CPE301 – SPRING 2022

Design Assignment 5

Student Name: Angelo Nolasco
Student #: 5005497011
Student Email: Nolasco@unlv.nevada.edu
Primary Github address: angelon3121@gmail.com
Directory:

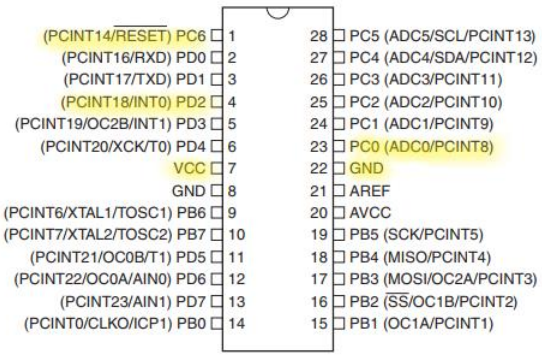
1. COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS

Atmel Studio 7.0

- Simulator
- Debugger
- Atmega328PB-Xmini
- multi-function shield
- DC Motor
- Stepper Motor
- Servo Motor

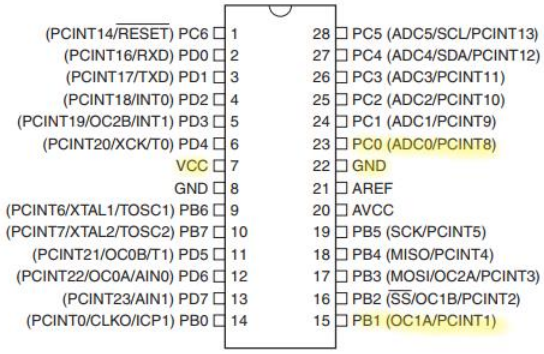
ATMEGA328

Port Pin DC motor



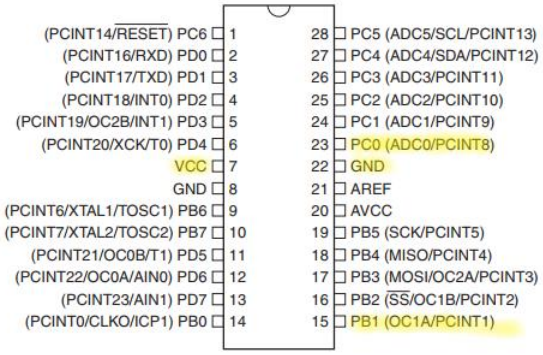
ATMEGA328

Port Pin Stepper motor



ATMEGA328

Port Pin Servo motor



-

2. INITIAL/MODIFIED/DEVELOPED CODE OF TASK 1/A

C Code for Task DC

```
/*************Function Protype**********************/
void ADC_Init();
int ADC_Read(char);
/*****************************************************/



int main(void)
{
DDRD &= ~(1<<PD2);                                  /* Make INT0 pin as Input */
PORTD |= (1 << PD2);    // turn On the Pull-up
DDRD |= (1<<PD6);                                   /* Make OC0 pin as Output */
EICRA |= (1 << ISC01);    // set INT0 to trigger to falling edge
EIMSK |= (1 << INT0);     // Turns on INT0
sei();  /*enable interrupt*/
ADC_Init();  /*calls the ADC_int function*/
TCNT0 = 0;                                          /* Set timer0 count zero */
```

```
TCCR0A |= (1<<WGM00)|(1<<WGM01)|(1<<COM0A1);/*set to CTC mode, and fast PWM*/
TCCR0B |= (1<<CS00)|(1<<CS02);/* Set Fosc/64 Timer0 clock */

   while (1)
   {
OCR0A = (ADC_Read(0)/4);                    /* Read ADC and map it into 0-255 to write
in OCR0 register */
}

}
```

C Code for Task Stepper

```
int main(void)
{
ADC_Init();                                                    /* Initialize ADC */
DDRD = 0x0F;                                          /* Make PORTD lower pins as output */
PORTC |= (1<<0);            //set my ADC port
DDRB = (1<<1);                          //set PORTB1

ICR1 = 4999;            //set as TOP
TCCR1A |= (1<<COM1A1) | (1<<COM1B1);//set CTC mode
TCCR1A |= (1<<WGM11);//set CTC mode
TCCR1B |= (1<<WGM12) | (1<<WGM13);//set CTC mode
TCCR1B |= (1<<CS10) | (1<<CS11);//set prescaler to 64

while(1)
{
ADC_Read(0);//calls the ADC read
_delay_ms(50);//wait


PORTD = 0x66;
_delay_ms(50);
PORTD = 0xCC;
_delay_ms(50);
PORTD = 0x99;
```

```
_delay_ms(50);
PORTD = 0x33;
_delay_ms(50);

//depending of the potentiometer adc conversion it set another delay
if((adc_value >= 973) && (adc_value < 1024)){
_delay_ms(10);
}
else if((adc_value < 972) && (adc_value >= 768)){
_delay_ms(10);
}
else if((adc_value < 767) && (adc_value >= 51)){
_delay_ms(10);
}
else{

PORTD = 0x00;
_delay_ms(10);
}
}
return 0;
}
```

3. DEVELOPED MODIFIED CODE OF TASK 2/A from TASK 1/A

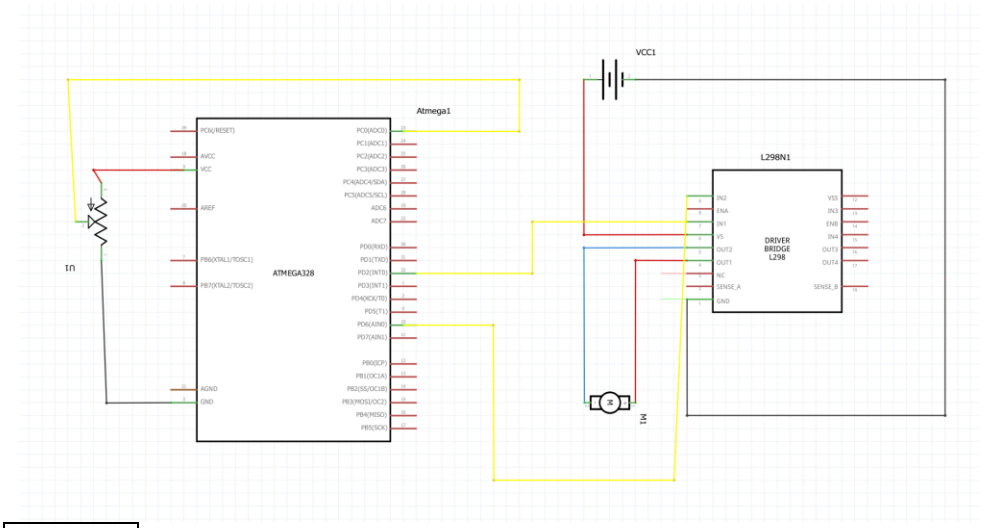
C Code for Task Servo

```
/*************Function Protype*********************/
void ADC_Init();
int ADC_Read(char);
/**********************************************/



int main(void)
{
ADC_Init();
DDRB |= (1 << PB1);    // turn On the Pull-up

TCNT1 = 0;
ICR1 = 2499;
```

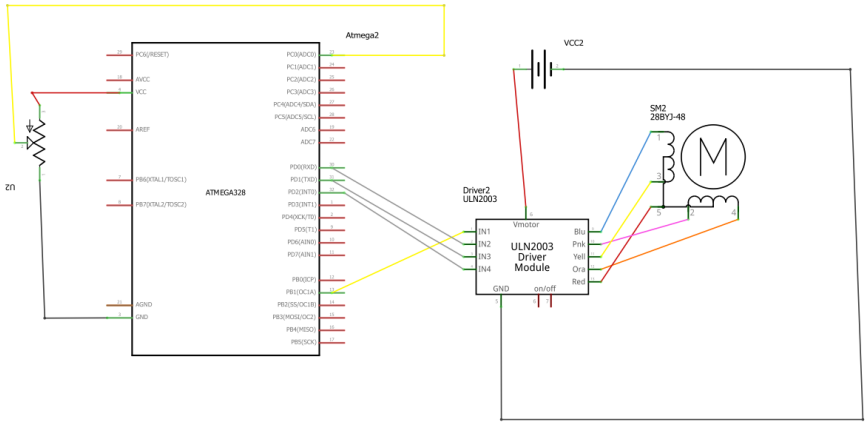
```
TCCR1A |= (1<<WGM11)|(1<<COM1A1);
TCCR1B |= (1<<WGM12)|(1<<WGM13)| (1<<CS10)|(1<<CS11);/* Set Fast PWM with Fosc/64 Timer0 clock */
while (1)
{
OCR1A = (ADC_Read(0)/4.35);
}

}
```

4. SCHEMATICS

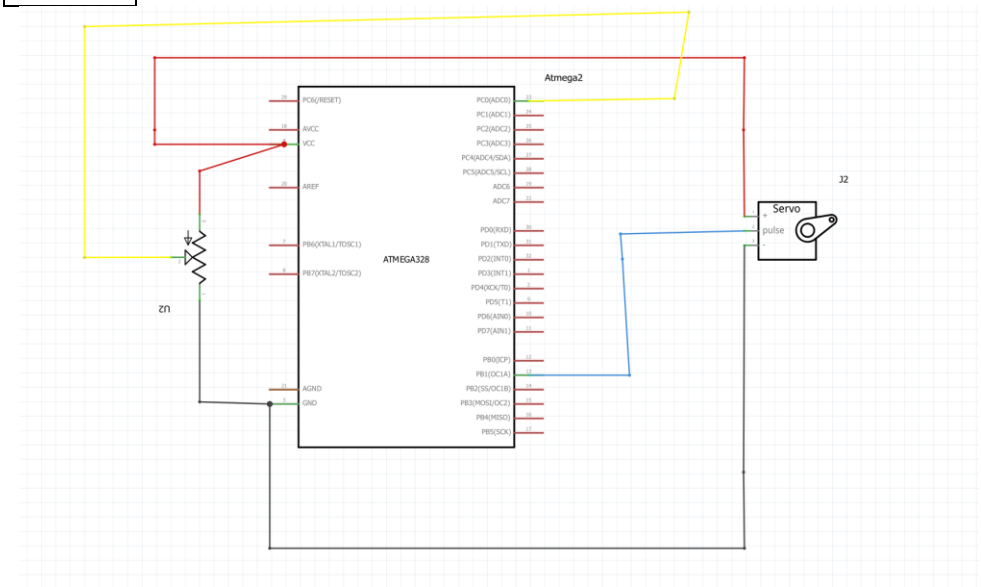
DC



Stepper



Servo



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

N/A

6. SCREENSHOT OF EACH DEMO (BOARD SETUP)

7. VIDEO LINKS OF EACH DEMO

8. GITHUB LINK OF THIS DA

https://github.com/AngeloNol/DA_submission