**EE4951W Design Specifications**

Objective: To develop an intelligent monitor to analyze the power consumption of a battery powered device by simultaneously measuring voltage and current supplied to the device under test (DUT). A microprocessor will obtain the analog voltage across the DUT along with its current consumption and will convert them into two streams of digital data that will be used to calculate the power consumption of the DUT. Voltage and current readings as well as power calculations will be logged to an onboard SD card in order to provide analysis of past readings. The device will provide minimum, maximum, and average voltage and current measurements as well as power calculations which will be shown on an LCD for real-time observations.

**Primary Constraints**

1. Input voltage range: 3.3 – 24v

2. Maximum power consumption: 1W

3. The system should provide 5 significant figures for current measurements in the range of 10µA to 1A and voltages in the range of 3.5 to 24V

4. The device should be able to be powered parasitically from the DUT

5. The device should log data to an SD card in csv format

6. The microcontroller should have USB accessibility for debugging and performing firmware upgrades

7. The device should be able to respond to push-button commands to start or stop statistical calculations.

**Secondary Constraints**

1. The system should be able monitor its own power consumption by means of an additional analog circuit that will provide measurements for current and voltage that the microprocessor will use to provide the consumption of the system by the command of a switch

2. Output real-time data over USB

3. Microprocessor and circuitry for analog voltage and current measurements should be able to operate from a 5-Volt source, such as the terminal from a USB cable connection

4. The system should be able to withstand accidental reversed power supply connections

5. The microcontroller should enter a minimum-consumption state once inactivity reaches a determined length of time (sleep mode)