

# Building a Portable Dual Beam Microscope

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# PROJECT: Portable Dual Beam Microscope

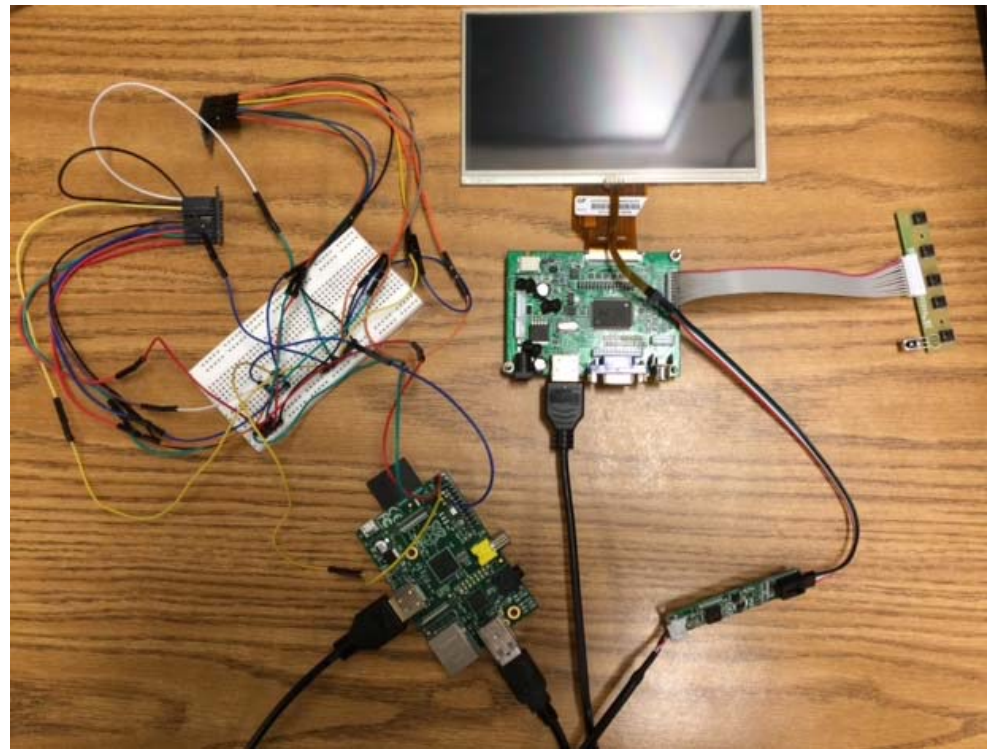
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- Focused Ion Beam (FIB)
- Scanning Electron Microscope (SEM)
- Electron Gun
- Ion Gun

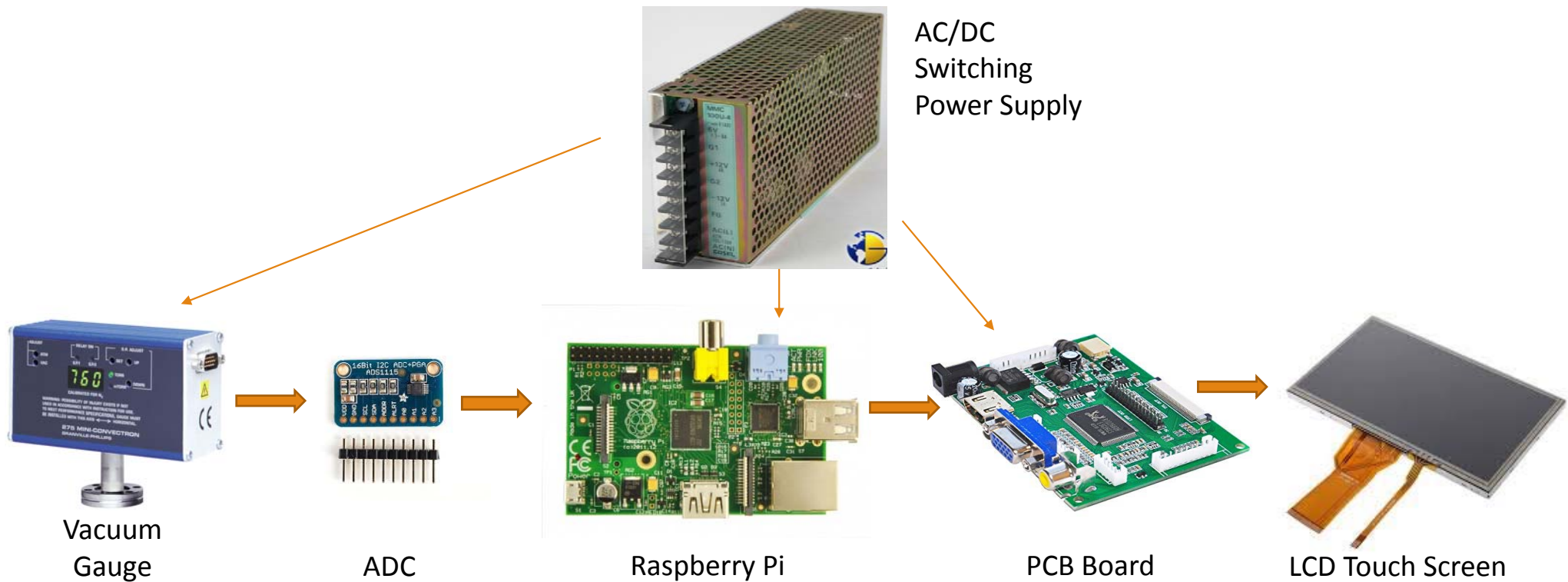


# Control System for the Vacuum Gauges

- Four Vacuum Gauges
- Two Analog to Digital Converters (ADC)
- Raspberry Pi 1 Model B
- PCB Controller Board
- 7" LCD Touch Screen Display
- AC/DC Switching Power Supply

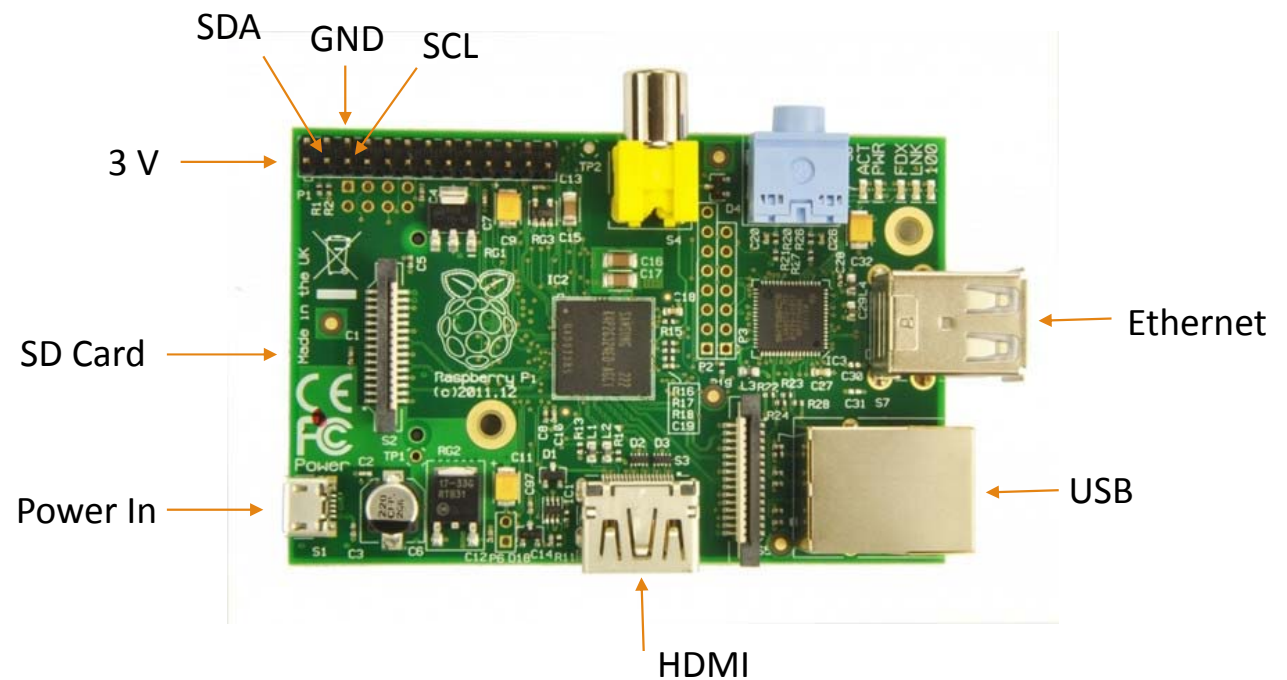


# Control System Break-Down



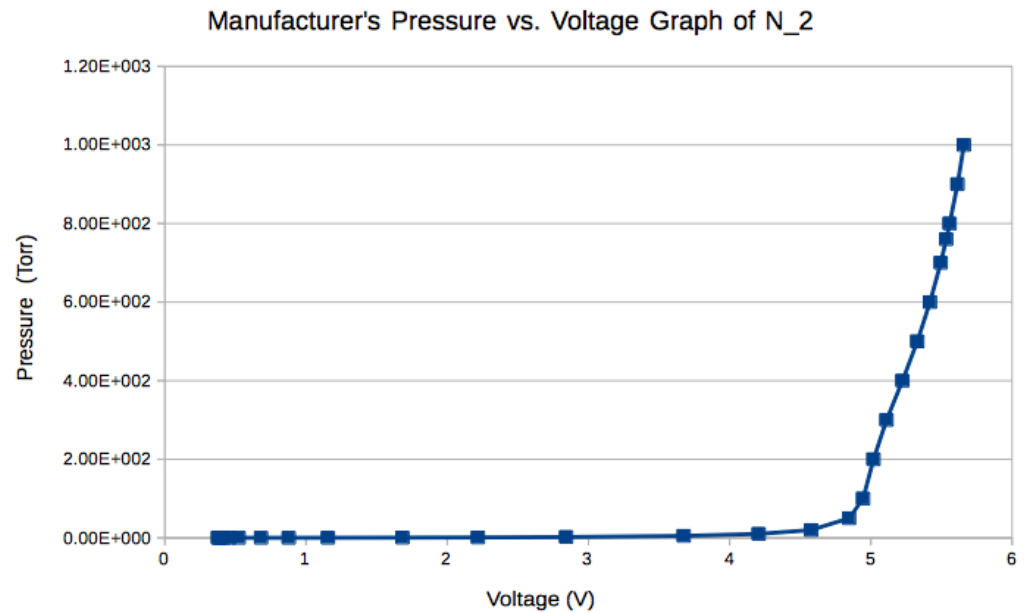
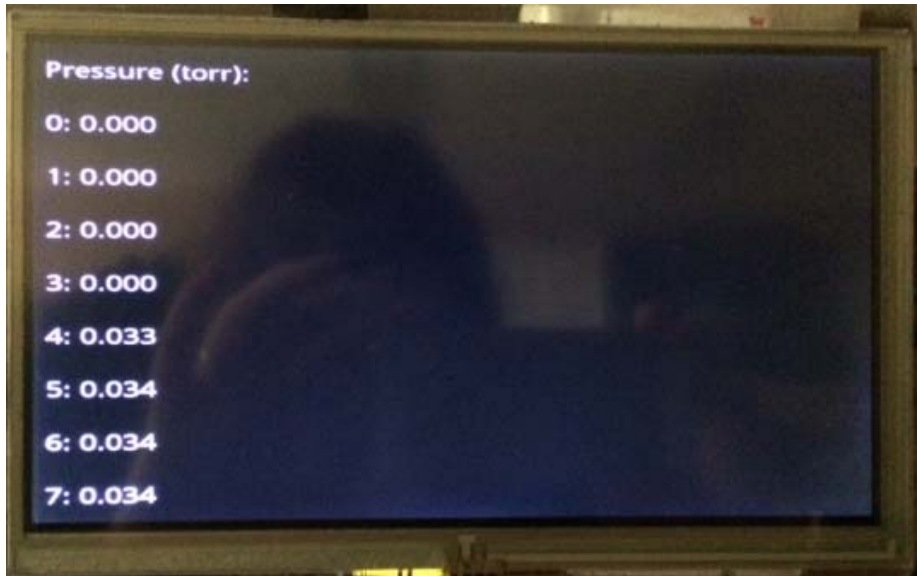
# Programming the Raspberry Pi

- What is a Raspberry Pi?
- Operating System: Raspbian
- GUI: Kivy-Pi
- Language: Python
  - Converting voltage to pressure



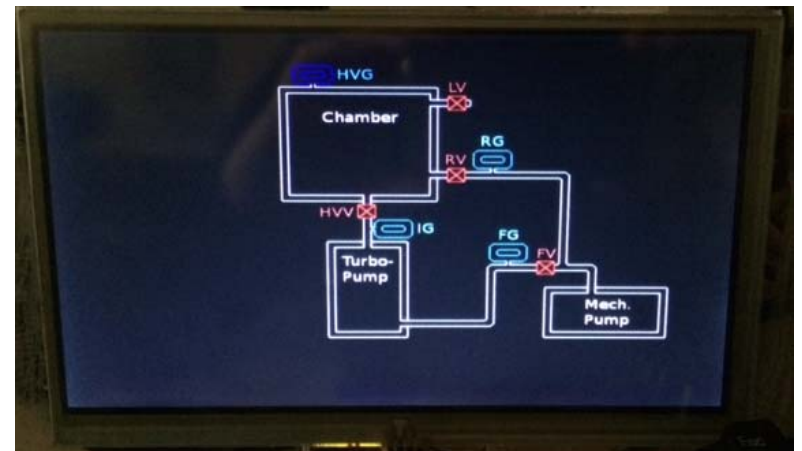
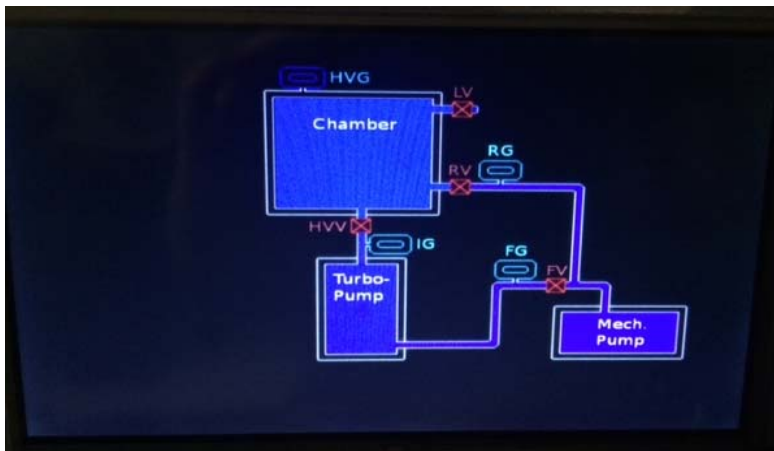
# Converting Voltage to Pressure

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# Where to go now?

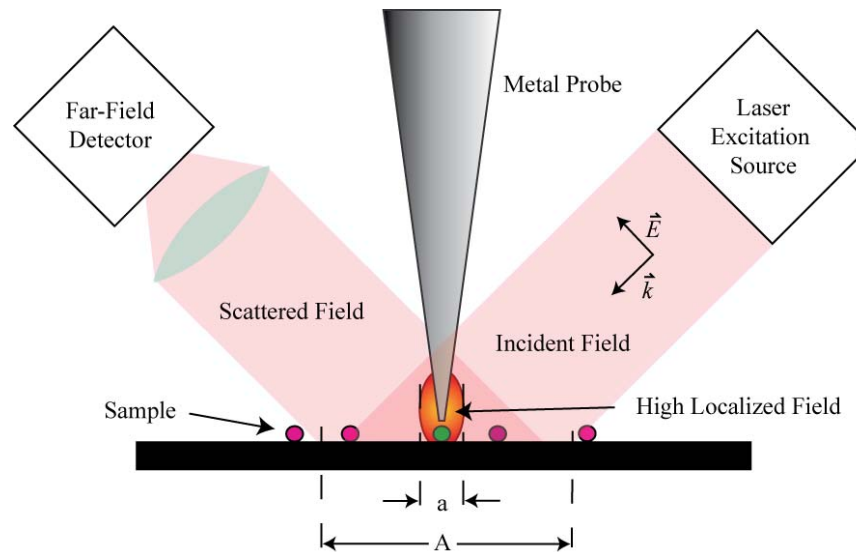
- Automate Pump Down System:
  - Opening/Closing Valves
  - Pump Down Curve
  - Pressure System Diagram
- Reference Manuals





# Applications

- Teaching
- Tip Manufacture  
for an TENOM  
Microscope
- Research



Conceptual drawing of a side illuminated TENOM probe.





# Thank you!

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- National Science Foundation (NSF)
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    - Dr. Sanchez
    - Group: Jeff, Cosmo, & Will
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