 **The mcEmeter**

Measures the long term energy usage of a load, i.e. Cell Modem, Radio or Instrument, by sampling its operating DC current and voltage. Both may vary with time. The base sample rate is about 1750 sps for a sample time of about 570 us. Energy consumption is E = V \* I \* t. Because sampling is not continuous, some energy is not measured when the internal microcontroller program performs other functions. This is compensated for with a scale factor applied to each energy measurement. These energy measurements are added to accumulate the total energy used. The time-averaged power is calculated by dividing the accumulated energy by the elapsed time.

There are two current measurements made for lower and higher values. The low current range extends to 1 A with a resolution of about 1 ma. The higher range extends to 10 A with a resolution of 10 ma. Range switching is automatic. The overange for the voltage measurement is 27 V. The absolute maximum voltage at V+ or L+ is 40 V.

A report is produced on a Sunfounder I2C LCD2004 display. The Sunfounder LCD library must be added to Arduino(#include <LiquidCrystal\_I2C.h). In addition to the energy consumed and time-averaged power, the current and voltage at the time of the report is displayed. This and other information is also available via the usb port to a serial monitor.

Here is a basic wiring diagram showing how to wire up a load, and **Commando 10,000** Packaging

-Team Electro

