Raspberry Pi Power Consumption

4/30/2019

1. Measure the Voltage input by the Breadboard using a 116

Voltage from the breadboard: 5.045 V

2. Set up the breadboard power supply to the the R-PI
3. Resistance across the R-PI: 6.580 k Ohm's
4. Equivalent resistance 6500 ohms

V = IR so I should be 5/6500 = 0.000769 amps

5. We measured the current through an equivalent resistance of the R-PI.

Current measured was : 525.4 micro amps

We attempted to put the R-PI in series with a DMM via the breadboard. The R-PI was able to turn on from the breadboard but when the current was below 5 volts (around 4.8 volts). The R-PI was not able to turn on the when voltage was around 4.7 volts and in series with the DMM. We tried this several different set ups but for some reason we can not find out why the R-PI would not turn on. Our plan for next class is to try to use power directly from the direct power supply.

5/1/2019

Objective for today is to again figure out the power consumption of the R-PI by measuring the current that the computer uses when it runs on 5 volts. We plan to use the direct current supply tower instead of the breadboard.

First we will trial the set up on equivalent resistance to the R-PI in order to see what that current would be with a constant resistance.

Current reading through equivalent resistor and direct power supply = 498.5 micro amps

Set up the R-PI in series with a 116 DMM powered by the direct current supply. When we turned the tower on the R-PI did not turn on and we got OL on the DMM. However when we turned off the power supply we noticed that the DMM was giving current readings that then dissipated to eventually be zero.

Tyring the same set up only this time using a 115 DMM instead of the 116. This resulted in the R-PI turning on and the DMM reporting current readings. Not expecting this we were not prepared to collect data on this trial. We are noticing the current fluctuating quite a bit in around .150 amps with some sudden spikes above 0.200 amps (at the beginning). We let the R-PI stay on for some time and did not notice any major spikes due to off loading.

Over time we realized that the current is very stable around .150 amps and will jump up to 0.200 amps and then down to 0.170 amps when it is off loading.

Setting up the same set up as used above (R-Pi in series with ammeter and DC power supply with no bread board). In this trial we will film the DMM as we turn on the DC power supply and keep filming the DMM until we go through 3 cycles of data and then turning off process. By recording the screen on the DMM we will be able to get the current as a function of time so that we will eventually be able to graph the power consumption over this increment of time.

An idea that we had was to obtain a current probe in order to collect data on the oscilloscope by collecting current and voltage on the same meter over time and then we could export the data from the oscilloscope. We also thought about obtaining a DMM that had the capability to connect to a computer where we could collect data over time more easily. Both of these options were unreasonably expensive and therefore we did not pursue either of these options.

Another idea we had was to purchase a USB power measurement tool that would allow us to read the current over time. This seems as of right now the best solution from a cost and accuracy perspective.

Performed trial using the DMM 115 and filmed its screen. Voltage input was 4.8 volts.

Important times to note:

- Raj begins power off at 4:26 on the iPhone clock
- Blue light turned off: 10:49 (manually)

Data was collected on the video and then we transferred the data into this spreadsheet (https://docs.google.com/spreadsheets/d/1rh-trSPzvCVzw3KOLzDJ0J0YvzEZVs9zdJmHyxJ9Mnc/edit#gid=0)