

EE 308 – LAB 10**Serial Communications using the HCS12 SPI and the MAX522 D/A Converter**

In this lab you will use the HCS12 SPI serial interface to communicate with a serial D/A converter. You will use the on-board A/D converter to read a voltage from a potentiometer, and reproduce that voltage with the D/A converter.

1. Your EE 308 kit has a MAX522 D/A converter and several capacitors. The attached schematic shows how to wire the project. Build the circuit on the protoboard area of your HCS12 board.
2. Write a simple program to set an output voltage of 1.25 V for Channel A, and 3.75 V for Channel B. Run your program and verify that you have the correct output voltages.
3. Connect a potentiometer to one of your A/D inputs, as you did in Lab 9. Write a program to read the voltage from the A/D, write the eight most significant bits of the A/D value to the D/A, and display it on the terminal with the `printf()` function. Do this at a rate of about 16 times a second, using an RTI interrupt.
4. Connect the SPI data, clock and slave select pins to a logic analyzer, and capture a transfer over the SPI. Verify that the clock frequency, phase and polarity match the values you programmed them for. Decode the serial data stream for the transfer to the D/A converter, and verify that these are the values you expected.

Pre-Lab

1. What is the maximum SPI serial clock frequency you can use for the MAX522?
2. What should you write to the MAX522 to turn on both Channels A and B, and set Channel A to 1.25V? (This will be two bytes — control byte and the data byte.)
3. What should you write to the MAX522 to turn on both Channels A and B, and set Channel B to 3.75V?
4. Write the program for Part 3 of Lab 10.

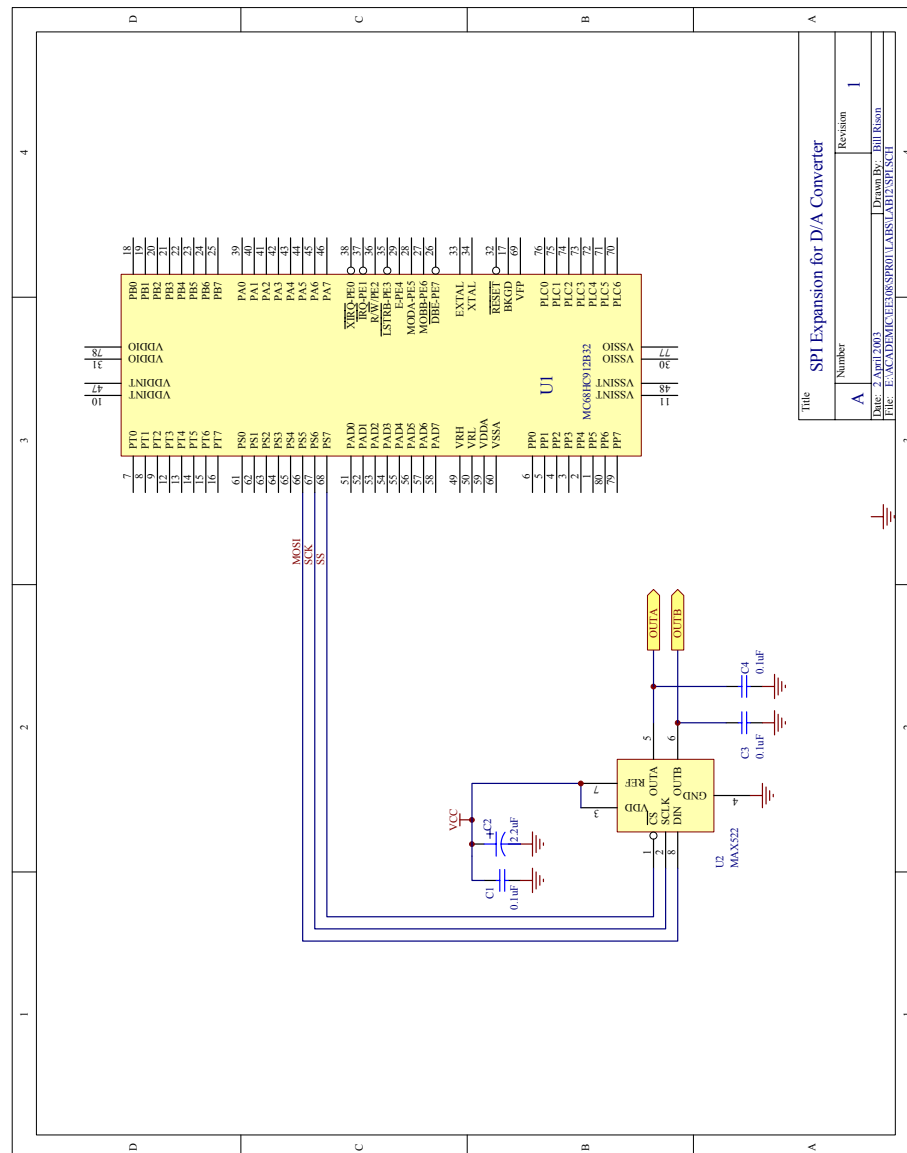


Figure 1. Schematic showing how to build the circuit to add the MAX522 D/A converter to your EVB.