A to D and D to A conversion

In this lab, we shall use the ADC converter included in the microcontroller used in the new 51S card and an external 12 bit DAC chip (MCP 4921). The DAC is connected using SPI (Serial Periphal Interface). We shall sample a wave form provided by a signal generator using the ADC and output the same data to the external DAC, thus re-constructing the wave form. The DAC is accessed using the SPI interface. SPI is another synchronous serial interface. The data sheet for MCP 4921 and a tutorial on SPI is being put up separately.

It is better to check your ADC code and DAC code independently, before putting them together to do waveform re-construction. Notice that the first two parts of the problem statement below are just implementation hints. The assignment is part 3.

1. Sample a DC value using the ADC and display the most significant 8 bits on the LEDs.

2. Read an 8 bit value from the slide switches and append four 0s at the LSB end to make it a 12 bit number. Output this value to the external DAC using the SPI interface. Check the output with a DVM.

3. Now connect the signal generator to ADC input and output the read values to the DAC, thus re-constructing the waveform.

In all cases, make sure that you never exceed the voltage rating of the ADC and the output current rating of the DAC.