

RoboJackets Electrical / Firmware Training Week 1 Setup

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v1.0

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1 Installing the Arduino IDE

We will be using the legacy version of the Arduino IDE (version 1.8.19). Follow the installation instructions based on your platform.

1.1 Windows and Mac

1. Go to <https://www.arduino.cc/en/software> and scroll down to “Legacy IDE (1.8.X)”. Download the binary corresponding to your platform.
2. Run the installer. Allow the installer to install everything, including drivers.

1.2 Linux

1. Go to <https://www.arduino.cc/en/software> and scroll down to the “Legacy IDE (1.8.X)”. The Linux Arduino IDE should download as a `tar.xz` file.
2. Run the following commands, replacing `<arduino-ide>` with the name of the downloaded file.

```
1 tar -xJvf <arduino-ide>.tar.xz -C /home/$(whoami)
2 cd /home/$(whoami)/<arduino-ide>
3 sudo ./install.sh
```

2 Verify CH340 Drivers

Our Arduino Nanos are kinda old, so they often don't work out of the box without installing the correct drivers first. Your operating system or the installation of the Arduino IDE might have installed the correct drivers, so it's a good idea to check if you have the driver before reinstalling them.

2.1 Checking CH340 Drivers on Windows

Checking if driver is present: type `driverquery` into the command prompt. You should see a driver called CH341SER.

```
cdrom      CD-ROM Driver      Kernel
CH341SER_A64 CH341SER_A64      Kernel      3/1/2023 4:14:37 AM
cht4iscsi   cht4iscsi           Kernel      2/5/2019 8:51:31 AM
```

Figure 1: Output of the command `driverquery` on Windows system. CH341SER driver module is present.

Checking if driver loads: Plug the Arduino Nano into your computer. Go to **Device Manager** and look under **Ports**. You should see the Arduino Nano as **USB-SERIAL CH340**, followed by the COM port it's associated with.

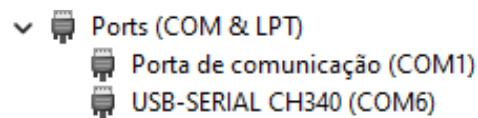


Figure 2: Windows Device Manager displaying Arduino Nano plugged into COM6

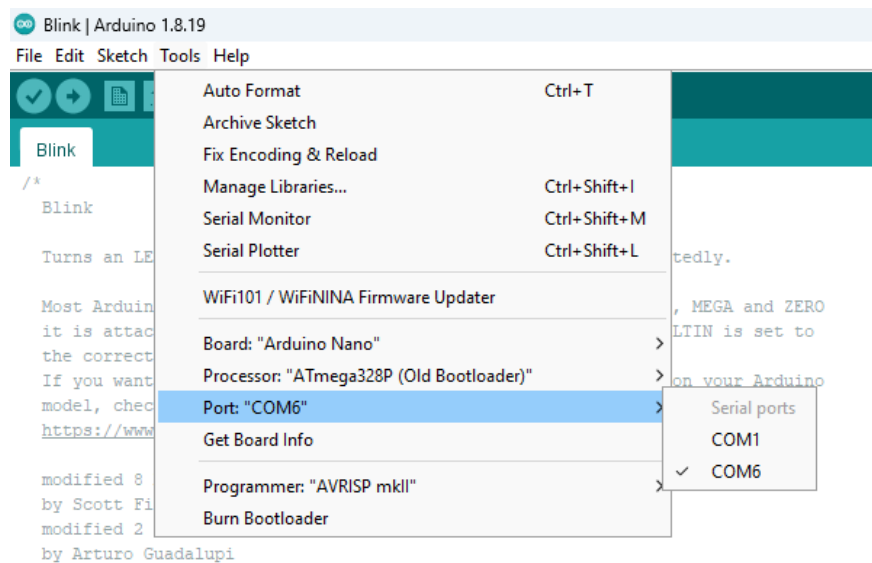


Figure 3: Arduino IDE on Windows with Arduino Nano plugged in. If the driver has been installed correctly, you should see the Arduino Nano show up in the Arduino IDE under **Tools > Port** which matches the COM port in Device Manager.

2.2 Checking CH340 Drivers on Linux

Checking if module is present: type `modinfo ch341` into your shell. The command should return a bunch of information about the `ch341` kernel module.

```
filename:    /lib/modules/6.2.0-32-generic/kernel/drivers/usb/serial/ch341.ko
license:    GPL v2
srcversion:  8146E4093739E857D637C97
alias:      usb:v9986p7523d*dc*dsc*dp*ic*isc*ip*in*
alias:      usb:v4348p5523d*dc*dsc*dp*ic*isc*ip*in*
alias:      usb:v2184p0057d*dc*dsc*dp*ic*isc*ip*in*
alias:      usb:v1A86p7523d*dc*dsc*dp*ic*isc*ip*in*
alias:      usb:v1A86p7522d*dc*dsc*dp*ic*isc*ip*in*
alias:      usb:v1A86p5523d*dc*dsc*dp*ic*isc*ip*in*
depends:     usbserial
retpoline:  Y
intree:     Y
name:       ch341
```

Figure 4: Output of command `modinfo ch341` on Linux system. `ch341` Linux kernel module is present.

Checking if module loads: Plug the Arduino Nano into your computer. Enter the command `sudo dmesg` into your shell.

- If you see the following, you need to uninstall `brlTTY`. After uninstalling `brlTTY`, unplug and plug in the Arduino Nano and run `sudo dmesg` again.

– Ubuntu: `sudo apt remove brlTTY`.

```
[ 301.733484] input: BRLTTY 6.4 Linux Screen Driver Keyboard as /devices/virtual/input/input17
[ 301.863341] usb 3-2: usbfs: interface 0 claimed by ch341 while 'brlTTY' sets config #1
[ 301.866443] ch341-uart ttyUSB0: ch341-uart converter now disconnected from ttyUSB0
[ 301.866462] ch341 3-2:1.0: device disconnected
```

Figure 5: Output of command `sudo dmesg` on Linux system after plugging in Arduino Nano. `brlTTY` is interfering with the `ch341` kernel module.

- If you see the following, type `ls /dev/tty*`. You should see the Arduino Nano show up as `/dev/ttyUSB[0-9]` or `/dev/ttyACM[0-9]`. This indicates that the kernel module has loaded successfully.

```
[ 5747.030542] ch341 3-2:1.0: ch341-uart converter detected
[ 5747.044554] usb 3-2: ch341-uart converter now attached to ttyUSB0
```

Figure 6: Output of command `sudo dmesg` on Linux system after plugging in Arduino Nano. `ch341` Linux kernel module has loaded correctly.

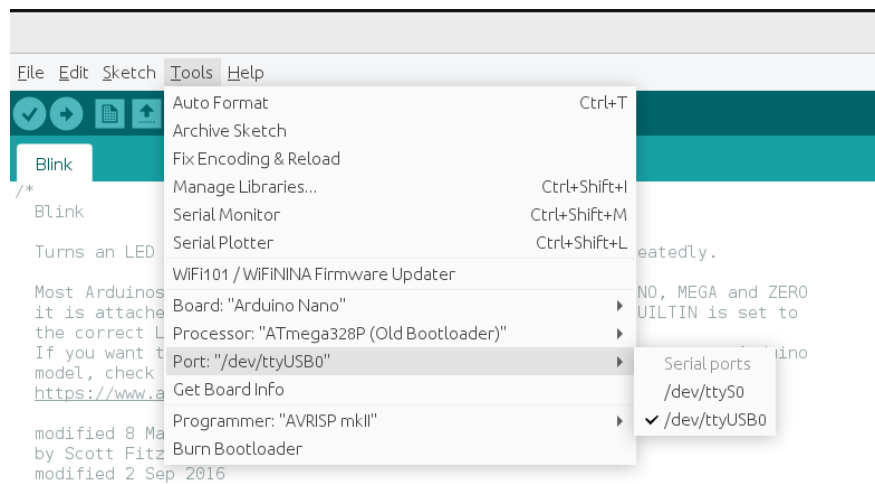


Figure 7: Arduino IDE on Linux with Arduino Nano plugged in. If the driver has been installed correctly, you should see the Arduino Nano show up in the Arduino IDE under **Tools > Port** as either `/dev/ttyUSB[0-9]` or `/dev/ttyACM[0-9]`.

3 Install CH340 Drivers

If you could not find the CH340 drivers, you may have to install them manually.

3.1 Installing CH340 Drivers on Windows and Mac

Follow the instructions at <https://learn.sparkfun.com/tutorials/how-to-install-ch340-drivers/all> to install the CH340 drivers.

After installing the drivers, go to section 2.1 to verify the drivers are present.

3.2 Installing CH340 Drivers on Ubuntu Linux

Open a command prompt and enter the following commands:

```
sudo apt install build-essential git
sudo apt remove brltty
git clone https://github.com/juliagoda/CH341SER.git CH341SER
cd CH341SER
make
```

Check if you have SecureBoot enabled by running `mokutil --sb-state`. If SecureBoot is enabled, run the command:

```
kmodesign sha512 /var/lib/shim-signed/mok/MOK.priv /var/lib/shim-signed/mok
/MOK.der ./ch34x.ko
```

Finally, run:

```
make load
```

After installing the drivers, go to section 2.2 to verify the drivers are present.