Program CircuitPython USB Devices with iPhone & iPad

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Overview

With the launch of **iOS** & **iPadOS 13**, iPhone and iPad now have the ability to **edit code** on **CircuitPython USB devices.** Users can connect a board such as Circuit Playground Express (https://adafru.it/wpF) to their mobile device and edit & run code on the go.

For this guide, we'll be using a Circuit Playground Express (https://adafru.it/wpF), but the process should work with any of **Adafruit's CircuitPython USB devices** - click here for a full list (https://adafru.it/FVt).

What you'll need

• An **iPhone** capable of running **iOS 13** or **iPad** capable of running **iPadOS.** Check your device's compatibility here (https://adafru.it/FVu).

Note that this tutorial is specific to Apple devices. It is hoped that other operating systems on other devices, such as Android, may work in the future.

iOS Lightning to USB OTG Cable

$17.50
IN STOCK

Add To Cart

Your browser does not support the video tag.

Circuit Playground Express

$24.95

IN STOCK

Add To Cart

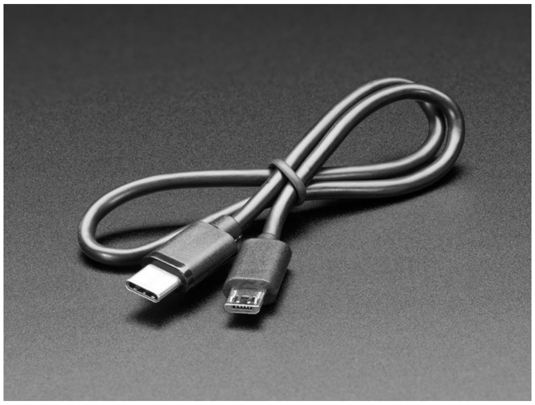
USB cable - USB A to Micro-B

$2.95

IN STOCK

Add To Cart

If you're using an **iPad Pro** equipped with a **USB-C port**, skip the Lightning Adapter & USB A to Micro-B cable and simply use a **USB-C to Micro-B cable**:



USB C to Micro B Cable - 1 ft 0.3 meter

$2.95

IN STOCK

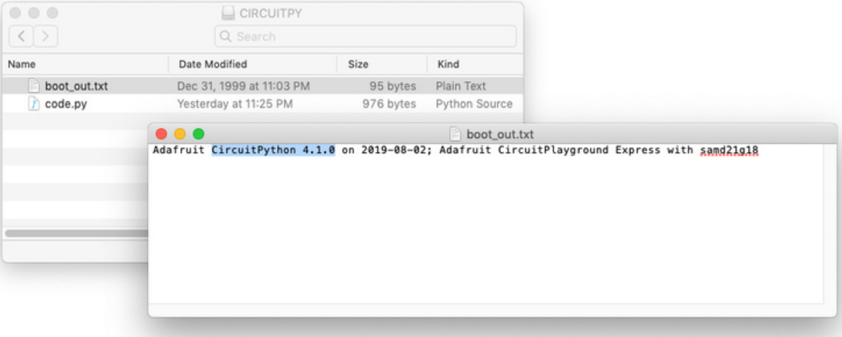
Add To Cart

Preparation

First, let's check to make sure your CircuitPython & Apple devices are ready to talk to eachother.

Update CircuitPython

At the time of this writing **iOS** & **iPadOS** have been tested and confirmed to work with **CircuitPython version 4.1.0**.



CIRCUITPY

Name	Date Modified	Size	Kind
boot_out.txt	Dec 31, 1999 at 11:03 PM	95 bytes	Plain Text
code.py	Yesterday at 11:25 PM	976 bytes	Python Source

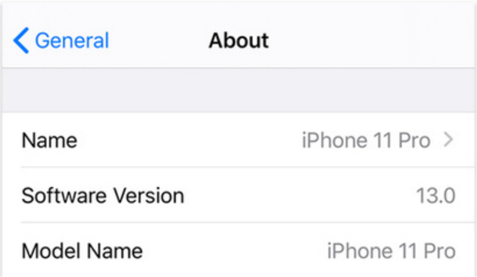
boot_out.txt

```
Adafruit CircuitPython 4.1.0 on 2019-08-02; Adafruit CircuitPlayground Express with samd21g18
```

Connect your CircuitPython compatible device to your **computer** (*not* the iOS device), and open the **boot_out.txt** file and check what **version** of CircuitPython you're running.

If you don't see a file named **boot_out.txt** or you have an **older (than 4.1.0)** or **alpha** version of CircuitPython installed, update to the latest stable release using these instructions (https://adafru.it/FVv).

Update iOS/iPadOS



Name	iPhone 11 Pro
Software Version	13.0
Model Name	iPhone 11 Pro

On your **iPhone/iPad**, check what **version OS** you're running by opening the **Settings** app and tapping **General**->**About** and checking the **Software Version** number.

If your version number is **13 or later**, you’re good to go. If not, update your OS via **Settings**->**General**->**Software Update**.

Connect CircuitPython device to iPhone/iPad

For devices with a **Lightning** connector – connect your **Lightning to USB Adapter** to **iPhone/iPad** and connect your **CircuitPython device** to the adapter via a **micro USB cable**.

For devices with a **USB-C** connector – connect your **CircuitPython device** directly to your **iPad** using a **USB-C to Micro-**

B cable.

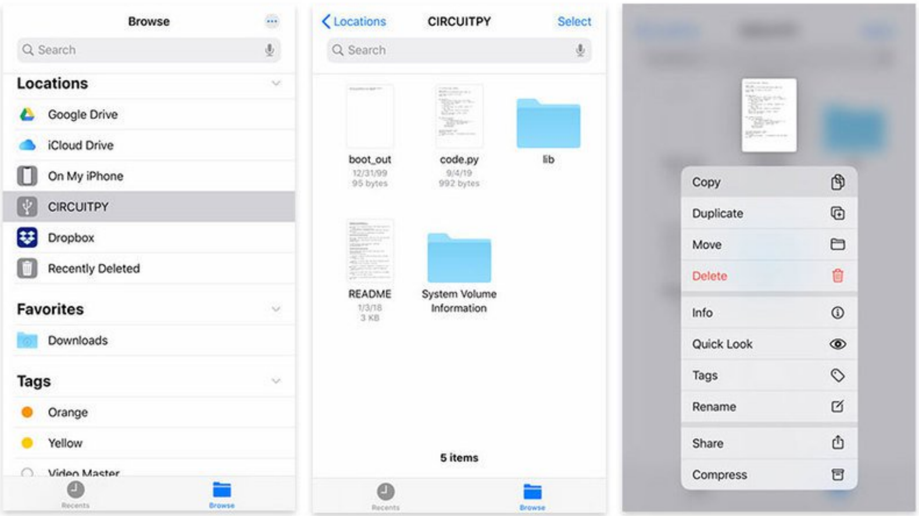
Copy, Edit, Paste

Screenshots below are from iPhone, but the editing process is the same for iPad

Copy code from CIRCUITPY drive

Plug your CircuitPython board, via USB, to your iDevice using the appropriate cable.

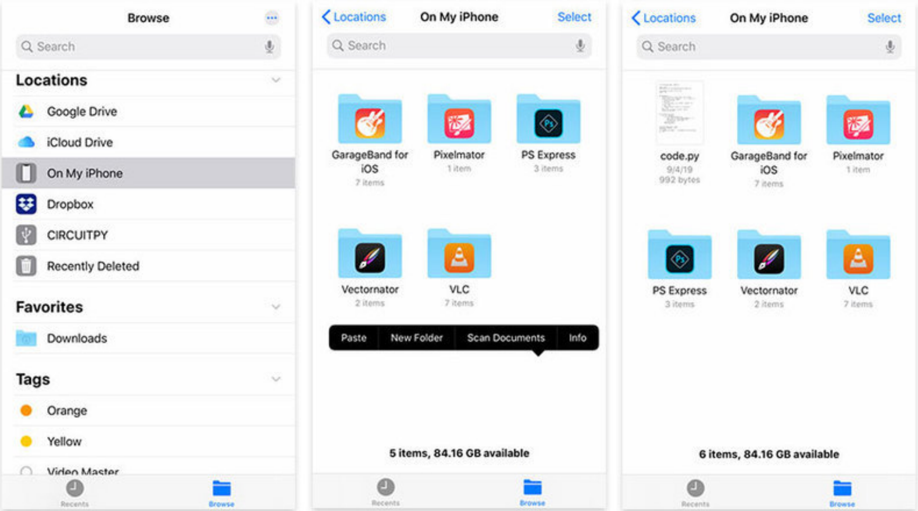
On your iDevice, open the **Files** app, and tap on the drive labelled **CIRCUITPY**. Locate the **code.py** file within. Tap and hold on **code.py** and choose **Copy** from the menu.



Paste code to internal storage

Next in the **Files** app, navigate back and tap **On My iPhone/On My iPad**.

Tap and hold on an empty area, and choose **Paste** from the menu.

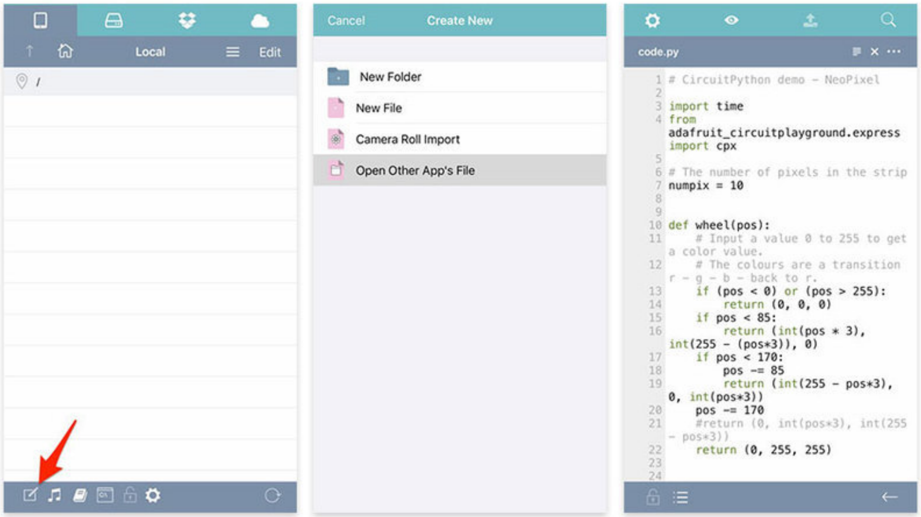


Edit code

Open the **App Store** and search for the **free** app named Koder Code Editor (https://adafru.it/FVw) and **download/install** it.

Open **Koder** and tap the **new file icon** in the lower left hand corner, tap **Open Other App's Files**, then open the **internal** copy of **code.py** stored in **On My iPhone/On My iPad**.

Make changes to your code, then **close** the file – it will be **saved automatically**.

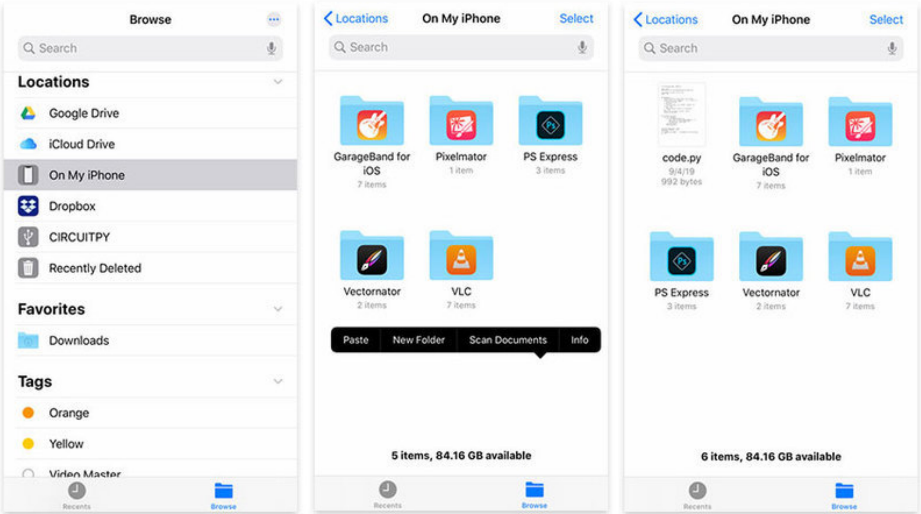


```
# CircuitPython demo - NeoPixel

import time
from adafruit_circuitplayground.express import cpx

# The number of pixels in the strip
numpix = 10


def wheel(pos):
    # Input a value 0 to 255 to get a color value.
    # The colours are a transition r - g - b - back to r.
    if (pos < 0) or (pos > 255):
        return (0, 0, 0)
    if pos < 85:
        return (int(pos * 3), int(255 - (pos*3)), 0)
    if pos < 170:
        pos -= 85
        return (int(255 - pos*3), 0, int(pos*3))
    pos -= 170
    #return (0, int(pos*3), int(255 - pos*3))
    return (0, 255, 255)
```

Overwrite original code.py on CIRCUITPY

Return to the **Files** app and navigate to **On My iPhone/On My iPad. Tap and hold** on the edited **code,py** file, and choose **Copy** from the menu.

Navigate to the **CIRCUITPY** drive, **tap and hold** in a blank area, choose **Paste** from the menu, and then choose **Replace** from the popup that appears.



Done

After a few seconds, your **CircuitPython device** should restart and begin **running** your **new code**. That's all there is to it - enjoy the world of mobile embedded development!

Troubleshooting

CircuitPython device restarts intermittently

Your CircuitPython device may periodically restart while being powered by iPhone or iPad – for continuous operation, connect your board to a dedicated power source using the battery port.

Unable to replace/overwrite files on CIRCUITPY drive

Please check to ensure your running the **latest 4.x stable** release of CircuitPython by following these steps.

If your project **requires** CircuitPython **5.0.0 or later** and you wish to edit your code on iOS/iPadOS follow these steps:

1. Connect your CircuitPython device to your computer
2. Open the CIRCUITPY drive (press **CMD**+**Shift**+**period** to view hidden files on macOS)
3. Delete the file named **.Trashes**

You should now be able to delete and replace files on your CircuitPython device from iOS/iPadOS.

CircuitPython 5.0.0 uses a file named .Trashes which is hidden by default on macOS. This file prevents macOS from storing deleted files on the CIRCUITPY drive before the system trash is emptied – helping to conserve the limited storage space of CircuitPython devices. Currently, the iOS Files app is incompatible with this technique, and presence of the file prevents deletion of any other file on the CIRCUITPY drive.

□ CIRCUITPY drive does not mount on iPhone/iPad

Check to ensure your Apple device is running iOS or iPadOS **13** or later. If not, please update your device.

Can I use a USB hub?

Manufacturer designs vary, so we **can't guarantee every hub** will work for connecting to iPhone/iPad to your CircuitPython device. That being said, we didn't have any issues with the USB hubs we tested - so your hub will likely work as well.