

Community Experience Distilled

Arduino for Secret Agents

Transform your tiny Arduino device into a secret agent gadget and build a range of espionage projects with this practical guide for hackers

Marco Schwartz

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PUBLISHING community experience distilled

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BIRMINGHAM - MUMBAI

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Preface

The Arduino platform makes it really easy to build electronics projects in various domains, such as home automation, Internet of Things, wearable technology, and even healthcare. It's also the ideal platform to build amazing projects for secret agents, which is what we are going to do in this book.

Using the power and simplicity of the Arduino platform, we are going to see how to build several projects that can be easily used by any aspiring secret agent. From audio recorders to GPS trackers, you will be able to make your own secret agent toolkit using the Arduino platform after reading this book.

What this book covers

Chapter 1, A Simple Alarm System with Arduino, is about building an alarm system that is based on the Arduino platform with a motion sensor and a visual alarm.

Chapter 2, Creating a Spy Microphone, is about making a secret recording system that can record the conversations and noises in a room.

Chapter 3, Building an EMF Bug Detector, is about creating a very useful device for any secret agent: a detector to check whether there are other secret agent devices in a room.

Chapter 4, Access Control with a Fingerprint Sensor, is about creating an access control system using your own fingerprint.

Chapter 5, Opening a Lock with an SMS, is about building a project where the secret agent can open a lock just by sending a text message to the Arduino device.

Chapter 6, Building a Cloud Spy Camera, is about making a spy camera that can be accessed from anywhere in the world and can record pictures in Dropbox when motion is detected.

Chapter 7, Monitoring Secret Data from Anywhere, is about learning how to secretly record any kind of data and how to log in this data on the Cloud.

Chapter 8, Creating a GPS Tracker with Arduino, is about creating one of the most useful devices for a secret agent: a GPS tracker that indicates its position on a map in real time.

Chapter 9, Building an Arduino Spy Robot, is about making a small surveillance robot that can spy on your behalf.

What you need for this book

In the entire book, we will be using the Arduino platform so you will definitely need the latest version of the Arduino IDE software.

We will be using a wide range of Arduino boards, shields, and hardware components. You will find all the details about these requirements in the relevant chapters.

Who this book is for

This book is intended for those who want to build exciting secret agent projects using the Arduino platform. For example, it is for those people who are already experienced in using the Arduino platform and want to extend their knowledge by building projects for secret agents. It is also for the people who want to learn about electronics and programming as Arduino is the perfect platform for that.

Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "Also, if the `alarm_mode` is going back to false, we need to deactivate the alarm immediately."

A block of code is set as follows:

```
if (alarm_mode == false) {  
  
    // No tone & LED off  
    noTone(alarm_pin);  
    digitalWrite(led_pin, LOW);  
}
```

Any command-line input or output is written as follows:

```
mjpg_streamer -i "input_uvc.so -d /dev/video0 -r 640x480 -f 25" -o  
"output_http.so -p 8080 -w /www/webcam" &
```

New terms and **important words** are shown in bold. Words that you see on the screen, for example, in menus or dialog boxes, appear in the text like this: "Now, inside the parameters of the app, there are two things you need: the **App key**, and the **App secret**."

 Warnings or important notes appear in a box like this.

 Tips and tricks appear like this.

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1

A Simple Alarm System with Arduino

I want to start this book with a simple project that any secret agent will want to have, a simple alarm system that will be activated whenever motion is detected by a sensor. This simple system is not only fun to make but will also help us to go over the basics of Arduino programming and electronics, which are the skills that we will use in this whole book.

It will basically be a simple alarm (a buzzer that makes sound, plus a red LED) combined with a motion detector. The user will also be able to stop the alarm by pressing a button.

We are going to do the following in this chapter:

- First, we are going to see what the requirements for this project are, in terms of hardware and software
- Then, we will see how to assemble the hardware parts for this project
- After that, we will configure our system using the Arduino IDE

Hardware and software requirements

First, let's see what the required components for this project are. As this is the first chapter of the book, we will spend a bit more time here to detail the different components, as these are components that we will be using in the whole book.

The first component that will be central to the project is the Arduino Uno board:



In several chapters of this book, this will be the 'brain' of the projects that we will make. In all the projects, I will be using the official Arduino Uno R3 board. However, you can use an equivalent board from another brand or another Arduino board, such as an Arduino Mega board.

Another crucial component of our alarm system will be the buzzer:



This is a very simple component that is used to make simple sounds with Arduino. You couldn't play an MP3 with it but it's just fine for an alarm system. You can, of course, use any buzzer that is available; the goal is to just make a sound.

After that, we are going to need a motion detector:



Here, I used a very simple PIR motion detector. This sensor will measure the infrared (IR) light that is emitted by moving objects in its field of view, for example, people moving around. It is really easy and quite cheap to interface with Arduino. You can use any brand that you want for this sensor; it just needs a voltage level of 5V in order to be compatible with the Arduino Uno board.

Finally, here is the list of all the components that we will use in this project:

- Arduino Uno (<https://www.sparkfun.com/products/11021>)
- Buzzer (<https://www.sparkfun.com/products/7950>)
- PIR (<https://www.sparkfun.com/products/13285>)
- LED (<https://www.sparkfun.com/products/9590>)
- 330 Ohm resistor (<https://www.sparkfun.com/products/8377>)
- Button (<https://www.sparkfun.com/products/97>)
- 1k Ohm resistor (<https://www.sparkfun.com/products/8980>)
- Breadboard (<https://www.sparkfun.com/products/12002>)
- Jumper wires (<https://www.sparkfun.com/products/8431>)

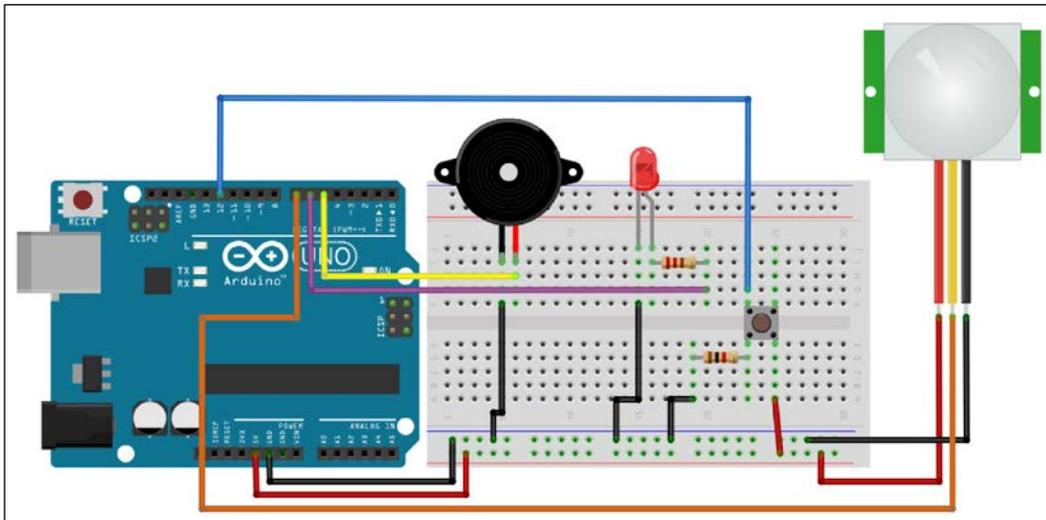
On the software side, the only thing that we will need in the first chapter is the latest version of the Arduino IDE that you can download from the following URL: <https://www.arduino.cc/en/main/software>.

Note that we are going to use the Arduino IDE in all the projects of this book, so make sure to install the latest version.

Hardware configuration

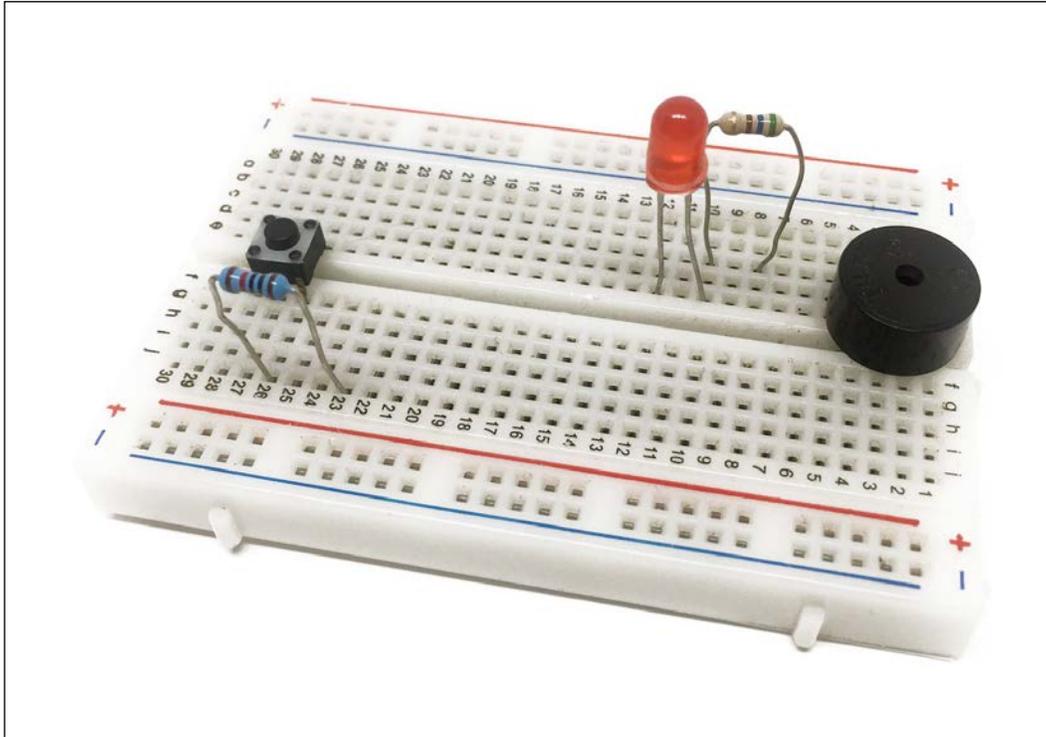
We are now going to assemble the hardware for this project. As this is the first project of this book, it will be quite simple. However, there are quite a lot of components, so be sure to follow all the steps.

Here is a schematic to help you out during the process:



Let's start by putting all the components on the board. Place the buzzer, button, and LED on the board first, according to the schematics. Then, place the 330 Ohm resistor in series with the LED anode (the longest pin) and connect the 1k Ohm resistor to one pin of the push button.

This is how it should look at this stage:



Now we are going to connect each component to the Arduino board.

Let's start with the power supply. Connect the 5V pin of the Arduino board to one red power rail of the breadboard, and the GND pin of the Arduino board to one blue power rail of the breadboard.

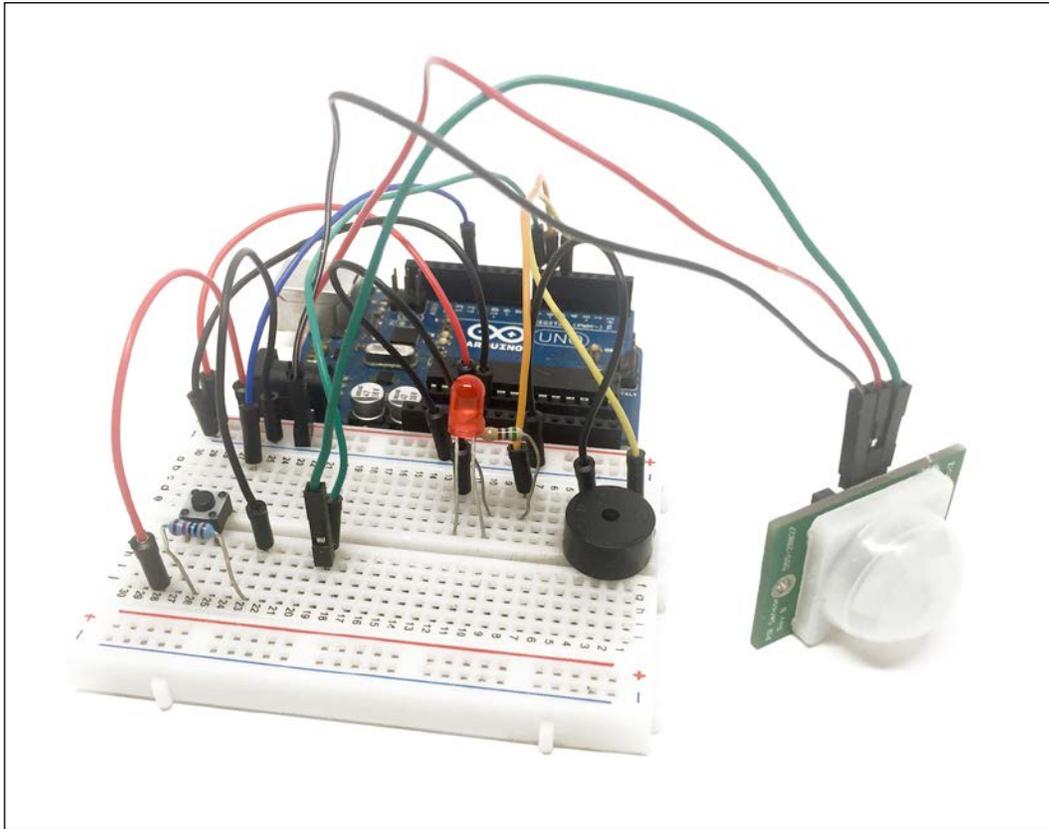
Then, we are going to connect the buzzer. Connect one pin of the buzzer to pin number 5 of the Arduino board and the other pin to the blue power rail of the breadboard.

After that, let's connect the LED. Connect the free pin of the resistor to pin number 6 of the Arduino board and the free pin of the LED (the cathode) to the ground via the blue power rail.

Let's also connect the push button to our Arduino board. Refer to the schematic to be sure about the connections since it is a bit more complex. Basically, you need to connect the free pin of the resistor to the ground and connect the pin that is connected to the button to the 5V pin via the red power rail. Finally, connect the other side of the button to pin 12 of the Arduino board.

Finally, let's connect the PIR motion sensor to the Arduino board. Connect the VCC pin of the motion sensor to the red power rail and the GND pin to the blue power rail. Finally, connect the SIG pin (or OUT pin) to Arduino pin number 7.

The following is the final result:



If your project looks similar to this picture, congratulations, you just assembled your first secret agent project! You can now go on to the next section.

Configuring the alarm system

Now that the hardware for our project is ready, we can write down the code for the project so that we have a usable alarm system. The goal is to make the buzzer produce a sound whenever motion is detected and also to make the LED flash. However, whenever the button is pressed, the alarm will be switched off.

Here is the complete code for this project:

```
// Code for the simple alarm system

// Pins
const int alarm_pin = 5;
const int led_pin = 6;
const int motion_pin = 7;
const int button_pin = 12;

// Alarm
boolean alarm_mode = false;

// Variables for the flashing LED
int ledState = LOW;
long previousMillis = 0;
long interval = 100; // Interval at which to blink (milliseconds)

void setup()
{
  // Set pins to output
  pinMode(led_pin, OUTPUT);
  pinMode(alarm_pin, OUTPUT);

  // Set button pin to input
  pinMode(button_pin, INPUT);

  // Wait before starting the alarm
  delay(5000);
}

void loop()
{
  // Motion detected ?
  if (digitalRead(motion_pin)) {
    alarm_mode = true;
  }

  // If alarm mode is on, flash the LED and make the alarm ring
  if (alarm_mode){
    unsigned long currentMillis = millis();
    if(currentMillis - previousMillis > interval) {
      previousMillis = currentMillis;
      if (ledState == LOW)

```