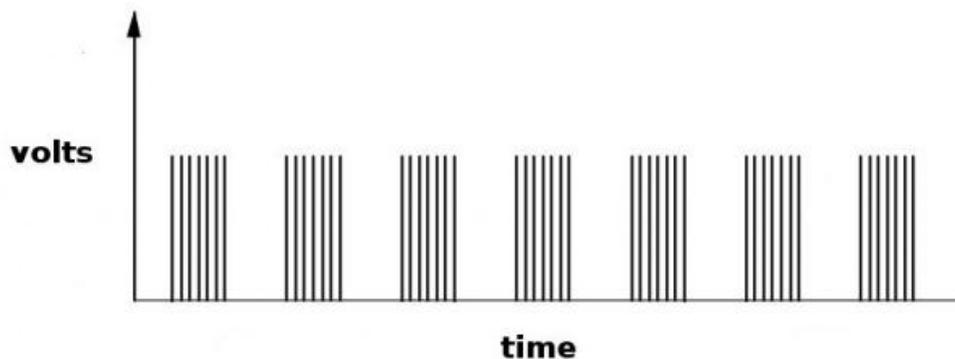


# IR COMMUNICATION BASICS

IR radiation is simply light that we cannot see which makes it great for communication. IR sources are all around us. The sun, light bulbs, or any anything with heat is very bright in the IR spectrum. When you use your TV remote, an IR LED is used to transmit information to your TV. So, how does the IR receiver in your TV pick out signals from your remote among all of the ambient IR? The answer is that the IR signal is modulated. Modulating a signal is like assigning a pattern to your data, so that the receiver knows to listen.

A common modulation scheme for IR communication is something called 38kHz modulation. There are very few natural sources that have the regularity of a 38kHz signal, so an IR transmitter sending data at that frequency would stand out among the ambient IR. 38 kHz modulated IR data is the most common, but other frequencies can be used.

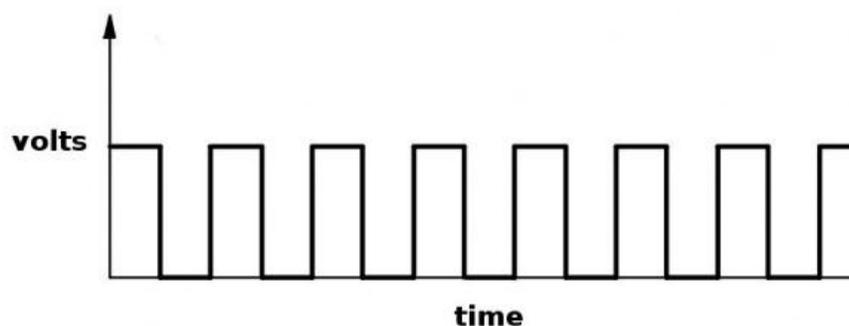
When you hit a key on your remote, the transmitting IR LED will blink very quickly for a fraction of a second, transmitting encoded data to your appliance.



*Each pulse is turned on and off at a frequency of 38kHz*

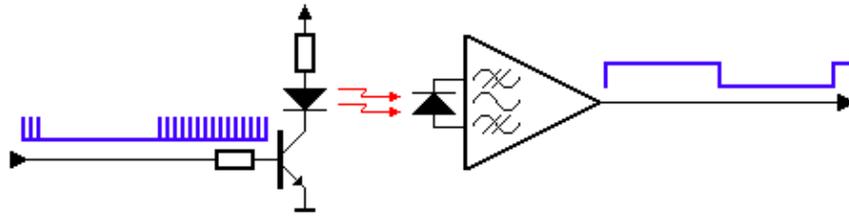
If you were to hook an oscilloscope up to your TV remote's IR LED, you would see a signal similar to the one above. This modulated signal is exactly what the receiving system sees. However, the point of the receiving device is to demodulate the signal and output a binary waveform that can be read by a microcontroller.

When you read the OUT pin of the TSOP382 with the wave from above, you will see something like this:



By controlling the spacing between the transmitted modulated signals, the waveform can be read by an input pin on a microcontroller and decoded as a serial bit stream.

Below is conceptual view of how an IR transmitter receiver pair works.



*Thanks to SBProjects.com for the gif and excellent IR resource!*

An Arduino or other microcontroller can be connected to either end of the system to transmit data (left side) or receive data (right side).

Source: <https://learn.sparkfun.com/tutorials/ir-communication#hardware-setup>