

## INSTALLING LARVA FOR WINDOWS

This guide walks you through how to install LArVa on Windows. LArVa will turn your Windows computer and an Arduino microcontroller into an ultra-low cost, data acquisition system. You can use this system to interface to all kinds of sensors and actuators, gather data, save the data and much, much more. Let's get started.

## WHAT YOU'LL NEED

All you need is a computer running a Windows operating system, an Arduino microcontroller, a USB cable and an internet connection. We'll use some solid core jumper wire to test the installation, as well. If you want to edit the sample files included in LArVa you will need Labview 2010 or higher and if you want to connect to any sensors or actuators you will need those too. However, this install guide requires no more than your computer, the internet and an Arduino and cable.

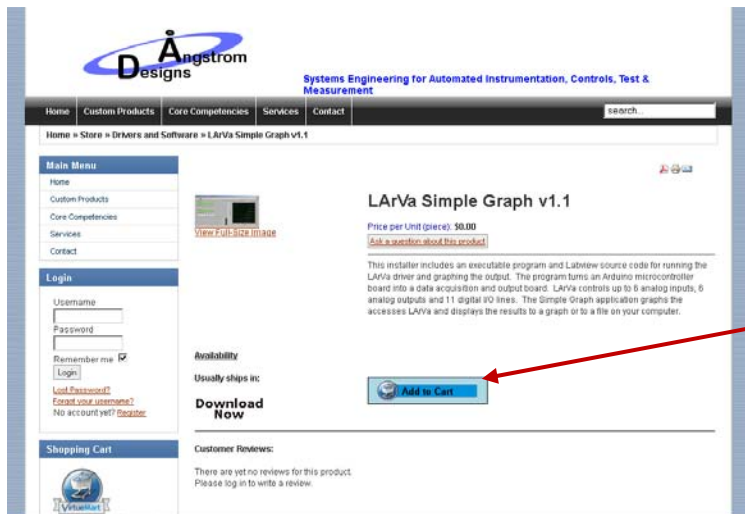
## GETTING LARVA

First you will need to download LArVa. This guide uses the Simple Graph Application using LArVa. Go to:

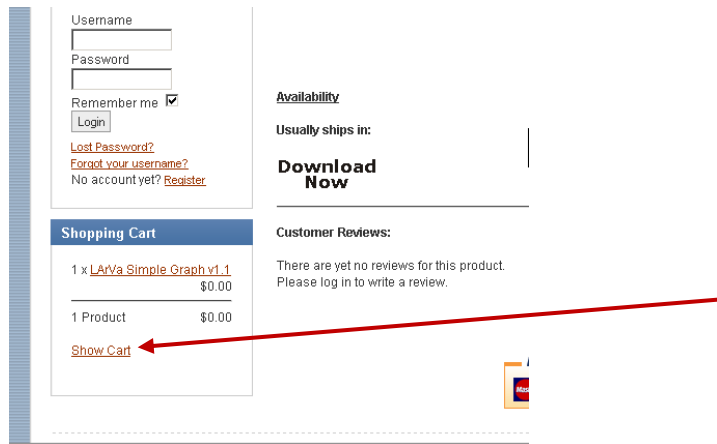
<http://angstromdesigns.com/larva/download>

to get the zip file containing the application and driver. Follow the links to the download section and download the driver.

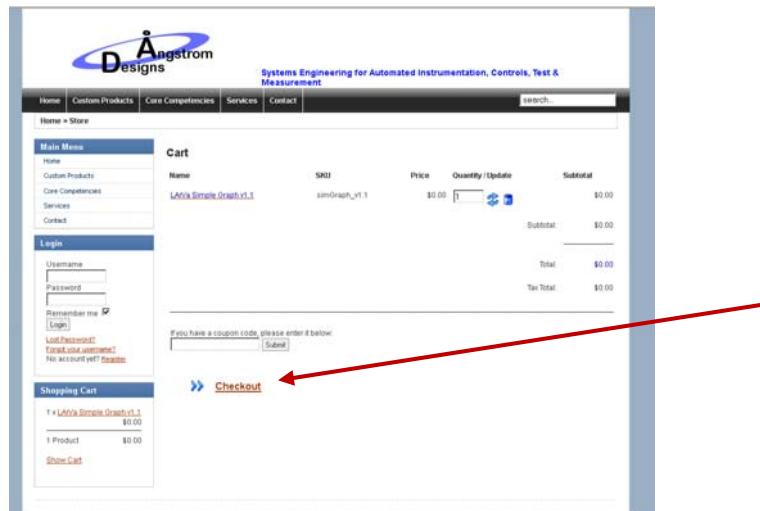
1. Click 'Add to Cart' to select the driver. It's free.



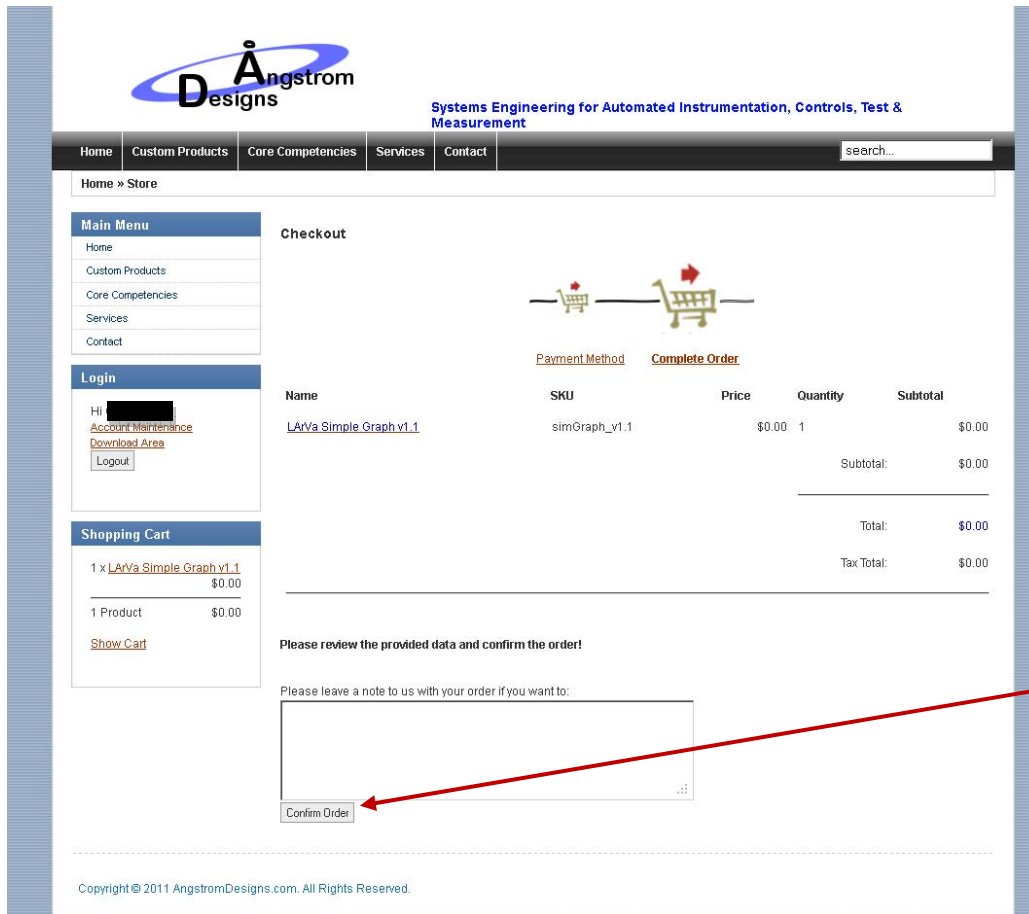
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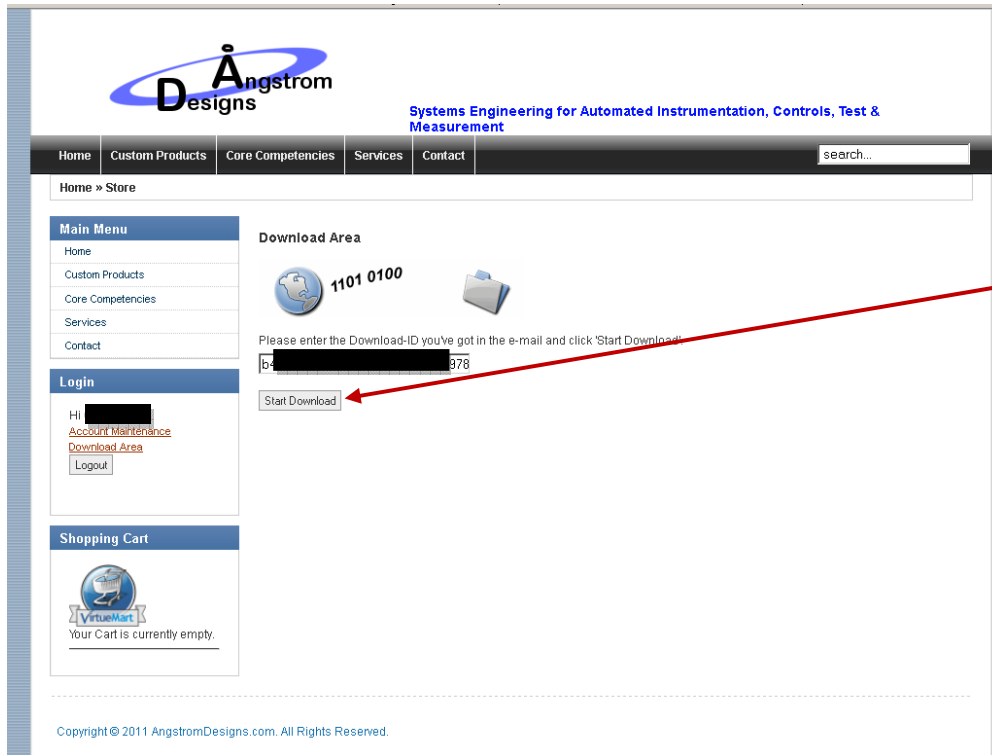
Name	SKU	Price	Quantity	Subtotal
LArVa Simple Graph v1.1	simGraph_v1.1	\$0.00	1	\$0.00
Subtotal:				\$0.00
Total:				\$0.00
Tax Total:				\$0.00

Please review the provided data and confirm the order!

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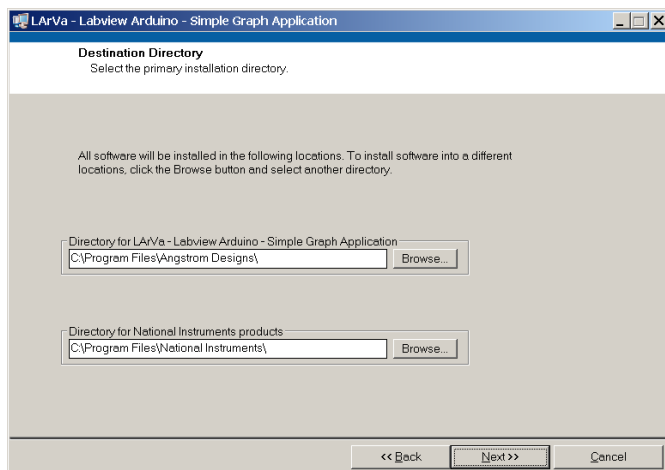
6. You will receive an email with a link to the file. Check your email and click the link. This will take you to the download area.
  - a. Alternatively, you can also access your order from the 'Account Maintenance' link in the 'Login' box. View the order and click the link and scroll to the bottom to see the link for the file download.
7. Click the 'Start Download' button. Save the .zip file onto your computer.



As of this writing, the current file is LArVa\_SimpleGraph\_v1.2\_LV2010\_WinXP.zip. Extract this file using your favorite unzip utility.

## INSTALLING LARVA

Open the folder created by the unzip utility and double click on setup.exe. This will start the installer which will install the Simple Graph application, the LArVa driver and some other needed software drivers on your computer. Follow the prompts until the installation has completed. For a normal installation, accept the default values for the installation.



The installer will put an executable version and a Labview 2010 version of the LArVa simple Graph application into the Angstrom Designs folder in your All Programs menu.

## INSTALLING THE ARDUINO UNO DRIVERS (ARDUINO UNO BOARDS ONLY)

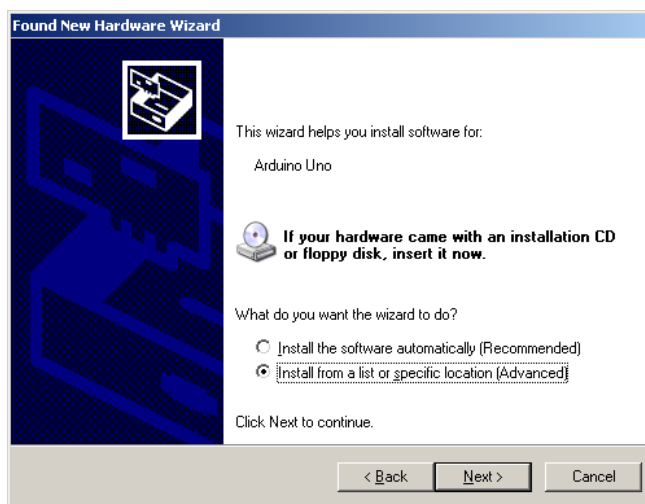
If you are using the Arduino Uno, you will need to install the drivers. These drivers are included in the LArVa installation. If you are using an earlier Arduino board, skip to the next section.

Plug in your Arduino and Windows will prompt you install the drivers. If you have previously failed the driver installation, then you will need to plug in your Uno and go to Control Panel\System\Hardware\Device manager\Other devices and delete the entry for Arduino Uno. The next time you plug in your Uno you will see the install prompts.

When prompted to allow Windows Update to search for software, select 'No, not this time' and click 'Next'



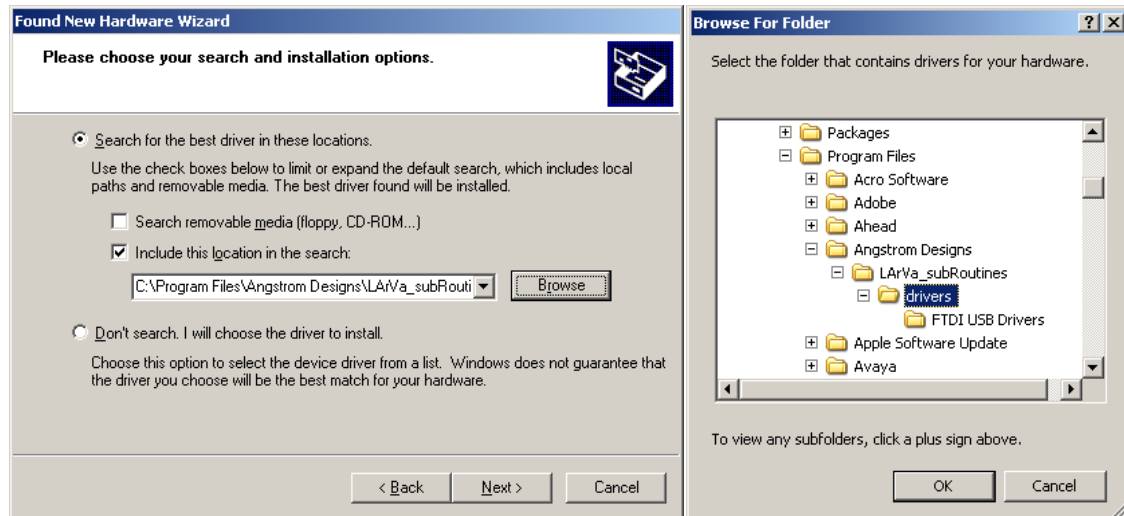
When prompted for an install location, select 'Install from a list or specific location (Advanced)'



Unselect all options except for 'Include this location in the search:'

Click 'Browse' to and Browse to Program Files\Angstrom Designs\LArVa\_subRoutines\drivers. Click OK.

Click Next.



Allow Windows to complete the hardware installation. Click 'Continue Anyway'



Click Finish.



## INSTALLING THE FTDI DRIVERS (ARDUINO BOARDS EARLIER THAN UNO ONLY)

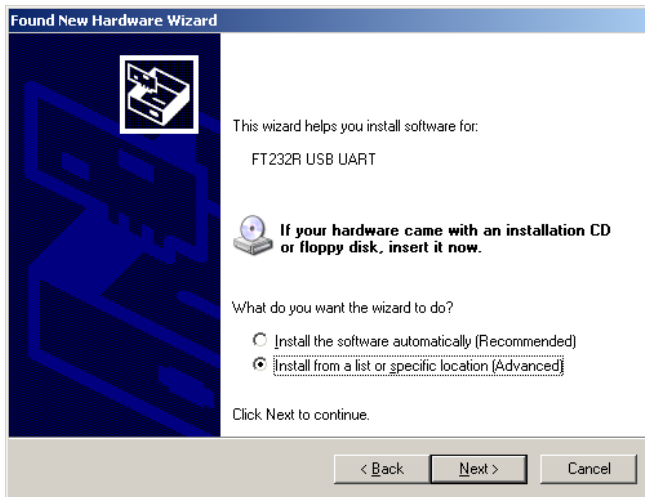
If you have an Arduino Uno (or newer) board, you should have performed the installation above and you should skip this section. For Arduino boards older than the Uno, Windows needs the FTDI drivers. These drivers are included in the LArVa installation.

Plug in your Arduino and Windows will prompt you install the drivers. If you have previously failed the driver installation, then you will need to plug in your Uno and go to Control Panel\System\Hardware\Device manager\Other devices and delete the entry for your Arduino, usually called ‘USB Serial Port’. The next time you plug in your Arduino you will see the install prompts.

When prompted to allow Windows Update to search for software, select ‘No, not this time’ and click ‘Next’



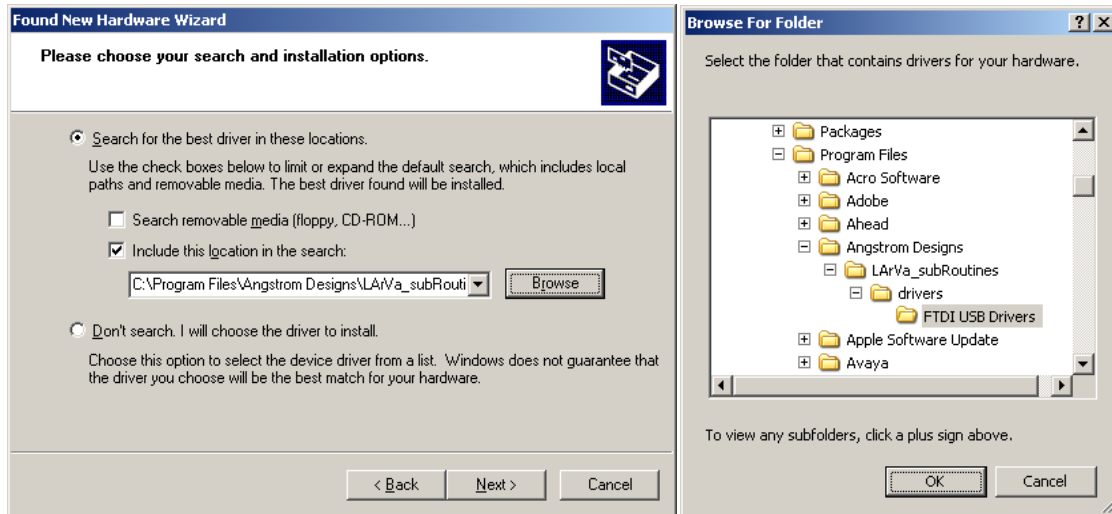
When prompted for an install location, select ‘Install from a list or specific location (Advanced)’



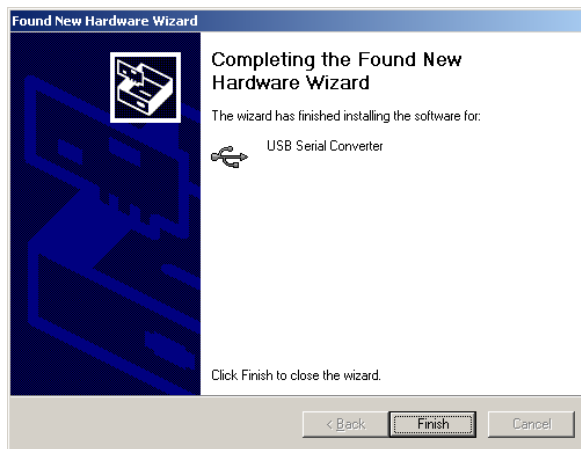
Unselect all options except for ‘Include this location in the search:’

Click ‘Browse’ to and Browse to Program Files\Angstrom Designs\LArVa\_subRoutines\drivers\FTDI USB Drivers. Click OK.

Click Next.



Click Finish.



Depending on your driver configuration, you may need to repeat this process a few times.

## RUNNING LARVA

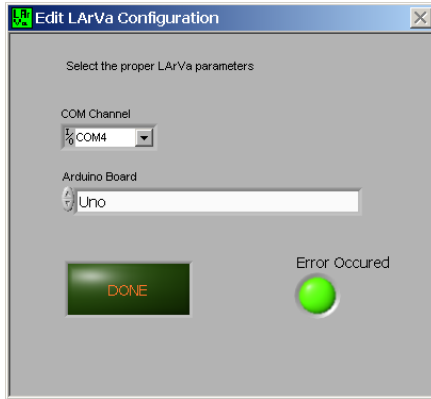
Navigate to the Simple Graph executable. For a default installation this will be located in All Programs \Angstrom Designs\ LarVa Simple Graph EXE. Simple Graph will start up.



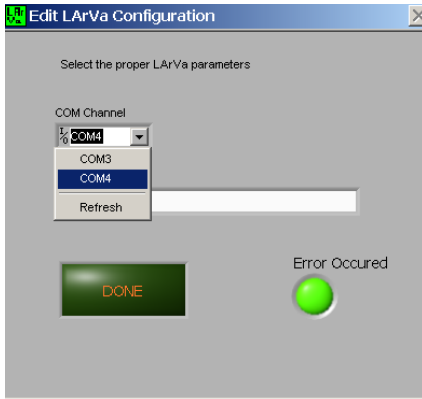
## SETTING THE CONFIGURATION

In order to communicate with your Arduino, LArVa needs to know what kind of Arduino Board you have and what COM port it's on. When you start LArVa a dialog box will ask you for the Board type and the COM port. These values are saved to a configuration file that is automatically created when you first run the program, loaded when you open the program in the future and saved each time you exit the program.

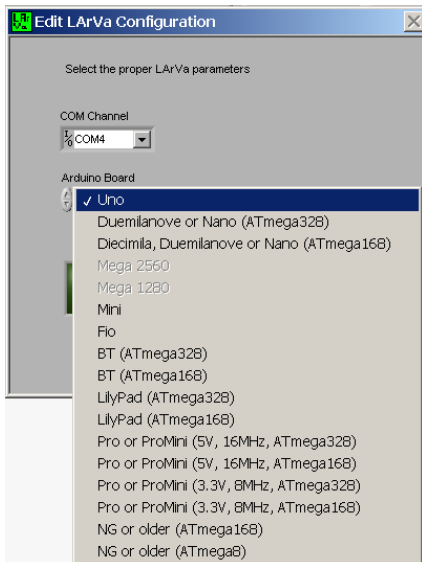




The COM port was automatically assigned when you plugged in your Arduino. The easiest way to determine which COM port your Arduino is on, is to select the dropdown of available COM ports with your Arduino plugged in, then unplug the Arduino and see which one goes away. You may need to select 'Refresh' between plugging/ unplugging if the menu does not change. When you plug your Arduino back into the USB port, that same COM port will reappear. Select this COM port in the drop down box.



Your board type is written on your Arduino. Select the correct board from the drop down box.



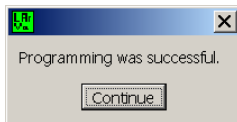
Click 'Done'

## UPLOADING THE LARVA FIRMWARE TO YOUR ARDUINO

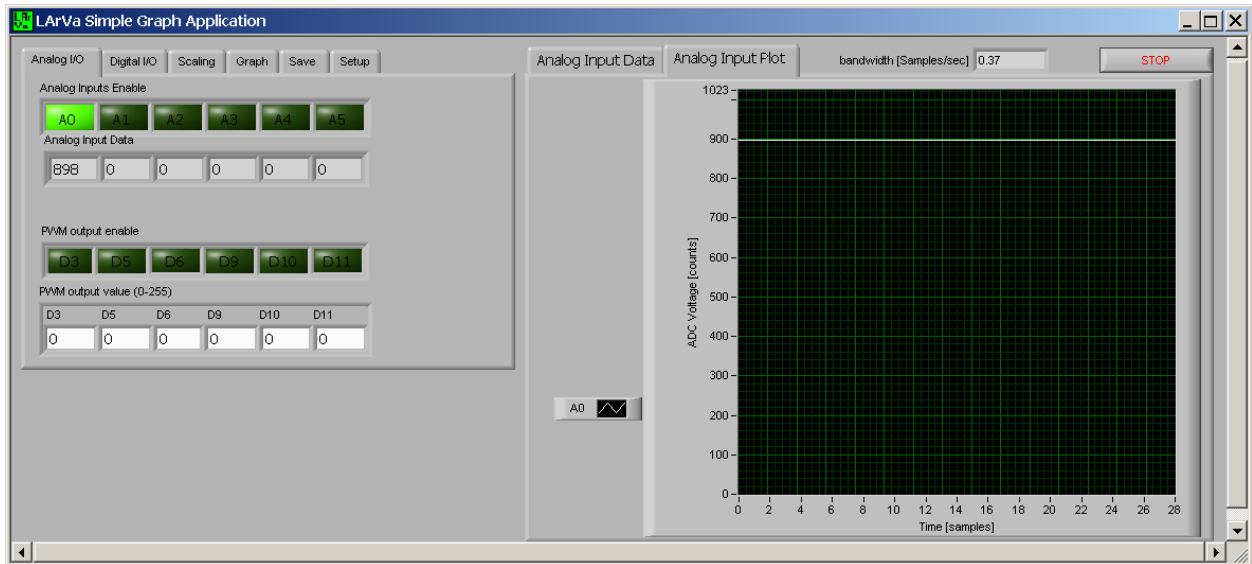
The first time you use your Arduino with LArVa, the driver will need to download the LArVa firmware. LArVa will ask you before it does this. If you do not upload the firmware, LArVa will not work properly.



If the Arduino Board type and COM port are set correctly, the firmware will load and you will see a successful programming message.



LArVa is now running and you should see the graph being populated with one channel of analog input data on channel A0. Note that this data will likely be random unless you have plugged something into channel A0 on your Arduino.

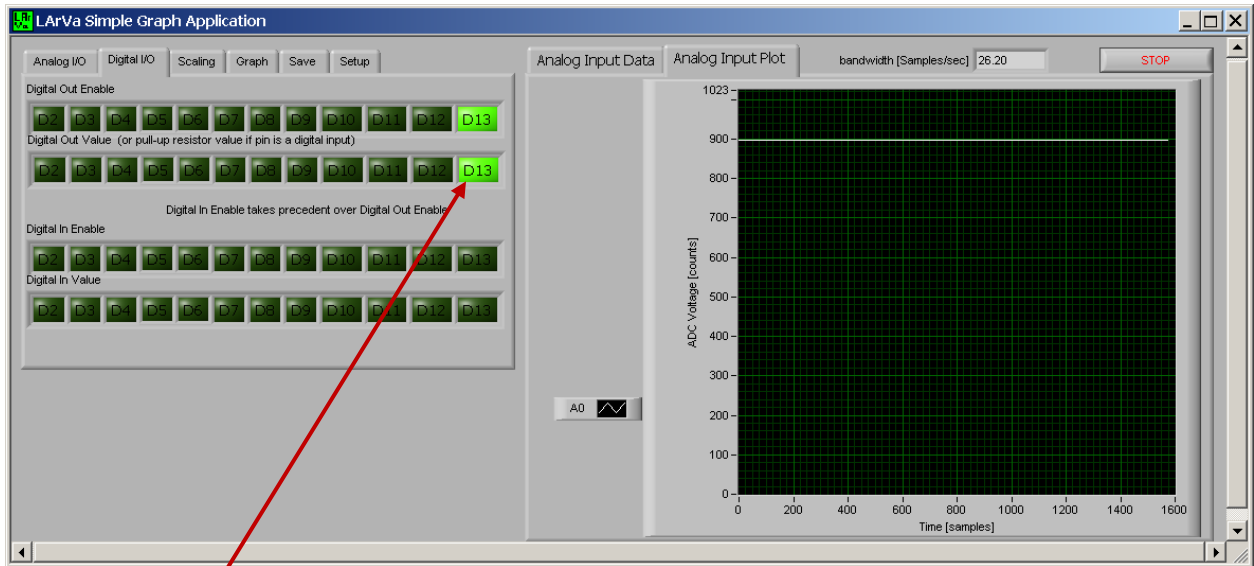


## TESTING YOUR INSTALLATION

Now you should have Simple Graph running on your machine.

## TURNING ON AND OFF THE LED

The easiest test to run is to turn on and off the LED on the Arduino. Click the Digital I/O tab in Simple Graph, under ‘Digital Output Enable’ enable channel D13. Change the output value of D13 in the ‘Digital Out Value’ control.

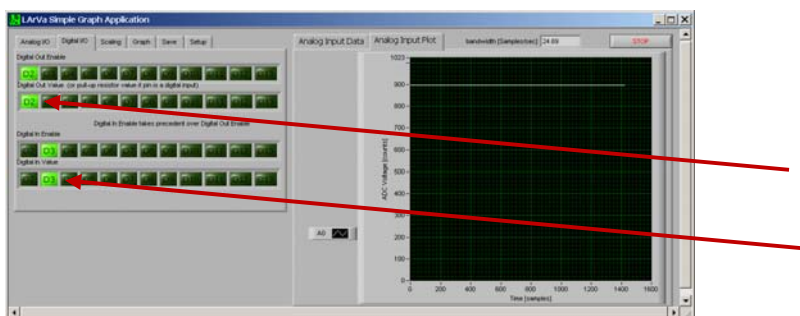


The LED on the Arduino board (location varies depending on which board you have, but it is usually located near pin 13 on the Digital connector) will be on when D13 is high and off when D13 is low.

### USING A JUMPER TO TEST DIGITAL INPUT AND DIGITAL OUTPUT

Using headers or solid core jumper wire bridge together digital pins 2 and 3. Be very careful not to break off any wire or debris in your Arduino connectors as they can be very difficult to clean out.

With digital pins 2 and 3 jumpered together, configure digital pin 2 as an output and digital pin 3 as an input in the Digital I/O tab of LArVa. Change the output value of pin 2 and you will see the input value for pin 3 change correspondingly.



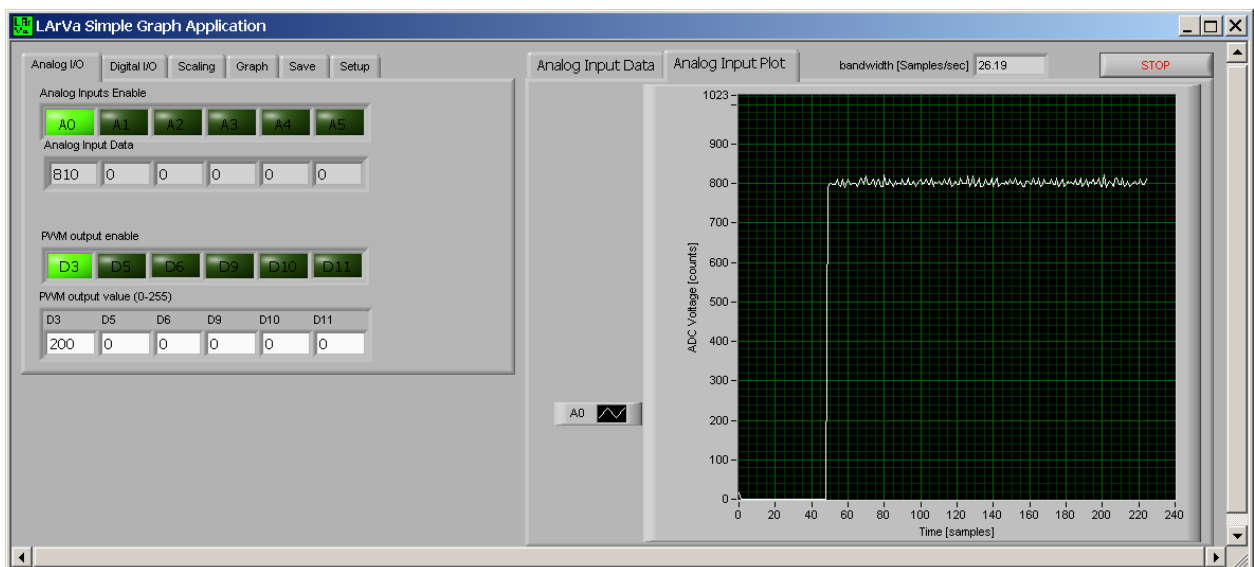


Do not use digital pins 0 and 1 at all, LArVa is using those to communicate between the computer and the Arduino. Similarly, digital pin 13 will behave differently than the other digital pins because it has an LED and resistor on it.

### USING A JUMPER TO TEST ANALOG INPUT AND ANALOG (PWM) OUTPUT

Finally, use a jumper to bridge PWM output pin digital 3 to analog input pin A0. Note that the digital pins and analog input pins are on different connectors on the Arduino. Disable the Digital Enables on the Digital I/O tab. On the Analog I/O tab, enable Analog Input A0 and PWM output D3. Set the value to D3 to 200.

You should see the value of the A0 channel jump to approximately 800 (with some “noise”) on the graph.



Your LArVa setup is now working properly. At this point you may have some questions, for example:

- If I set the PWM output to 200, why is the analog input reading 800?

The PWM output is 8 bits (0 to 255) and the Analog Input is 12 bits (0 to 1023) so tying the two together will show a difference of a factor of 4. If you want the graph to display 200, go to the Scaling tab and change the ‘Analog Data Scaling’ to 0.25.

- If PWM means ‘Pulse Width Modulation’ why do I see a single line at 800 instead of only values at 1023 (~80% of the time) and 0 (the other ~20% of the time)?

That is exactly what is happening, except LArVa performs very fast averaging onboard your Arduino by default. Go to the 'Setup' tab to see the averaging. Set this value to something small, like 2, to see a more raw version of the PWM. Note that this question quickly gets into issues of aliasing and sample rates, which are beyond the scope of this guide.

- What should I do next?

Check out the Basic Data Acquisition Application Note, and the other applications at [AngstromDesigns.com](http://AngstromDesigns.com).

- What if I have a problem?

If there are any problems, please get some help, see below. Please post your issues and what you've learned so we can fix the problems and so others can learn from your experience.

## QUESTIONS, COMMENTS OR JOIN THE LARVA COMMUNITY

LArVa is a powerful tool that turns ultra-inexpensive hardware into a data acquisition system. The possibility for gathering data, lab automation and cool projects is endless. Please join the discussion and tell us what you are doing at [AngstromDesigns.com](http://AngstromDesigns.com)

Of course, if you have a problem, please check [AngstromDesigns.com](http://AngstromDesigns.com) for frequently asked questions, known issues and help. Someone in the community, or someone at Angstrom Designs, would be happy to help you get started.