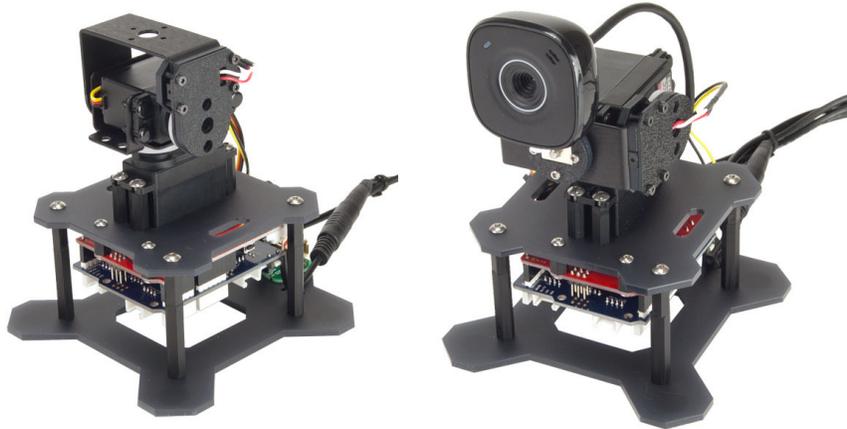


QUICK START GUIDE

Desktop RoboTurret Vision Tracking Starter Kit



INTRODUCTION

The intent of this kit is to provide a compact physical computing platform that is easily programmable using the Arduino programming environment. If you are not already familiar with Arduino, we highly recommend taking a trip over to <http://arduino.cc> and reading up on this great platform. All documentation (including this manual, so that you can click links), assembly guides, code examples, and relevant links can be found on the RoboTurret product pages.

The default kit ships with a Wii Nunchuk Joystick controller to give experimenters some easy to use sensors to get started with. The product page contains code examples and libraries so that users can jump in and start programming. The Wii Nunchuk was chosen as it provides a 2-axis joystick, 3 axis accelerometer, and 2 push buttons all in one easy-to-use package. Most digital and analog sensors can also be interfaced to this kit through the Grove Sensor Shield, allowing builders to customize their project however they see fit.

There are 4 main components to this kit:

- **Seeeduino Microcontroller** – This is the brains behind this robot platform, a “Freeduino” that is fully Arduino-Compatible and can be interfaced to your computer via USB. You will need to download and install the Arduino IDE from <http://arduino.cc> to program this microcontroller as the Seeeduino does not come pre-programmed. You can find demo Arduino code on the product page of the RoboTurret to give you a head start. Sketches can be written so that the RoboTurret operates autonomously, or the USB connection can be used to interface it to a PC for communication and control.
- **Grove Sensor Shield** – This shield plugs into the Seeeduino and provides a standardized sensor interface for connecting servos, analog/digital sensors, and serial/I2C devices. It uses a 0.1” spacing 4-pin JST connection, which can easily be interfaced to any of our sensors using various cable adapters. It is plug-n-play with the entire Seeedstudio Grove Sensor product line carried at Trossen Robotics.
- **Servo Pan & Tilt** – This is the physical output of the RoboTurret. These servos are controlled by the Seeeduino using the integrated Servo libraries in the Arduino IDE and allow you to pan, tilt, and otherwise aim at various things. We’ve also included a micro laser so that you can get a visual representation of where your RoboTurret is aimed.
- **Wii Nunchuk Joystick** – This is a great low-cost physical input device for controlling turrets and receiving inertial data. It has a 2-axis joystick, 3 axis accelerometer, and 2 push buttons all easily accessible through the I2C interface and supplied Arduino Nunchuk library. Please see the code examples on the product page for further information on how to use this nifty little joystick.

GETTING STARTED

1. First things first! Let's get this RoboTurret assembled. Check the parts list and ensure that you have all required components and tools to assemble the kit. The Assembly Guide can be found here: <http://www.trossenrobotics.com/productdocs/assemblyguides/roboTurret-v2.html>
2. Once your RoboTurret has been assembled, you will need to start the process of programming it. The RoboTurret is programmed using the Arduino IDE build 1.0.1, which can be downloaded here: <http://arduino.googlecode.com/files/arduino-1.0.1-windows.zip>
3. After you have Unzipped/installed the Arduino IDE, please note the location and then download RoboTurret Code & Libraries here: http://www.trossenrobotics.com/Downloads/RoboTurret_Code.zip
 - a. You will need to locate the "ArduinoNunchuk" library within the libraries folder in the download.
 - b. Copy the "ArduinoNunchuk" folder to your libraries folder within the Arduino IDE folder location. You will need to restart the Arduino IDE if you had it open.
4. Next, you will need to plug in your RoboTurret via USB and ensure that the drivers install correctly and that a com port has been assigned. If your PC does not automatically find the device, please install the appropriate drivers found here: <http://www.ftdichip.com/Drivers/VCP.htm>
5. Select your board under the menu option: Tools > Board > "Arduino Duemilanove w/Atmega 328" (for Seeeduino 2.2 & 3.0) or "Arduino Diecimila or Duemilanove w/Atmega 168" (for Seeeduino 2.1, no longer shipped). Then, select the appropriate com port under the menu option: Tools > Serial Port > COMx (where X is your com port)
6. Next up, upload your first sketch to make sure everything is working! You'll find the Wii Nunchuk RoboTurret demo app in the RoboTurret Code & Libraries download, inside the "RoboTurret Sketches" folder. Click upload and watch the output at the bottom of the screen. It should compile the program and tell you when the upload is finished.
7. Try out your RoboTurret! The Wii Nunchuk will move the RoboTurret around using the joystick by default. Hold down the Z button and control it using the integrated accelerometer. The C button should toggle the laser on/off. And there you have it: Read through the code, see how the library provides the Nunchuk values, and start programming from there!

VISION TRACKING STARTER KIT

The Vision Tracking Starter Kit has a different approach to development using the RoboTurret. [Roborealm](#) has created an interface sketch which can be uploaded to the Seeeduino as well as an Arduino Roborealm Module (please note that the Trossen Robotics RoboTurret Module **is NOT compatible** with the RoboTurret v2 version). This handles all PC to Arduino communication, provides an easy-to-use UI to access the microcontroller's IO, and creates a seamless integration to the Roborealm environment. Within Roborealm you have full access to all of Roborealm's vision filters and modules and can easily tie them to the real world using the RoboTurret platform. We've created a demo Roborealm program to track colored objects that is available for download on the RoboTurret product pages, which should get users pointed in the right direction. **Please note** that the Wii Nunchuk Joystick is not supported within the Roborealm environment by default. Custom firmware would have to be developed to support this device; however it is fully supported within the Arduino code environment.

1. Install Roborealm using the disk received with your kit, be sure to register it so that you can get the most updated version! Installation instructions and general getting started info can be found here: <http://www.roborealm.com/help/Getting%20Started.php>
2. Next, you will need to upload the Roborealm_Arduino Sketch found in the Roborealm Code & Libraries download. See the previous section for details on this.
3. Once Roborealm is launched, make sure your webcam is plugged in and properly recognized in the options menu.
4. Load the Desktop_RoboTurret.robo file found in the downloaded folder. Select the proper com port and start it up! By default, the RoboTurret should track red objects, though this can be modified.
5. For more information on the Arduino module used to interface to Roborealm, please refer to the documentation found here: http://www.roborealm.com/help/Sparkfun_Arduino.php