# Blood Pressure

Objectives

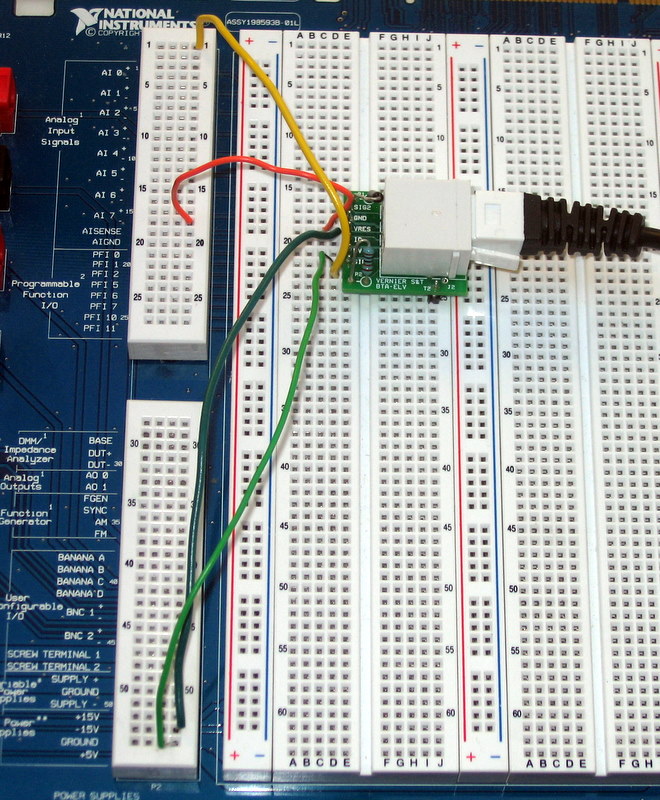
MATERIALS

* NI LabVIEW 8.5.1
* NI ELVIS II Benchtop Workstation
* NI ELVIS II Series Prototyping Board
* AC/DC power supply
* NI ELVISmx 4.0 or later CD
* High-speed USB 2.0 cable
* Computer
* Wires to build circuits
* Vernier Analog Proto Board Connector (Order Code BTA-ELV)
* **<<<<SENSOR>>>>>**

Theory

Building the experiment on elvis II

The Vernier sensor attaches to NI ELVIS II through the Analog Proto Board Connector. The following steps and Figure 1 below illustrate how to connect the Analog Proto Board Connector to the NI ELVIS II Series Prototyping Board.



**Figure 1: Connecting the Analog Proto Board Connector to NI ELVIS II**

Connect the following pins to wire the connector:

1. AI0+ to SIG1 of the Analog Proto Board Connector
2. +5V DC power supply to 5V of the Analog Proto Board Connector
3. GROUND power supply to GND of the Analog Proto Board Connector
4. AIGND to GND of the Analog Proto Board Connector

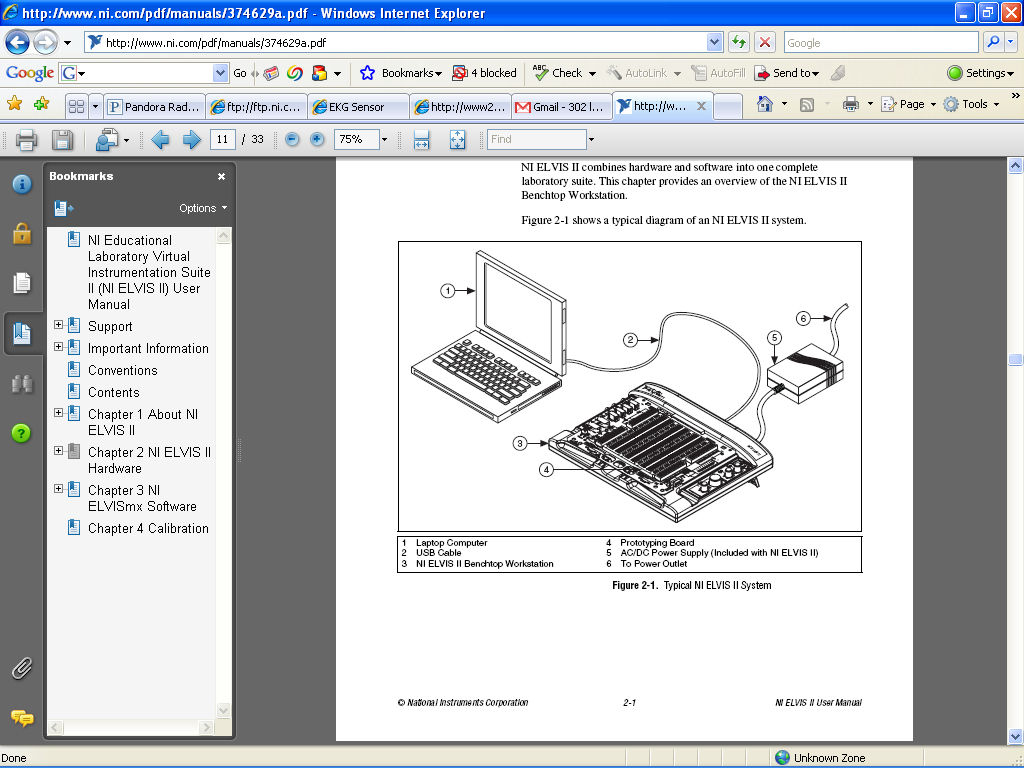
Running the Experiment

To set up the experiment on NI ELVIS II:

1. Connect the power supply and USB cable from NI ELVIS II to your computer
2. Turn the prototyping board power switch located on the rear panel to the on position (see Figure 2)
3. Turn the prototyping power supply switch located on the benchtop workstation to the on position (see Figure 2)

* A green power LED should now be lit, indicating that the full power supply is turned on
* A yellow USB ready LED should also be lit, indicating that the NI ELVIS II is properly connected to the USB host

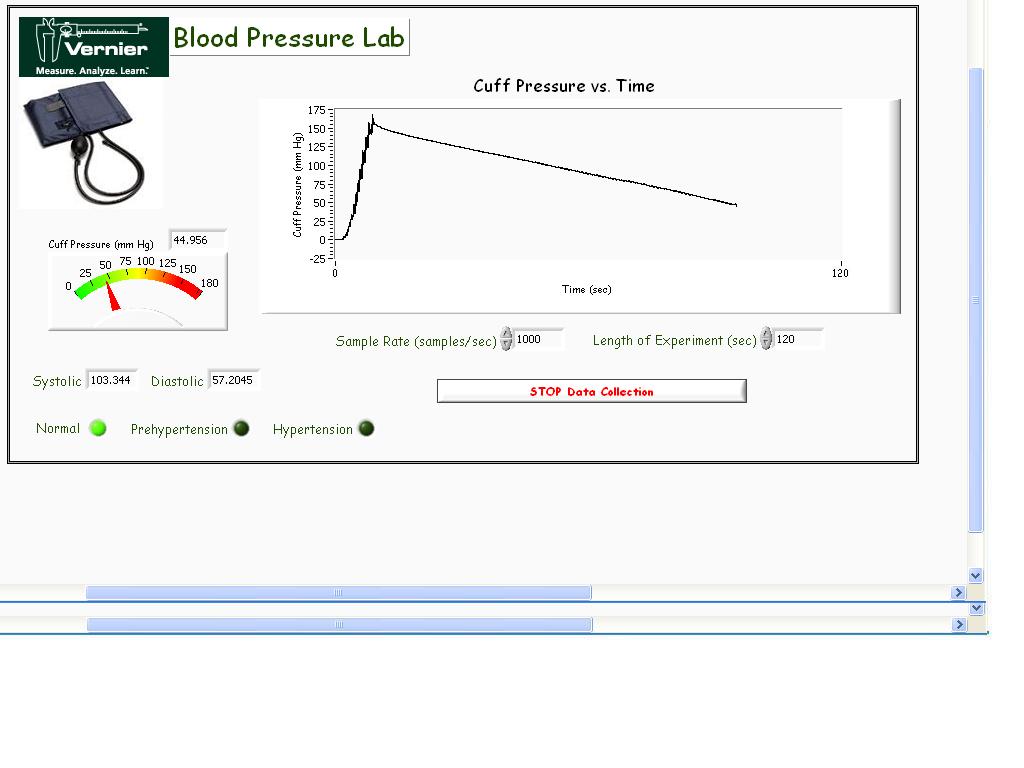
1. Insert the **<<<<sensor>>>>** to the Analog Proto Board Connector connected to AI 0+



**Figure 2: NI ELVIS II Set-Up**

To set up the experiment on LabVIEW:

1. Open LabVIEW 8.5.1 on your computer
2. If the Biomedical Applications palette is not installed on your computer:
   * **Go to** [**http://www.ni.com**](http://www.ni.com) **and click on \*\*\*\*\*\*\*\***
   * **<<<insert instructions to download palette>>>>**
3. Open a blank VI from the initial “Getting Started” pop-up menu
4. On the front panel, go to “Window” and select “Show Block Diagram”
5. Right click in the white space of the block diagram to view the Functions palette
6. To access the Muscle Fatigue VI: scroll to Biomedical Applications >> Vernier Sensors >> Muscle Fatigue
7. Drag the Muscle Fatigue VI onto the block diagram
8. Go to “Window” and select “Show Front Panel”
   * The front panel is shown below in Figure 3
   * The Force vs. Time graph displays the force recorded by the hand dynamometer over time in Newtons
   * The EMG graph displays the electrical activity of your muscles recorded by the three surface electrodes
   * The maximum, minimum, and median force indicators display the maximum, minimum, and median force recorded over the entire length of the experiment, respectively
   * Selecting the “Write to file?” boolean allows you to save the data as a .lvm file
   * The default experiment length is 60 seconds
   * The default sampling rate is 1000 samples per second
   * The “STOP Data Collection button” will terminate data collection at any point during the experiment



**Figure 5: Example Experiment Front Panel**

Data Collection

Reminders: change exhaust rate of cuff

Change experiment length if need longer time

Data Analysis

CHALLENGE

This section of the lab will introduce some of the basic concepts about the code used to produce this program. There are a series of hints followed by a couple of questions. This is meant to give you a chance to explore LabVIEW code and to begin to understand how the program is structured.

references

NI Educational Laboratory Virtual Instrumentation Suite II (NI ELVISTM II) User Manual.” National

Instruments. Austin, TX: National Instruments Corporation. 4/08. [www.ni.com](http://www.ni.com).

**<<<INSERT SENSOR>>** User Guide. Vernier Software & Technology. Rev. 4/30/08. Accessed 7/15/08.

[www.vernier.com](http://www.vernier.com).