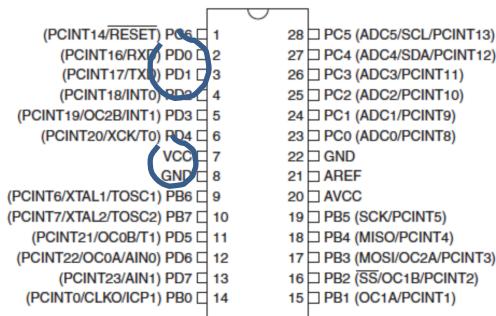
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Directory: DA3A

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

- Xplained mini board
- Micro usb
- Atmel Studio
- Male/female wires
- FTDI/USB Serial Converter

ATMEGA328



**2. DEVELOPED CODE OF TASK 1/A in C**

```
#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!"; //string that will be printed
char outs[20]; //array of characters
volatile float tmp = 27.23; //float number

int main(void)
{
    TCCR1B = 5; //setting the prescaler to 1024
    TIMSK1 = (1<<TOIE1); //enable interrupt flag
    TCNT1 = 49911; //set TCNT
```

```

USART_init(); //call function

sei(); //enable interrupt

while(1)
{
    //main loop
}

ISR(TIMER1_OVF_vect)
{
    USART_tx_string(str); //pass string to function
    USART_tx_string("\n"); //line feed
    USART_send('7'); //print integer 7
    USART_tx_string("\n"); //line feed
    sprintf(outs,sizeof(outs),"%f\r\n", tmp); // print it
    USART_tx_string(outs); //pass array to function
    USART_tx_string("\n"); //linefeed

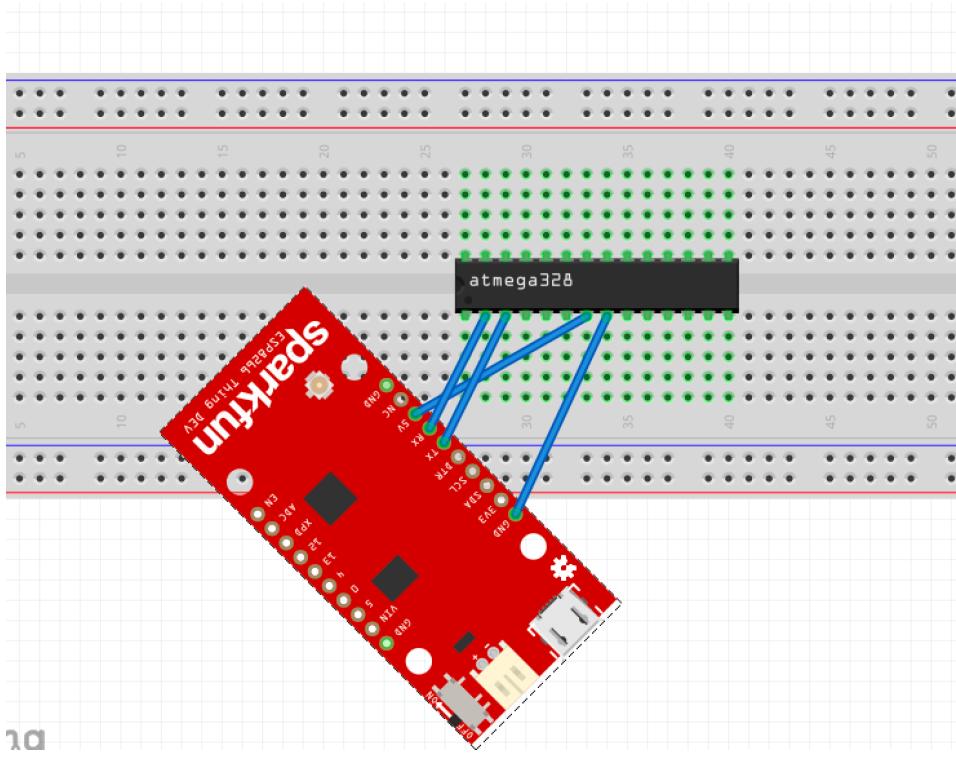
    TCNT1 = 49911; //reset tcnt
}

void USART_init( void )
{
    UBRR0H = 0; //set lower bits
    UBRR0L = F_CPU/16/BAUD - 1; //
    UCSR0C = _BV(UCSZ01) | _BV(UCSZ00); /* 8-bit data */
    UCSR0B = _BV(RXENO) | _BV(TXENO); /* Enable RX and TX */
}

//*****
/*Sends some 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)
{
    /*wait for data to be received*/
    while(!(UCSR0A & (1<<UDRE0)));
    UDR0 = val;
}

```

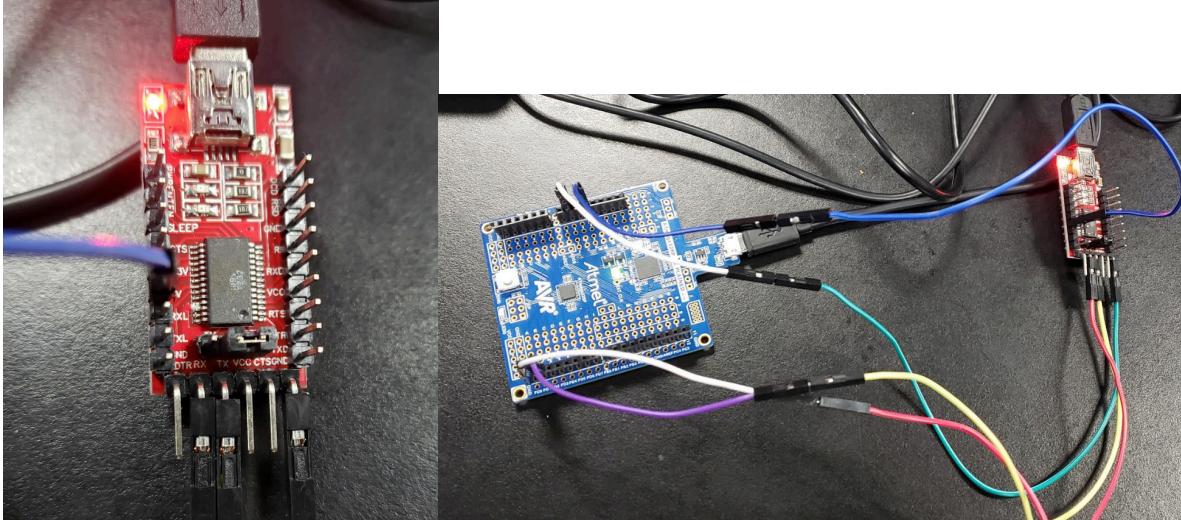
### 3. SCHEMATICS



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

```
7  
27.230000  
Hello World!  
7  
27.230000  
Hello World!  
7  
27.230000  
Hello World!  
7  
27.230000
```

**5. SCREENSHOT OF EACH DEMO (BOARD SETUP)**



**6. VIDEO LINKS OF EACH DEMO**

<https://www.youtube.com/watch?v=MYYlnVg1Hh4>

**7. GITHUB LINK OF THIS DA**

[https://github.com/HadidBuilds/hw\\_sub\\_da1](https://github.com/HadidBuilds/hw_sub_da1)

**Student Academic Misconduct Policy**

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

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

Itzel Becerril