LifeBud Project

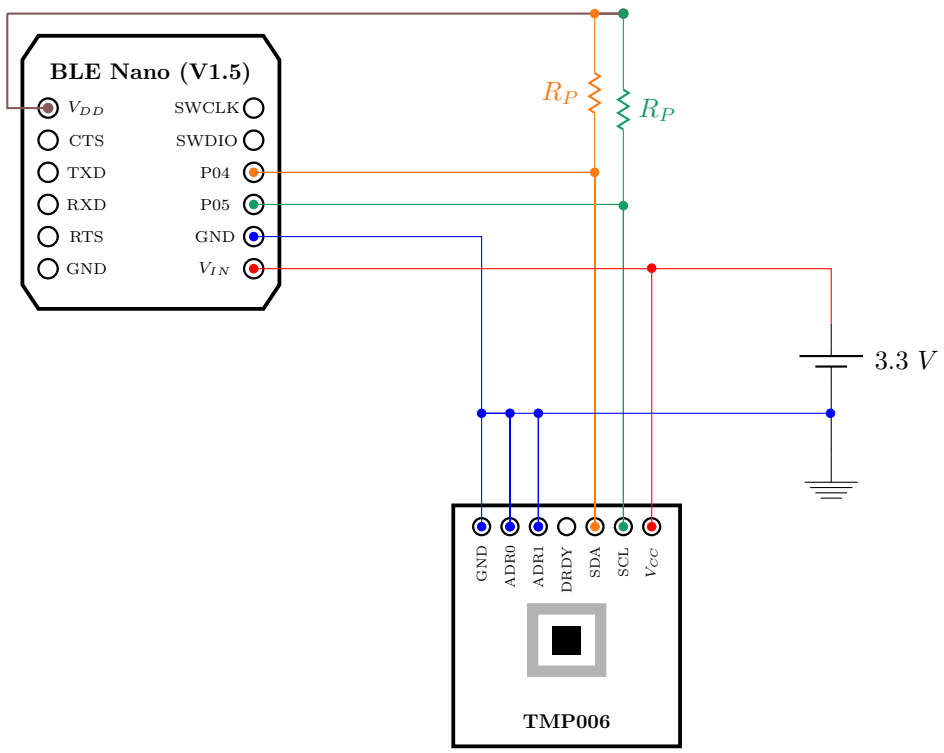
Chad Chapnick
Saint Louis University Biomedical Engineering Department

June 27, 2016

Hardware

For the SDA and SCL connections we need pull up resistors. These are used to ensure that inputs to logic systems settle at expected logic levels if external devices are disconnected or high-impedance is introduced. Usually used with open-collector or open drain outputs.

Circuit Diagram



Calculations

To calculate the value of the pull up resistor needed for the temperature sensor:
`http://www.ti.com/lit/ds/symlink/tmp006.pdf`
`http://www.ti.com/lit/an/slva689/slva689.pdf`

- Low-Level Output Current (I_{OL}) : 6 mA
- Output Low Voltage (V_{OL}): 0.4 V

$$R_{P(min)} = \frac{V_{CC} - V_{OL(max)}}{I_{OL}} = \frac{3.3\ V - 0.4\ V}{6\ mA}$$
$$\approx 483.33\ \Omega$$

$$R_{P(max)} = \frac{t_r}{0.8473 \cdot C_b} = \frac{300\ ns}{0.8473 \cdot (3\ pF)}$$
$$\approx 118\ k\Omega$$