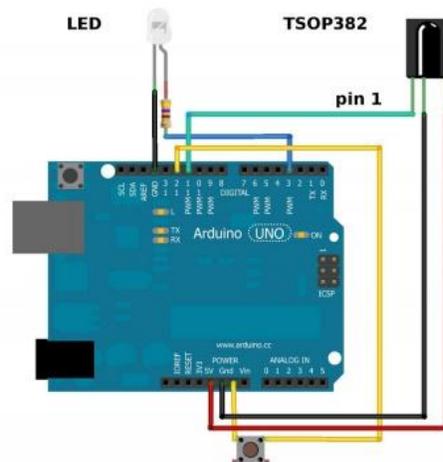# HARDWARE SETUP

For the hardware in this tutorial, you will need these parts:

- Arduino Uno

- IR LED

- TSOP382 IR Receiver

- Mini Push Button Switch

- 330Ω Resistors

- IR Keychain Remote or any IR remote that uses 38kHz modulation

You will be setting up two separate circuits both using an Arduino. The first example circuit uses a TSOP382 IR photo sensor to receive and demodulate the IR signal from a common remote control. The second example circuit uses an IR LED and current limiting resistor to transmit IR codes to a common appliance, for example a home stereo or TV.

Here is the complete setup for connecting to an Arduino:

Hardware setup for both of the examples.

Be sure to connect your LED correctly! The long leg is positive and connects to the resistor, then to the Arduino's output pin. The short leg is negative and is connected to ground (GND).

Also, you cannot see IR LED light with your eyes, since IR radiation is outside of the visible spectrum. However, most cellphone cameras can detect short wave IR and can see the LED faintly glowing.


When the LED is modulating at 38kHz, the LED should appear constantly lit, but dim.

Also, pay attention to the polarity of the TSOP382. Refer to the TSOP382 datasheet for the pinout of the sensor.

The current limiting resistor attached to the LED can have values down to 100Ω (40mA) for full power and longest range. If you use a larger value resistor, the LED won't light as bright and your range will suffer. With a 330Ω resistor, you should be able to operate the IR LED across a dimly lit room.

Receiving IR Example
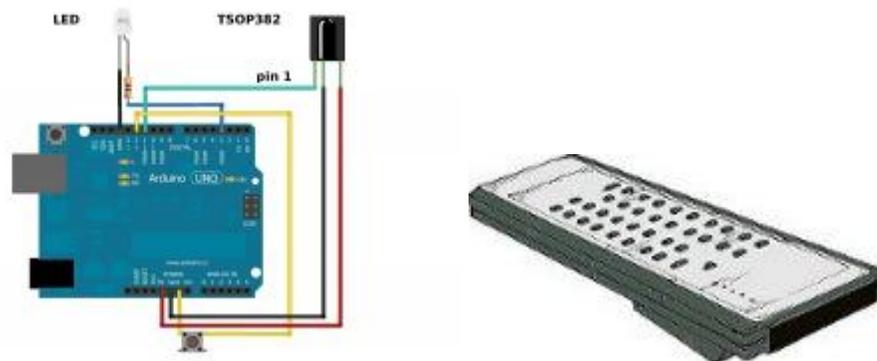
In this example, all you need is the TSOP382 IR receiver connected to an Arduino and a common remote control. The IR LED and button can stay connected, but you will not use it until the next example.

IR remote controls are as ubiquitous as their appliance counterparts. What if you could put all of those old remote controls to use in your next project? This example will show you how to read IR remote codes from any IR remote using the TSOP382 IR photo sensor and an Arduino.

Once you can receive codes from individual button presses, your remote control and Arduino become a general purpose, short range, communication interface!

The first thing you need to do is install the IR Arduino library. Instructions on how to install an Arduino library can be found here.

- IR Arduino Library

After downloading the IR library, go to your Arduino project directory -> libraries -> IRremote -> examples -> IRrecvDemo -> and open the IRrecvDemo.ino. Upload the sketch to your Arduino.

The sketch will automatically decode the type of remote you are using and identify which button on your remote is pressed. Open the serial port in the Arduino IDE at 9600 bps and hit different buttons on your remote.
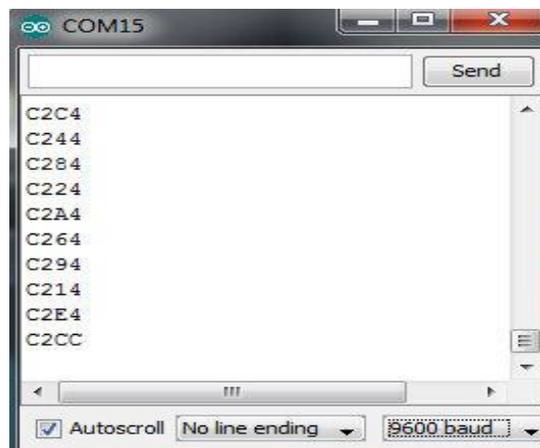
Terminal window displaying random button presses on my remote. Different buttons show different codes.

When specific buttons are pressed, you can use the incoming values to do something else in your code, for example turn on and off a motor or LED.

The results from each button press can be found by calling the value() method:

COPY CODE

```
results.value
```

You can print the values to the terminal window:

COPY CODE

```
Serial.println(results.value, HEX); //prints the hex value a a button press
```

Or you might need read the values to run a conditional statement:

COPY CODE

```
if(irrecv.decode(&results)) //this checks to see if a code has been received
{
   if(results.value == 0xC284) //if the button press equals the hex value 0xC284
   {
      //do something useful here
   }
   irrecv.resume(); //receive the next value
}
```