Lab Report: Glucose monitor

Eric Miller

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1 Voltage Source

Having my younger siblings visiting for Family Weekend, I asked them to find a pair of resistors ending in "k" with a ratio of approximately $2:3$. The resulting resistor values were nominally $4k\Omega$ and $6.04k\Omega$, for a theoretical voltage divider output of

$$5V * \frac{4k\Omega}{4k\Omega + 6.04k\Omega} = 1.992V$$

The actual measured value was slightly lower, at $1.97V$, but the difference wasn't significant enough to be a problem.

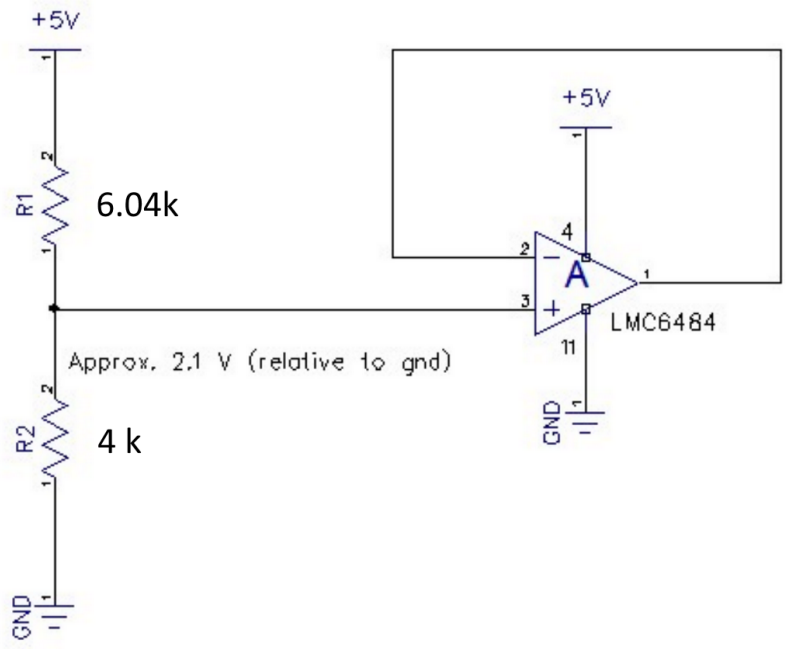

Figure 1: Voltage Divider circuit

Ch	Name	Value
C1	Average	1.976 V

Figure 2: Voltage Divider results

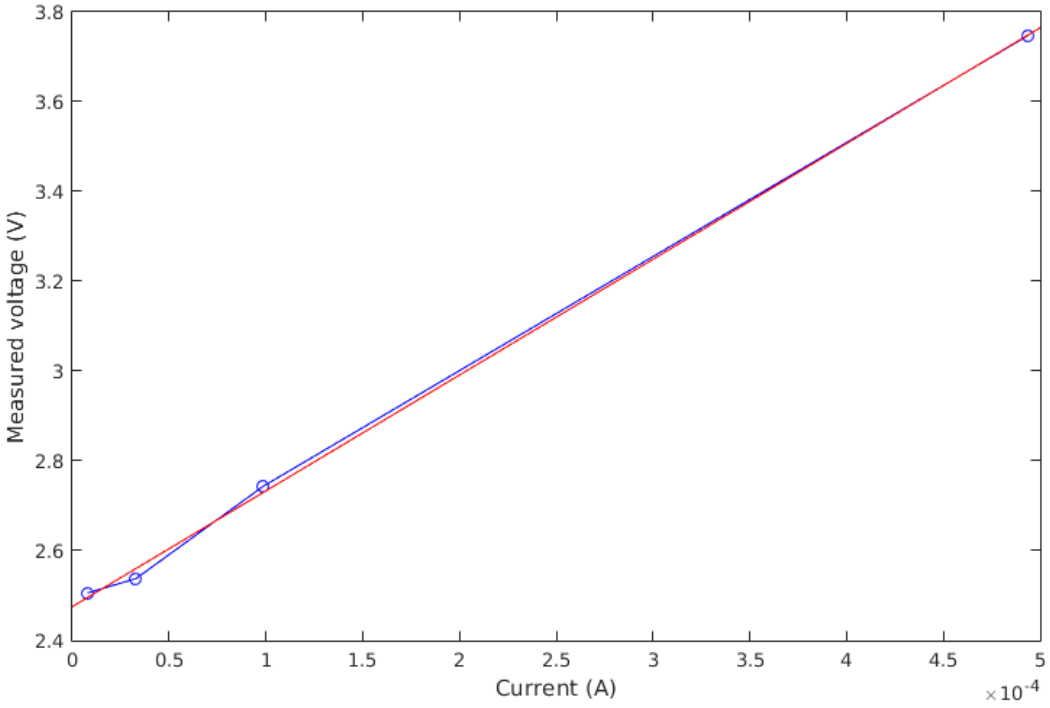

Figure 3: Partial current measurement results

2 Measure Resistance

Five resistor values were tested, as shown below. For each resistor, the current it theoretically allowed was calculated as $\frac{1.976V}{[Resistance]}$, also in the table.

Table 1: Resistor testing data

Resistance	Calculated Current (mA)	Measured voltage
604	3.272	4.96
4000	0.494	3.75
20000	0.099	2.74
60000	0.033	2.54
249000	0.008	2.50

Shown here is a plot of the Currents and measurements for the lower four rows in the table, those with less than $1mA$ theoretical current flow. As expected, the data points fall nicely along a line, giving an accurate way to measure small currents. (Figure 3)

Unfortunately, the 604Ω resistor proved to allow more current to pass than the system could reliably measure, as seen by the fact that its data point falls well off the line. (Figure 4 on the next page)

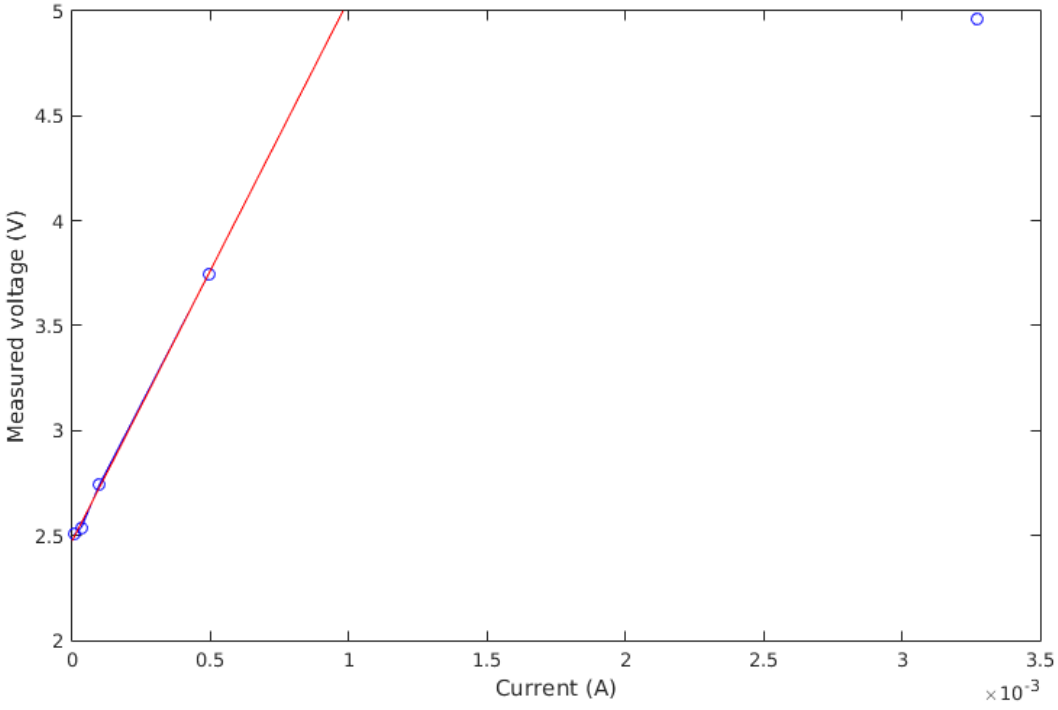

Figure 4: Full current measurement results