Homework Assignment 4
Circuit schematics in multisim
Due February 16, 2011

For this assignment we are divided into teams as follows

Team	Members
Software/CPU	Marohn, Mason
Hardware	Yelton, Ravindran, Landavazo
PCB layout	Guillette, Huynh, Mason
Components/purchasing	Quiroga, Jorgensen

I am setting the due date for this homework as Wednesday February 16. However I may change the due date after receiving updates on February 14. On Monday February 14 I want a one-paragraph e-mail from each student. Describe what you did, the progress of your team, and how much work still remains to complete the assignment.

1. Software/CPU: Demonstrate programming the CPU with a program that can exercise ADC and DAC and verify. Produce pseudo-code outline of CPU software. Measure/estimate power consumption of CPU subsystem.

2. Hardware: Decide on high-voltage range (± 16 or ± 18?). Demonstrate functional tests of CMS, VVS, and Power:

   1) Show that CMS outputs theoretically expected voltage versus current in the few nA to 100μA range (large resistor plus function generator?). Measure/estimate power consumption of components and CMS subsystem.

   2) Show that Power produces expected voltage levels: 3.3 V, 5 V, $\pm$ high-V. Show that the voltage levels are maintained under a load similar to what is expected. Show that power can be turned off (coordinate with CPU and PCB teams to have CPU control incorporated). Measure/estimate power consumption of components and Power subsystem.

   3) Show that VVS produces expected bias voltage range as a function of 0-3 V input. Measure/estimate power consumption of components and VVS subsystem.

3. PCB layout: Create a complete PCB layout. The PCB layout should be in a state ready for manufacturing at www.4pcb.com (check their requirements). Gather information from CPU, CMS, VVS, and Power schematic authors, then take ownership. For some parts such as inductors, capacitors, and resistors you will need to decide on appropriate surface mount components (these can be changed in the final design if necessary). Easily obtainable parts are preferred for these. The dimensions of the PCB should be 46 x 46 mm with 3 x 3 mm cut out of each corner, 4-layer, two-sided. Assume total height available to be 8.5 mm (that includes thickness of PCB and height of components on each side). For connectors to probe and guard not yet specified, leave board space and place pads for later modification.

4. Components/purchasing: Catalog existing parts and required parts. Much of this information will need to be gathered from subsystem experts and PCB layout team. In

each list below indicate in which subsystem the parts are required in, and in what quantity.

1) Complete catalog of parts received to date. Including exact part numbers and quantities.

2) Complete list of parts required for the instrument. Including exact part numbers and quantities.

3) A differential list of parts that still need to be purchased.