![Adafruit logo]

Program RP2040 in Arduino

Created by Dylan Herrada

https://learn.adafruit.com/rp2040-arduino-with-the-earlephilhower-core
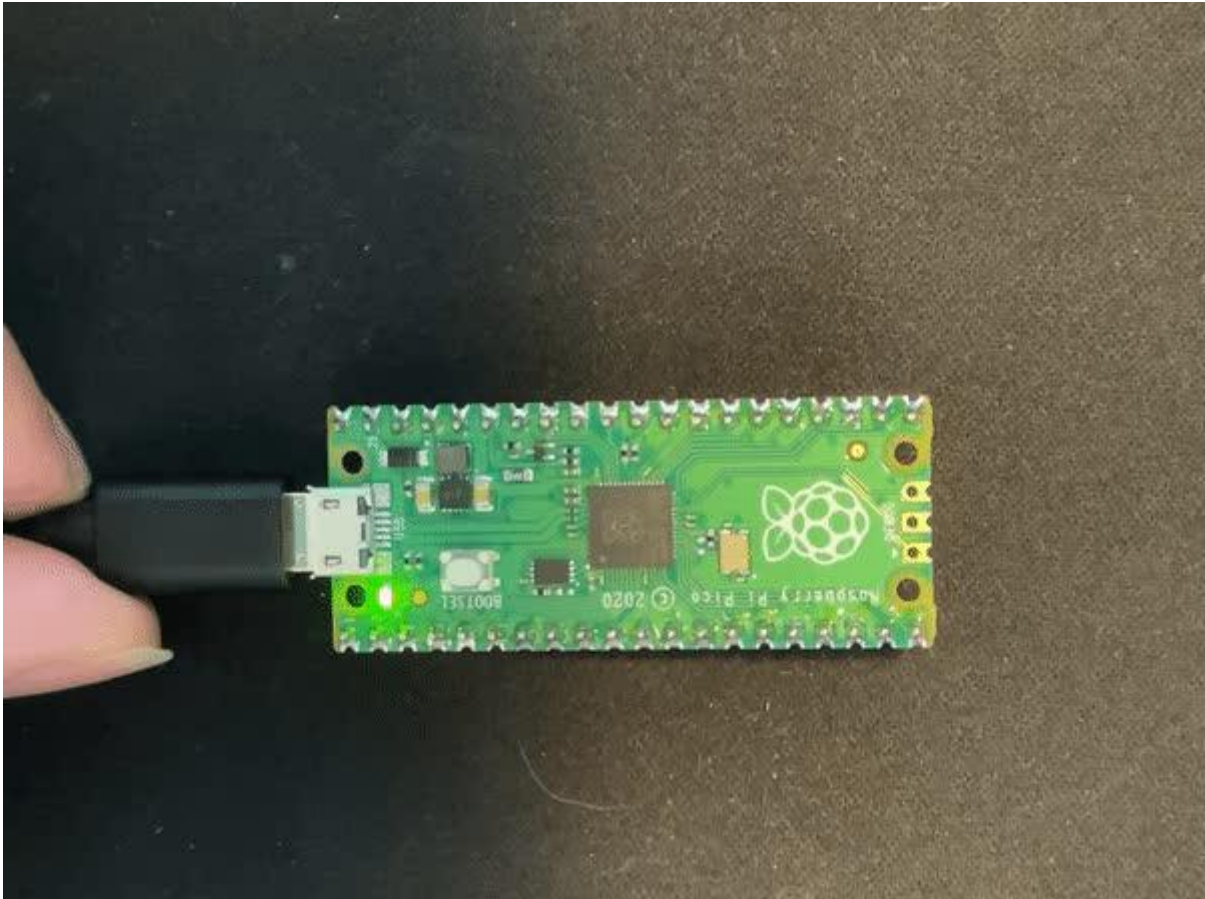
Last updated on 2021-11-15 08:25:09 PM EST

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Overview

In this guide you'll learn how to install Earle Philhower's Arduino core (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.

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.
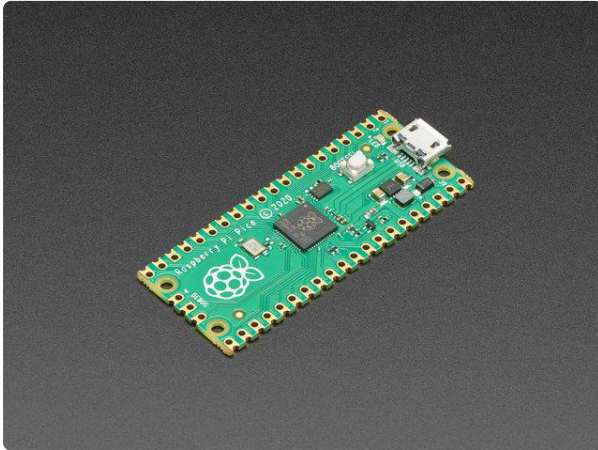
Raspberry Pi Pico RP2040

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

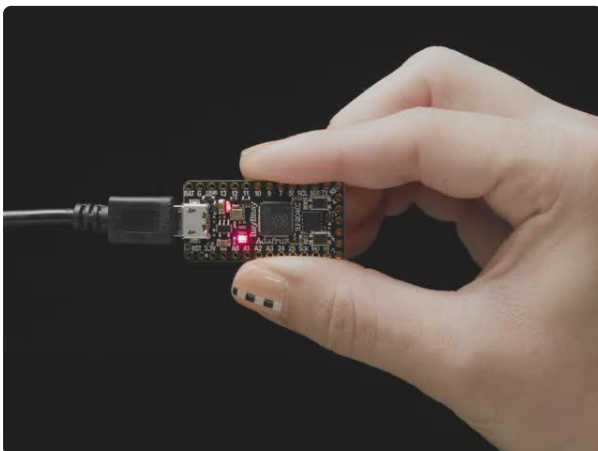https://www.adafruit.com/product/4864
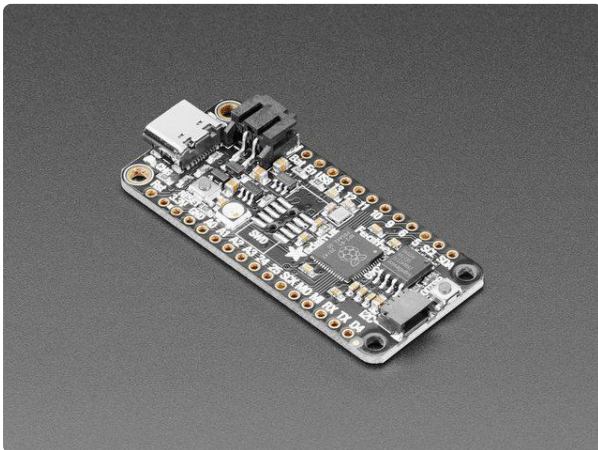
Adafruit Feather RP2040

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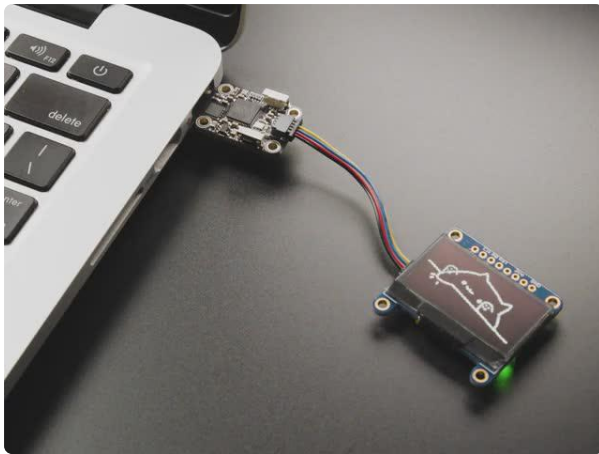
https://www.adafruit.com/product/4884

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](https://www.adafruit.com/product/5056)
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.
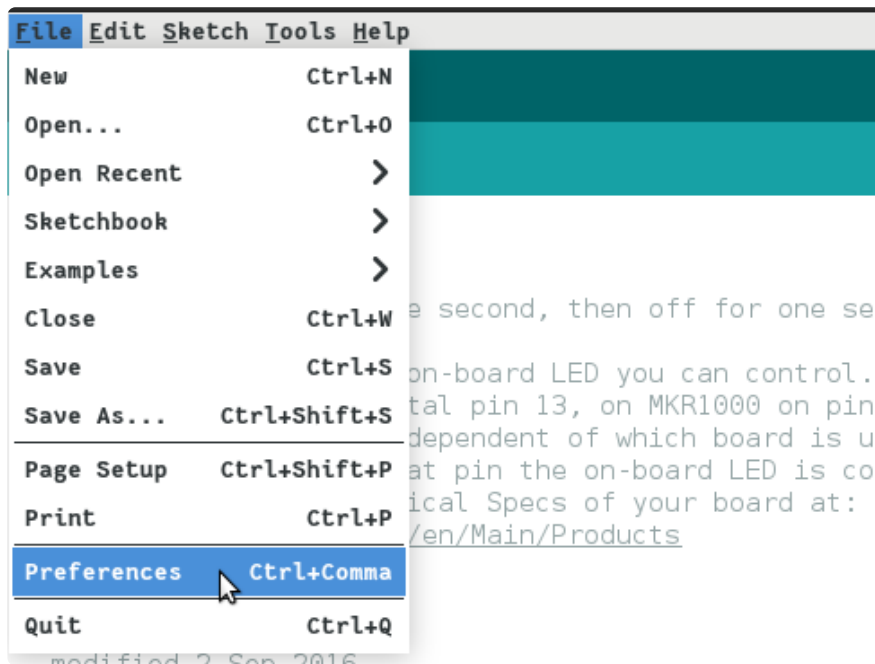

The link to copy and paste:

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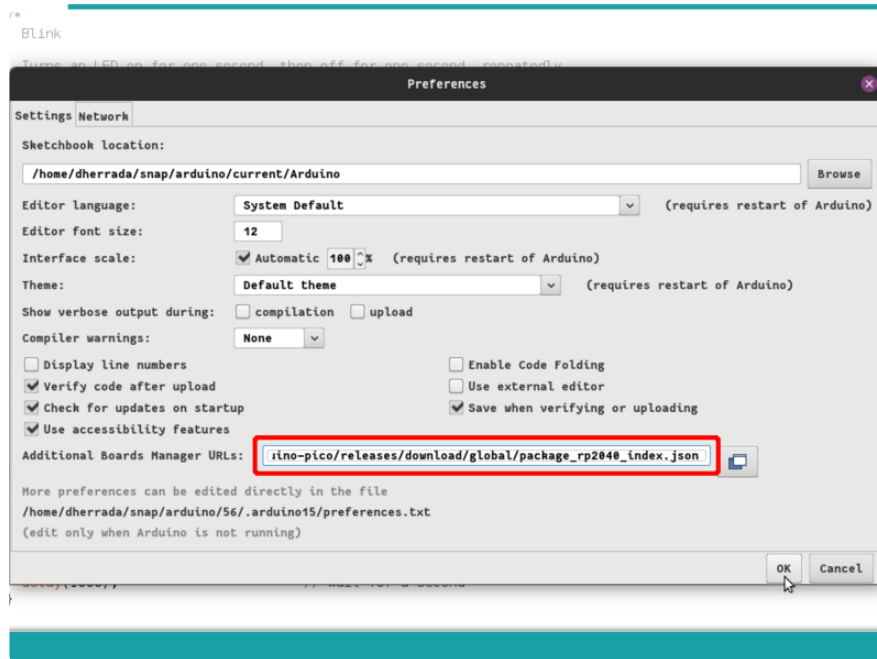

Click "OK" to save these preferences. Then, go to Tools -> Board -> Board Manager and type pico into the search bar, and hit enter. Select Raspberry Pi Pico/RP2040 by Earle F. Philhower, III and press Install. Then press close and you should be all set to connect your RP2040.
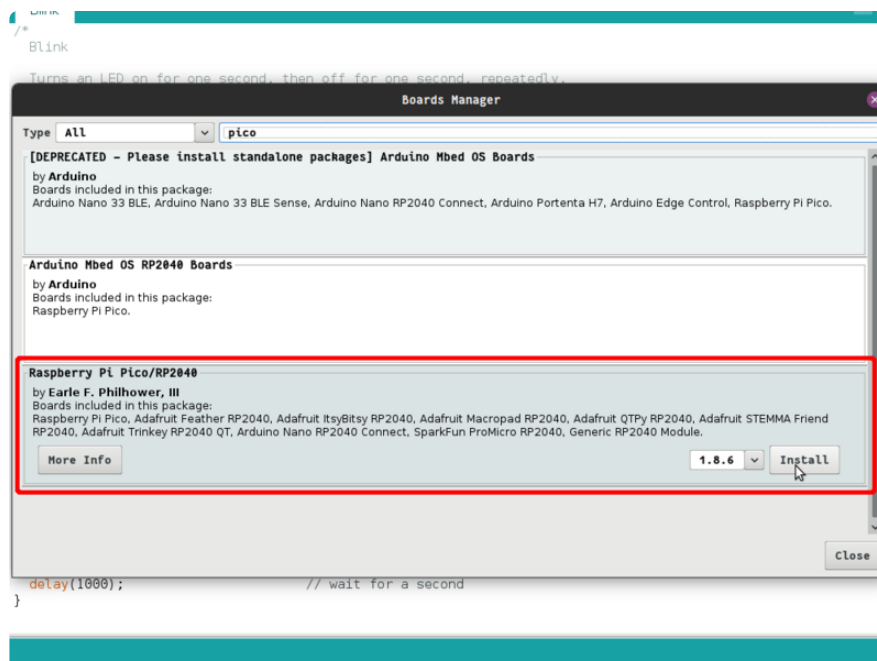
Connecting your RP2040

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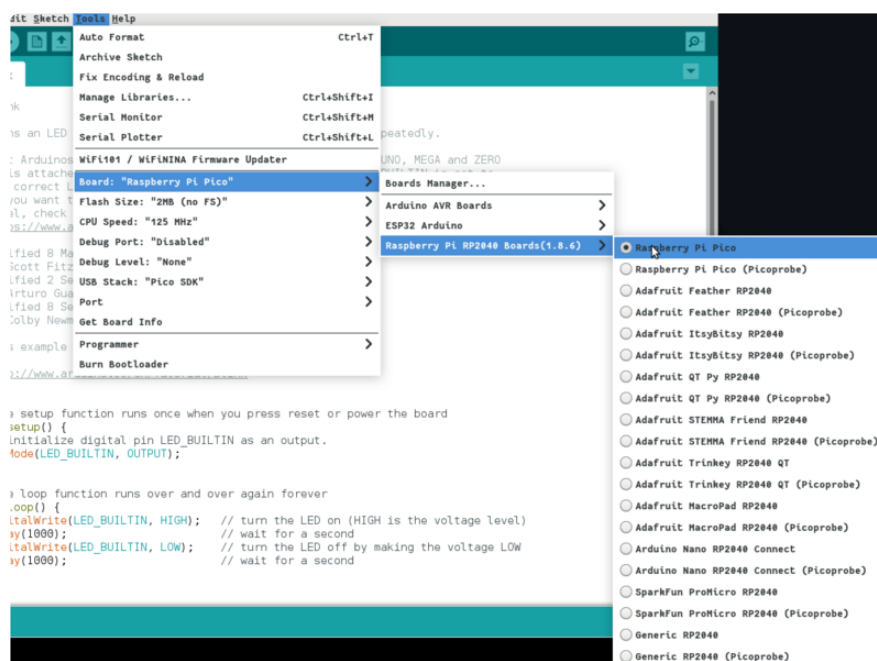
Now, you're going to want to select the correct port to use. Open Tools -> Port, and select the right port. On my computer, it was /dev/ttyS0. If it only gives you the options to use a port with ACM (Linux) in it, as in /dev/ttyACM0 or usbmodem (Mac/OSX), as in /dev/tty.usbmodem14301 then try unplugging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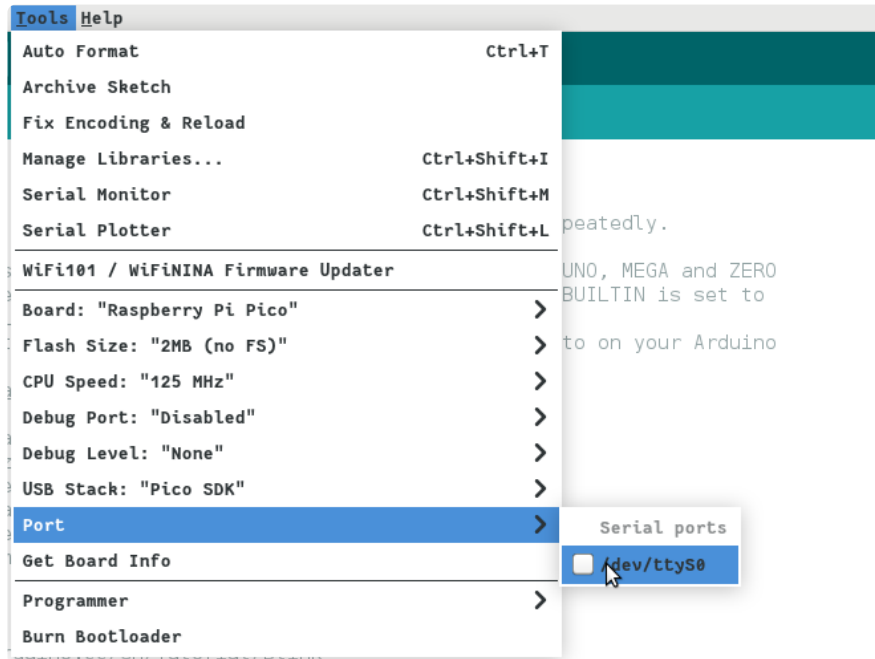

Note that after you flash your first sketch, the board will not show up as a USB drive and will use ports such as /dev/ttyACM0, COM, or /dev/tty.usbmodem14301. Make sure to change the port in Tools -> Port.

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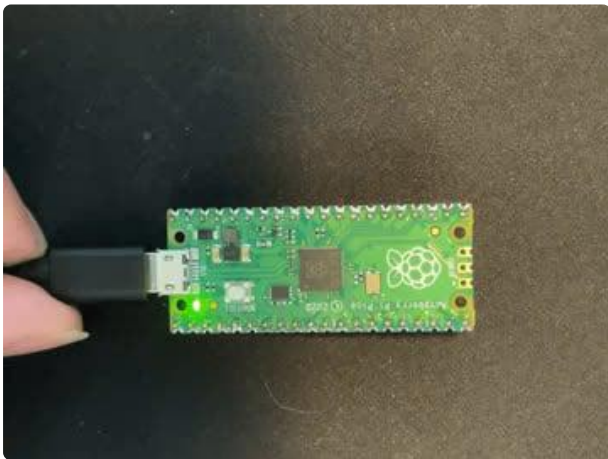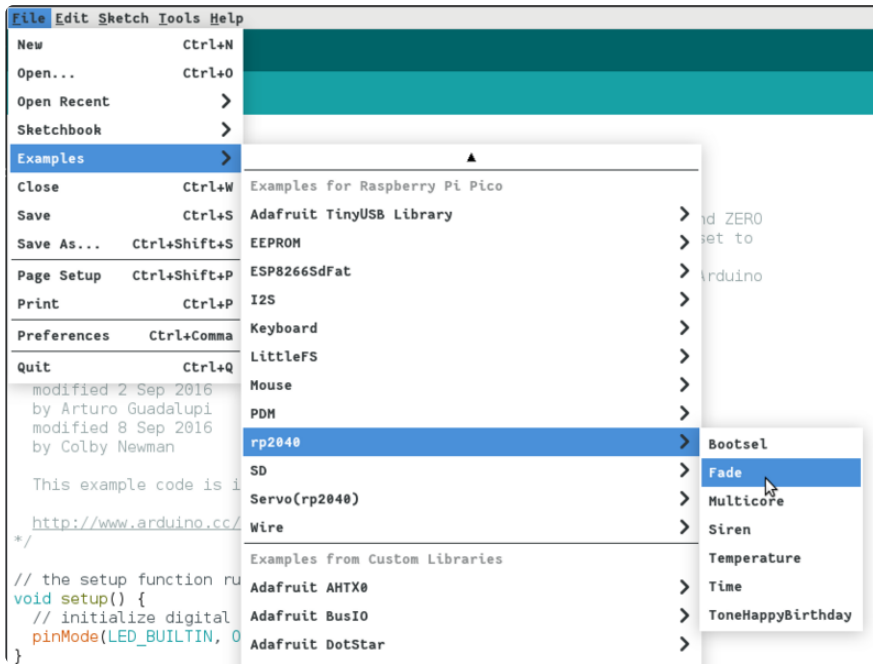
If it worked, your RP2040 should look something like this.