CPE301 – SPRING 2019

Design Assignment X

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Primary Github address: https://github.com/RickyPerez79/submission_da
Directory: DA4A

Submit the following for all Labs:

1. In the document, for each task submit the modified or included code (only) with highlights and justifications of the modifications. Also, include the comments.
2. Use the previously create a Github repository with a random name (no CPE/301, Lastname, Firstname). Place all labs under the root folder ESD301/DA, sub-folder named LABXX, with one document and one video link file for each lab, place modified asm/c files named as LabXX-TYY.asm/c.
3. If multiple asm/c files or other libraries are used, create a folder LabXX-TYY and place these files inside the folder.
4. The folder should have a) Word document (see template), b) source code file(s) and other include files, c) text file with youtube video links (see template).

1. COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS

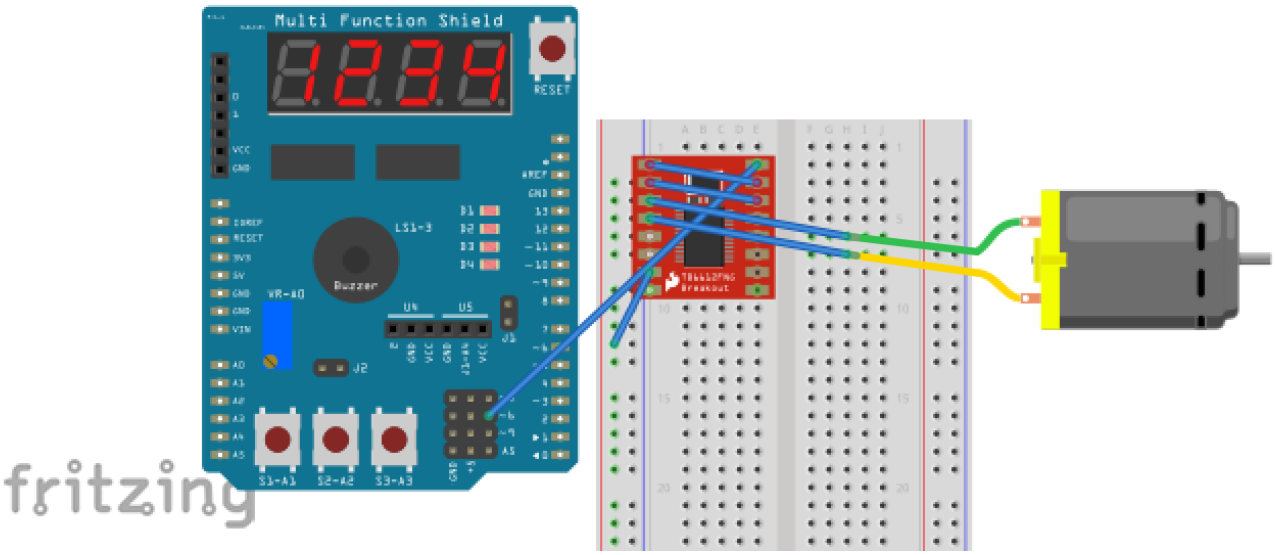
- Multi-Functional Shield
- 35BY48B06 -Unipolar Stepper Motor
- DC Motor
- External Power source

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

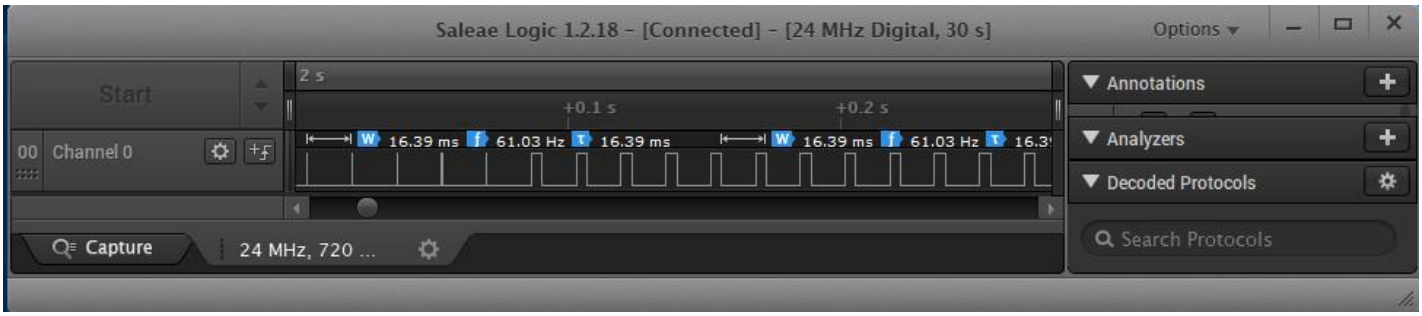
```
/*
 * DA4A.c
 *
 * Created: 4/10/2019 1:37:12 PM
 * Author : perezr1
 */

/******************** Define Variable/Include Libraries *********************/
#define F_CPU 16000000UL
#include <avr/io.h>
#include <util/delay.h>
#include <avr/interrupt.h>
/****************************************************************************/

/************************ Function Prototype ********************************/
void init_adc(void);
/****************************************************************************/

/*****************************Global Variable********************************/
int status_motor = 0; // status of the motor each time push button is pressed
/****************************************************************************/

int main()
{
/************************Set Ports Up*****************************/
	DDRD = 0x40; //enable port D
	DDRC = 0x04; // set Port C as outputs
	PORTC |= (1<<2); // enable pull-up pin
/*****************************************************************/



/*****************************************************************/
	TCCR0A=0x83; // set fast PWM & clear OCR0A on MATCH
	TCCR0B=0x05; // 1024 prescalar
/*****************************************************************/

/************************Set up PinChange Interrupt*****************************/
	PCICR = 0x02; // 0x02 is PCIE1, that is, enable PCIE1 for PCMSK1 to work
	PCMSK1 = 0x04; // enable pin changes on PCINT9 (PC1)
/*******************************************************************************/
	init_adc(); // function call for init_adc

	sei(); // enable interrupt

	while (1)
```

```
	{
		// wait here
	}
}
void init_adc(void) // Initiate ADC functions
{
	ADMUX = (1<<REFS0); // Reference voltage at A_ref
	ADCSRA = (1<<ADEN)|(1<<ADSC)|(1<<ADATE)|(1<<ADPS2)|(1<<ADPS1)|(1<<ADPS0); //
enable ADC/Start Conversion , 128 prescalar
}

// Pin Change Interrupt Service Routine
ISR(PCINT1_vect)
{
	if(!(PINC & (1<<PINC2))) // if push button is pressed go in if statement
	{
		if(status_motor == 0) // motor will be OFF
		{
			OCR0A = 0;
			_delay_ms(1000); // delay for debouncing
		}
		if (status_motor == 1) // motor will be ON
		{
			while((ADCSRA&(1<<ADIF))==0); // wait for conversion
			// when convertion is done, it will store the value into OCR0A
			OCR0A = ADC/10; // Converts ADC/Output value to 0CR0A
			_delay_ms(1000); // delay for debouncing
		}
		status_motor ^= 1; //update status (ON = 1, OFF = 0) of the motor when push
button is pressed
	}
}
```

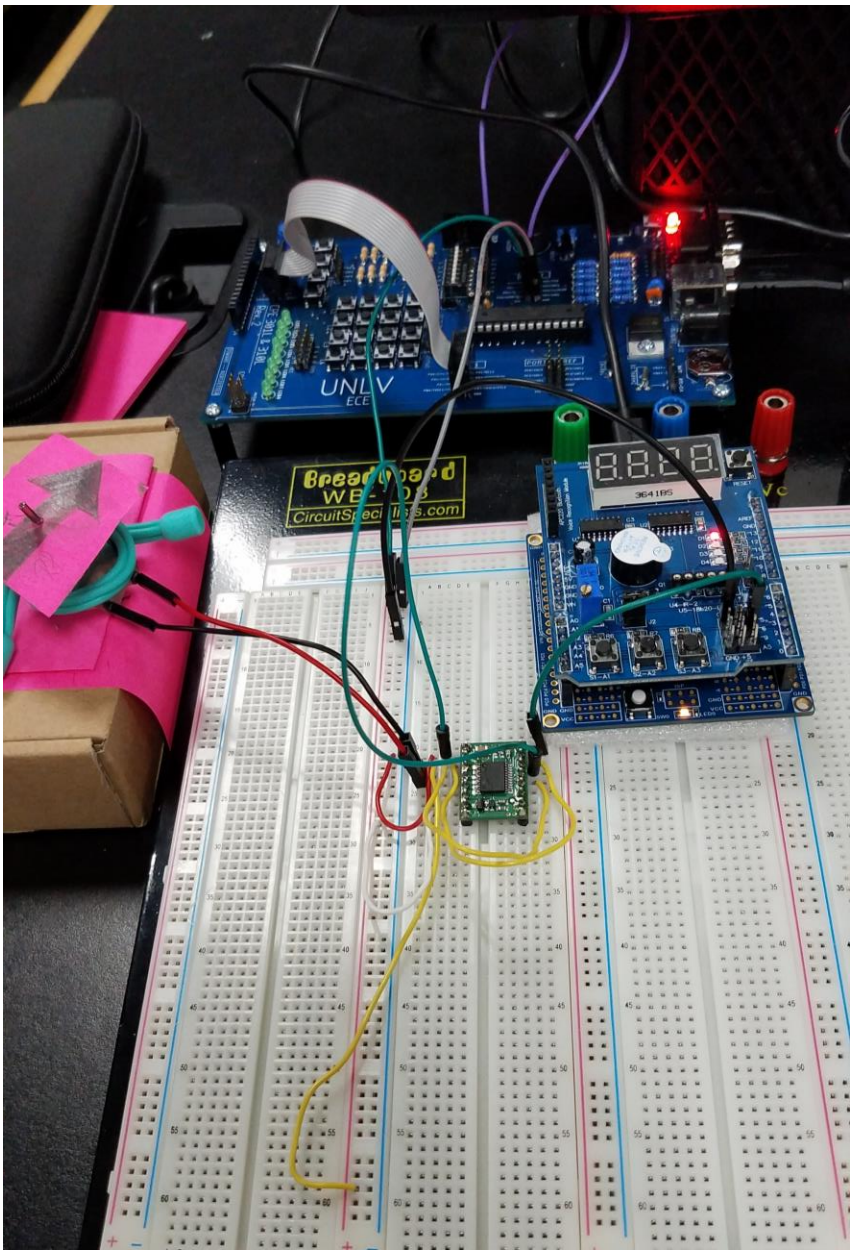
3. SCHEMATICS



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



5. SCREENSHOT OF EACH DEMO (BOARD SETUP)



6. VIDEO LINKS OF EACH DEMO

https://youtu.be/RaAgurkVjFg

7. GITHUB LINK OF THIS DA

https://github.com/RickyPerez79/submission_da

Student Academic Misconduct Policy
http://studentconduct.unlv.edu/misconduct/policy.html

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