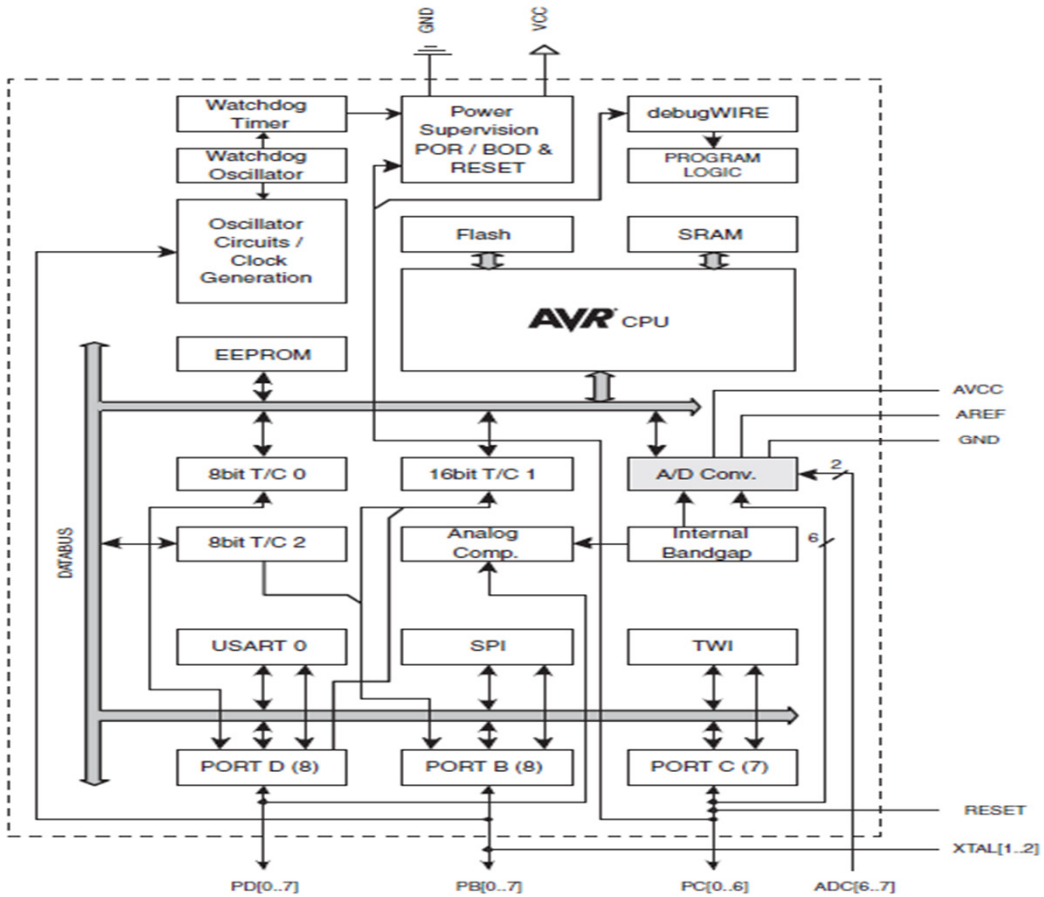
Learning Arduino

Material from Arduino.cc website

Microchip ATmega328 – base MCU for Arduino

Figure 2-1. Block Diagram

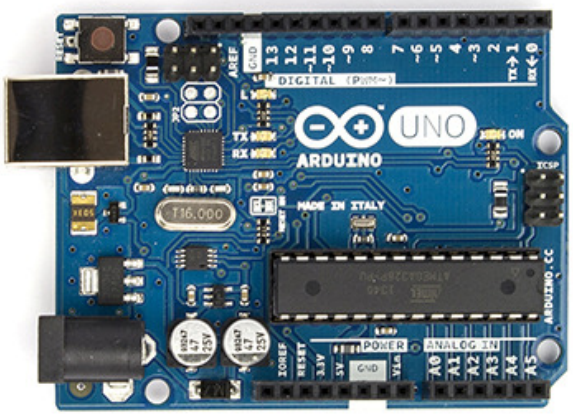


Getting Started with Arduino on Windows

- *This document explains how to connect your Arduino board to the computer and upload your first sketch.*
- 1 | Get an Arduino board and USB cable
- 2 | Download the Arduino Software (IDE)
- 3 | Connect the board
- 4 | Install the drivers
- 5 | Launch the Arduino application
- 6 | Open the blink example
- 7 | Select your board
- 8 | Select your serial port
- 9 | Upload the program

Get an Arduino board and USB cable

- In this tutorial, we assume you're using an Arduino Uno, Arduino Duemilanove, Nano, Arduino Mega 2560 , or Diecimila. If you have another board, read the corresponding page in this getting started guide.
- You also need a standard USB cable (A plug to B plug): the kind you would connect to a USB printer, for example. (For the Arduino Nano, you'll need an A to Mini-B cable instead.) **$4.99 and up.**



Download the Arduino Software (IDE)

- Get the latest version from the download page. When the download finishes, unzip the downloaded file.
- www.arduino.cc

Connect the board

- The Arduino Uno, Mega, Duemilanove and Arduino Nano automatically draw power from either the USB connection to the computer or an external power supply. If you're using an Arduino Diecimila, you'll need to make sure that the board is configured to draw power from the USB connection. The power source is selected with a jumper, a small piece of plastic that fits onto two of the three pins between the USB and power jacks. Check that it's on the two pins closest to the USB port.
- Connect the Arduino board to your computer using the USB cable. The green power LED (labelled PWR) should go on.

Installing the drivers

- Installing drivers for the Arduino Uno or Arduino Mega 2560 with Windows 7, Vista, or XP:
- Plug in your board and wait for Windows to begin it's driver installation process. After a few moments, the process will fail, despite its best efforts
- Click on the Start Menu, and open up the Control Panel.
- While in the Control Panel, navigate to System and Security. Next, click on System. Once the System window is up, open the Device Manager.
- Look under Ports (COM & LPT). You should see an open port named "Arduino UNO (COMxx)". If there is no COM & LPT section, look under "Other Devices" for "Unknown Device".
- Right click on the "Arduino UNO (COmxx)" port and choose the "Update Driver Software" option.
- Next, choose the "Browse my computer for Driver software" option.
- Finally, navigate to and select the driver file named "arduino.inf", located in the "Drivers" folder of the Arduino Software download (not the "FTDI USB Drivers" sub-directory). If you are using an old version of the IDE (1.0.3 or older), choose the Uno driver file named "Arduino UNO.inf"
- Windows will finish up the driver installation from there.
- See also: step-by-step screenshots for installing the Uno under Windows XP.

Installing the Drivers (cont.)

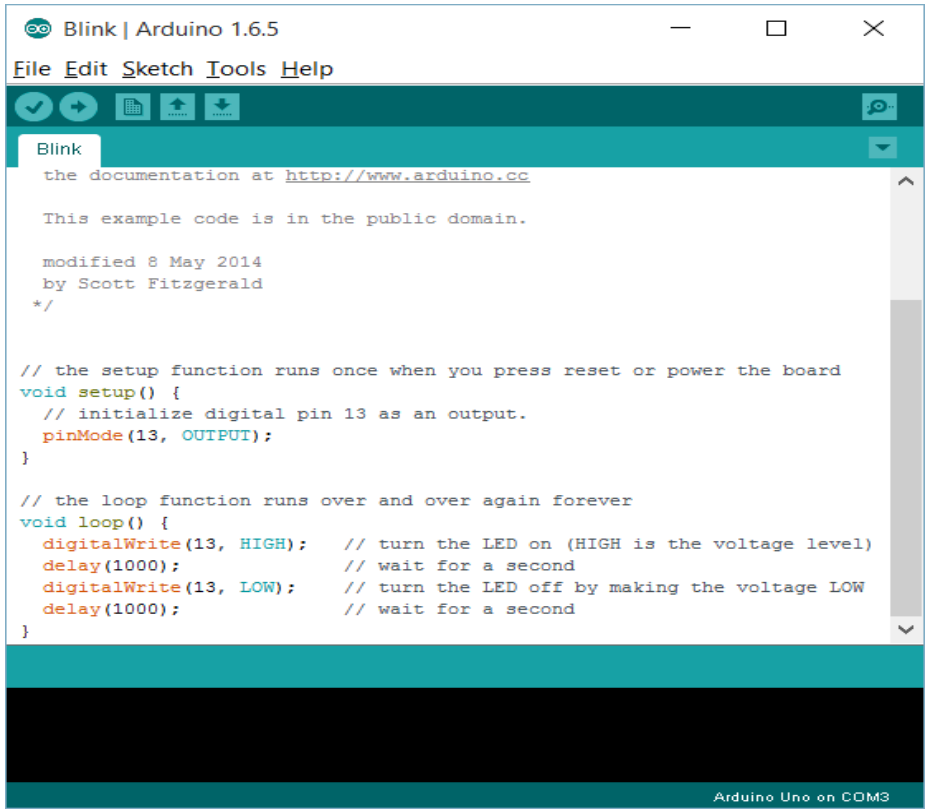
- Installing drivers for the Arduino Duemilanove, Nano, or Diecimila with Windows7, Vista, or XP:
- When you connect the board, Windows should initiate the driver installation process (if you haven't used the computer with an Arduino board before).
- On Windows Vista, the driver should be automatically downloaded and installed. (Really, it works!)
- On Windows XP, the Add New Hardware wizard will open:
- When asked Can Windows connect to Windows Update to search for software? select No, not this time. Click next.
- Select Install from a list or specified location (Advanced) and click next.
- Make sure that Search for the best driver in these locations is checked; uncheck Search removable media; check Include this location in the search and browse to the drivers/FTDI USB Drivers directory of the Arduino distribution. (The latest version of the drivers can be found on the FTDI website.) Click next.
- The wizard will search for the driver and then tell you that a "USB Serial Converter" was found. Click finish.
- The new hardware wizard will appear again. Go through the same steps and select the same options and location to search. This time, a "USB Serial Port" will be found.
- You can check that the drivers have been installed by opening the Windows Device Mananger (in the Hardware tab of System control panel). Look for a "USB Serial Port" in the Ports section; that's the Arduino board.

Launch the Arduino application

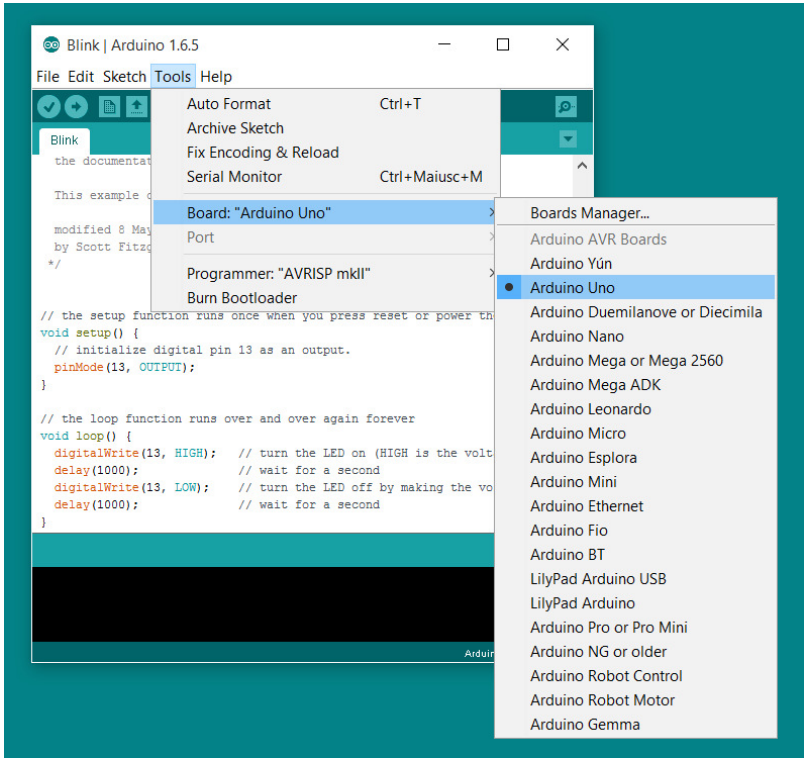
- Double-click the Arduino application (arduino.exe) you have previously downloaded . (Note: if the Arduino Software loads in the wrong language, you can change it in the preferences dialog. See the Arduino Software (IDE) page for details.)

Open the blink example

- Open the LED blink example sketch: File > Examples >01.Basics > Blink.



Select your board – Arduino UNO



Select your serial port

- Select the serial device of the Arduino board from the Tools | Serial Port menu. This is likely to be COM3 or higher (COM1 and COM2 are usually reserved for hardware serial ports). To find out, you can disconnect your Arduino board and re-open the menu; the entry that disappears should be the Arduino board. Reconnect the board and select that serial port.

Upload the program

- A few seconds after the upload finishes, you should see the pin 13 (L) LED on the board start to blink (in orange). If it does, congratulations! You've gotten Arduino up-and-running. If you have problems, please see the troubleshooting suggestions.
- You might also want to look at:
- the examples for using various sensors and actuators
- the reference for the Arduino language
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Language Reference – learning the syntax

- Arduino programming language can be divided in three main parts: functions, values (variables and constants), and structure.
- Functions - For controlling the Arduino board and performing computations.
- Variables - Arduino data types and constants.
- Structure - The elements of Arduino (C++) code.

Tutorials – there are lots of Resources available

TUTORIALS ON ARDUINO PROJECT HUB

Arduino Project Hub is our official tutorial platform powered by hackster.io. Get inspired by a variety of tutorials, getting started guides, showcases and pro tips. Contribute projects and ideas, comment on the tutorials you are curious about, and 'Respect' the ones you like the most.

BUILT-IN EXAMPLES

Built-in Examples are sketches included in the Arduino Software (IDE), to open them click on the toolbar menu: File > Examples. These simple programs demonstrate all basic Arduino commands. They span from a Bare Minimum Sketch to Digital and Analog IO, to the use of Sensors and Displays.

EXAMPLES FROM LIBRARIES

The Arduino Software (IDE) can be extended through the use of libraries, just like most programming platforms, to provide extra functionality to your sketches. These tutorials walk you through the Examples of a number of libraries that come installed with the IDE, to open them click on the toolbar menu: File > Examples.

FOUNDATIONS AND MORE

This section guides you though some of the key elements of the Arduino hardware and software, and the concepts behind them. What is a Sketch? What are Microcontrollers? What are the building blocks of the Arduino Programming language? Find these answers here.

HACKING

In this section you can find useful information to expand your knowledge about the Arduino platform. Do you want to know what's under the hood? Here you can find guidelines for customizing every software that runs on an Arduino board and the explanation of some of the hardware design details.