

BASIC VOLTAGE ACQUISITION USING LARVA

The world is full of sensors, actuators and other devices that can be read, controlled and interfaced. Examples include sensors, such as a temperature sensor that costs less than a dollar to massive and expensive microscope or telescope systems. Similarly, actuators can be simple, cheap solenoid valves or large, complex motion systems.

Many of these systems, independent of cost and complexity, interface to the world via reading and writing voltages. Data acquisition allows us to interface those devices to our computers so we can get the data and control the devices.

LArVa is a free driver that turns an under \$30 Arduino microcontroller into an ultra-low cost data acquisition system. While spending hundreds, thousands or more dollars on data acquisition system is necessary in some cases, inexpensive data acquisition can do a lot for a very little... and with more and more amazing and inexpensive sensors and actuators available every day, there are unending possibilities.

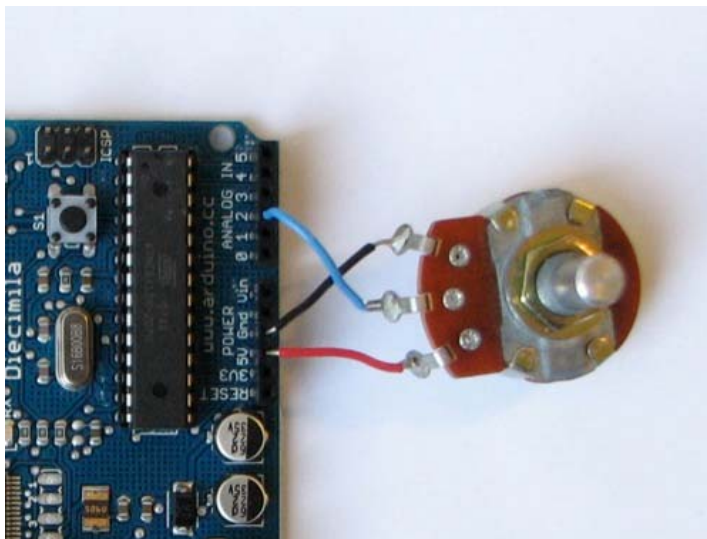
WHAT YOU NEED

You will need an Arduino microcontroller and the LArVa Simple Graph Application installed on your computer. LArVa is free from AngstromDesigns.com. For download and installation, see User Guide UG01 – Installing LarVa for Windows at AngstromDesigns.com.

This Application Note will show how to measure a voltage from the most basic voltage source, a simple voltage divider using a potentiometer (pot). You will need a potentiometer and some wire. We recommend plugging into the Arduino pins using male, single inline headers, so you'll need some headers too.

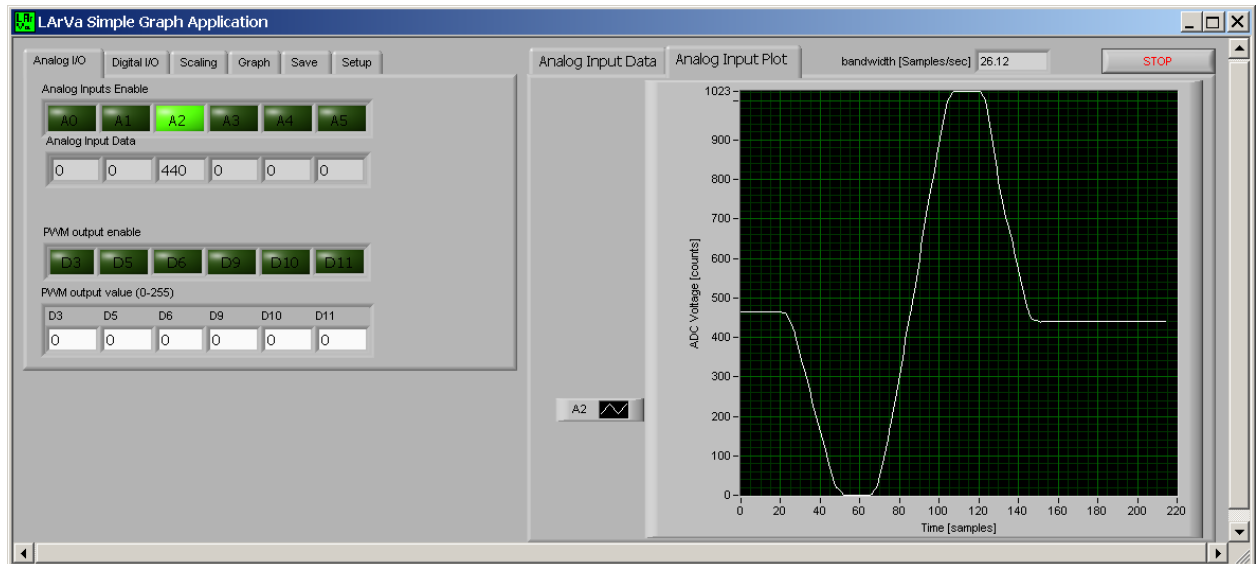
WIRING UP A POTENTIOMETER

Wire up your potentiometer as shown below. One side of the pot is connected to Arduino power (5V), the other side is connected to ground (GND). The wiper, or the center terminal, of the pot is connected to analog input pin A2.



MEASURING THE POTENTIOMETER VOLTAGE

Open LArVa Simple Graph.exe and gather analog input channel A2. You should see the potentiometer voltage spanning from 0 (0V) to 1023 (5V). Turn the pot to see the voltage change on the graph. That's it. You can now measure voltages from all types of sources.



ADVANCED ANALOG INPUT

Displaying a single, simple voltage on the graph is just the start of what you can do with LArVa. Here are a few other things to check out while you are gathering voltages:

- Try enabling multiple analog inputs to gather multiple signals at the same time
 - You can also send out PWM signals, set digital line voltages and read digital line voltages
- You can change the offset and scaling of the graph from the 'Scaling' tab
- You can change the graph labels, clear the graph data and deactivate updates from the 'Graph' tab
- You can save the data to a text file in the 'Save' tab
- There are many advanced option in the 'Setup' tab including:
 - Options to increase or decrease the number of averages LArVa performs in firmware before sending the data back to the computer
 - Setting the delay, in milliseconds, between each voltage read
 - Returning the averaged analog input values as floating point numbers or integers
 - Using the bit depth of the analog inputs more effectively by setting the ADC Voltage Reference
 - Changing communication rates
- You can run, edit and improve on LArVa Simple Graph using the sample programs in Labview 2010, or higher, format. These are installed in the program files directory with LArVa simple Graph.

LEARN MORE AND STAY IN CONTACT

For more applications, user guides, help, questions and too see what else is going on with LArVa, go to www.AngstromDesigns.com.