Motor:

Using modified code from PWM for an LED, we were able to sweep through PWM lengths to change the motor speed. This was on a loop, speeding up and then slowing down over and over.

Current:

After looking into reading from the ADC pins, we were able to convert the ADC values to voltage and then calculate the current from that. According to those calculations, the motor can draw up to 2.06 amps (see the next page for a small section of the serial output).

Shaft Angle Encoder:

We found a few libraries (AiEsp32RotaryEncoder, Encoder, and ESP32Encoder) that are able to decode the signals from the SAE into more useful data, however when trying out the example sketches provided with the libraries we found that the ESP32Encoder example wasn't working at all providing no output. The example sketch from the AiEsp32RotaryEncoder appeared to work great but the position values drifted after moving the arm around a bit and the example from the Encoder library had very spotty output. With all three libraries failing to function properly we used an oscilloscope to verify the signals from the rotary encoder were correct. The signals OUTA and OUTB looked normal on the connector to the board but OUTA was never dropping below 1.6V directly on pin IO0. This is due to the fact that the pin IO0 is pulled up by default and we have not found a way to pull it down. The function pinMode(0, INPUT_PULLDOWN) did not work. Our plans are to remove the pin connected to IO0 and bridge pin 33 and 32 on the PCB so we can use IO4 instead of IO0.

Serial output from current reading:

Vup_ADC = 3622 and Vdn_ADC = 2393

Current = 1.98 amps

Vup_ADC = 3712 and Vdn_ADC = 2479

Current = 1.99 amps

Vup_ADC = 3792 and Vdn_ADC = 2545

Current = 2.01 amps

Vup_ADC = 3152 and Vdn_ADC = 2338

Current = 1.31 amps

Vup_ADC = 3892 and Vdn_ADC = 2649

Current = 2.00 amps

Vup_ADC = 3966 and Vdn_ADC = 2706

Current = 2.03 amps

Vup_ADC = 4028 and Vdn_ADC = 2757

Current = 2.05 amps

Vup_ADC = 4050 and Vdn_ADC = 2782

Current = 2.04 amps

Vup_ADC = 4095 and Vdn_ADC = 2819

Current = 2.06 amps

Vup_ADC = 4095 and Vdn_ADC = 2849

Current = 2.01 amps

Vup_ADC = 4095 and Vdn_ADC = 2883

Current = 1.95 amps