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How to Install CH340 Drivers

CONTRIBUTORS: BBOYHO, SANTAIMPERSONATOR

FAVORITE

11

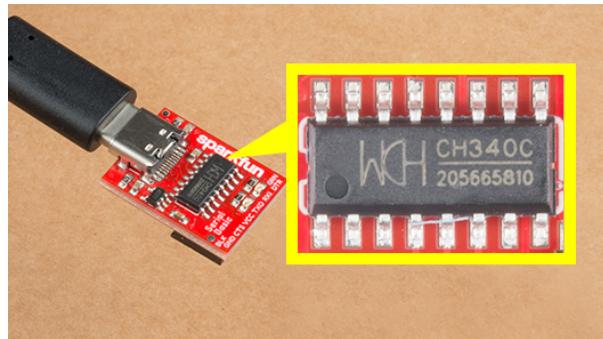
Introduction

In this tutorial, we'll show you how to install CH340 drivers on multiple operating systems if you need. The driver should automatically install on most operating systems. However, there is a wide range of operating systems out there. You may need to install drivers the first time you connect the chip to your computer's USB port or when there are operating system updates.

Tutorial: Installing CH340 Drivers



Watch a video walkthrough of this process



Required Materials

Depending on your application, the CH340 may be populated on a breakout or development board. Here are a few boards that use this particular USB-to-serial converter.



SparkFun Serial Basic Breakout - CH340C and USB-C

● DEV-15096

\$9.95

★★★★★ 9

SparkFun RedBoard Qwiic

● DEV-15123

\$21.50

★★★★★ 20



SparkFun Serial Basic Breakout - CH340G

● DEV-14050

\$8.95

★★★★☆ 7

SparkFun RedBoard Artemis Nano

● DEV-15443

\$16.50

★★★★☆ 6



SparkFun Servo pHAT for Raspberry Pi

● DEV-15316

\$11.95

★★★★☆ 5

SparkFun RedBoard Artemis

● DEV-15444

\$21.50

★★★★☆ 10



SparkFun RedBoard Artemis ATP

● DEV-15442

\$26.95

★★★★★ 2

Accessories

You'll also need the correct USB cable to connect the board to your computer. You may need a jumper wires and a breadboard for prototyping.



USB Micro-B Cable - 6 Foot

● CAB-10215

\$5.50

★★★★★ 15



Jumper Wires Premium 6" M/M Pack of 10

● PRT-08431

\$4.50

★★★★★ 2



USB 3.1 Cable A to C - 3 Foot

● CAB-14743

\$5.50

★★★★★ 4

Suggested Reading

Before you begin this tutorial, you should have the Arduino IDE installed on your computer. Check out our Installing Arduino tutorial for a step by step guide.

Serial Communication

Asynchronous serial communication concepts:
packets, signal levels, baud rates, UARTs and more!

Connector Basics

Connectors are a major source of confusion for people just beginning electronics. The number of different options, terms, and names of connectors can make selecting one, or finding the one you need, daunting. This article will help you get a jump on the world of connectors.

What is an Arduino?

What is this 'Arduino' thing anyway? This tutorial dives into what an Arduino is and along with Arduino projects and widgets.

Logic Levels

Learn the difference between 3.3V and 5V devices and logic levels.

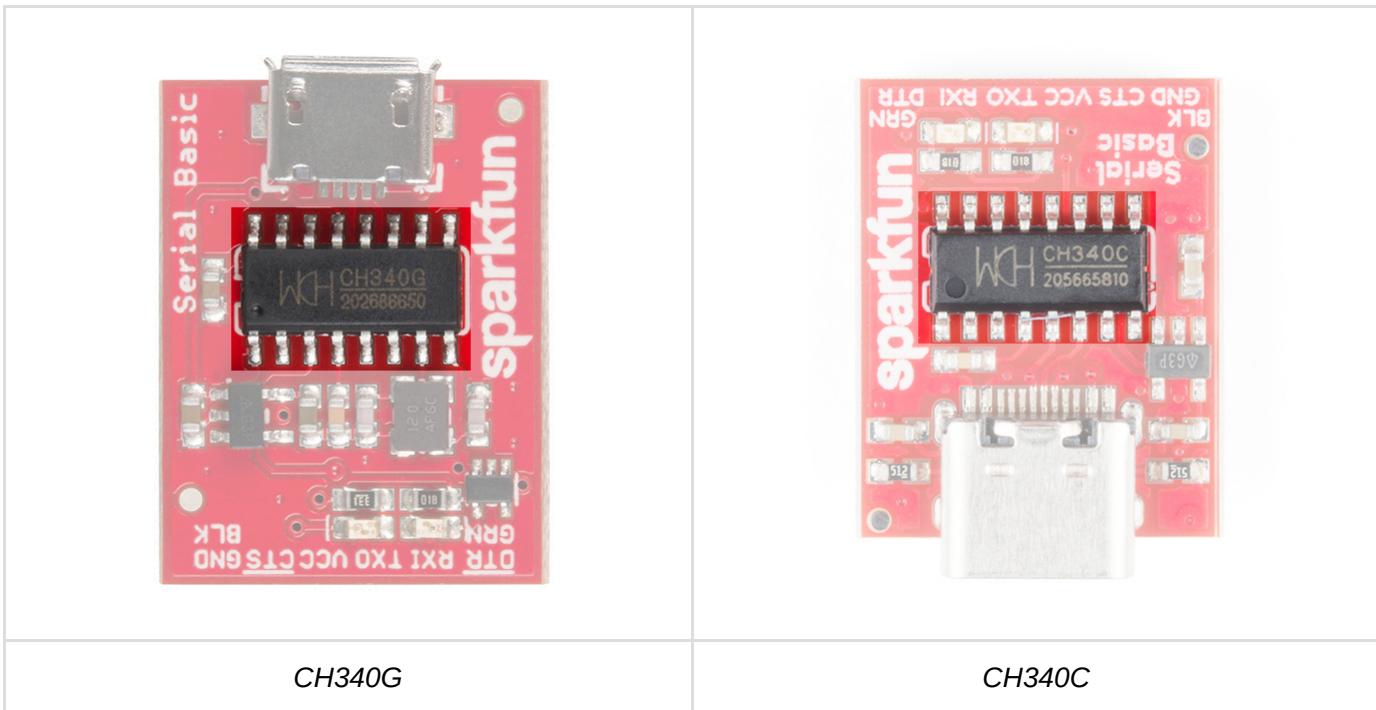
Serial Terminal Basics

This tutorial will show you how to communicate with your serial devices using a variety of terminal emulator applications.

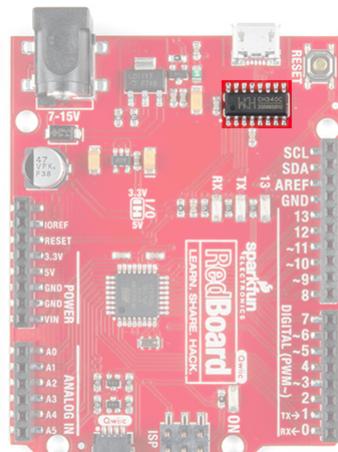
Alright, let's get to work! You can visit the next section to learn more about the CH340 and why you need the drivers, or you can skip straight to the operating system of your choice!

Meet the CH340

There are a few variants of the CH340. The **CH340G** requires an external crystal oscillator to function while the **CH340C** includes a built-in crystal oscillator. However, both function in the same fashion - they convert USB data for a serial UART and vice versa!



The CH340 is also populated on development boards such as the RedBoard Qwiic to upload code using the Arduino IDE.



Drivers (If You Need Them)

The CH340 has been tested on:

- Windows 7/10
- Mac OSX
 - v10.10.5 (Yosemite)
 - v10.11.6 (El Capitan)
 - v10.13.0 (High Sierra)
 - v10.14.5 (Mojave)
- Linux
 - Raspbian Stretch (11-13-2018 release) for the Raspberry Pi
 - Raspbian Buster (2019-07-10 release) for the Raspberry Pi
 - Ubuntu v18.04.2, 64-bit

These operating systems have the CDC drivers pre-installed, which means you shouldn't need to install any extra software. However, there are a wide range of operating systems out there, so if you run into driver problems, you can get the archived drivers linked below:

- Windows (EXE) -- Driver executable
- Windows (ZIP) : Driver v3.4 (2016-09-27)
- Mac (ZIP) : Driver v1.5 (2018-07-04)
- Linux (ZIP) : Driver v1.5 (2018-03-18)

The CH340 is made by WCH. You can find the latest version of their drivers in their English translated website.

[WCH: CH340 DRIVERS \(ENGLISH PAGE\)](#)

Note: At the time of writing, you were only able to find the latest version of their drivers from their website in Mandarin. If you use a Chrome web browser, you had the option to have the web page translated. However, you now have the option of browsing the WCH website in either language. For those interested in heading to the Mandarin side, you can click on the button below.

[WCH: CH340 DRIVERS \(MANDARIN PAGE\)](#)

Updating Drivers

If you have the older CH340 drivers installed, you may need to update them. In the following sections, are the instructions for doing so on each of the tested operating systems.

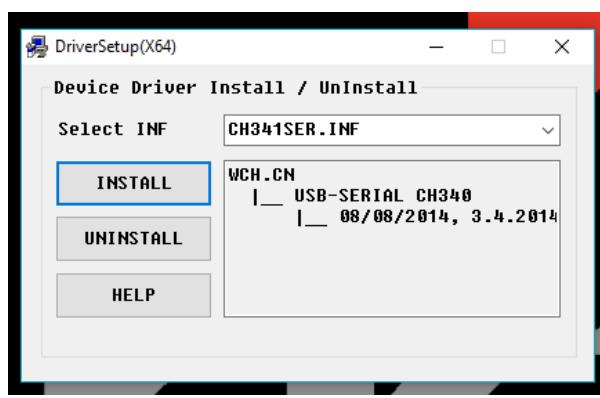
Windows 7/10

Note for Educators: You will need to obtain administrative privileges from your network or IT administrator in order to install these drivers. Make sure to test the drivers before class and set aside some time with students in the classroom when installing the drivers.

Download and run the executable.

[CH341SER \(EXE\)](#)

Click the "Uninstall" button first. Then click on the "Install" button.



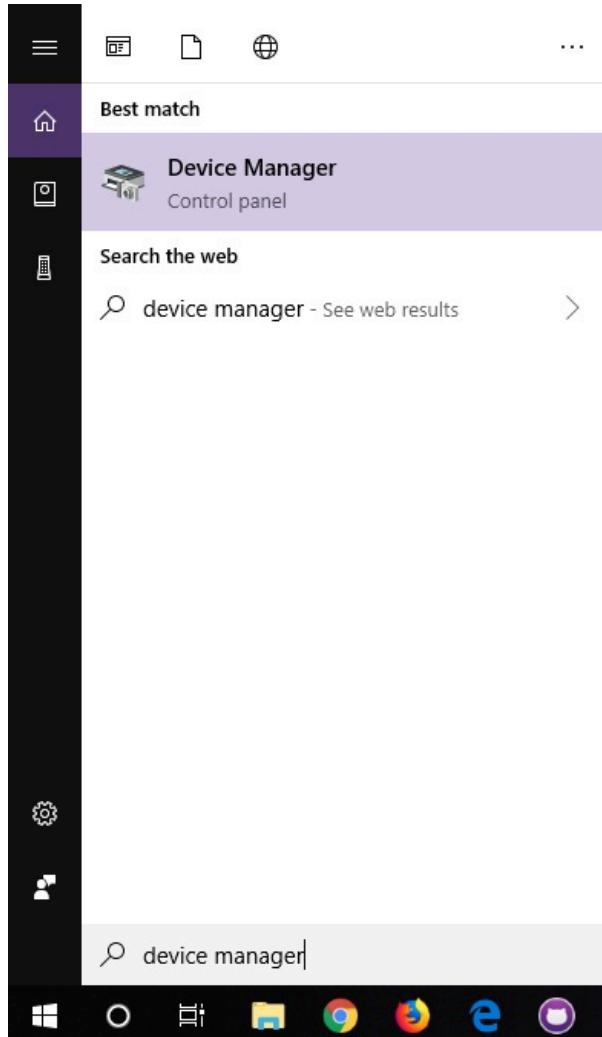
Windows CH340 Driver Installation

Driver Verification for Windows

To verify that your driver is working, you should see a difference in the following pictures after plugging the CH340 to a USB port.

Device Manager

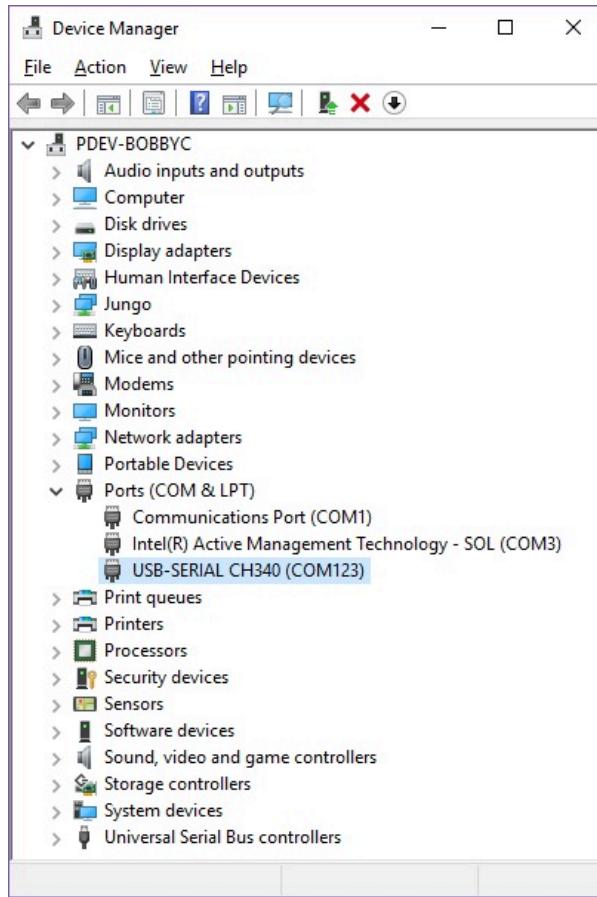
To check that the CH340 enumerates to a COM port, you can open the device manager. You can click the **Start** or  (Windows) button and type "device manager" to quickly search for the application.



Using the search on Windows 10 to look for the device manager.

Note: On Windows 10, the quick search function is picky on the spelling of the application you are searching for. For example, you may get results using "devi" and none for "device".

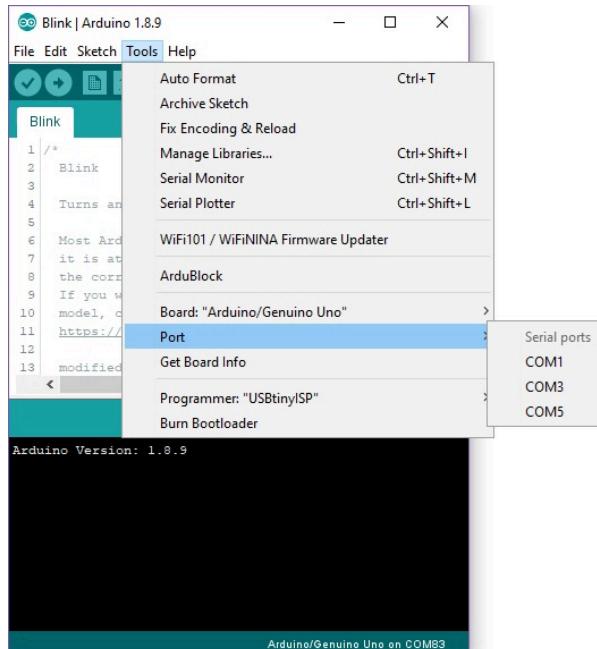
After opening the device manager, you will need to open the **Ports (COM & LPT)** tree. The CH340 should show up as **USB-SERIAL CH340 (COM##)**. Depending on your computer, the COM port may show up as a different number.



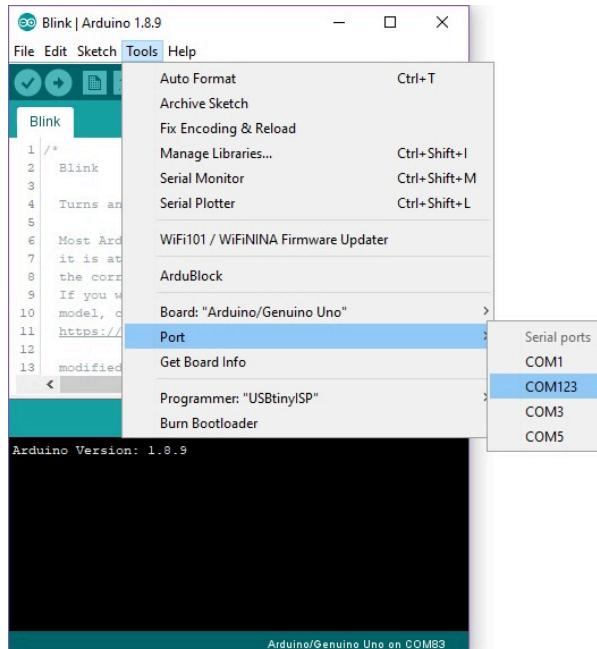
Screenshot of Window 10 Device Manager with a CH340 displayed on COM123. Click to enlarge.

Arduino IDE

Alternatively, if you have the Arduino IDE installed, you should also see a change in the number of available COM Ports (you may need to restart the Arduino IDE for the board to populate). Without the CH340 connected to your computer, click on **Tools** > **Port**. Take note of the **Serial Ports** available.

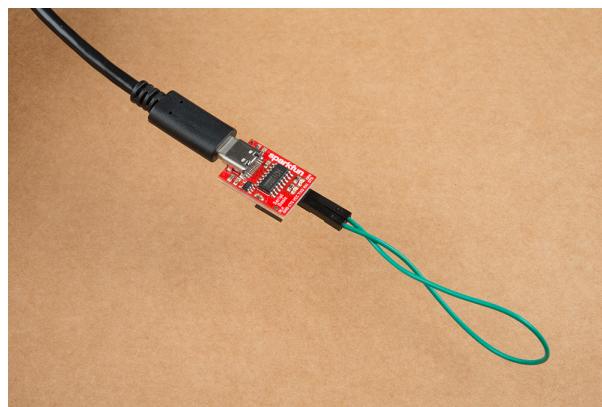


Connect the CH340 to your computer's USB port. Click on somewhere else on the screen for the menu to refresh itself. Then head back to the menu by clicking on **Tools** > **Port**. A new COM port should pop up. By process of elimination, the CH340 should have enumerated to the new COM port! Feel free to click on the COM port to select if you are uploading code to a microcontroller. Depending on your computer, the COM port may show a different number.



Serial Loop Back Test

You can also verify if the USB-to-serial converter is working by doing a serial loop back test or echo test. If you are using the breakout board, you can add a jumper between the Tx and Rx to try and echo a character in a terminal program. For more information, try checking out the Hardware Test for the serial basic hookup guide.



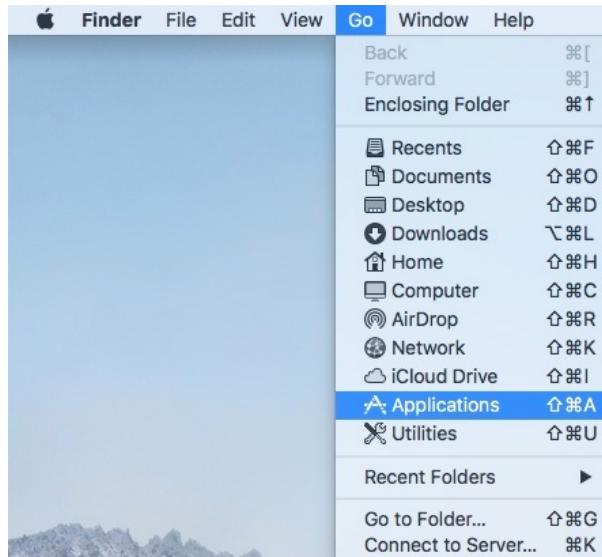
Serial Loop Back Test with a Jumper Wire

Mac OSX

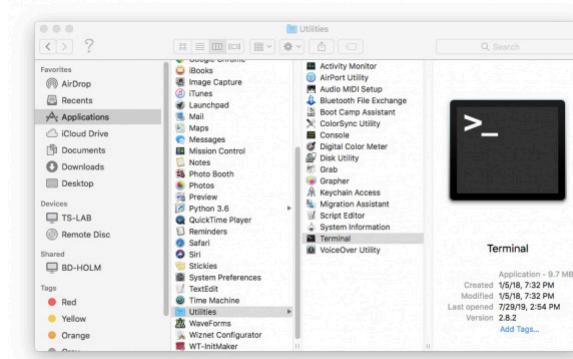
Note for Educators: You will need to obtain administrative privileges from your network or IT administrator in order to install these drivers. Make sure to test the drivers before class and set aside some time with students in the classroom when installing the drivers.

⚠ Warning: If you have a **Mac OS X v10.12+ (i.e. High Sierra, Mojave)**, your computer may restart as soon as you insert the CH340 to your computer. We recommend that you uninstall the old drivers first and follow these directions below before connecting the CH340 to your COM port. If you observe this issue, you will need to unplug the CH340 from your USB port, restart the computer, and follow the steps below to reinstall the latest drivers.

Open the Terminal program by selecting **Go > Applications**.



Select and open the Terminal program under **Applications > Utilities > Terminal**.



Note: You can also search with Spotlight by pressing **⌘ (Command) + space bar (Space Bar)**. Then type "Terminal" and double-click the search result.

If you are still unsure of how to access the Terminal, watch this video or read this Apple support article.

You'll need to move to the directory where the ***.kext** files are stored.

- For Mac OSX v10.9+, you will need to use this command:

```
cd /Library/Extensions
```

- For Mac OSX v10.8 and below, you will need to use this command:

```
cd /System/Library/Extensions
```

In this case, we will be using Mac OSX v10.13, so we will need to use the first command.

```
Last login: Tue Jul 30 13:09:12 on ttys000
[PDEV-LAB:~ productdev$ cd /library/extensions
[PDEV-LAB:extensions productdev$ ls
AC56x.kext          HighPointIOP.kext
ATTOCelerityFC8.kext HighPointRR.kext
ATTOExpressSASHBA2.kext PromiseSTEX.kext
ATTOExpressSASRAID2.kext SoftRAID.kext
ArcMSR.kext          usbserial.kext
CalDigitHDProDrv.kext
[PDEV-LAB:extensions productdev$ ls | grep usb
usbserial.kext
[PDEV-LAB:extensions productdev$ ]
```

To check to see if the CH340 driver is in the correct path, use the following command to list the contents of the folder.

```
ls
```

To look for CH340 driver files (i.e. **usb.kext** or **usbserial.kext**) in the path, you could use the following command.

```
ls | grep usb
```

You should see something similar to the output below after using the commands.

```
Last login: Tue Jul 30 13:09:12 on ttys000
[PDEV-LAB:~ productdev$ cd /library/extensions
[PDEV-LAB:extensions productdev$ ls
AC56x.kext          HighPointIOP.kext
ATTOCelerityFC8.kext HighPointRR.kext
ATTOExpressSASHBA2.kext PromiseSTEX.kext
ATTOExpressSASRAID2.kext SoftRAID.kext
ArcMSR.kext          usbserial.kext
CalDigitHDProDrv.kext
[PDEV-LAB:extensions productdev$ ls | grep usb
usbserial.kext
[PDEV-LAB:extensions productdev$ ]
```

If you have found the file in the path, you will need to run each of the following commands in the CLI/Terminal to remove old CH340 drivers. In this case, there was only the **usbserial.kext** file but it does not hurt to run both commands. Make sure to have administrative privileges to ensure that the drivers are removed.

```
sudo rm -rf /Library/Extensions/usb.kext
sudo rm -rf /Library/Extensions/usbserial.kext
```

Check if the old drivers were removed in the paths by using the `ls` command with your respective OS version. You will notice that the `*.kext` file is removed from the respective paths. In this case, the **usbserial.kext** was removed from Mac OSX High Sierra.

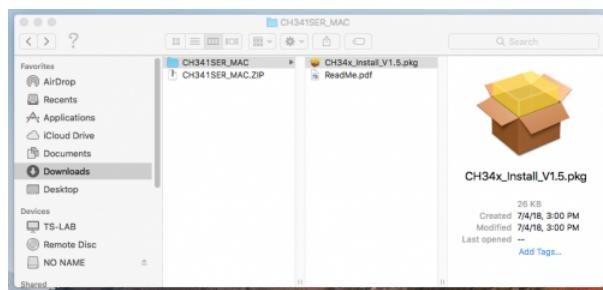
```
ls
```

```
Last login: Tue Jul 30 13:09:12 on ttys000
[PDEV-LAB: productdev$ cd /library/extensions
[PDEV-LAB:extensions productdev$ ls
AC54x.kext           HighPointIOP.kext
ATTOCeleryFC8.kext    HighPointRR.kext
ATTOExpressSASHB42.kext PromiseSTEX.kext
ATTOExpressSASRAID2.kext SoftRAID.kext
ArcMSR.kext
CalDigitHDProDrv.kext
[PDEV-LAB:extensions productdev$ ]
```

Download and extract the folder.

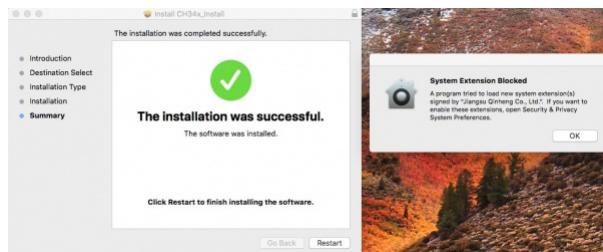
CH341SER_MAC (PKG)

Then, open the **"*.pkg"** file from the unzipped folder and follow the instructions. You'll need to restart your computer for the changes to take effect.



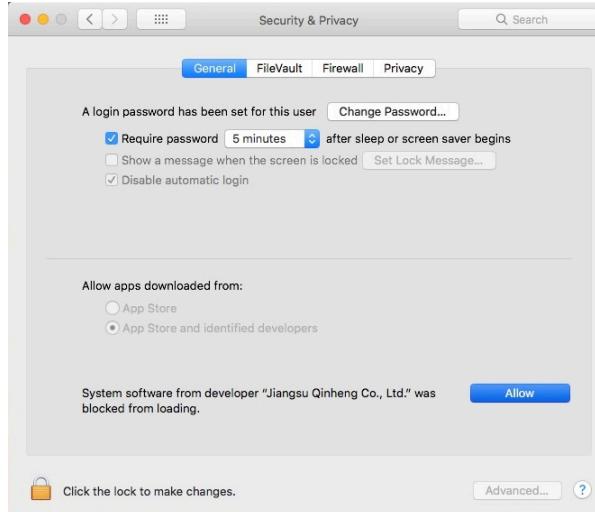
Mac OS X CH340 Driver Installation File

Heads up! Depending on your settings, you may need to adjust your **Security & Privacy** settings to allow the CH340 drivers to function. A window may pop up indicating that the drivers have been blocked as shown in the image below.



Click on image for a closer look.

If you receive a window that indicates that the system extension is blocked, you'll need to open a search with Spotlight by pressing **⌘ (Command) + space bar (Space Bar)**. Type **Security & Privacy** and click on the "**Allow**" button to enable the CH340 drivers.

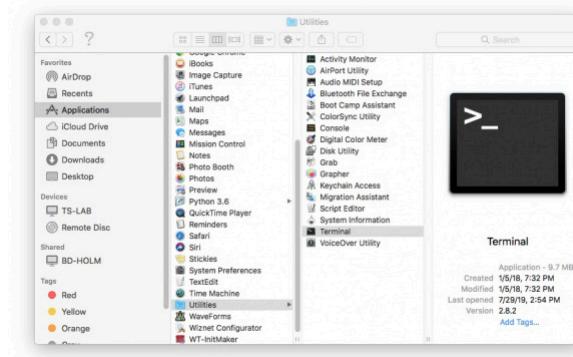


Driver Verification for Macs

To verify that your driver is working, you should see a difference in the following pictures after plugging the CH340 to a USB port.

Command Line

Open the Terminal by heading to **Applications > Utilities > Terminal** if the program is not open yet.



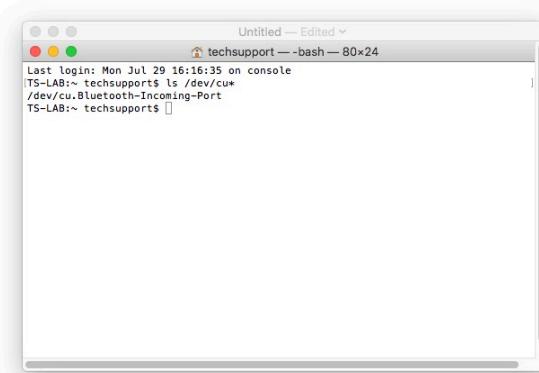
Note: Press **⌘ (Command) + space bar (Space Bar)** to launch Spotlight and type "Terminal," then double-click the search result as explained above.

If you are still unsure of how to access the Terminal, watch this video or read this Apple support article.

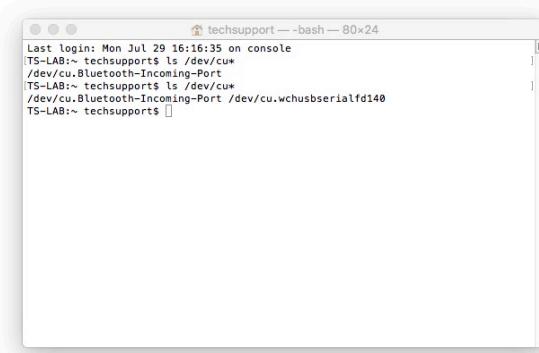
Then run the following command:

```
ls /dev/cu*
```

A list of devices connected to your Mac's COM ports will be displayed as a result. Assuming that the CH340 is not connected to your computer, you should see something similar to the image below.



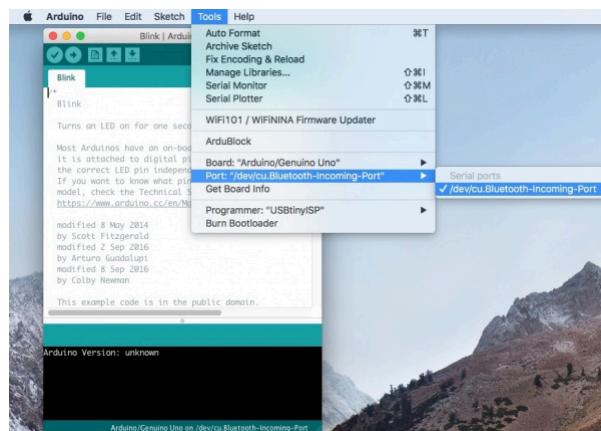
Connect the CH340 to one of your Mac's COM ports. Check for the following changes (your board may show up under a different device name). The CH340 should show up as **/dev/cu.wchusbserial*******. Depending on your computer, the COM port may show up as a different number.



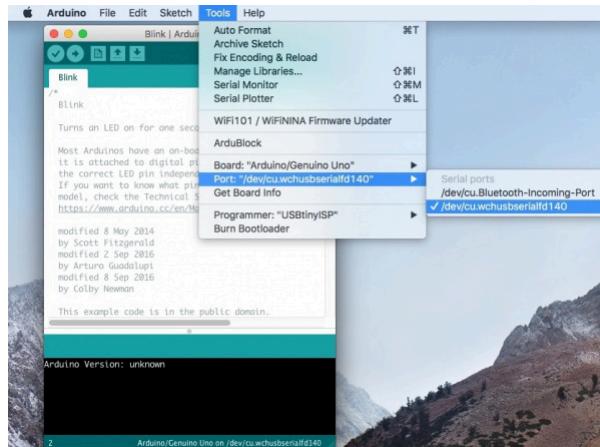
Screenshot of Mac OSX terminal with CH340 on cu.wchusbserialfd1410. Click to enlarge.

Arduino IDE

Alternatively, if you have the Arduino IDE installed, you should also see a change in the number of available COM Ports (you may need to restart the Arduino IDE for the board to populate). Without the CH340 connected to your computer, click on **Tools > Port**. Take note of the **Serial Ports** available.

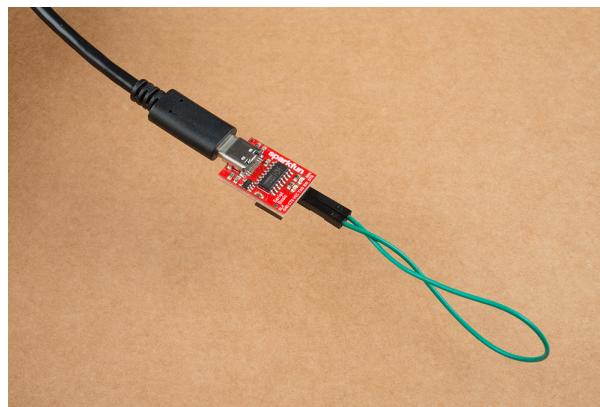


Connect the CH340 to your computer's USB port. Click on somewhere else on the screen for the menu to refresh itself. Then head back to the menu by clicking on **Tools > Port**. A new COM port should pop up. By process of elimination, the CH340 should have enumerated to the new COM port! Feel free to click on the COM port to select if you are uploading code to a microcontroller. Depending on your computer, the COM port may show a different number.



Serial Loop Back Test

You can also verify if the USB-to-serial converter is working by doing a serial loop back test or echo test. If you are using the breakout board, you can add a jumper between the Tx and Rx to try and echo a character in a terminal program. For more information, try checking out the Hardware Test for the serial basic hookup guide.



Serial Loop Back Test with a Jumper Wire

Linux

Note for Educators: You will need to obtain administrative privileges from your network or IT administrator in order to install these drivers. Make sure to test the drivers before class and set aside some time with students in the classroom when installing the drivers.

Raspbian for Raspberry Pi

Run the following commands in the CLI/Terminal when using Raspbian on a Raspberry Pi. After updating, the latest CH340 should be installed!

```
sudo apt-get update
sudo apt-get upgrade
```

Other Linux Distributions

Here is a downloadable ***.ZIP** of standard CH340 drivers for Linux.

DOWNLOAD CH340 DRIVERS FOR LINUX (ZIP)

There are some reported cases of serial communication failure when using the factory drivers in Linux. If you encounter this problem, you can try installing patched drivers as explained in this forum post. Here are the steps (to run in the command line):

- Plug and unplug your CH340 device from the USB port
- Type `dmesg` to see what has happened
 - The expected output (shows "ch341") should have the following in the recent log:

```
[ xxx] ch341-uart ttyUSB0: ch341-uart converter now disconnected from ttyUSB0
[ xxx] ch341 3-2:1.0: device disconnected
```

- Download the patched drivers repository and unzip the files

GITHUB LINUX PATCHED CH340 DRIVERS

- `cd` into the directory where the files are saved
- `make clean`
- `make`
- `sudo make load`
- `sudo rmmod ch341` to uninstall the broken driver
- `lsmod | grep ch34` to list what modules are currently installed
- Plug and unplug your CH340 device again on the USB port
- `dmesg`
 - Expected output (should show "ch34x" now):

```
[ xxx] ch34x ttyUSB0: ch34x converter now disconnected from ttyUSB0
[ xxx] ch34x 3-2:1.0: device disconnected
```

Depending on your root permissions, you may need to configure the serial port with the following two commands. Make sure to adjust the `$username` with respect to the user ID that is currently logged in.

```
sudo usermod -a -G dialout $username
sudo chmod a+r /dev/ttyUSB0
```

Heads up! Depending on how the CH340 enumerated on your computer, the `/dev/ttyUSB0` may be different. Try using `ls` command as explained in the Driver Verification if you have issues configuring the serial port settings and adjusting the port as necessary.

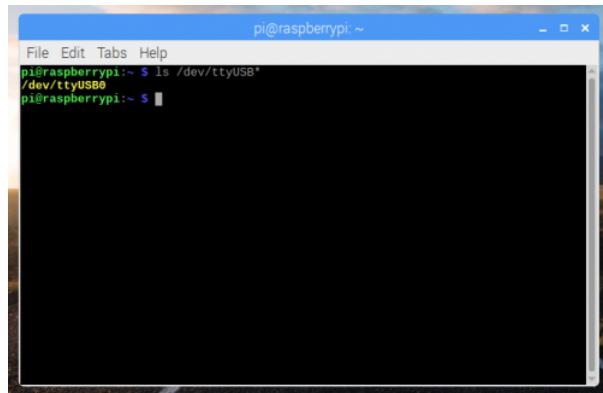
Driver Verification for Linux

Command Line

Plug the CH340 back to your computer's USB port. Then run the following command in the CLI/Terminal on any Linux distribution. Check for the following changes (your board may show up under a different device name).

```
ls /dev/ttyUSB*
```

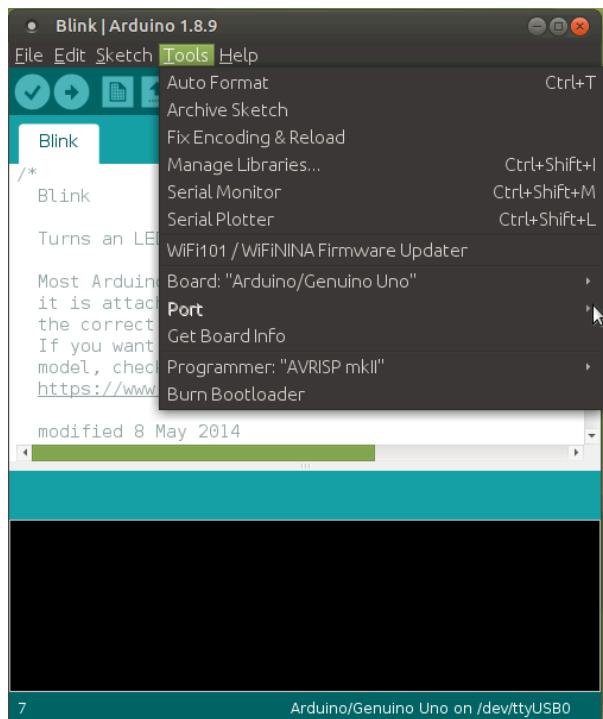
The serial port that CH340 is connected to should pop up as a result.



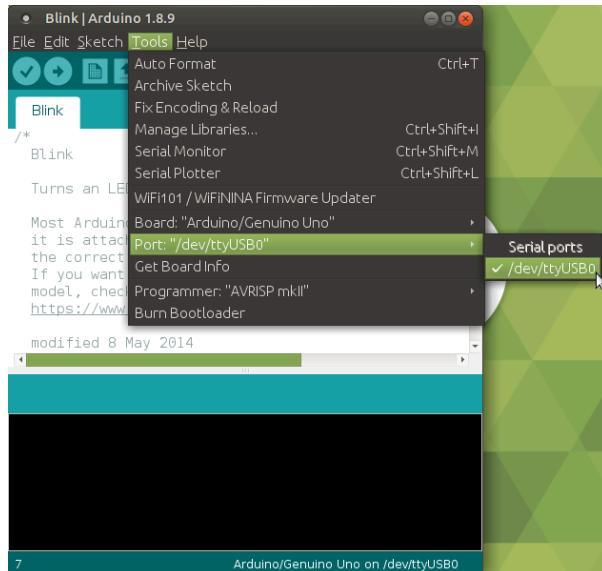
Screenshot of Raspberry Pi CLI with the CH340 on ttyUSB0. Click to enlarge

Arduino IDE

Alternatively, if you have the Arduino IDE installed, you should also see a change in the number of available COM Ports (you may need to restart the Arduino IDE for the board to populate). Without the CH340 connected to your computer, click on **Tools > Port**. Depending on the Linux flavor that you have, the **Ports** may not open to display any serial ports. Take note of the **Serial Ports** available if it opens up.

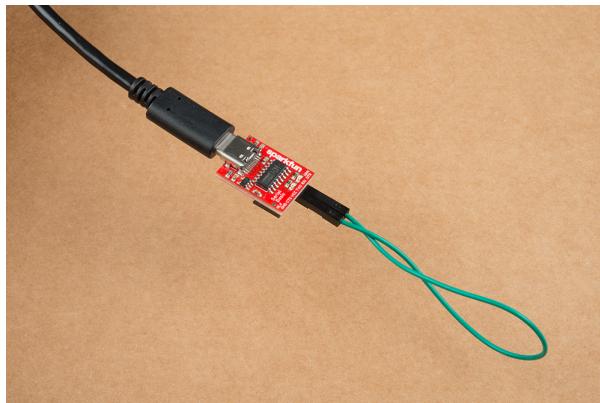


Connect the CH340 to your computer's USB port. Click on somewhere else on the screen for the menu to refresh itself. Then head back to the menu by clicking on **Tools > Port**. A new COM port should pop up. By process of elimination, the CH340 should have enumerated to the new COM port! Feel free to click on the COM port to select if you are uploading code to a microcontroller. Depending on your computer, the COM port may show a different number.



Serial Loop Back Test

You can also verify if the USB-to-serial converter is working by doing a serial loop back test or echo test. If you are using the breakout board, you can add a jumper between the Tx and Rx to try and echo a character in a terminal program. For more information, try checking out the Hardware Test for the serial basic hookup guide.



Serial Loop Back Test with a Jumper Wire

Troubleshooting

COM Port is Not Showing Up as CH340 Windows

We have had a few reports on Windows 10 where the driver will automatically install and the board will show up under a new COM port as **USB-Serial CH340**, but with a different device name. However, the board cannot be accessed on the Arduino IDE. Others have had issues where the installation process hangs.

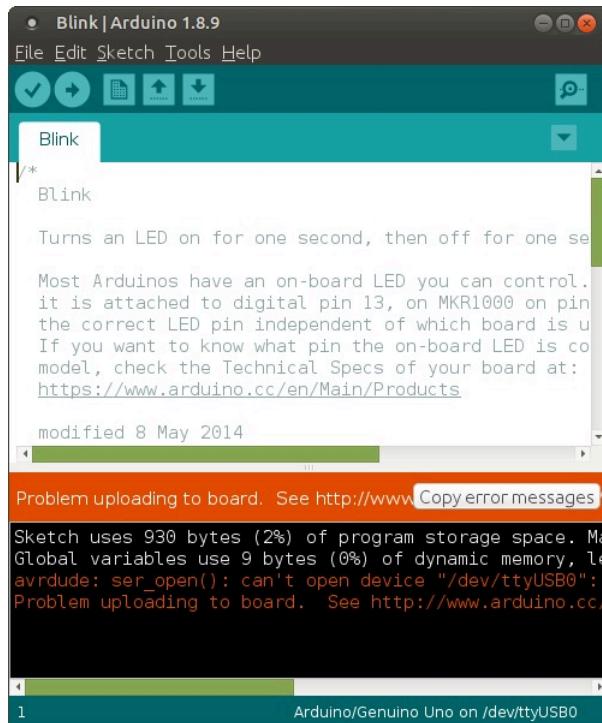
Based on the customer experiences, this might be specific to the manufacturer and are usually isolated cases. Users seem to be able to eventually get the board recognized by a combination of giving the computer time to finish the install (*close to 20 min*), plugging the board back in multiple times, reinstalling the drivers, and/or resetting the computer multiple times (*repeat both steps*).

COM Port Not Available Windows, Mac, and Linux

If you installed the drivers for the CH340 on your computer but have issues connecting via serial terminal or uploading code using the Arduino IDE, there may be an issue with your user settings preventing you from using the CH340. You may receive an `avrduude: ser_open(): can't open device` error similar to the output shown below.

```
avrduude: ser_open(): can't open device "/dev/ttyUSB0": No such file or directory
```

In this case, the error appeared on a Linux when trying to upload code due to the drivers not being installed and the root permissions.



Make sure to check your configuration settings and ensure that the serial port for the CH340 is enabled for your OS. You may also need to reinstall the drivers for your operating system.

USB Cable Windows, Mac, and Linux

Certain USB cables are for power only and may not have the data lines available. Try checking your USB cable and ensure that the data lines are intact.

Issues Uploading at Fast Baud Rates

If you are uploading to certain boards like the Apollo3 on the Artemis development boards with fast baud rates, there are some platforms (Linux flavors) where the standard CH340 USB to serial drivers don't operate well at speeds higher than **115200**. So if you run into upload problems, consider reducing the upload speed. For more information about upload issues, see this forum post and consider upgrading with these drivers for Mac OSX or these for Linux.

Resources and Going Further

Now that you've successfully got your CH340 up and running, it's time to incorporate it into your own project!

- WCH: CH340 Drivers - Latest drivers can be downloaded from the manufacturer.
 - Windows (EXE) -- Driver executable
 - Windows (ZIP) -- Driver v3.4 (2016-09-27)
 - Mac (ZIP) -- Driver v1.5 (2018-07-04)
 - Linux (ZIP) -- Driver v1.5 (2018-03-18)

USB-to-serial converters like the CH340 are great for uploading code to a microcontroller or viewing data from a GPS on a serial terminal. Check out these tutorials to dive even deeper into the world of microcontrollers or send serial data to your computer with a GPS!

Serial Terminal Basics

This tutorial will show you how to communicate with your serial devices using a variety of terminal emulator applications.

GPS-RTK Hookup Guide

Find out where you are! Use this easy hook-up guide to get up and running with the SparkFun high precision GPS-RTK NEO-M8P-2 breakout board.

SparkFun Inventor's Kit Experiment Guide - v4.1

The SparkFun Inventor's Kit (SIK) Experiment Guide contains all of the information needed to build all five projects, encompassing 16 circuits, in the latest version of the kit, v4.1.2 and v4.1.

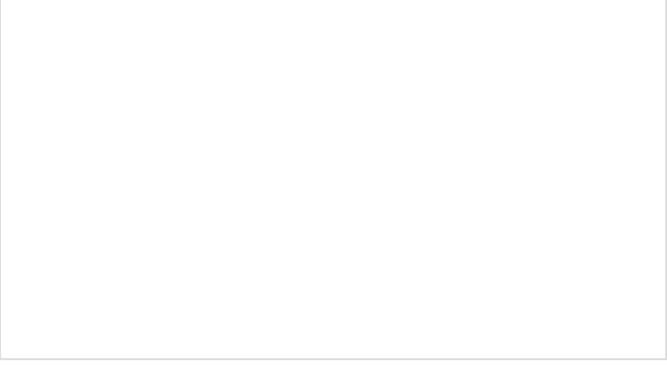
Or check out these blog posts.

Headless Raspberry Pi Setup

Configure a Raspberry Pi without a keyboard, mouse, or monitor.

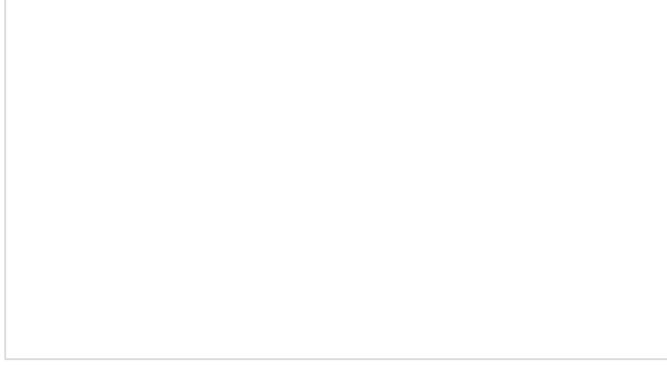
RedBoard Qwiic Hookup Guide

This tutorial covers the basic functionality of the RedBoard Qwiic. This tutorial also covers how to get started blinking an LED and using the Qwiic system.



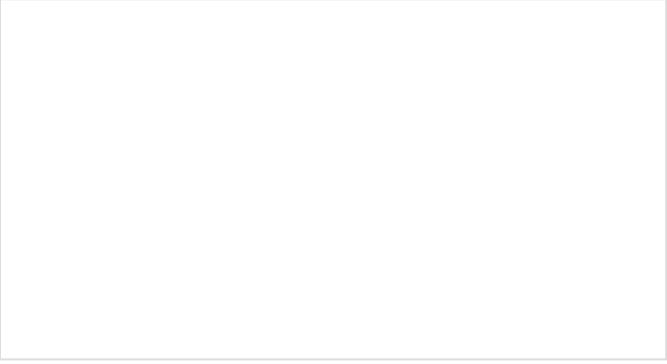
Hardware Hump Day: USB Device Rules on Raspberry Pi

MARCH 15, 2017



Enginursday: Exploring Different USB-Serial Boards

SEPTEMBER 14, 2017



What Drives your SparkFun Inventor's Kit?

AUGUST 14, 2019