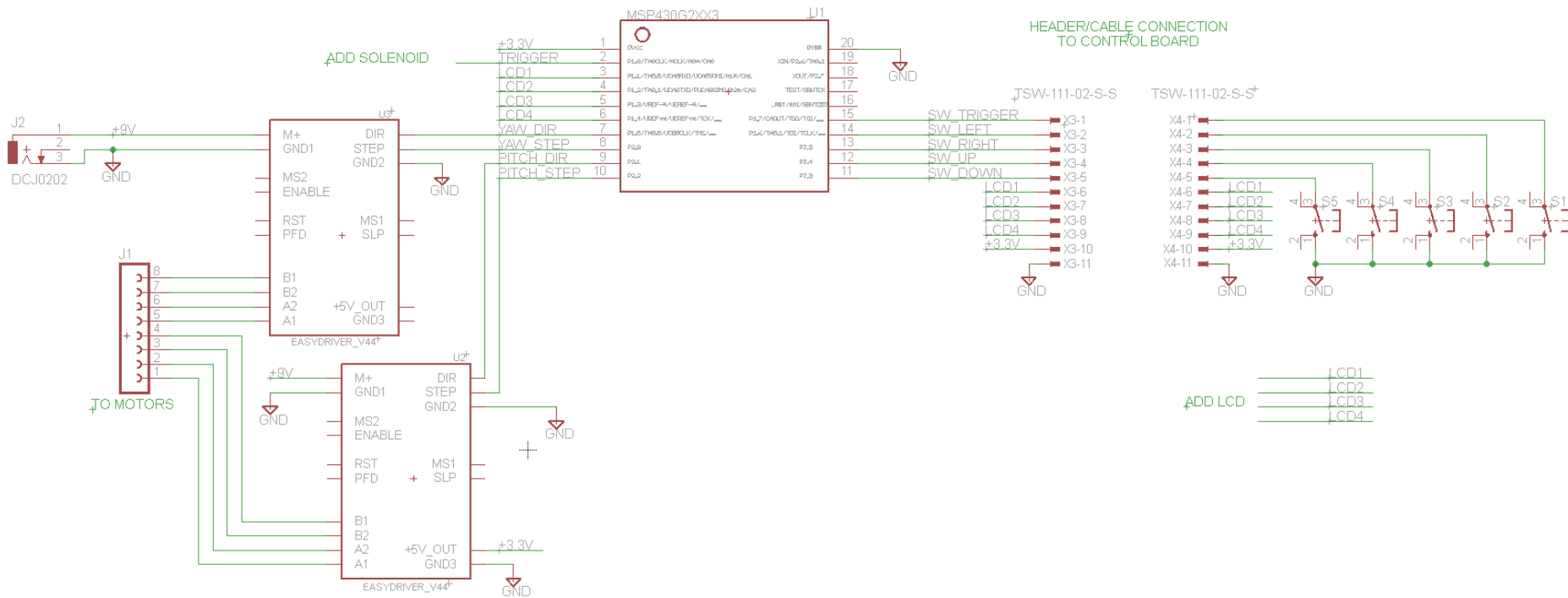


Foam Rocket Turret

Group 6

Maria Malik
Katayoun Neshatpour
Mohammad Rezaeirad
Edward Roderick

Overall Status



Completed:

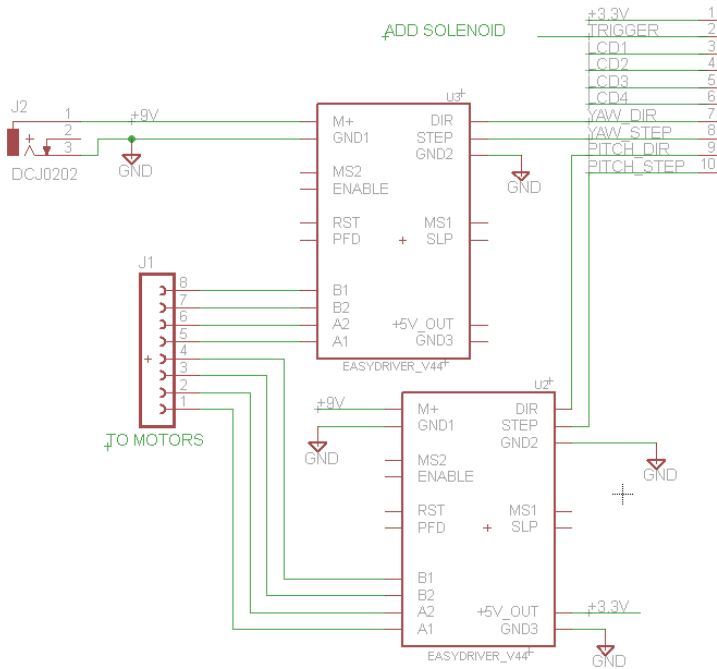
- Stepper motor controllers/power supply
- Switches for user interface

To Do:

- Solenoid / control circuitry
- LCD interface with 4 wire control max
- Assemble Circuit / Mechanical Prototype

Stepper Motor Controllers

Hardware Interface



Software Interface

```
void yawControl(int dir){
```

```
    //set direction pin high or low depending on dir value
```

```
    if(dir==BIT1){
        P2OUT |= BIT5;
    }
```

```
    else{
        P2OUT &= ~BIT5;
    }
```

```
    P2OUT |= BIT4;
```

```
    for(i=0; i<10;i++){
        P2OUT ^= BIT4;
        for(j=0; j < 101; j++); //delay between steps
    }
}
```

Function:

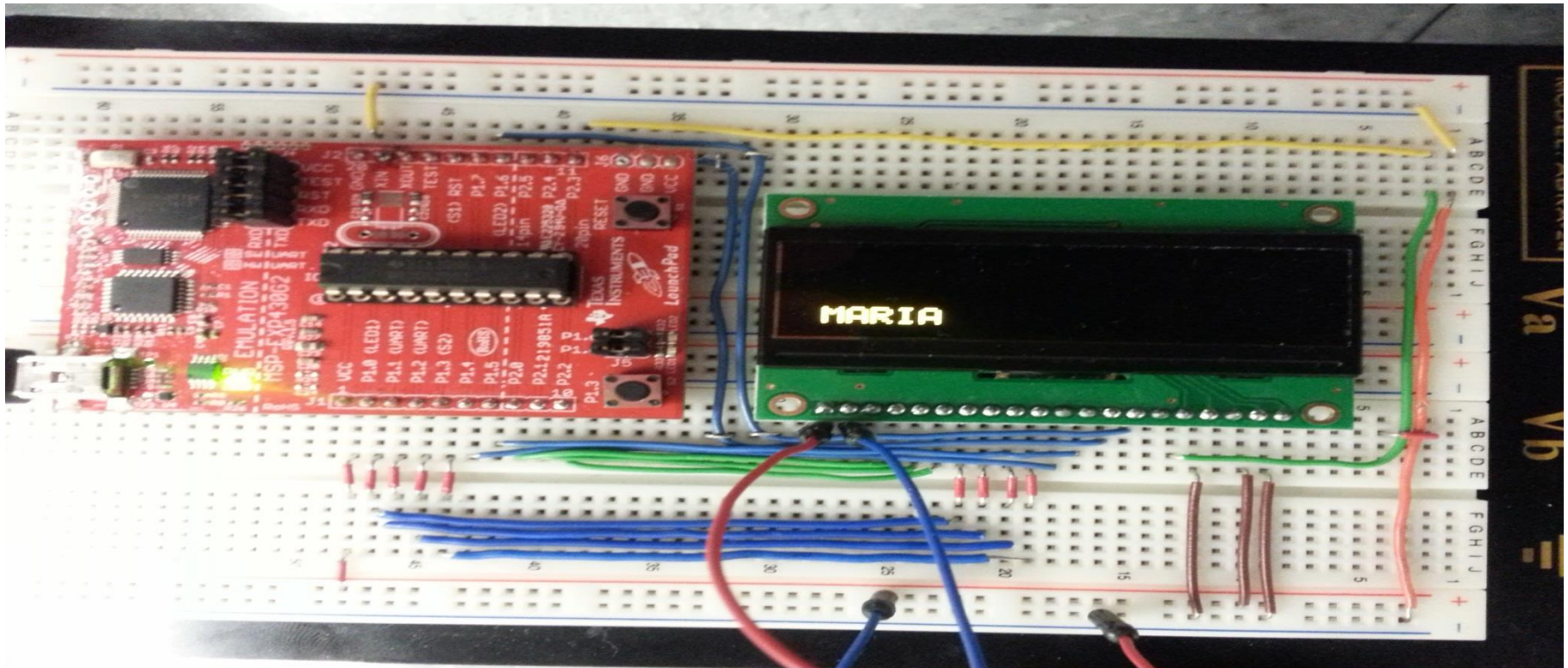
- Sets direction pin high/low depending on left or right switch pressed
- Interrupt calls loop to toggle “step” pin 10 times for 18 degrees of rotation
- Delay loop controls motor speed

Status:

- Prototyped and tested single motor. Need to copy code and update pins for second motor
- Will evaluate variable speed control based on press duration

LCD Display interface with MSP430

- LCD Specifications
 - NHD-2.23-12832UCY3
 - 128 x 32 pixel resolution
 - M68 Parallel Interface



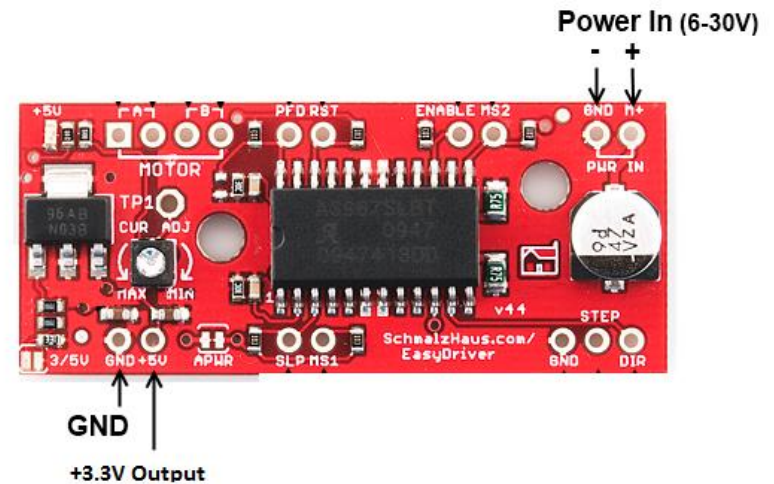
Power Distribution

Power Connector



- DC Power Jack connector
- 9 or 12v DC Voltage from Wall supply

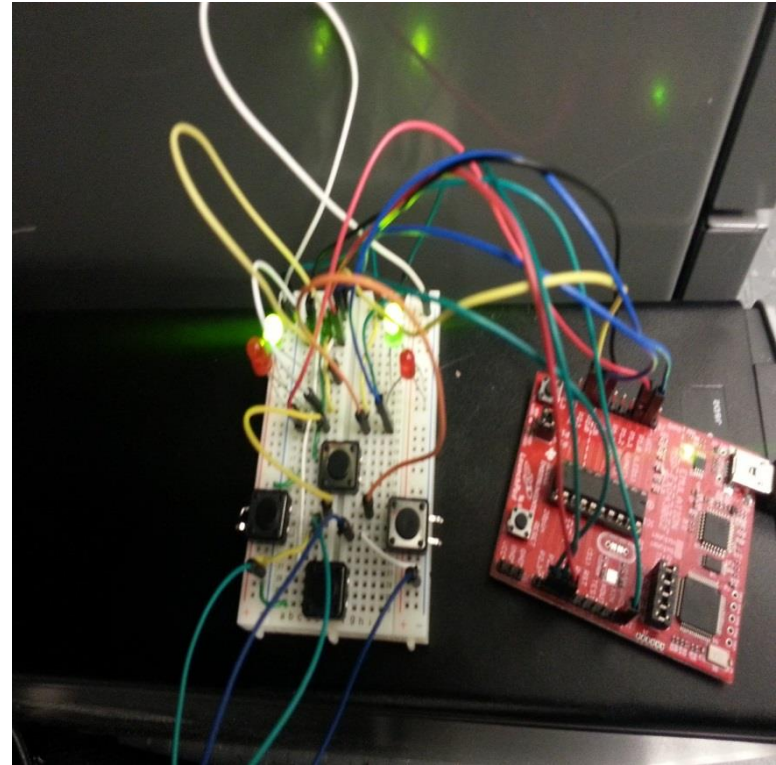
DC/DC Power Conversion



- Motor drivers have onboard DC/DC
- Can supply 400 mA to rest of circuit
 - Successfully tested running the MSP

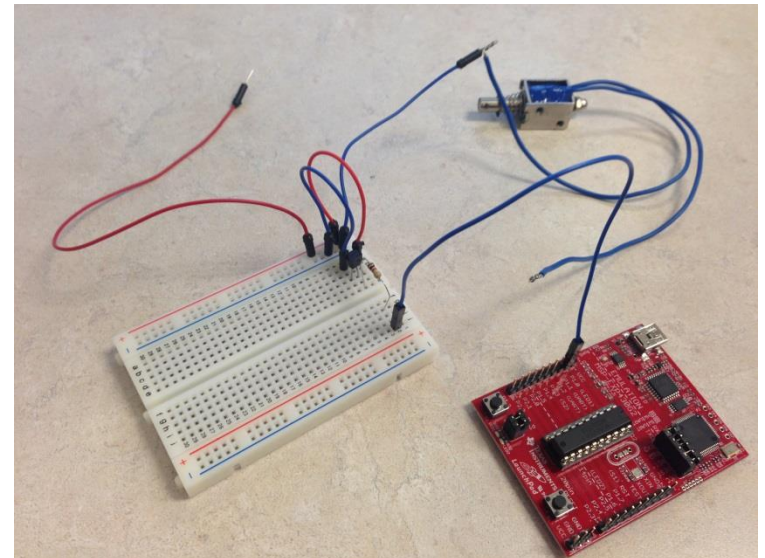
User inputs to the design

- 4 Pushbuttons use the interrupts to get the movements.
- Each pair (left and right)(Up and Down) produce two outputs for each Motor (one for directions the other for move steps)
- Ready LED is on when the Motors is not moving
- One more pushbutton for trigger



Solenoid Trigger

- Solenoid Spec:
 - $V_{dc}=12$
 - $I=500\text{ mA}$
- Transistor:
 - V_{ceo} = Up to 40
 - $I_c=1.0$



Project Status

Task Division:

Maria:	LCD Display interface with MSP430
Katayoun:	User Input to MSP430 and Power distribution
Mohammad:	Trigger solenoid and fire status detection
Ed:	Stepper motor interface and control

Components Working:

- Motors/Drivers
- Directional switches
- LCD display

To Do:

- Wire solenoid and design trigger circuit
- Add software to convey turret attitude to display
- Reconfigure pins in code for schematic draft
- Wire full prototype and combine code

Challenges:

- Pin count limitations; exploring shift register solution, may cut sensors/Status LEDs
- Finding appropriate transistor/switch to drive solenoid