NILM Test bench – Data Acquisition

Analog Bin Logger – SdFat Library – William Greiman

Analog Bin Logger.ino logs analog data to a binary SD file at high rates. Samples are logged at regular intervals by using timer1. Timer/Counter1 Compare Match B is used to trigger the ADC for the first pin in a sample. The ADC is triggered for remaining sample pins in the ADC conversion complete interrupt routine. Data is captured in the ADC interrupt routine and saved in 512 byte buffers.

Buffered data is written to the SD in a function called from loop (). The entire data set is written to a large contiguous file as a single multi-block write. This reduces write latency problems.

Many inexpensive SD cards work well at lower rates. I used a $6.00 SanDisk 4 GB class 4 card for testing. SanDisk class 4 cards work well at fairly high rates. I used the 4 GB SanDisk card to log a single pin at 40,000 samples per second.

Sampling pins: A0 & A1

ADC bits: 10

ADC clock kHz: 1000

Sample Rate: 15873.02 Hz

Samples / Cycle: 318

Sample interval uSec: 63.0000

Record time sec: 10.003

Sample count: 158768

Overruns: 0

Total no of Trials: 50

Time for Each Trial: 50 Seconds

Total Time for 50 Trials: 45 Mins

Size of Each CSV File: 1.36 Mb

Total Size of data for 50 Trials: 68.1 Mb