ME 333 Final Project

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Homework 8

28.4.1 Decisions, Decisions

1) **The NU32 communicates with the encoder counter by an SPI channel. Which SPI channel will you use? Which NU32 pins does it use?**

   UART Channel: 2

   NU32 Pins: F4/F5

2) **The NU32 reads the MAX9918 current sensor using an ADC input. Which ADC input will you use? Which NU32 pin is it?**

   Input: SDA1/SCL1

   NU32 pins: D9/D10

3) **The NU32 controls the DRV8835 H-bridge using a direction bit (a digital output) and PWM (an output compare and a timer). Which peripherals will you use, and which NU32 pins?**

   Peripherals: RD1 (digital output); OC1 (output compare); Timer3

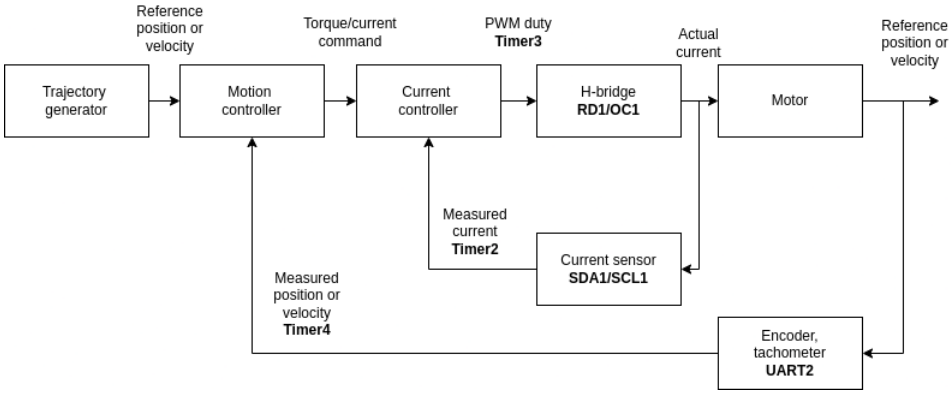
   NU32 Pins: D0/D1

4) **Which timers will you use to implement the 200 Hz position control ISR and the 5 kHz current control ISR? What priorities will you use?**

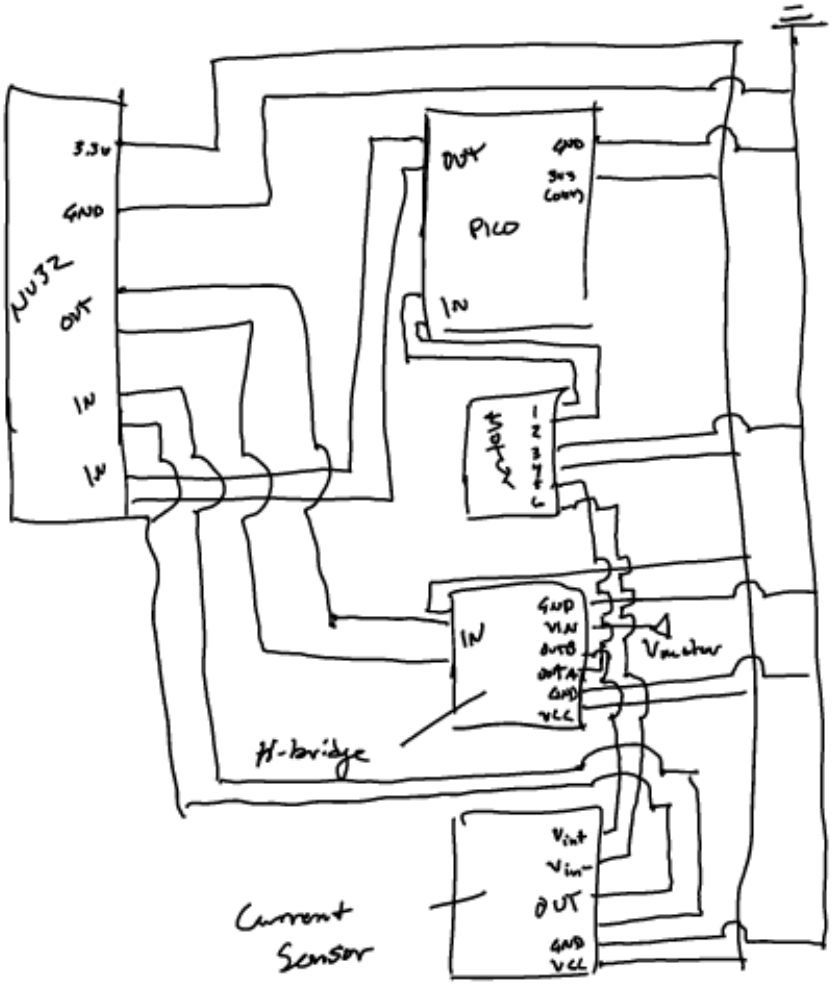
   Position control ISR: Timer4 — Priority: 4

   Current control ISR: Timer2 — Priority: 6

5) **Based on your answers to these questions, and your understanding of the project, annotate the block diagram of Figure 27.7. Each block should clearly indicate which devices or peripherals perform the operation in the block, and each signal line should clearly indicate how the signal is carried from one block to the other. (After this step, there should be no question about the hardware involved in the project. The details of wiring the H-bridge, current sensor, and encoder are left to later.)**



6) **Based on which circuit boards need to be connected to which pins of the NU32, and the connections of the circuit boards to the motor and encoder, sketch a proposed layout of the circuit boards relative to the NU32 so that wire crossing is approximately minimized. (Do not make a full circuit diagram at this time.)**



28.4.9 PWM and the H-Bridge

8) **Now that the PWM output appears to be working, it is time to wire up the DRV8835 H-bridge circuit, as discussed in Chapter 27.1.1, to the motor and the PIC32 outputs (Figure 28.8). Notice that the 15 mohm resistor on the current-sense PCB is in series with the motor. Turn in a circuit diagram showing all connections of the H-bridge to the NU32, motor, and current sensor PCB.**