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Weekly Meeting 2/2/22

Weekly Recap(1/26-2/2)

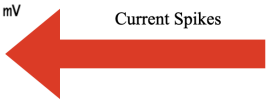
This week I have been working on the circuit and the individual elements that make up the PCB. I worked specifically on testing the motor with the current sensor, mainly just outputting the current and voltages read in by the sensor and outputting to the serial communication within the arduino using this code.

```
#include <Wire.h>
#include <Adafruit_INA219.h>

Adafruit_INA219 ina219;

enum states {
  STANDBY,
  CUTTING,
  REMOVAL,
  EXITING
};

enum states deviceState;

const float stallCurrent = 700;
const int PH = 10; //pb2
const int EN = 9; //pb1
const int motorEnable = 11; //pb3

const int pwm = 0;

const int high = 255;

void setup(void)
{
   pinMode(PH, OUTPUT);
   pinMode(EN, OUTPUT);
  deviceState = STANDBY;

  analogWrite(PH, pwm);
  analogWrite(EN, pwm);

Serial.begin(115200);
while (!Serial) {
  delay(1);
}

uint32_t currentFrequency;

Serial.println("Hello!");
```

```
// By default the initialization will use the largest range (32V, 2A). However
// you can call a setCalibration function to change this range (see comments).
ina219.begin();
// To use a slightly lower 32V, 1A range (higher precision on amps):
//ina219.setCalibration_32V_1A();
// Or to use a lower 16V, 400mA range (higher precision on volts and amps):
//ina219.setCalibration_16V_400mA();

Serial.println("Measuring voltage and current with INA219 ...");
}

void loop(void)
{
float shuntvoltage = 0;
float busvoltage = 0;
float current_mA = 0;
float loadvoltage = 0;
float power_mW = 0;

shuntvoltage = ina219.getShuntVoltage_mV();
busvoltage = ina219.getBusVoltage_V();
current_mA = ina219.getCurrent_mA();
power_mW = ina219.getPower_mW();
loadvoltage = busvoltage + (shuntvoltage / 1000);

Serial.print("Bus Voltage: "); Serial.print(busvoltage); Serial.println(" V");
Serial.print("Shunt Voltage: "); Serial.print(shuntvoltage); Serial.println(" mV");
Serial.print("Load Voltage: "); Serial.print(loadvoltage); Serial.println(" V");
Serial.print("Current: "); Serial.print(current_mA); Serial.println(" mA");
Serial.print("Power: "); Serial.print(power_mW); Serial.println(" mW");
Serial.println("");
if(deviceState == STANDBY){
  if(current_mA >= stallCurrent){
    deviceState == CUTTING;
    analogWrite(PH, pwm);
    analogWrite(EN, pwm);
  }
}

delay(2000);
}
```

I got results that were expected which means the connections were accurate and as the motor was moving, I tried manually stalling it to see what the current sensor can read. The motor's stall current should be 750 mA and when I tested the output you could see the spike of the current measurements from just running to being stalled. The measurement didn't read 750mA but 665mA and I think that is mainly because I didn't stall it for long enough with the delay so it showed the spike but because of the delay, it showed the latter part of the spike, therefore I will probably make the delay less time but for testing purposes it was able to demonstrate the spike in current. Therefore changes going forward is to ensure that the current to reach will be a little lower than the expected stlal current but as long as it is significantly over the regular current than the circuit should work fine.

```
12:43:40.792 -> Bus Voltage: 7.68 V
12:43:40.792 -> Shunt Voltage: 55.78 mV
12:43:40.792 -> Load Voltage: 7.74 V
12:43:40.792 -> Current: 266.80 mA
12:43:40.792 -> Power: 4410.00 mW
12:43:40.792 ->
12:43:42.776 -> Bus Voltage: 7.63 V
12:43:42.776 -> Shunt Voltage: 72.84 mV
12:43:42.776 -> Load Voltage: 7.70 V
12:43:42.776 -> Current: 665.90 mA
12:43:42.776 -> Power: 5092.00 mW
12:43:42.776 ->
12:43:44.792 -> Bus Voltage: 7.78 V
12:43:44.792 -> Shunt Voltage: 29.80 mV
12:43:44.792 -> Load Voltage: 7.81 V
12:43:44.792 -> Current: 268.60 mA
12:43:44.792 -> Power: 2802.00 mW
12:43:44.792 ->
12:43:46.808 -> Bus Voltage: 7.82 V
12:43:46.808 -> Shunt Voltage: 15.05 mV
12:43:46.808 -> Load Voltage: 7.84 V
12:43:46.808 -> Current: 265.60 mA
12:43:46.808 -> Power: 2516.00 mW
12:43:46.808 ->
12:43:48.792 -> Bus Voltage: 7.86 V
12:43:48.792 -> Shunt Voltage: 28.70 mV
12:43:48.792 -> Load Voltage: 7.88 V
12:43:48.792 -> Current: 306.00 mA
12:43:48.792 -> Power: 2396.00 mW
12:43:48.792 ->
```



I started testing the code with the motor driver and the entire circuit, however when I went to program the Arduino micro, the usb port fell off. I just bought a new one online and it should be at my apartment by the time I get home later today. This is a prevalent problem with the arduino micro as the usb isn't well placed on the board so even the slightest bit of pressure can rip off the usb, especially with the cheaper clones that are found on amazon.

Upcoming Week(2/2/22-2/9/22)

In terms of assignments for my class I have my beta build, beta test plan and progress presentation coming up that I need to work on. I am hoping that with the new arduino coming today I can work with just ensuring all of the connections work as intended and that the code performs the program. With this the PCB can be bought for the beta build and then we can start testing with the pcb and the gelatin by the end of february when it comes in.