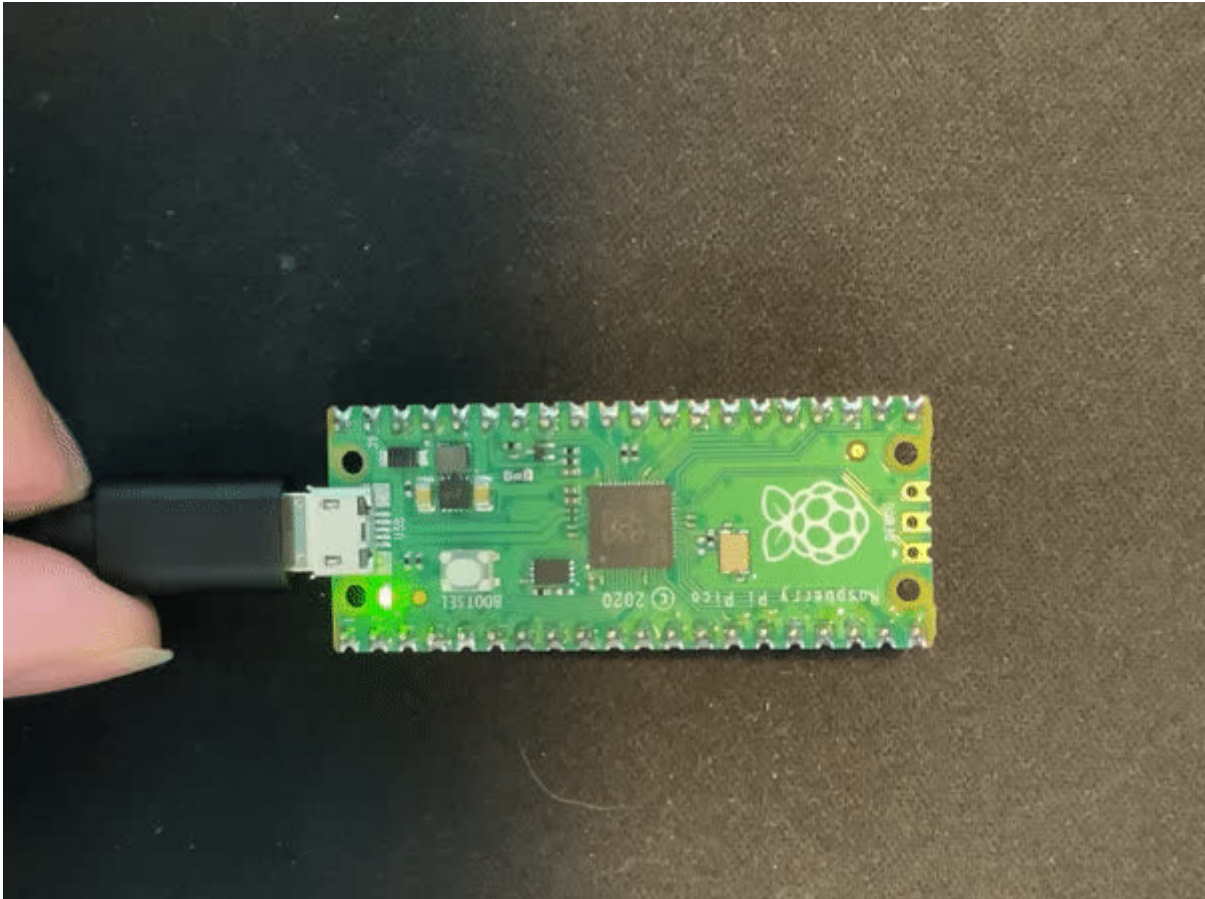




Program RP2040 in Arduino

Created by Eva Herrada



<https://learn.adafruit.com/rp2040-arduino-with-the-earlephilhower-core>

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Overview



In this guide you'll learn how to install [Earle Philhower's Arduino core](https://adafru.it/ToC) (<https://adafru.it/ToC>) for RP2040 devices, `arduino-pico`. This core supports a bunch of different RP2040 boards.

Supported boards at time of writing (there's probably more now)

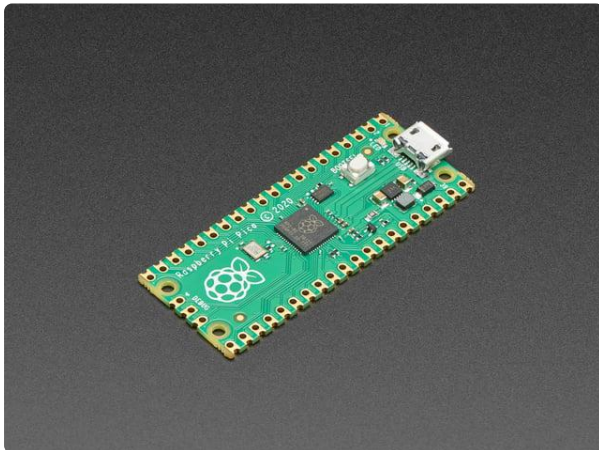
- Raspberry Pi Pico
- Adafruit Feather RP2040
- Adafruit ItsyBitsy RP2040
- Adafruit Macropad RP2040
- Adafruit QTPy RP2040
- Adafruit STEMMA Friend RP2040
- Adafruit Trinkey RP2040 QT
- Arduino Nano RP2040 Connect
- SparkFun ProMicro RP2040
- Generic (configurable flash, I/O pins)

This core makes it easy to use Arduino with all your favorite RP2040 boards so you can create fast projects using them.

You can find the documentation for the Earle Philhower Arduino core at [https://
arduino-pico.readthedocs.io/en/latest/](https://arduino-pico.readthedocs.io/en/latest/)

Parts

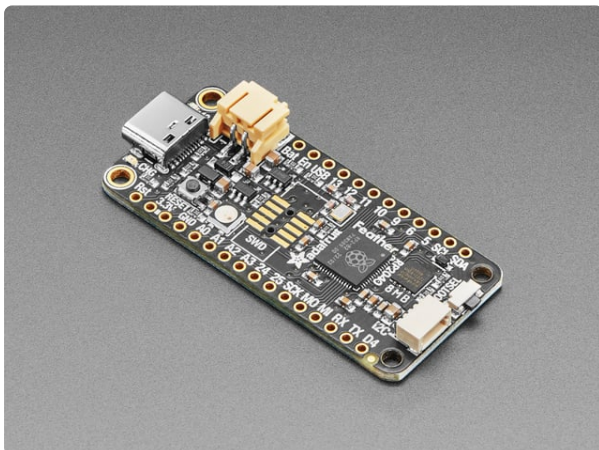
The core supports all the boards below so pick whichever you want. There are some boards supported that haven't even been released yet, so if there's one on that list you want to use, check back later.



Raspberry Pi Pico RP2040

The Raspberry Pi foundation changed single-board computing when they released the Raspberry Pi computer, now they're ready to...

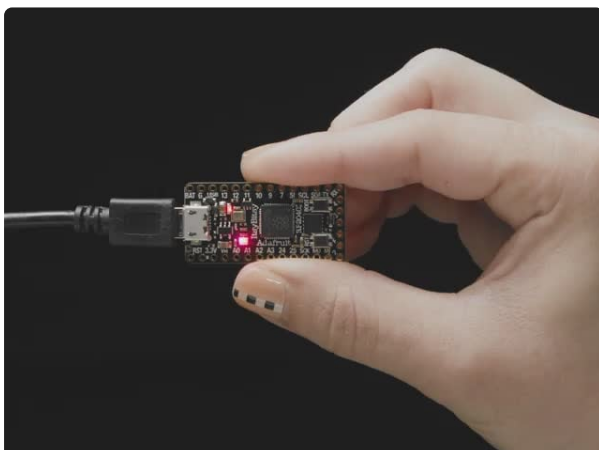
<https://www.adafruit.com/product/4864>



Adafruit Feather RP2040

A new chip means a new Feather, and the Raspberry Pi RP2040 is no exception. When we saw this chip we thought "this chip is going to be awesome when we give it the Feather..."

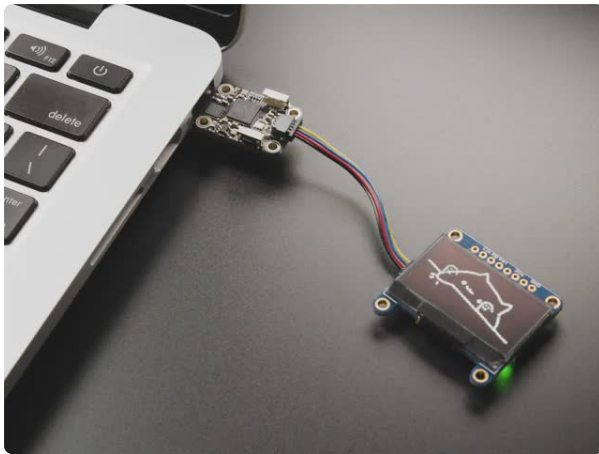
<https://www.adafruit.com/product/4884>



Adafruit ItsyBitsy RP2040

A new chip means a new ItsyBitsy, and the Raspberry Pi RP2040 is no exception. When we saw this chip we thought "this chip is going to be awesome when we give it the ItsyBitsy..."

<https://www.adafruit.com/product/4888>



Adafruit Trinkey QT2040 - RP2040 USB Key with Stemma QT

It's half USB Key, half Adafruit QT Py, and a lotta RP2040...it's Trinkey QT2040, the circuit board with an RP2040 heart and Stemma QT legs....

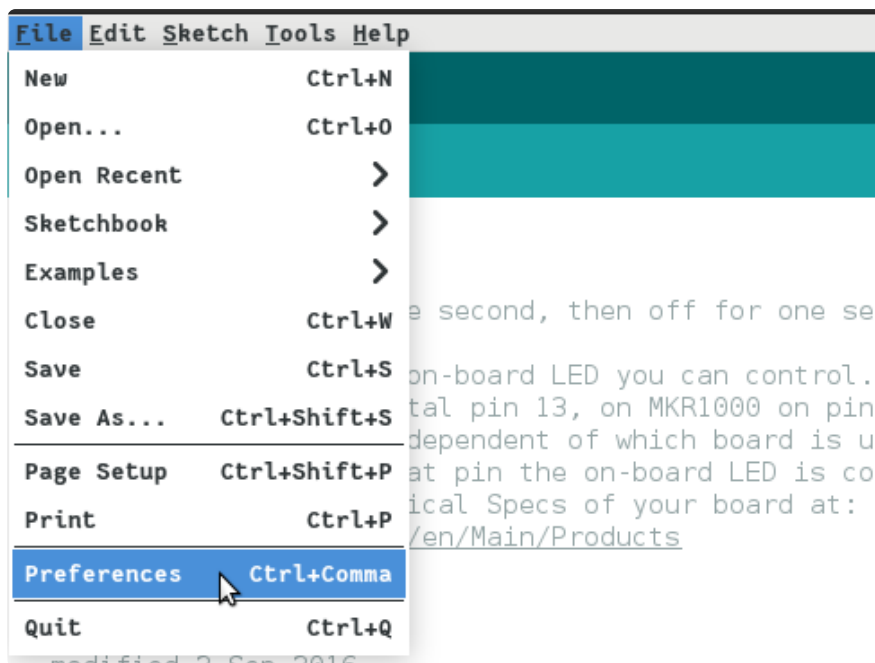
<https://www.adafruit.com/product/5056>

Installing the Earle Philhower core

The first step to getting the Earle Philhower core to run on your RP2040 device is to install it.

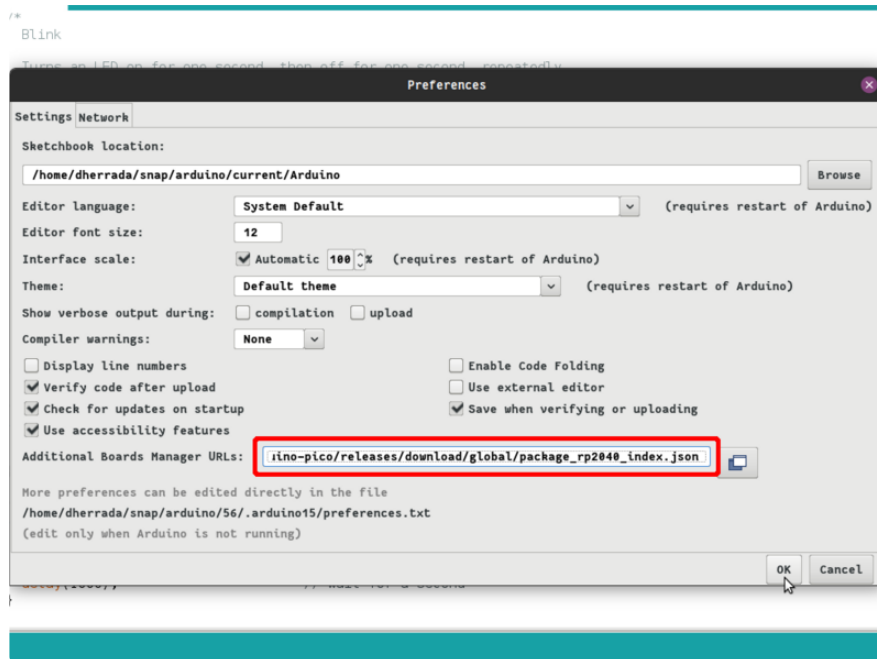
First, open the Arduino IDE.

Then, navigate to **File -> Preferences** and paste the link below into **Additional Board Manager URLs**. If the field is initially blank, just paste the link in and press **OK**. If there are already one or more URLs there, add a comma to the last one and paste the link there and press **OK**.

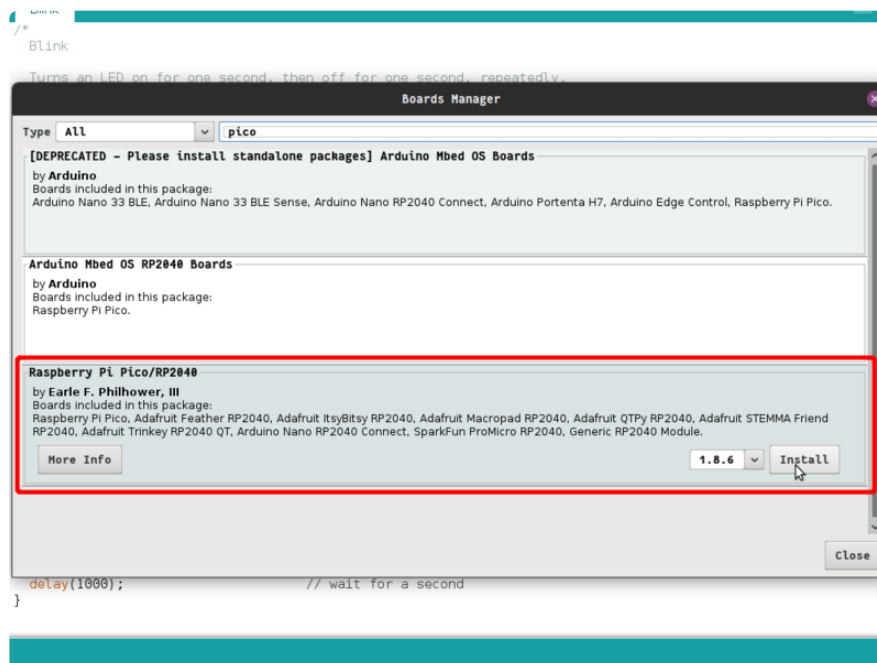


The link to copy and paste:

https://github.com/earlephilhower/arduino-pico/releases/download/global/package_rp2040_index.json



Click “OK” to save these preferences. Then, go to **Tools -> Board -> Board Manager** and type **pico** into the search bar, and hit enter. Select **Raspberry Pi Pico/RP2040** by **Earle F. Philhower, III** and press **Install**. Then press close and you should be all set to connect your RP2040.



Connecting your RP2040

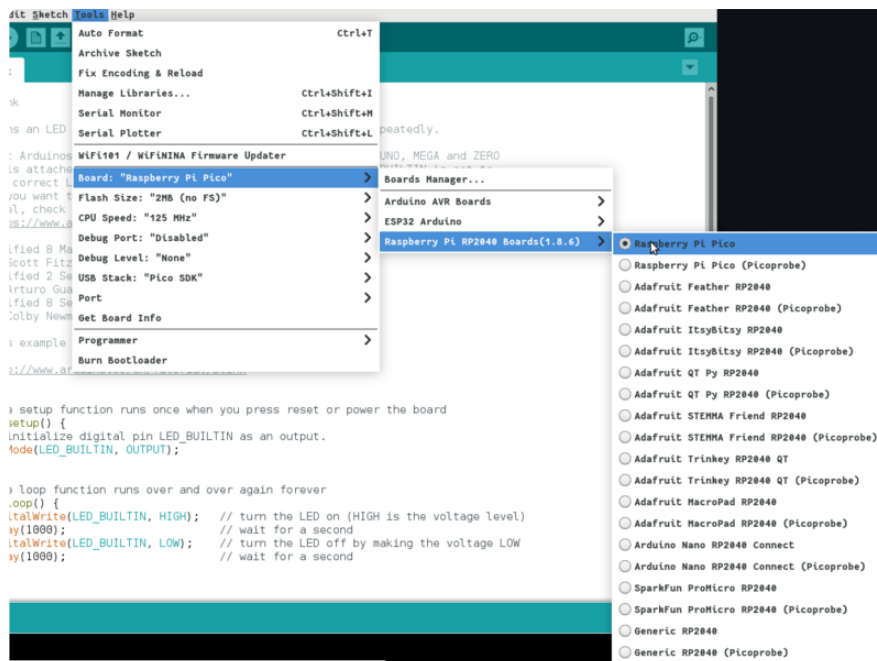
Now that you've successfully installed the core, you can move on to connecting your RP2040 to the Arduino IDE.



To connect your RP2040 microcontroller-based board, connect it to your computer via a known good USB power+data cable. Hold down the **BOOTSEL** button when you're plugging it in to enter the bootloader. It should then show up as a USB drive with the name **RPI-RP2** (or something similar) in your computer File Explorer / Finder (depends on operating system).

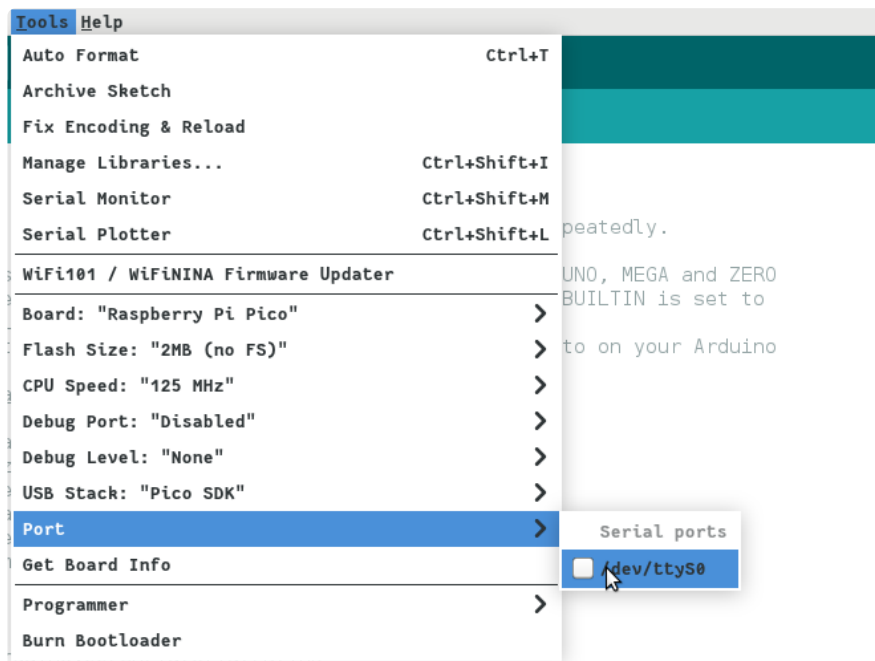
You only need manually to enter the bootloader the first time you load an Arduino sketch onto your Pico. It is not necessary to manually enter the bootloader to load subsequent sketches once you are already running an Arduino sketch.

Then in the Arduino IDE, go to **Tools -> Board -> Raspberry Pi RP2040 Boards** and select the board you are using.



Now, you're going to want to select the correct port to use. Open **Tools -> Port**, and select the right port. On my computer, it was **/dev/ttyS0**. If it only gives you the options to use a port with **ACM** (Linux) in it, as in **/dev/ttyACM0** or **usbmodem** (Mac/OSX), as in **/dev/tty.usbmodem14301** then try unplugging it and plugging it back in,

making sure to hold down the **BOOTSEL** button as you do so. On Windows, serial ports show up as COM ports.



Note that after you flash your first sketch, the board will not show up as a USB drive and will use ports such as /dev/ttyACM0, COM, or /dev/tty.usbmodem14301. Make sure to change the port in Tools -> Port.

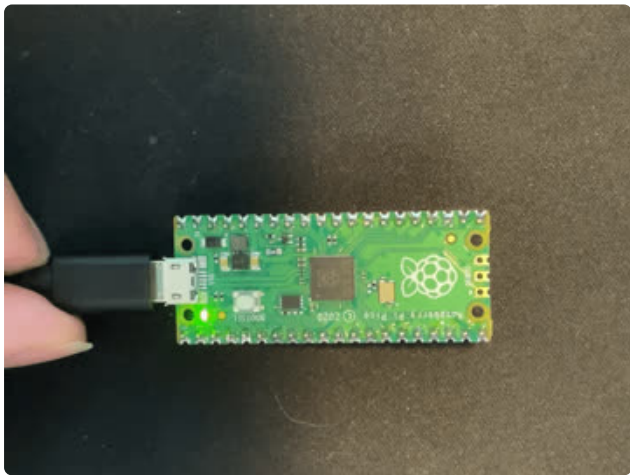
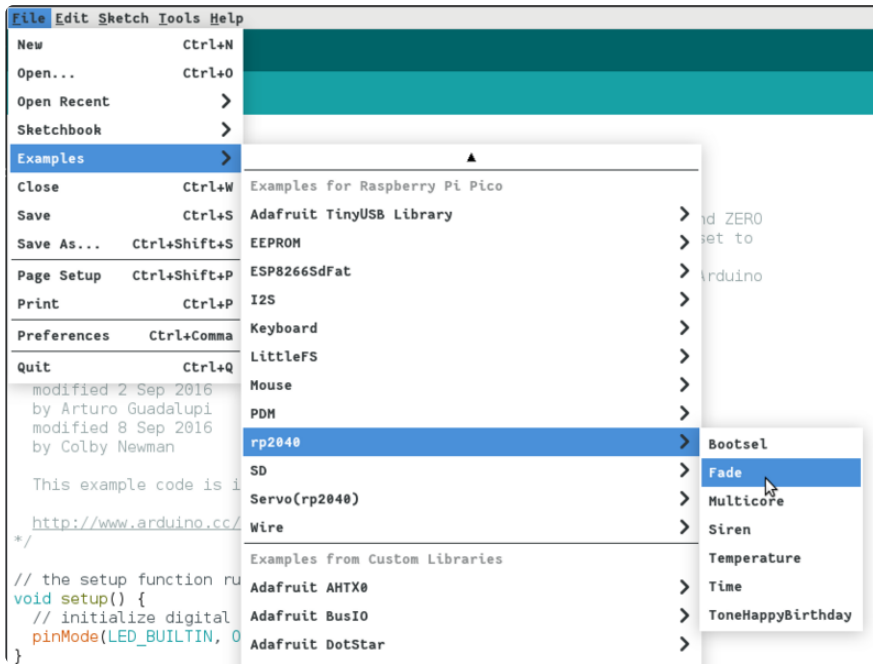
Uploading a Sketch

Finally, to test that everything works, you can upload an example sketch that will make the onboard LED fade in and out.

Now that you've installed everything and connected your RP2040, it's time to flash a sketch to your board.

Make sure all your Arduino settings are correct and you've selected the correct serial port.

In the Arduino IDE, navigate to **File -> Examples -> Examples for Raspberry Pi Pico** and select the **Fade** example. Then press the upload button and your code should start running in a few seconds.



If it worked, your RP2040 should look something like this.