

-
- Welcome, [log in](#) to access your account.
- [My account](#)



- [Contact Us](#)
- English

Putting robotics at your service™

Search

[View your cart](#)

Free shipping on orders over 250.00\$

- [Products](#)
 - [Robots to Build & Experiment](#)
 - [Robot Parts](#)
 - [Robots & Kits](#)
 - [Robotics Education](#)
 - [Tools & Equipment](#)
 - [Robot Books](#)
 - [Robots for the House](#)
 - [Personal & Domestic Robots](#)
 - [Domestic Robot Accessories](#)
 - [Domestic Robot Replacement Parts](#)
 - [Robot Toys](#)
 - [Professional & Service Robots](#)
 - [Defense, Security & Surveillance](#)
 - [Unmanned Aerial Vehicles \(UAV\)](#)
 - [Robot Manipulators](#)
 - [Entertainment Robots](#)
 - [Guide & Telepresence](#)
 - [Unmanned Underwater Vehicles \(UUV\)](#)
 - [Full Store Directory](#)
- [Robot Apps](#)
 - [Fischertechnik](#)
 - [FlowBotics](#)
 - [FlowStone](#)
 - [iRobot](#)
 - [Lynxmotion](#)
 - [Roborealm](#)
 - [Servocity](#)
 - [VEX Robotics](#)

- [Community](#)
 - [RobotShop Forum](#)
 - [Lynxmotion Forum](#)
 - [RobotShop Blog](#)
 - [Twitter](#)
 - [Facebook](#)
 - [Youtube](#)
 - [GoRobotics >> Education](#)
 - [How to Make a Robot](#)
 - [Arduino Tutorials](#)
 - [Robotics Projects](#)
 - [Dynamic Tools](#)
 - [Educational Robots](#)
 - [Why Robotics](#)
- [Services](#)
 - [Contact Us](#)
 - [Warranty & Returns](#)
 - [Shipping](#)
 - [Accelerator for Inventors](#)
 - [Connect Your Robots](#)

[RobotShop](#) >



[RobotShop Blog](#) > [GoRobotics >> Education](#) > [Tutorials](#) > [Arduino](#) > Arduino 5 Minute Tutorials: Lesson 5 – Servo Motors



GoRobotics is the ultimate destination for learning about Robotics.

Search for:

Categories

-  [Consumer Robotics](#)
-  [GoRobotics >> Education Competitions](#)

[Dynamic Tools](#)

[Robotics Projects & Kits](#)

[Schools & Curriculum](#)



[Tutorials](#)

[Arduino](#)

[Electronics](#)

[Hobbyist](#)

[How To Make a Robot](#)

[Mechanics](#)

[Software and Apps](#)

[Where to Start](#)



[Professional and Research Robots](#)



[Robotic News](#)

Popular Articles

- [How to Build a Simple Robot – Beetle Robot](#) (350)
- [How To Build A Simple Robot](#) (337)
- [March Robot Giveaway to Celebrate GoRobotics' 10th Birthday](#) (202)
- [How to Make a Robot – Lesson 1: Getting Started](#) (189)
- [GoRobotics February Robot Prize Giveaway!](#) (87)
- [JANUARY GIVEAWAY – 10 Years of GoRobotics!](#) (86)
- [Robot Suppliers in India? Give Me Your Insight](#) (79)
- [How to Make a Robot – Lesson 3: Making Sense of Actuators](#) (62)
- [Robot Giveaway – 10 Years of GoRobotics, \\$1000 in prizes!](#) (60)
- [How to Make a Robot – Lesson 2: Choosing a Robotic Platform](#) (52)

Stay in Touch



[Follow us on Twitter](#)



[Watch RobotShop TV](#)



[Find us on Facebook](#)



[Subscribe to the feed](#)



RobotShop

Like 16,482

Tag Cloud

[Aldebaran Robotics](#) [Arduino](#) [Arm](#) [Art](#) [Asimo](#) [AUV](#) [AUVSI](#) [Boston Dynamics](#) [Cloud Robotics](#) [Contest](#) [Cyborgs](#) [DARPA](#) [Drone](#)
[Google](#) [Grand Tutorial Series](#) [Honda](#) [How To](#) [Humanoid](#) [iRobot](#) [Japan](#) [kits](#) [learning](#) [Lego](#) [Lego Mindstorms](#) [lynxmotion](#) [Make a](#)
[Robot](#) [Mars](#) [Mindstorms](#) [Mint](#) [Motors](#) [Movie](#) [MyRobots.com](#) [Nao](#) [NASA](#) [Neato](#) [NXT](#) [Pleo](#) [PR2](#) [robot](#) [RobotShop](#) [RobotShop TV](#) [RobotShop](#)
[Ultimate Challenge](#) [Robot Vacuums](#) [Roomba](#) [Roomba 400 series](#) [Roomba 500 series](#) [Roomba Discovery](#) [Sensors](#) [Servo](#)
[Tutorial](#) [Underwater](#) [Unmanned Aerial Vehicles](#) [Vacuum](#) [Vex](#) [Willow Garage](#) [XV-11](#)

Contributors



[Coleman Benson](#) Passionate creator of all things robotic.



[Carl Owen](#) CEO - DSPRobotics, makers of FlowBotics Studio and the FlowStone programming language. Robotics specialist and electronics engineer. Regular journalist for Robot Magazine.



[Jeffrey Arcand](#) Software Developer and Robotics Specialist, who builds web applications, cloud services, autonomous robots and human hamster wheels.



[Julie Gendron](#) Domestic Robot Specialist. I am fascinated by new and innovative domestic robot technology that can change our lives and help us enjoy more free time.



[Mario Tremblay](#) Chairman, CEO, Founder - RobotShop inc.



[RB1](#) I am RobotShop's proud mascot. My mission is to put robotics at your service!

[View all contributors.](#)



[Go Robotics Learning Centre](#)



[RobotShop Corporate](#)



[Robotic News The Market](#)



Arduino 5 Minute Tutorials: Lesson 5 – Servo Motors

Posted on April 25, 2012 by [Coleman Benson](#) & filed under [Arduino](#), [Electronics](#), [Schools & Curriculum](#), [Software and Apps](#).



Lessons Menu:

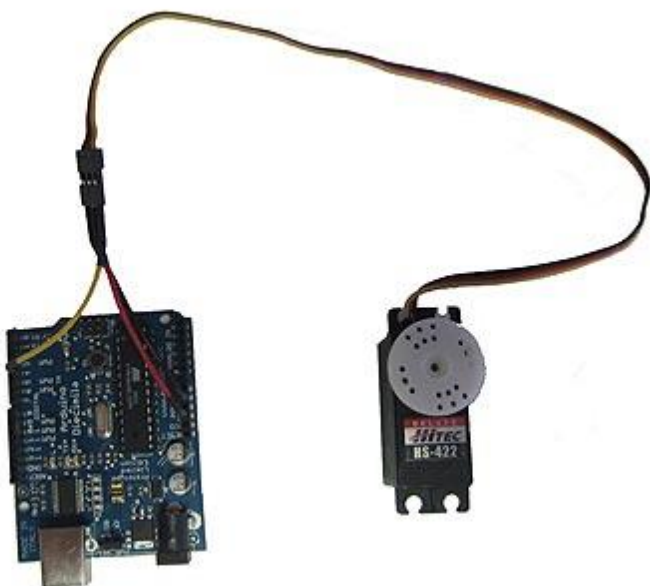
- [Lesson 1 – Software Downloading / Installing & Interface](#)
- [Lesson 2 – Basic Code](#)
- [Lesson 3 – Sensors: Potentiometers](#)
- [Lesson 4 – Sensor: Infrared Distance](#)
- [Lesson 5 – Actuator: Servo Motor](#)
- [Lesson 6 – Sensor: Force, Bend, Stretch](#)
- [Lesson 7 – Sensor: Accelerometer, Gyro, IMU](#)

Lesson 5 Hardware:

1. Computer / Laptop or Netbook
2. [Arduino Microcontroller](#)
3. [USB to Serial Adapter](#) (*if your microcontroller does not have a USB port*)
4. Appropriate USB [cable](#) (*Arduino boards draw power from the USB port – no batteries yet*)
5. Standard servo motor (current consumption <50mA)
6. Pin headers / cables

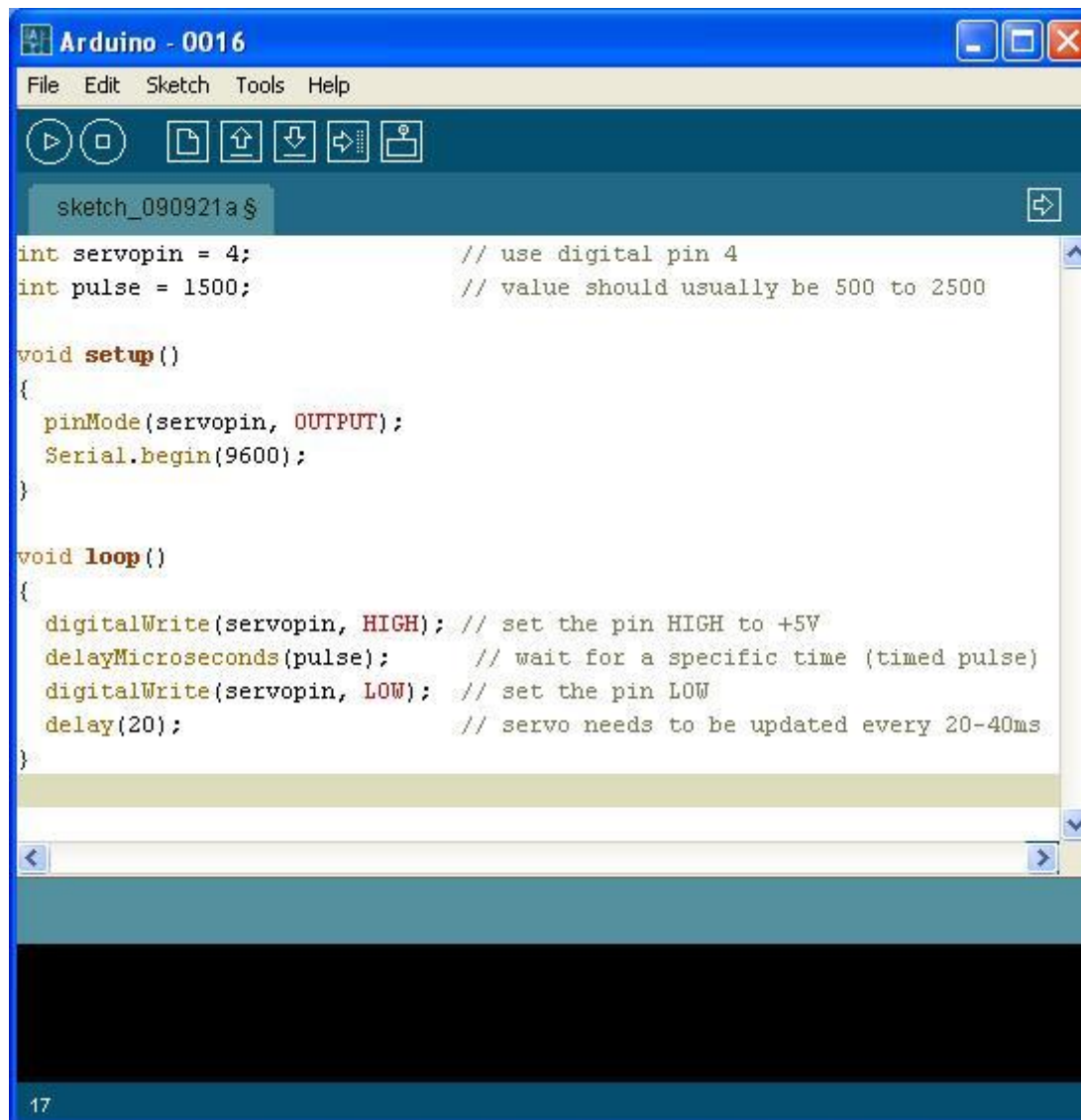
Controlling a [servo motor](#) directly from the [Arduino](#) is quite easy. However, a servo motor may require significantly more current than the Arduino can provide. The following example uses a standard sized servo (without any load) powered directly from the Arduino via USB. When powering the servo directly from the Arduino board:

1. Connect the black wire from the servo to the GND pin on the Arduino
2. Connect the red wire from the servo to the +5V pin on the Arduino
3. Connect the yellow or white wire from the servo to a digital pin on the Arduino



Alternatively, you can plug the servo's wire into three adjacent pins, and set the pin connected to the red lead to "HIGH" and the pin connected to the black lead to "LOW". If you want to use a more powerful servo, or

if you want to connect it to a separate power supply, you would connect the battery / power supply's red (5V) and black (GND) wires to the servo's red and black wires, and connect the signal wire to the Arduino. Note that you also need to connect the batter's GND line to the Arduino's GND pins ("common ground").

A screenshot of the Arduino IDE window titled "Arduino - 0016". The menu bar includes File, Edit, Sketch, Tools, and Help. Below the menu is a toolbar with icons for running, stopping, saving, and other functions. The main text area shows a sketch named "sketch_090921a" with the following code:

```
int servopin = 4;           // use digital pin 4
int pulse = 1500;           // value should usually be 500 to 2500

void setup()
{
  pinMode(servopin, OUTPUT);
  Serial.begin(9600);
}

void loop()
{
  digitalWrite(servopin, HIGH); // set the pin HIGH to +5V
  delayMicroseconds(pulse);     // wait for a specific time (timed pulse)
  digitalWrite(servopin, LOW);  // set the pin LOW
  delay(20);                    // servo needs to be updated every 20-40ms
}
```

The status bar at the bottom left shows the line number 17.

`pinMode`(pin number, `OUTPUT`);

This sets a pin number as dedicated input or output. In this case, we called the pin "servopin" and assigned it a value of 4. The term "pulse" is in black as it is not a reserved word and can be changed by the user. It is best to use descriptive variables when coding to understand what each does, or the information it will contain. Servos operate by sending a timed +5V pulse (usually between 500us and 2500us) to the onboard electronics, which is repeated every ~20ms. This pulse corresponds to a [servo](#) position, usually from 0 to 180 degrees.

- 5V for 500 microseconds = 0.5 milliseconds and corresponds to 0 degrees
- 5V for 1500 microseconds = 1.5 milliseconds and corresponds to 90 degrees
- 5V for 2500 microseconds = 2.5 milliseconds and corresponds to 180 degrees
- The relationship is linear, so use mathematics to determine the pulse which corresponds to a given angle. Note that if you send a signal that is greater or lower than the servo can accept (for example, Firgelli linear actuators accept 1 to 2 ms), you might damage the actuator.

Another option for controlling servos is to use the Arduino "[servo library](#)" (previously separate from the basic

Arduino software, it is now included with V1.0). The servo library manages much of the overhead and includes new, custom commands. If you want to control multiple servo motors, you should use a servo motor controller and a separate power supply between 4.8V to 6V.

Tags: [actuator](#) [Arduino](#) [code](#) [lesson](#) [Motors](#) [Servo](#) [software](#)

Share this:



Leave a Reply

- Name (required)
- Mail (required) (will not be published)
- Website

Submit Comment

Our Products

- [Personal and Domestic Robots](#)
- [Professional and Service Robots](#)
- [Robot Parts](#)
- [Robotic Kits](#)
- [Robotic Toys](#)
- [Educational Robots](#)
- [Tools and Equipment](#)
- [Books](#)
- [Shop by Brand](#)
- [Popular Searches](#)

My Account

- [Log in / Register](#)
- [My Account](#)
- [Order History](#)
- [Shopping Cart](#)
- [Compare Products](#)

[RobotShop App Store](#)

[Corporate](#)

- [About](#)

- [Testimonials](#)
- [Press Room](#)
- [Careers](#)
- [Become a Dealer](#)
- [Suggest Your Products](#)
- [Suggest Your Apps](#)
- [Commercialize your invention](#)

Customer Service

- [Contact Us](#)
- [Terms and Conditions](#)
- [Service for Makers](#)
- [Robot Repair Center](#)

Stay in Touch



Subscribe to the Newsletter

Stay informed about the latest RobotShop offers.

[Previous newsletters](#)

The Robotshop Group Also Includes





RobotShop, the world's leading robot store for personal and professional robot technology. Here you will find the best selection of [robot vacuums](#) and other [domestic robots](#), [professional robots](#), [robot toys](#), and [robot kits](#), and [robot parts](#) for building your own robots.

RobotShop is also a leading force in [robotic education and research](#). We provide a diverse product selection, educational and quantity discounts, useful resources and specialized support.



© 2013 RobotShop Distribution Inc. All rights reserved.
 Putting robotics at your service is a trademark of RobotShop Distribution inc.

[United States](#) | [Canada](#) | [Europe](#) | [International](#)

