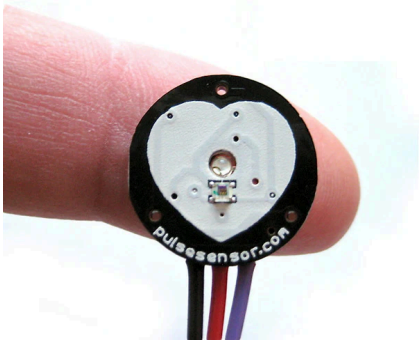


PulseSensor Datasheet

THE EASY TO USE HEART RATE SENSOR & KIT

Table of Contents

Introduction

Explore heart-rate monitoring and biofeedback creatively with **the Original PulseSensor Kit, a trusted, versatile tool for students, artists, and developers** globally. It's user-friendly and compatible with Arduino, ESP32, micro:bit boards. It is supported by comprehensive example code and documentation, guiding you from basic to advanced applications. In short, it allows you to rapidly create biofeedback devices on any maker platform.

Technical Overview

The PulseSensor is an affordable optical heart rate sensor (PPG) designed for use with Arduino and other microcontrollers. It uses light transmission to detect changes in blood volume at the fingertip, providing an easy way to measure and track live pulse, beats per minute (BPM), Heart Rate Variability (HRV), and Interbeat Interval (IBI).

Key Features

- **Reliable and Durable Design**: Built with high-quality materials, the PulseSensor ensures consistent performance and comes with a **2-year hardware warranty**, giving you peace of mind against manufacturing defects.
- **Plug-and-Play Convenience**: Easy to integrate with platforms like Arduino, ESP32, and micro:bit, providing immediate functionality for your projects.
- **Comprehensive Project Support**: Extensive tutorials and code examples are available, with ongoing software updates and **support via GitHub** throughout the product lifecycle.
- **Versatile Applications**: Ideal for wearable health monitors, interactive art installations, and educational projects.
- **Enhanced User Safety**: Designed with safety in mind, featuring skin-friendly materials and easy insulation methods for reliable long-term use.

The Kit Includes

Included Kit accessories for high-quality sensor readings.

1) Soft braided-copper core, 26 gauge thickness wires, and **610 mm (24 inches) length**, PVC Insulation.

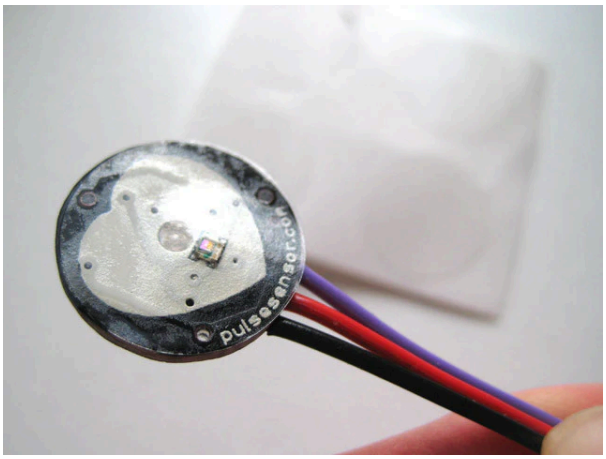
2) An **Ear Clip** that's perfectly sized to the sensor.

3) A **Velcro Finger Strap** and **Velcro Dots**

4) Transparent Vinyl Dots, which make electrical insulation simple.

Required Electrical Insulation Included

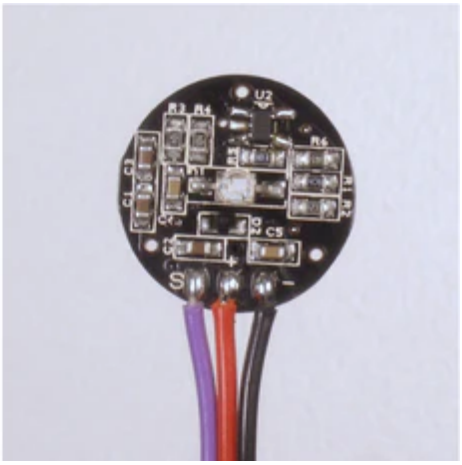
The PulseSensor will not work correctly without insulating the front and back of the circular circuit board with the included kit components. **Some user preparation is required.**

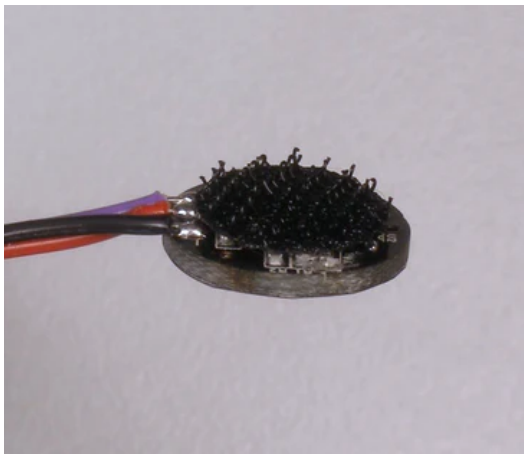


Vinyl Dots:

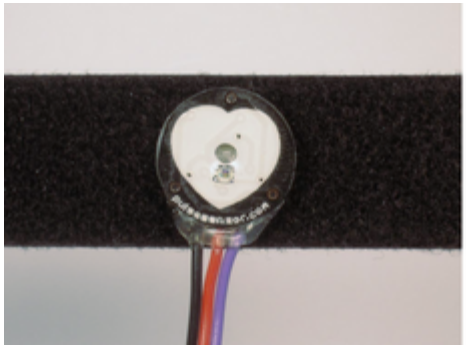
Start by Insulating the front from the user's skin with the transparent Vinyl Dots.

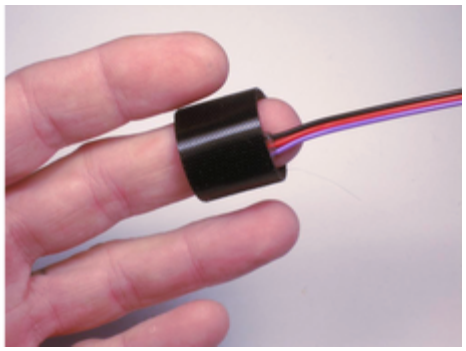
Velcro Dot: Insulate the back from any human skin and any electronically connective material, simply by putting velcro backing on the back of the printed circuit board.





Velcro Strip: Use the Velcro Strip to wear the sensor on a finger tip.





Ear Clip: Or attach the sensor to the included ear clip using hot glue.

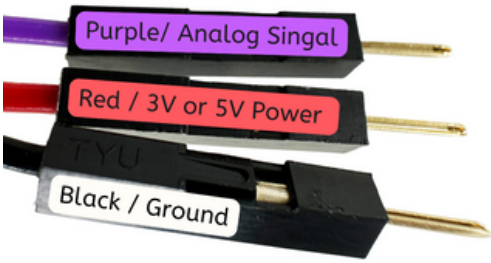
Pin Out/Connector Configuration

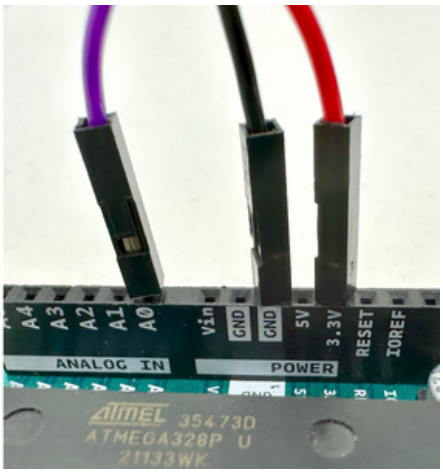
The PulseSensor comes with a 3-cable ribbon cable terminating in a male header. The pinout is as follows:

Purple Wire = Analog Pulse Signal (Vdd/2)

Red Wire = Vdd, Power with 3V or 5V

Black Wire = Ground

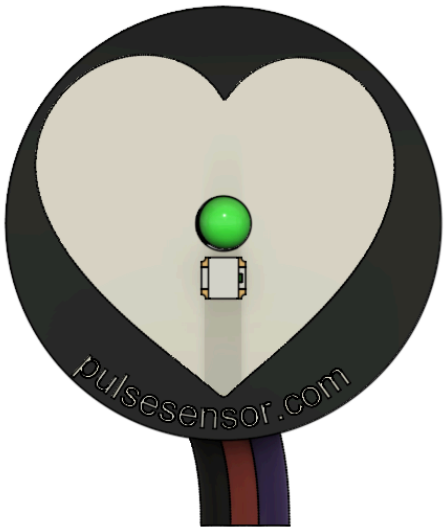


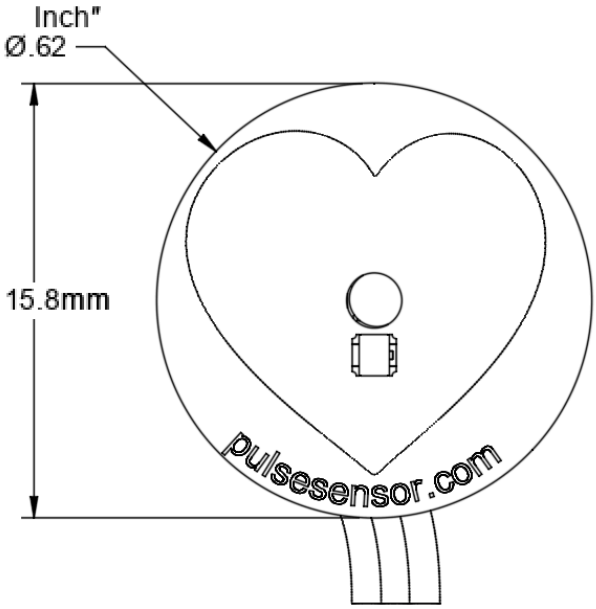


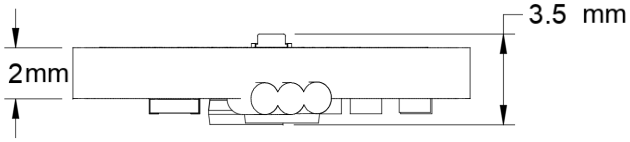
Electrical Specifications

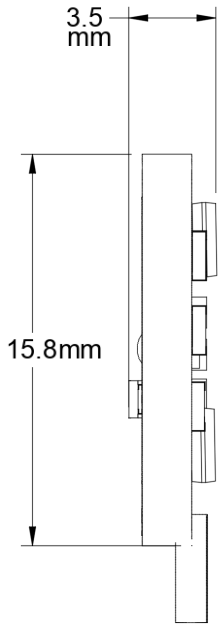
Parameter	Min	Typ	Max	Unit
Operating Temperature Range	-40		+85	°C
Input Voltage Range	3		5.5	Volts
Output Voltage Range	0.3	Vdd/2	Vdd	Volts
Supply Current	3	4		milliamps

Physical Dimensions



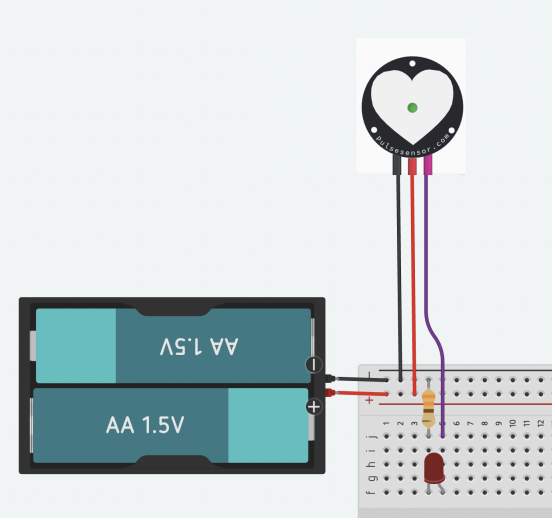






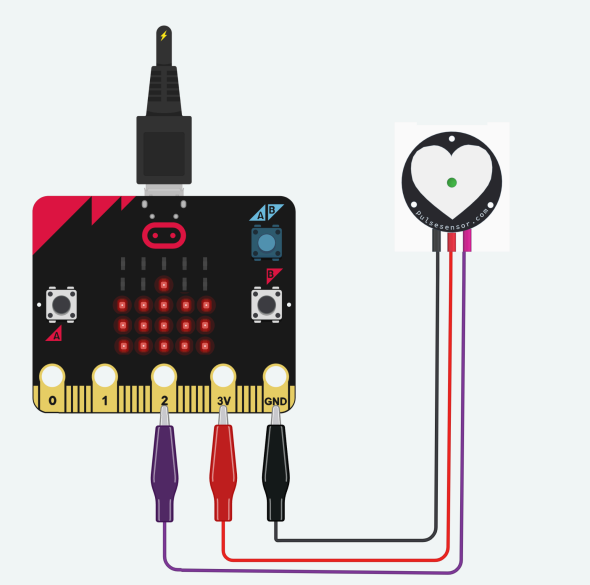
Circuit Diagrams

Solderless Breadboard Circuit Diagram



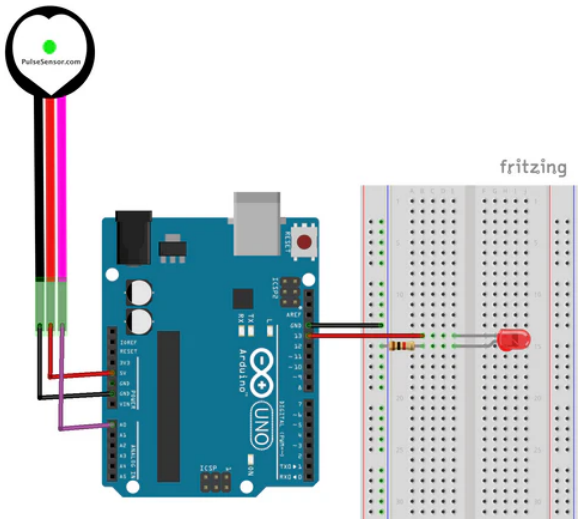
Blink LED with Heartbeat Application

micro:bit Wiring Diagram



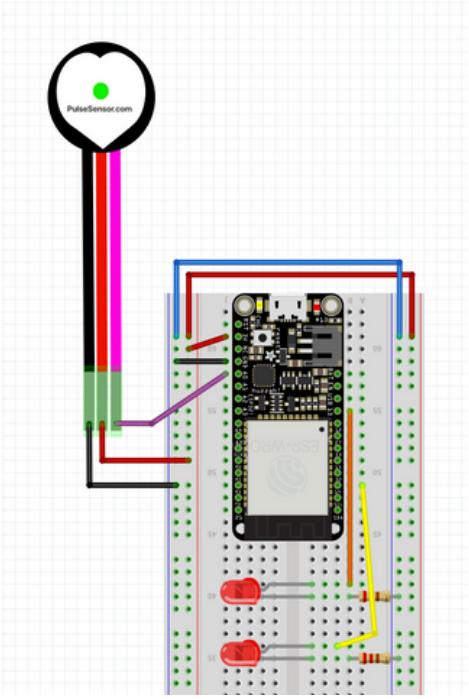
micro:bit (All Versions)

Arduino Circuit Application Diagrams

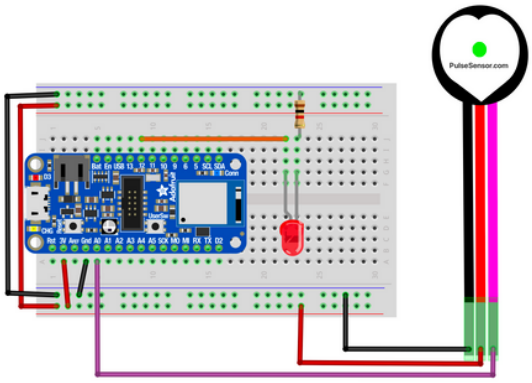


Arduino board Uno Diagram

PulseSensor connected to an Arduino Board



ESP32 BPM WiFi Server circuit diagram



nRF52 BLE Heart Rate Monitor circuit diagram

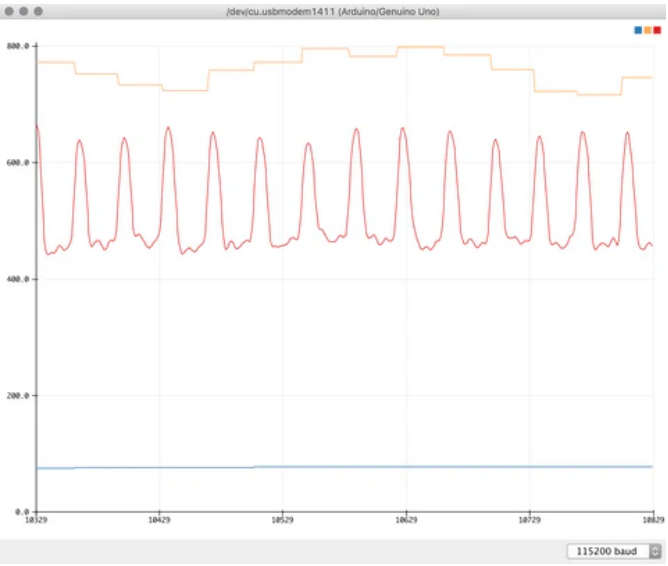
Arduino Software Library 2.3.x

Playground Library 2.3.x

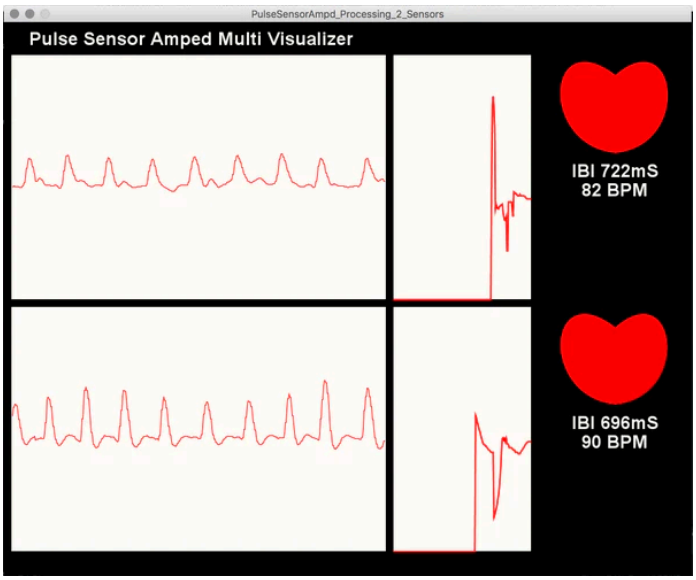
Explore a range of up-to-date PulseSensor code examples, right in the Arduino IDE.

PulseSensor Playground Code 2.3.0	Description
GettingStartedProject.ino	Introductory setup for PulseSensor and Arduino. Basic hardware and library integration.
Getting_BPM_to_Monitor.ino	Real-time BPM monitoring on Serial Monitor. Heartbeat alerts. LED visualization on PIN 13.
PulseSensor_BPM.ino	Standard BPM measurement setup with PulseSensor.
PulseSensor_ATtiny85_Serial.ino	PulseSensor use with ATtiny85, including serial communication.
PulseSensor_ATtiny85_noSerial.ino	PulseSensor with ATtiny85, no serial communication.
PulseSensor_BPM_UNO_R4_LEDmatrix_Heartbeat.ino	Heartbeat display on LED matrix using UNO R4.
PulseSensor_BPM_UNO_R4_LEDmatrix_Plotter.ino	Plotting heartbeat data on LED matrix with UNO R4.
PulseSensor_ESP32.ino	PulseSensor integration with ESP32 module.
PulseSensor_PTT.ino	Pulse Transit Time functionality based on heart rate.
PulseSensor_Servo.ino	Controlling a servo based on heart rate data.
PulseSensor_Speaker.ino	Audio feedback from heart rate data with a speaker.
SoftwareSerialDemo.ino	Software serial communication with PulseSensor.
PulseSensor_nRF52.ino	PulseSensor with nRF52 series boards.

Software Visualizers



Arduino Serial Plotter Output Example Screenshot

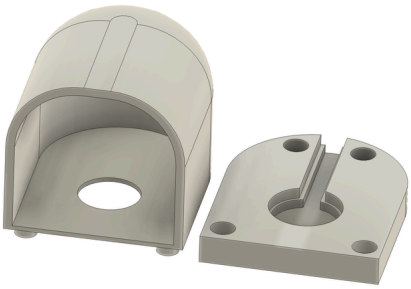


Processing Example Project to Visualize BPM and IBI.

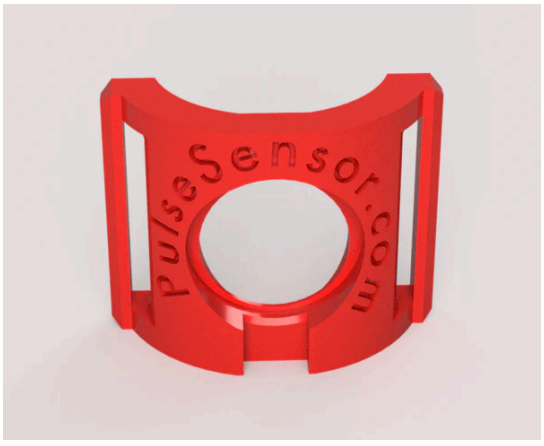
Free Accessories (Not Included in Kit)

Unlock precision and comfort with PulseSensor.com's Table Top Holder and Light Shield along with our Stabilizer Ring—enhance readings, maintain freedom of movement, and 3D print your own today!

Table Top Holder and Light Shield



Stabilizer Ring

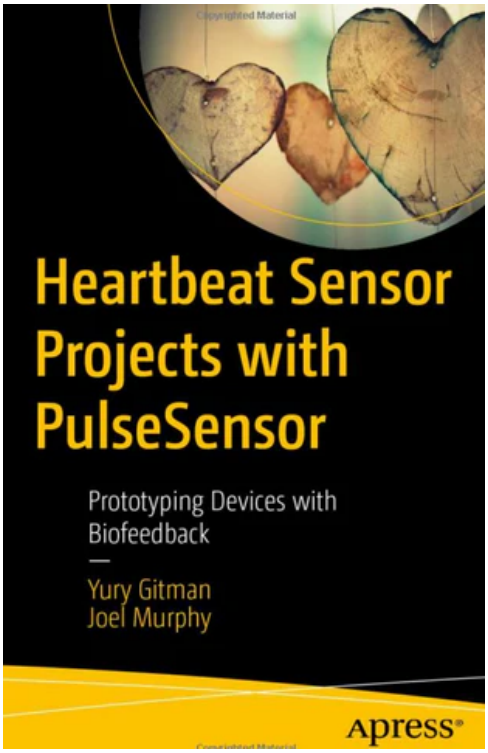


Supplementary Text

Heartbeat Sensor Projects with PulseSensor. Prototyping Devices with Biofeedback

Publisher: APESS

By: Yury Gitman and Joel Murphy



Contact Support

Email Support: support@pulsesensor.com

Arduino Library Support: https://github.com/WorldFamousElectronics/PulseSensorPlayground/issues

Compliance and Certifications

Certified as Open Source with the Open Source Hardware Association: OSHW US000075

“PulseSensor.com” is a registered trademark of World Famous Electronics LLC. NY, USA

Ordering Information

Universal Product Code **(UPC): 864620000204**

Manufacturer: World Famous Electronics llc. New York, USA

Designed in New York City

Made in Taiwan

www.PulseSensor.com®

Datasheet Revision History

Revision History

Revision	Date	Description
B	2024-11	Updated datasheet with images based on user feedback and best practices.
A	2012-09	Initial Datasheet Release

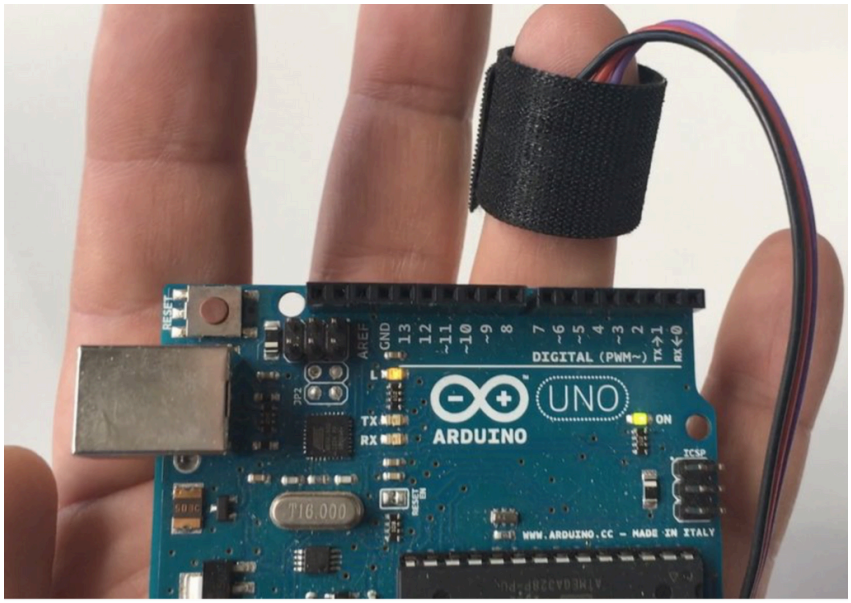


Photo of LED13 Blinking with a user's heartbeat.