Nighthawk Scribe

(Prototype Version Only)

User Manual
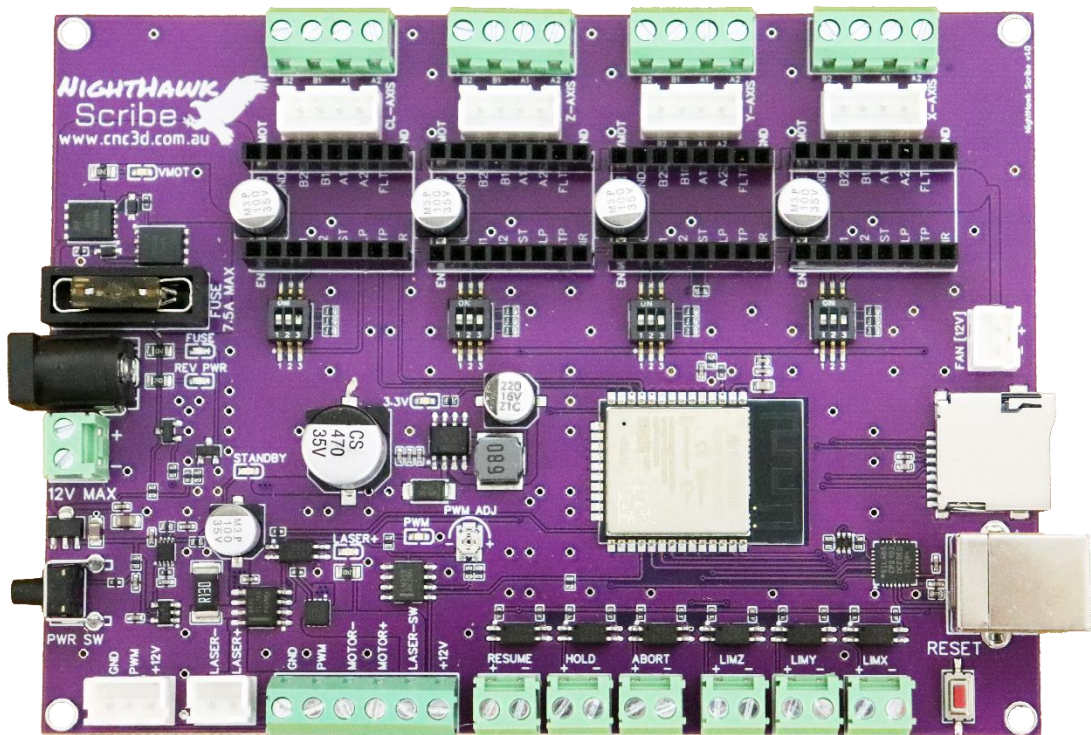
CNC3D
CREATING PRECISION

Safety precautions

- **Please read this entire manual before using your new Nighthawk Scribe controller or CNC3D Commander software.**

- **Please ensure any relevant PPE equipment is worn or used when operating any CNC machine. This includes safety glasses for using any lasers.**

- **CNC machines can be dangerous and must be operated with diligence and safety in mind.**

By using this controller and or any associated software, you acknowledge and agree that you are taking full responsibility for any damage to property, machinery, person, or persons that could potentially occur as a result of using this product. CNC3D PTY LTD will not be held liable or responsible in any way for the misuse or use of this product.

All 240V wiring MUST be done by a licensed electrician. Failure to do so can cause fire or electric shock!

DO NOT ATTEMPT ANY 240V WIRING WITHOUT AN ELECTRICAL LICENSE

Table of Contents

Prototype vs Production Scribe Controllers

There are currently 2 different versions of the Nighthawk Scribe CNC Controller – Prototype and Production.

You can easily tell them apart with a quick visual check.

The Prototype version **does not have a Probe** connection point whereas the Production version does.

If you received your Scribe without an enclosure or accessories then you will most likely have a Prototype version.

The Prototype version of the card is still extremely capable and has all the communication features expected from every controller in the Nighthawk family ie: WiFi and Bluetooth. However, as it was produced early in the production run there have been some hardware changes that were made to add additional features like additional I/O and an LCD screen option.

This manual is for the Prototype version of the Scribe cards. There are some differences between the two in terms of operation so if you have the Production version of the Scribe you should switch to the Production version of the manual.

Nighthawk Scribe (Prototype) Specifications

Input Voltage	12V DC (max)
Power Usage	90W (max)
Fuse Rating	7.5A
Onboard Protections	Reverse Polarity
	Overcurrent (Fuse)
Driver Compatibility	'Polulu' or 'StepStick'
	Stepper Drivers
	(not supplied)
Total Axes	3 (XYYZ or XYZ)
SD Support	Class 4-10 (Up to 32Gb)
SD Format	FAT32 Required
WiFi Frequency	2.4GHz
Operating Frequency	240MHz
Onboard Antenna	2dBi Gain
Enclosure	None
Cooling	12v Fan Plug
	(no fan supplied)

Nighthawk Scribe Onboard Connections
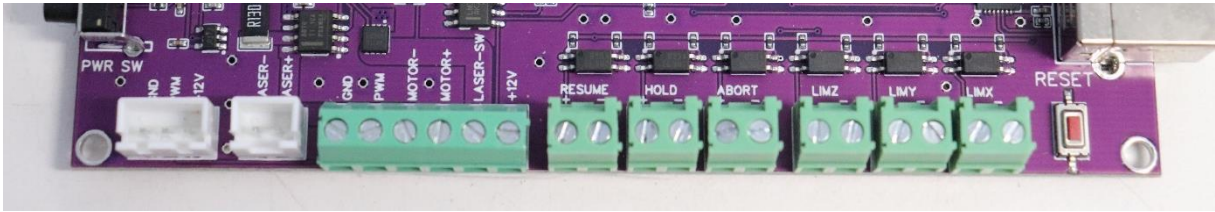
2-Pin Green I/O Connectors

Discrete connectors for each XYZ limit switch for mechanical-type limit switches.

X: The X axis limit switch. No polarity needed – either wire can go to either hole.

Y: The Y axis limit switch. No polarity needed – either wire can go to either hole.

Z: The Z axis limit switch. No polarity needed – either wire can go to either hole.

Discrete connectors for Hold, Resume and Abort external buttons or switches.

Hold: Triggers a Feed Hold command to pause your machine.

Resume: Resumes the job after a Feed Hold.

Abort: "Soft" Emergency stop. Will immediately stop the machine movement and deactivate attached peripherals such as a laser but will not turn off the electrical power.

6-Pin Green I/O Connector

GND: Common DC Ground

PWM: 0-5Vdc Analogue Output

Motor - :   "GND" or "Negative" side of a 12v Spindle Motor

Motor + :   0-12Vdc for 12v Spindle Motor Speed Control   *– Maximum 3A across 12v Rail*

Laser-Sw: +12Vdc Activates/Deactives with M3/M5 Commands   *– Maximum 3A across 12v Rail*

+12v: Constant 12v Output for 3-Pin Laser Modules   *– Maximum 3A across 12v Rail*

White JST Connectors

3-Pin: 3-Pin Laser Connector for 12V Laser Modules   *– Maximum 3A across 12v Rail*

2-Pin: 2-Pin Laser Connector for 12V Laser Modules   *– Maximum 3A across 12v Rail*

Be Aware: With the prototype Scribe boards, any voltage you put into the card will be output on the 12v rail – there are no voltage regulators for the 12v rail i.e. If you put in 24v, you will get 24v out, this is the reason for the Prototype boards being limited to 12v!

Nighthawk Scribe Stepper Drivers
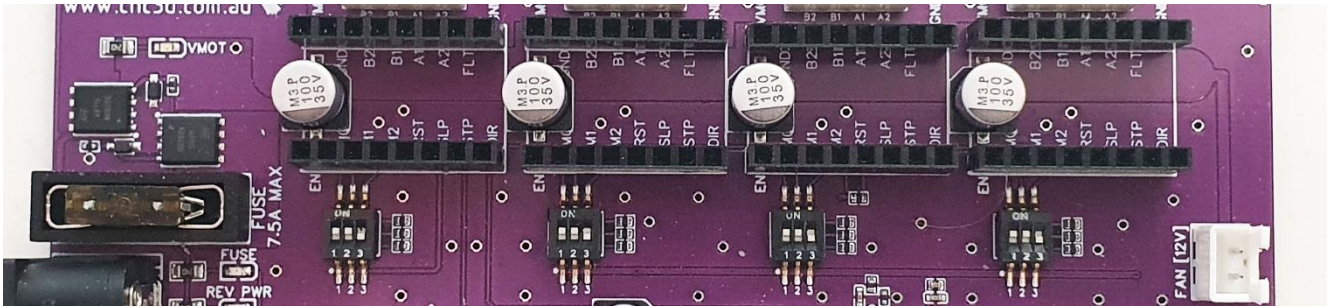
The Scribe uses 'Polulu' or 'StepStick' style driver cards as they are easily sourced, easy to use and can be easily replaced if they get damaged. There are also different drivers that operate in different ways so you can tune them to your motors, allowing you to set up your Scribe with the drivers to suit your specific purpose.
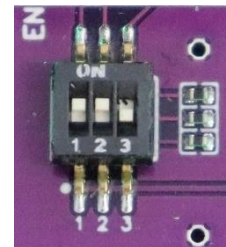
Setting Micro-Stepping

Each drive has the option of *1 / [1, 2, 4, 8, 16, 32]* micro-stepping settings. For most CNC routing applications, a **1/8** ratio is a good balance of torque, accuracy, and maximum speed.

There are 4 DIP switch blocks on the Scribe's PCB which will allow you to set your micro-steps for each driver. Each block is associated to the driver it is closest to on the board.

Each of these switch blocks has 3 small switches for setting your micro-stepping.

The default on your controller will be 1/8.

Please note the ON position and switch number:

Micro-stepping settings chart

Set the switches for each drive in the order as per the table below to choose your micro-stepping options.

DRV8825

SW1	SW2	SW3	Pulse/Rev	Microstep (1 / ..)
Off	Off	Off	200	1
On	Off	Off	400	2
Off	On	Off	800	4
On	On	Off	1600	8
Off	Off	On	3200	16
On	On	On	6400	32

A4988

SW1	SW2	SW3	Pulse/Rev	Microstep (1 / ..)
Off	Off	Off	200	1
On	Off	Off	400	2
Off	On	Off	800	4
On	On	Off	1600	8
On	On	On	3200	16

TMC2208/2209 StepStick drivers do not have a way to physically override microstep settings using DIP switches. You will need to refer to the user manual of your driver to set this via UART interface.

Setting the current for each driver (DRV8825/A4988 Only)

This section is only for users with DRV8825 or A4988 drivers. For TMC drivers skip to page 11.

Each driver will need to have its current set to match the motors you are using on your machine.

You should always set the current of your motors slightly lower than the value as listed in your motor's datasheet to avoid overdriving the stepper and increasing the motor's lifespan. A good rule of thumb is 10%.

For example: if your stepper motor is rated for 2A, it's a good idea to set your driver to 1.8A. You will very likely not notice the difference in performance but will see a noticeable drop in motor and driver temperature.

The current output from your driver is determined with the following equation.

$$V_{ref} = I \times 8 \times R_{sense}$$

V_{ref} is the voltage you will set the driver to
I is the required current of your stepper motor in Amps (1A = 1000mA)
*R_{sense} is the value of the current sense resistor in Ohms (1Ω = 1000mΩ)*

*This equation is only listed as a reference, keep reading further for simplification of this formula.*

To set your motor current, you will need to provide 12V power to the Scribe. You will also need:

- **Multimeter (Alligator clip on the + lead will be helpful!)**
- **Small Screwdriver (Must be conductive along the shaft)**
- **4x Driver Cards (Your choice of driver)**

Step 1: Plug in your driver cards paying close attention to the orientation. Both the Scribe board and your driver card will have VMOT and GND printed on them, and it is crucial that they line up. **If your driver card isn't in the correct orientation before powering up, you *will* cause driver failure. Picture below shows where to find orientation indicators.**
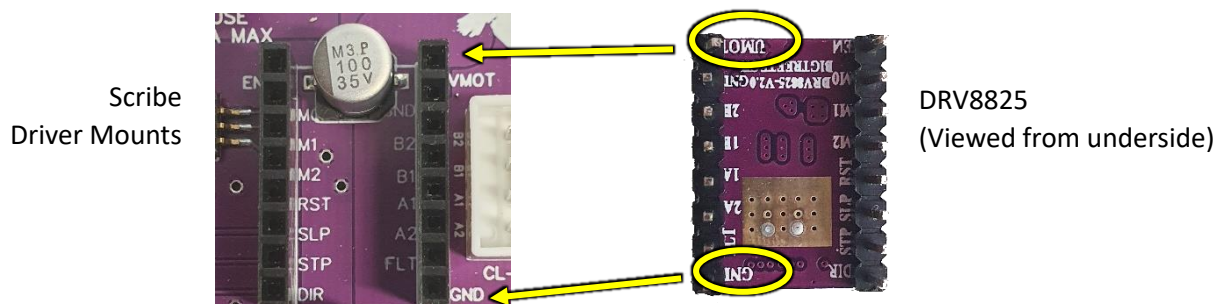
Scribe
Driver Mounts

DRV8825
(Viewed from underside)

Step 2: Once all 4 driver cards are inserted correctly, **ensure no motors are currently plugged in**, then turn on the power to your Scribe and check to see that the VMOT light is illuminated green. If you have an orange Standby light, you will need to press the power button to turn on the controller.
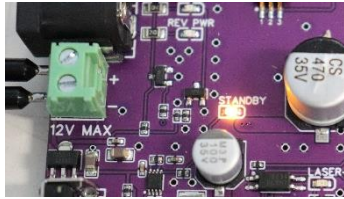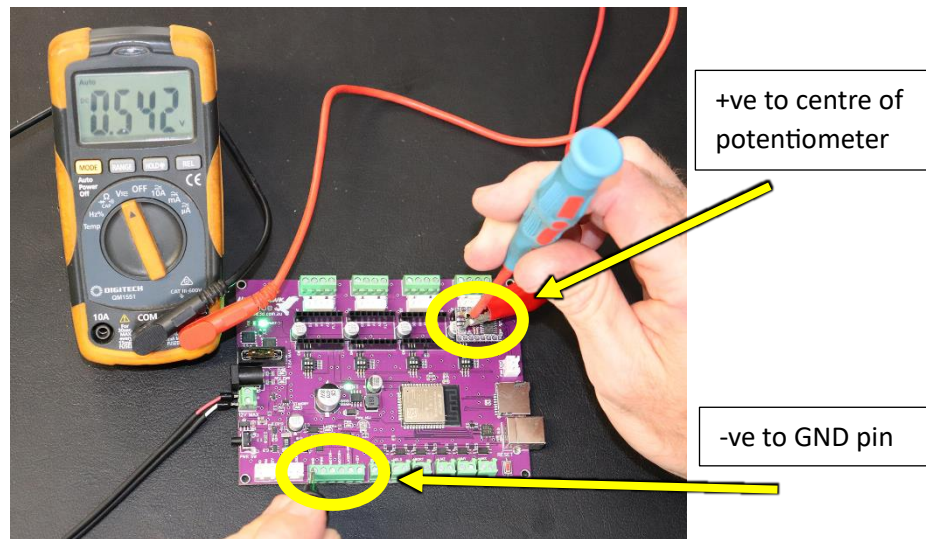

Controller in "Standby" mode
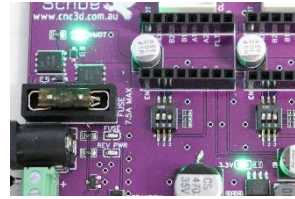
Controller in "On" mode

Step 3: Set up your multimeter. You will need to have the COM touching any GND pin on the Scribe and the positive will need to be reading the voltage in the centre of the potentiometer on the driver card. The easiest way to do this is using an alligator clip onto the shaft of the screwdriver. *See picture below for example.*

+ve to centre of potentiometer

-ve to GND pin

You can tune the driver by turning the potentiometer clockwise or anticlockwise to raise or lower the voltage being read on the multimeter, known as Reference Voltage (V$_{ref}$).

The current output from your driver is determined with the following equation.

(DRV8825)   Voltage = Current x 0.8
(A4988)   Voltage = Current x 0.4

Current is the required current of your stepper motor in Amps (1000mA = 1A)

Using the example above where our stepper motor is to be run at 1.8A on a DRV8825 driver, after putting 1.8A into the equation we get a result of 1.44V. This is the number to look for on the multimeter when tuning the driver.

Step 4: After tuning all 4 drivers to match your required motor current, you can move on to connecting your stepper motors.

Setting the current for each driver (TMC2208/TMC2209 Only)

Each driver will need to have its current set to match the motors you are using on your machine.

You should always set the current of your motors slightly lower than the value as listed in your motor's datasheet to avoid overdriving the stepper and increasing the motor's lifespan. A good rule of thumb is 10%.

For example: if your stepper motor is rated for 2A, it's a good idea to set your driver to 1.8A. You will very likely not notice the difference in performance but will see a noticeable drop in motor and driver temperature.

The current output from your driver is determined with the following equation.

$$V_{ref} = I_{max} \times RMS$$

V_{ref} is the voltage you will set the driver to
I_{max} is the maximum required current of your stepper motor in Amps (1A = 1000mA)
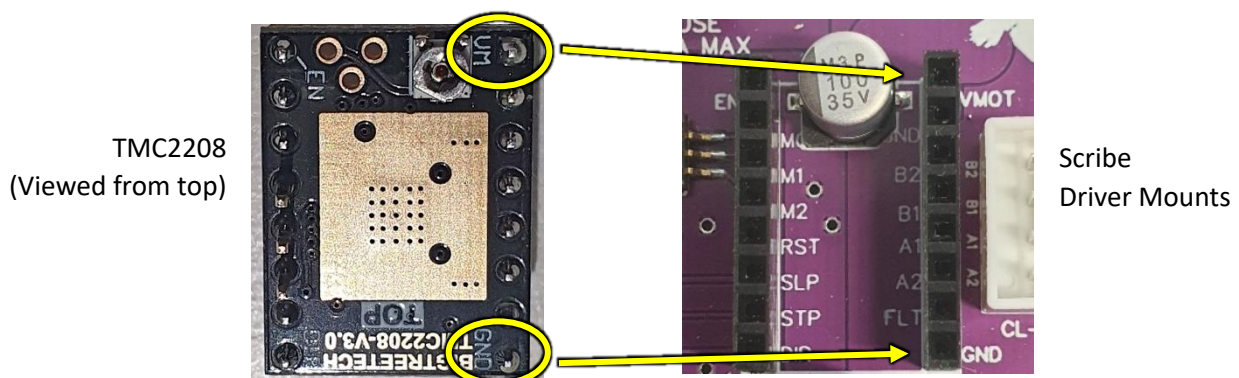*RMS is the maximum current your driver can provide in Amps (1A = 1000mA)*

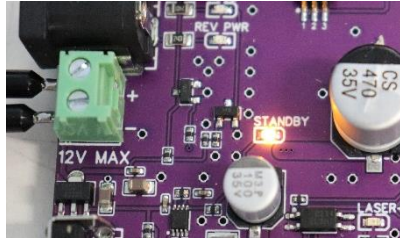*This equation is only listed as a reference, keep reading further for simplification of this formula.*

To set your motor current, you will need to provide 12V power to the Scribe. You will also need:

- **Multimeter**
- **Small Screwdriver**
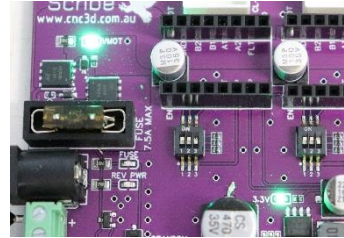- **4x Driver Cards (Your choice of driver)**

Step 1: Plug in your driver cards paying close attention to the orientation. Both the Scribe board and your driver card will have VMOT and GND printed on them, and it is crucial that they line up. **If your driver card isn't in the correct orientation before powering up, you *will* cause driver failure.**

TMC2208
(Viewed from top)

Scribe
Driver Mounts

Step 2: Once all 4 driver cards are inserted correctly, **ensure no motors are currently plugged in**, then turn on the power to your Scribe and check to see that the VMOT light is illuminated green. If you have an orange Standby light, you will need to press the power button to turn on the controller.
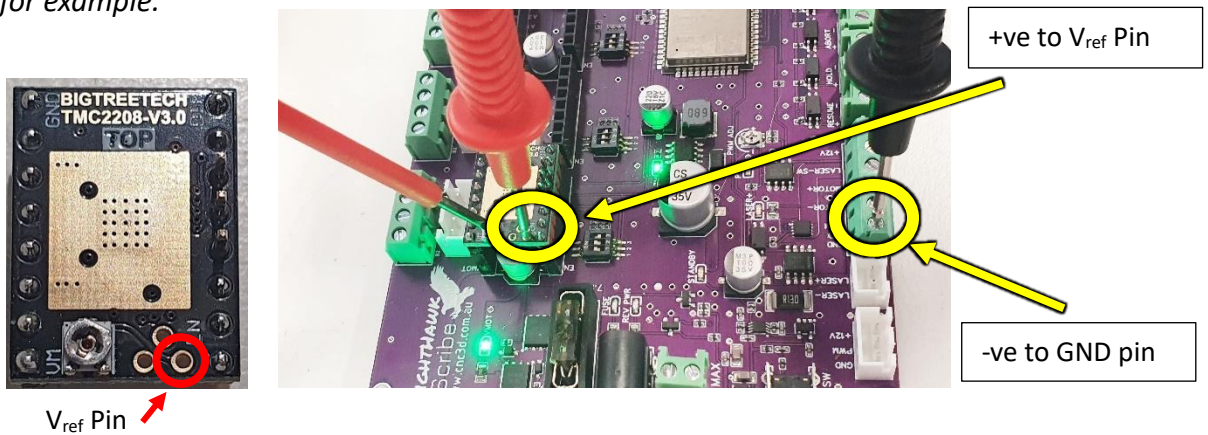

Controller in "Standby" mode

Controller in "On" mode

Step 3: Set up your multimeter. You will need to have the COM touching any GND pin on the Scribe and the positive will need to touch the V_{ref} pin on the driver. *See picture below for example.*

V_{ref} Pin

+ve to V_{ref} Pin

-ve to GND pin

You can tune the driver by turning the potentiometer clockwise or anticlockwise to raise or lower the voltage being read on the multimeter, known as Reference Voltage (V_{ref}).

The current output from your driver is determined with the following equation.

(TMC2208) Voltage = Current x 1.2
(TMC2209) Voltage = Current x 1.77

Current is the maximum required current of your stepper motor in Amps (1000mA = 1A)

Using the example above where our stepper motor is to be run at 1.8A on a TMC2208 driver, after putting 1.8A into the equation we get a result of 2.16V. This is the number to look for on the multimeter when tuning the driver.

Step 4: After tuning all 4 drivers to match your required motor current, you can move on to connecting your stepper motors.

Connecting your stepper motors
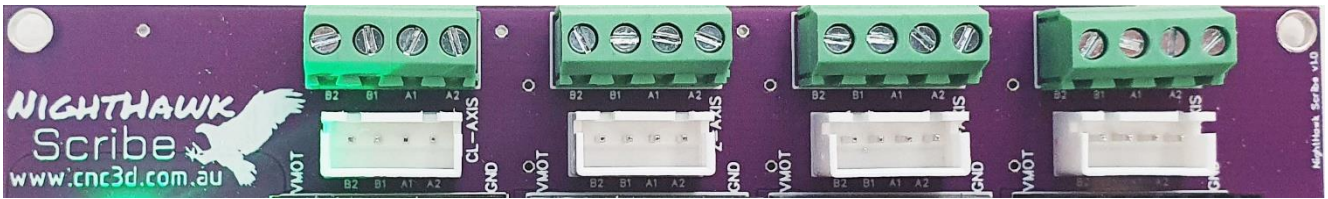
The Nighthawk Scribe supports the connection for 4-wire stepper motors. Generally, these motors have 2 pairs of motor poles. Connecting them to your controller should be relatively straight forward. You can confirm which wires are pairs using a multimeter in continuity mode.

PLEASE NOTE

Always ensure the unit is powered OFF and the USB cable is disconnected before connecting or disconnecting any motors from your controller. Failing to properly power off the board while working on the motors can cause irreparable damage to the controller.

The Scribe has 2 options to connect your stepper motors.

Option 1: White JST Connections

Most small stepper motors like those on the 3018-style machines and diode laser engraver frames will come with white plugs on the end of the stepper motor cables. These should plug straight into the white connectors on the Scribe board.

Option 2: Green Terminals

If your motors do not have pre-attached connectors or your connectors are a different shape and don't fit you can use the individual green screw terminals. To use them you will need to cut the existing connector off and strip the end of each wire.

Use a small flat head screwdriver to attach your motor wires to the green plugs.

The motor connections are shown here, check your motors datasheet for the wiring colours of your motors to match them to the controller.

If your machine is set up to use separate motors for each Y axis (XYYZ) then your Y2 motor will go into the CL plug.
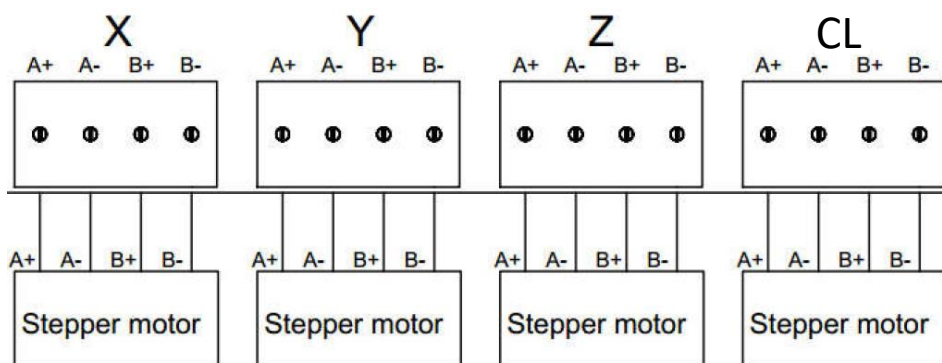
Laser and Spindle Motor Setup

LASER SAFETY WARNING!

Always ensure you are wearing laser safety goggles and other appropriate PPE when using any high-powered lasers. Please ensure the laser is pointing away from people and sensitive materials.

Remember when plugging in or unplugging any wiring INCLUDING the laser connector, it is vital to ensure the machine is NOT powered up. So called "hot-swapping" can cause irreparable damage to the laser or the Scribe Controller!

The Nighthawk Scribe can run either a 12v Spindle Motor or 12v diode laser module without any external power.

Be sure to turn off and unplug your Scribe before doing any wiring, including plugging in or unplugging any connectors!

Please Note: The Scribe has not been designed to interact with a VFD and does not have any logic or connections related to VFD use.

For a spindle to run from the Scribe board, it must be 12v and no more than 2.5A.

Your spindle can connect to the Scribe using the Motor+ and Motor- terminals on the 6-pin green connector, with the + being the 12v connection to the motor and the – being the negative. The Scribe is capable of controlling the speed of the motor by raising or lowering the voltage being supplied to the motor.
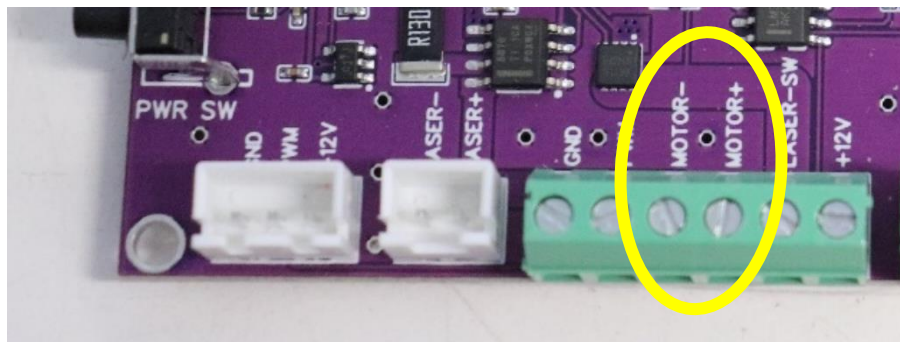
When it comes to laser modules, there are both 3-pin and 2-pin laser connections to ensure a wide compatibility range with different laser modules available on the market.

If your laser only has 2 wires coming out of it you will connect it to the white plug labelled Laser- and Laser+, pay close attention to the orientation of the wires. **Red will most likely be positive.**

If your laser has 3 wires coming out of it you can choose to use the white 3-pin plug or the 6-pin green terminal block.

If using the white JST plug, ensure the wires are in the correct orientation before powering up or you risk damaging your laser or the controller.

If using the green terminal block, you will use the pins labelled **GND, PWM and +12v.** The +12v will always be active while the Scribe is powered on and the PWM signal will control the intensity of the laser beam.
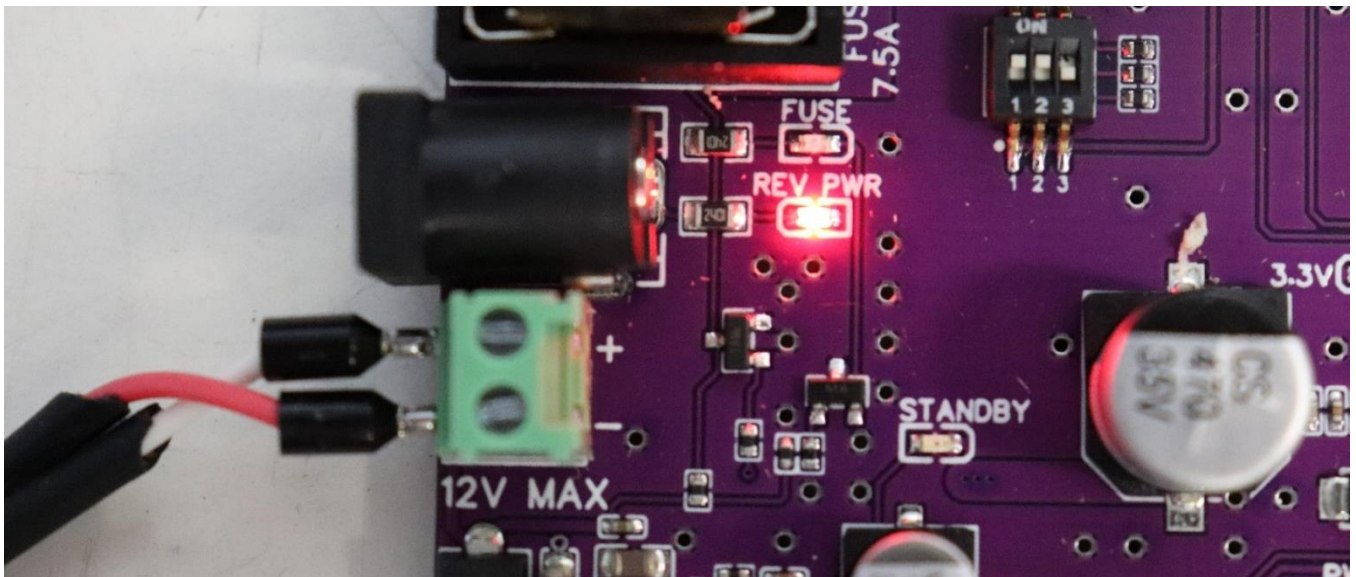
On-Board Protection

The Scribe has a few built-in protections to protect itself from overcurrent or reverse polarity on the power input side of the board.

Reverse Polarity Protection

This is a situation where the positive and negative wires coming from the power supply are connected to the Scribe inverse to what they should be ie: positive 12v is connected to the GND input.

When this happens, the Scribe will not allow itself to power up and there will be a red LED light on the board with the label **REV PWR.** To correct this, turn off the power supply and ensure the positive is connected to the + terminal and the negative is connected to -.

If you are using the barrel-type connector the centre pin is positive and the outside of the barrel is negative.

Overcurrent Protection

Overcurrent protection is provided in the form of a 7.5A automotive fuse located just near the power input on the Scribe board. If there is a short circuit and the board is put into an overcurrent situation, the fuse will blow and remove power from the board.

If power is supplied to the Scribe with a blown fuse, or if the fuse is not inserted correctly you will see a red LED light under the **FUSE** label.

If you ever see the **FUSE** LED light up, power off your Scribe and look for any signs of short circuits through your machine wiring, such as charring or blackening on any connectors or any metal swarf or chips lying across any electrical connections.

Once the machine is clear of any swarf and all electronic connections are clean and repaired (if needed) you will need to replace the fuse before you can continue to use your Scribe.
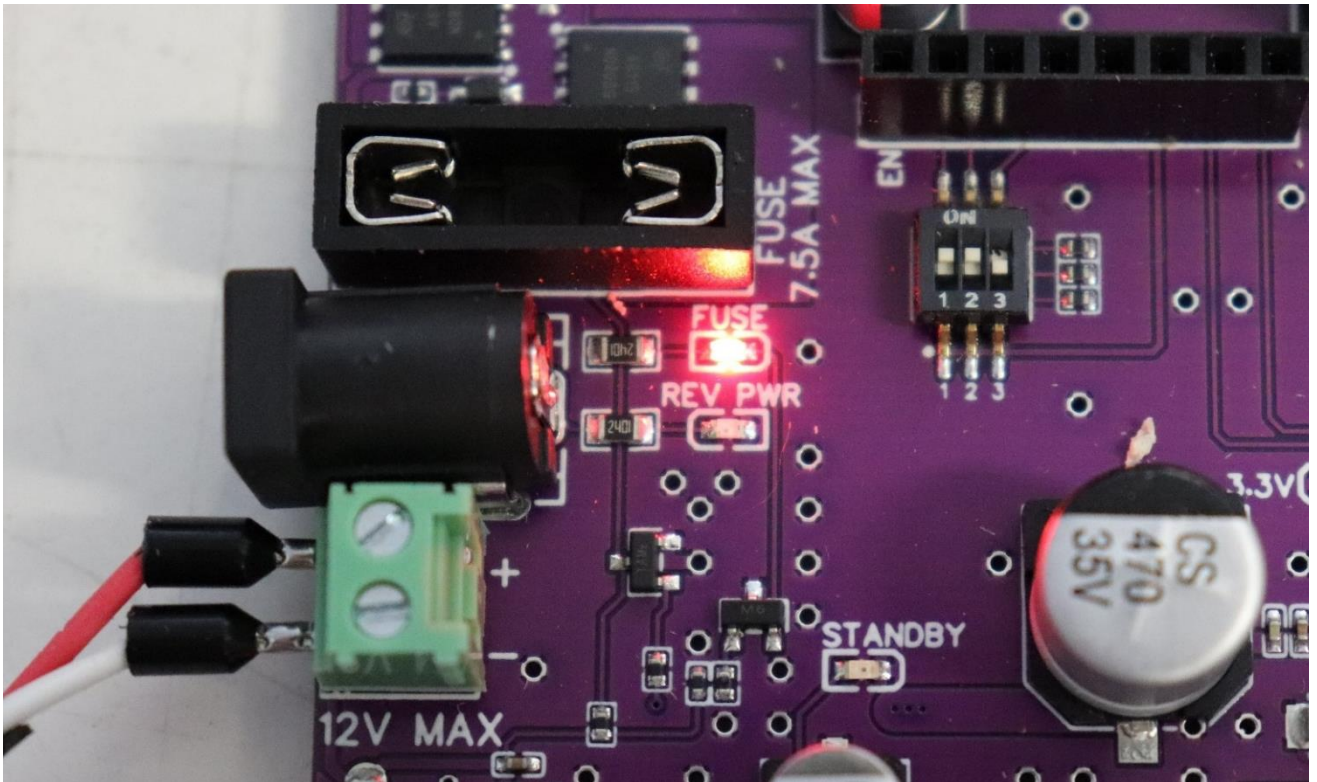
Getting connected

Now that your hardware is set up, let's take control!

The first step is to connect power to your Scribe controller and download our Commander control software by clicking the link below or typing it into your internet browser.

https://www.cnc3d.com.au/commander

To use your Nighthawk Scribe CNC Controller, you will need to have a way of communicating with it from a PC so you can give it GCODE files as well as commands like movement and of course, running your jobs!

There are multiple options that you can use to connect to your Nighthawk Scribe CNC Controller – USB, WiFi, and Bluetooth.

USB (Not Recommended)

Your first instinct may be to use USB however this is the **least reliable way** to control and run your machine and it is heavily discouraged! While it's running the spindle will create lots of Electromagnetic Interference (EMI) and electrical noise which can cause the USB connection to drop out resulting in random job stoppages or irregular machine behaviour. We only recommend using the included USB cable for setting up wireless communications, then unplugging the cable and storing it in a drawer.

WiFi (Best Option)

The best possible way to run your Scribe controller is via WiFi and connecting the machine to an existing WiFi network such as a house or factory network.

The next preferable option is WiFi – Direct Access Point Mode which allows you to connect directly to the Scribe instead of connecting the Scribe to an existing network. This will be the best option if there is no network in the area where your Scribe is located or if you are using a mesh network/WiFi range extenders as the Scribe cannot connect to these networks. This works the same as connecting to a network, but the drawback is that the computer running the machine will not have access to the internet while running the machine.

Bluetooth (Backup Option)

The third option is connecting to the Scribe via Bluetooth from a compatible PC or Laptop (not a smartphone!)
Bluetooth works the same as USB without the physical cable so it will eliminate the risk of EMI and unpredictable machine behaviour.

WiFi (Connect to Existing Network)

Connecting your Scribe to an existing wireless network is the best and most reliable way to communicate with and control your Scribe controller. Keep in mind that your Scribe DOES NOT need internet access, it only needs access to the network so that computers and devices on the same network can communicate with it.

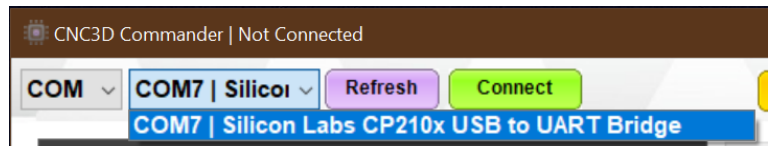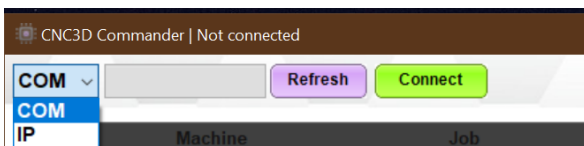**Note: There are some network configurations that the Scribe will not work with or will have limited connectivity.**

- WiFi routers are often capable of putting out signals in both the 5.8GHz and 2.4GHz frequency bands. **Your Scribe is only capable of interacting with and connecting to the 2.4GHz band.** If you are unsure which frequency band your network is you will need to contact the person who set it up for you as our support team cannot help with this.

- Mesh networks are common in large properties where a single router isn't powerful enough to provide wireless signals to the entire property. You will need to make a simple setting change to use a WiFi mesh network.

- WiFi range extenders are common in large properties where a single router isn't powerful enough to provide wireless signals to the entire property. You will need to make a simple setting change to use a WiFi network with a range extender.

To get started with this process you will need to have a Windows PC located near the machine so you can connect to it with a USB cable.

Plug in your USB cable, turn on your PC, turn on the Scribe and open CNC3D Commander.

Note: If your Scribe is not installed automatically or detected by your PC, refer to the USB setup section of this guide.

Select COM in the first drop-down menu. In the second drop-down menu select the correct COM port, it should be the one that has CP210x in the description.

Once connected, you will need to clear the Alarm by clicking the E-stop button and then "Unlock" so the Alarm box changes to green, then click on the Connections/ESP32 tab to access the wireless settings.

In the drop-down box you will need to select WiFi – Connect to Existing Network and the relevant options will highlight in the bottom of the window in the WiFi (Station) section.
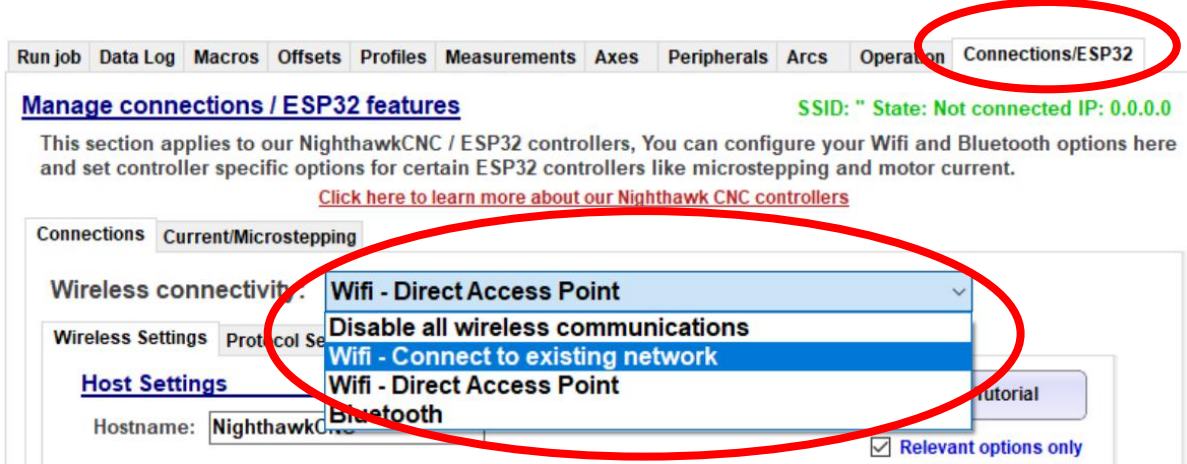
With the correct options highlighted, click on the "Show WiFi List" button to bring up the list of available WiFi networks that your Scribe can see.
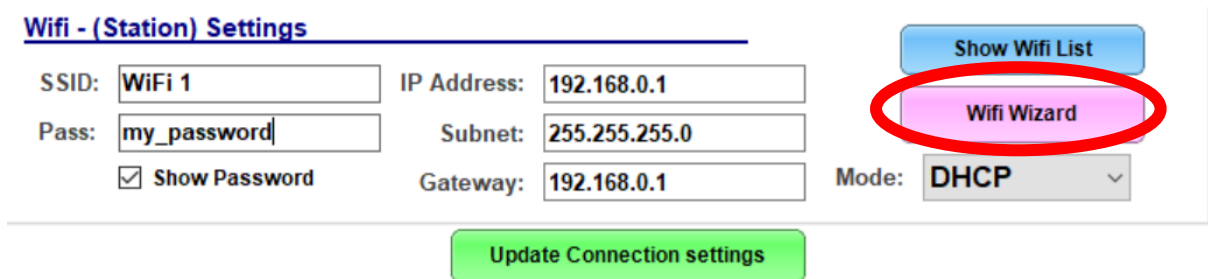
Pro Tip: Your network will usually be the one with the best signal, but not always!
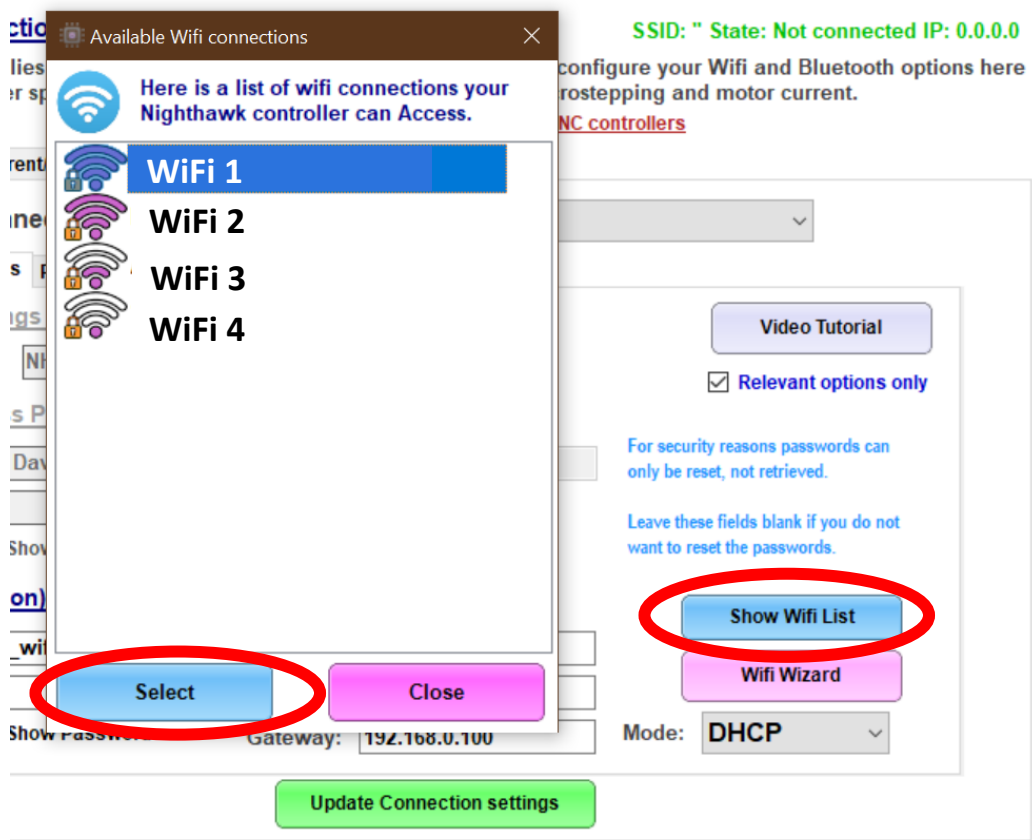
Note: You may need to refresh the list by closing the window and clicking the WiFi list button again

Highlight your network name, then click Select. This will put the network name you selected into the SSID box; you will then need to enter in your WiFi password. For now, you can leave the other boxes with numbers in them alone, and do not update settings just yet.

The next step is to click the WiFi Wizard button. This will automatically grab some details about your network from your computer and put them into the IP Address, Subnet and Gateway boxes. To do this your computer MUST be connected to the same network that you are setting up on your Scribe controller.

If your computer is connected to your WiFi network, you can click "Yes" on the popup box.

The window that pops up next is asking you if your network is a **mesh** network, or if you have a **range extender** in use. Make sure you answer this correctly. If you are not sure you may need to contact your network administrator or the person who set up your network – CNC3D's support team can likely not answer this question for you.

The next box allows you to set the Scribe controller's IP Address. For most users the default of 155 is perfect. If you do not need to assign a particular number here, you can leave it at 155.

Click OK to update the numbers and look for the popup to confirm it has been completed and click "OK".
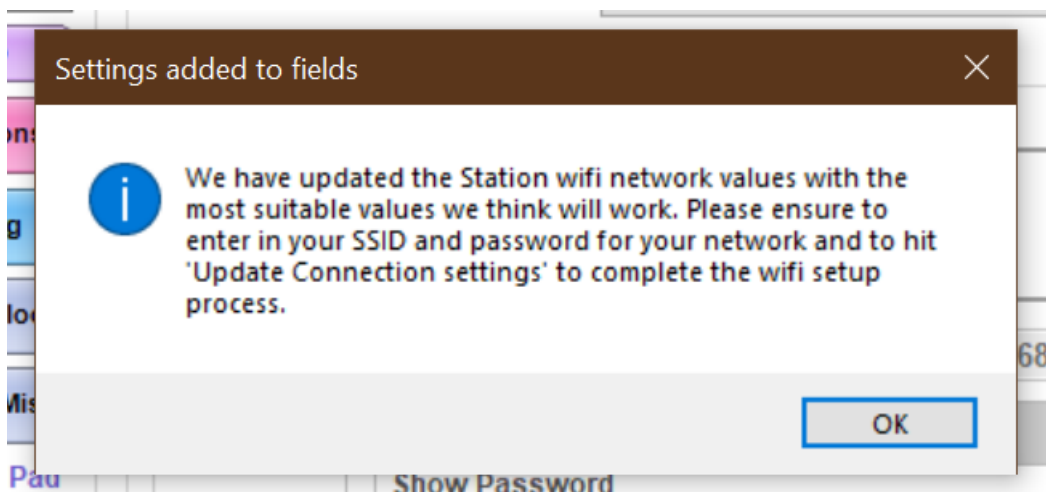

If you did not get a popup box telling you the settings have been updated, check to see if your machine is in an Alarm state in the bottom left corner of the Commander window next to the E-Stop. If you are in Alarm state you will need to clear it by clicking the E-stop button, then "Unlock" and re-do the process to update your settings.

You will see the numbers in IP Address, Subnet and Gateway may have changed to best suit your network, and the Mode box will read STATIC.

Pro Tip: Keep a note of the number in the IP Address box. All 4 number sets and '.' are vital!

You can now click "Update Connection Settings" and look for the popup box confirming the settings have been updated.
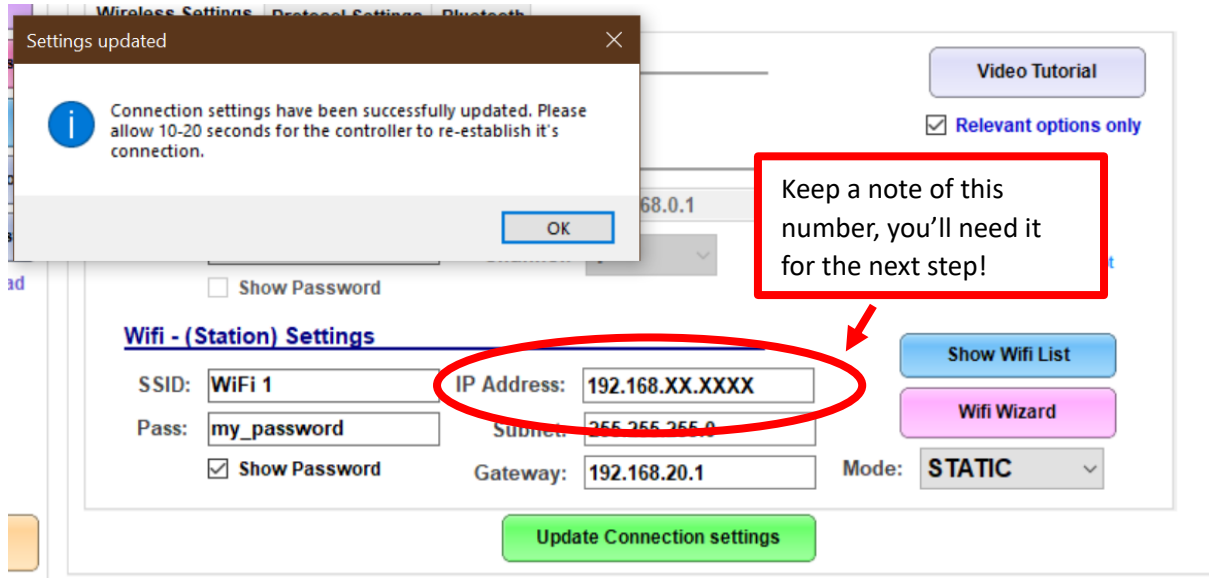
You should now click "Disconnect", turn off your Scribe controller, wait 10-20 seconds, and then turn it back on.

After powering the controller back on, you can click "Connect" to re-establish a connection via the USB cable after selecting the correct COM port, then switch over to the Connections/ESP32 tab. If your connection was successful, you will see green text at the top right of the tab.
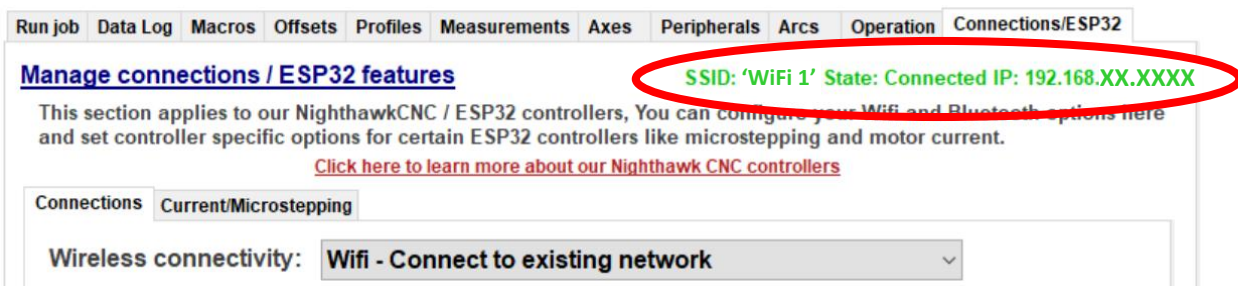
You can now click "Disconnect" at the top left of Commander, then change that first drop-down box to IP, and then type in the IP Address that was specified in the previous step and click "Connect".

If everything was successful, Commander will light up and you will have full control of your machine. You will also see "Connected.. NighthawkCNC…" in the coloured bar above the "Disconnect" button. You can ignore the description in the brackets eg: 4 Axis.

CNC3D Commander | Connected.. NighthawkCNC 2.2 (4 Axis)
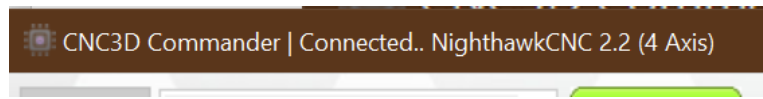
You can now unplug the USB cable from both the PC and the Scribe and continue to control your machine via your WiFi connection.

WiFi (Direct Access Point)

This connection method is only recommended if the one above does not work. We recommend trying the WiFi (Connect to Existing Network) option first.

If you do not have access to an existing wireless network, or your existing network setup is incompatible with your controller, you can connect directly to your Scribe using its own built-in WiFi signal.

Note: The PC used to run the Scribe will not have internet access while connected to your machine if using the Direct Access Point method.

If you're using Easel or another web-based design suite to create your toolpaths, you will need to ensure you have downloaded your GCODE file or job file **BEFORE** connecting to your controller as you will not be able to do so while connected to your Scribe.

To get started with this process you will need to have a Windows PC located near the machine so you can connect to it with a USB cable.

Plug in your USB cable, turn on your PC, turn on the Scribe and open CNC3D Commander.

Note: If your Scribe is not installed automatically or detected by your PC, refer to the USB setup section of this guide.

Select COM in the first drop-down menu. In the second drop-down menu select the correct COM port, it should be the one that has CP210x in the description.

Once connected, you will need to clear the Alarm by clicking the E-stop button and then "Unlock" so the Alarm box changes to green, then click on the Connections/ESP32 tab to access the wireless settings.

In the first drop-down box you will need to select WiFi – Direct Access Point and the relevant options will highlight in the middle of the window in the WiFi (Access Point) section.
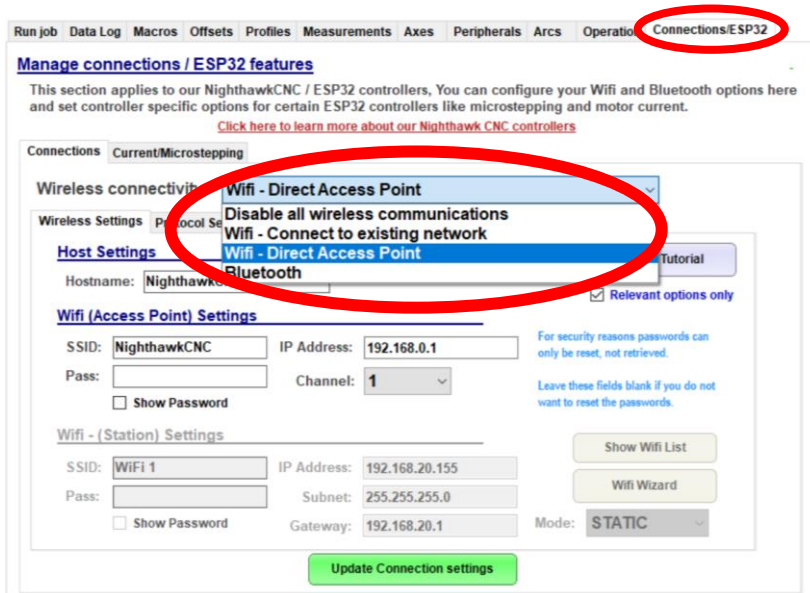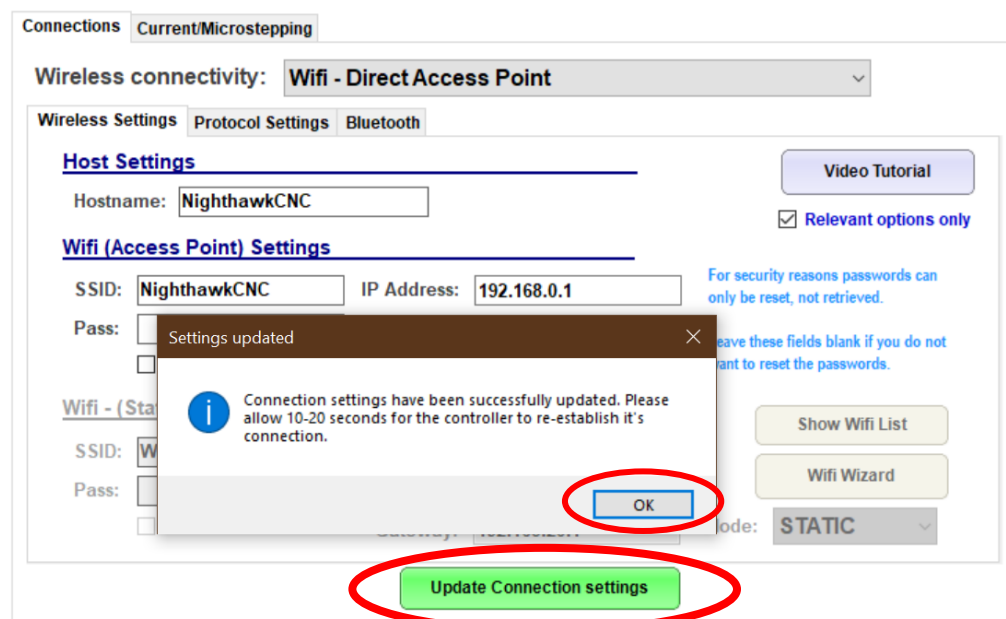
The SSID, IP Address and Channel boxes should match the ones in the image above, these are the defaults and will work just fine. The Hostname box should be the same as the SSID, which is **NighthawkCNC** by default.

The Pass box is blank, though the default password has already been set on the controller. You do not need to put anything in the Pass box unless you want to change the default password.

If you do want to change the password from the default you can enter your desired password into the box.

If all your settings are correct, you can now click "Update Connection Settings" and look for the popup box confirming the settings have been updated and click "OK".

If you did not get a popup box telling you the settings have been updated, check to see if your machine is in an Alarm state in the bottom left corner of the Commander window next to the E-Stop. If you are in Alarm state you will need to clear it by clicking the E-stop button, then "Unlock" and re-do the process to update your settings.

You should now click "Disconnect", turn off your Scribe controller, wait 10-20 seconds, and then turn it back on.

After powering your Scribe back on, you will need to connect your PC to the Scribe's wireless signal. You will need to do this from your PC's WiFi selection settings, not in our Commander software.

Please Note: PCs will vary due to the different versions of Windows/Mac operating system that are available. Because of this yours might look a little different to the pictures below. If you are unsure on how to navigate the next step on your particular PC you may need to get help from your PC retailer's technical support as this is specific to your computer and is not a part of CNC3D Commander software.

Look for the WiFi signal in the bottom-right corner of your computer screen. Open the menu to see the available wireless networks and look for the NighthawkCNC network.

Windows 10	Windows 11
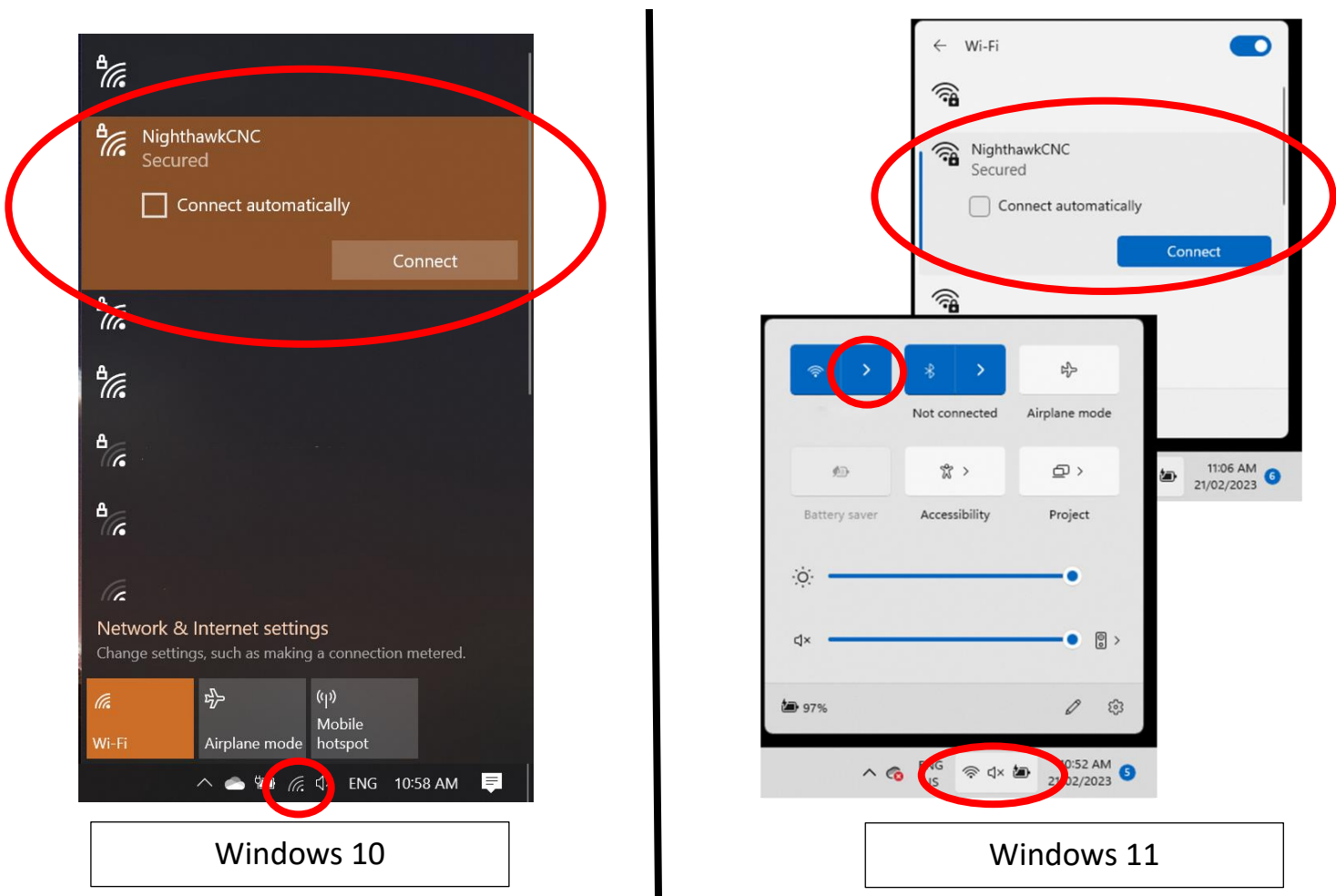
After selecting the NighthawkCNC network in the list, click 'Connect' and enter the password.

If you did not specify a password in the previous step, your default password will be 12345678 with no spaces between the numbers or any other characters.

Your PC may take a minute or so to connect to the Scribe as it is verifying the connection. Once your PC is connected you will see "No Internet, secured" or "Connected Without Internet" written below the "NighthawkCNC" WiFi name.

You can now switch back to our Commander software.

In the top-left corner of Commander you will need to change the first drop-down box to "IP" and the second box will need to read **192.168.0.1** you do not need to enter the :23. Click 'Connect' and Commander will add the :23 to the end of the IP address and connect to your Scribe.

If everything was successful, Commander will light up and you will have full control of your machine. You will also see "Connected.. NighthawkCNC..." in the coloured bar above the "Disconnect" button. You can ignore the description in the brackets eg: 4 Axis.
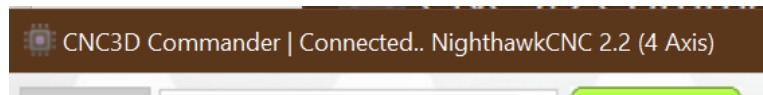
You can now unplug the USB cable from both the PC and the Scribe and continue to control your machine via your WiFi connection.

Note: When the connection to your Scribe drops by either turning off the machine, moving your PC out of range or by using the Emergency Stop button, you may need to go through the steps above to reconnect to your NighthawkCNC WiFi Network before attempting to connect to your Scribe in Commander.

Bluetooth

This connection method is only recommended if neither of the WiFi options work for you. We recommend trying the WiFi (Connect to Existing Network) option first.

Bluetooth connections work the same as a USB connection without the drawbacks of having a physical wire plugged into the Scribe, so it is impervious to EMI interruption.

Bluetooth and USB connections work by sending every line of code to the Scribe one-by-one so if anything interrupts that connection you run the risk of your machine stopping mid-job or uncontrolled machine movement. This can be something as simple as your computer going to sleep or a laptop losing power so if you are certain you must use a Bluetooth connection to control your machine make sure you have disabled all power saving options in your PC and are plugged into power if using a laptop.

Contact your PC retailer's technical support if you need assistance with disabling these features.

Please Note: Bluetooth will only work with a Windows laptop or desktop computer with Bluetooth capabilities, it is not intended for use with a smartphone or iPad.
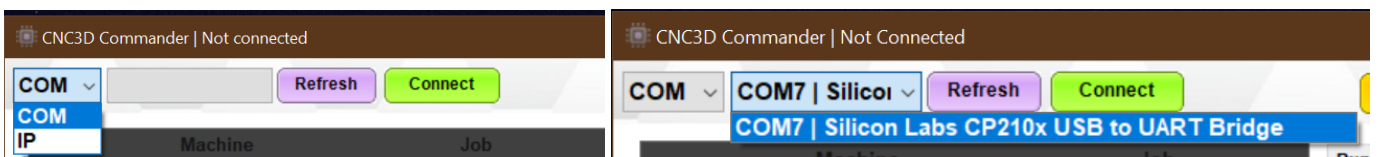
Most modern laptop computers will have a Bluetooth adapter built into the computer, however if not you can use a plug-in Bluetooth adapter which are readily available from most electronics retailers.

To get started with this process you will need to have a Windows PC located near the machine so you can connect to it with a USB cable.

Plug in your USB cable, turn on your PC, turn on the Scribe and open CNC3D Commander.

Note: If your Scribe is not installed automatically or detected by your PC, refer to the USB setup section of this guide.

Select COM in the first drop-down menu. In the second drop-down menu select the correct COM port, it should be the one that has CP210x in the description.

Once connected, you will need to clear the Alarm by clicking the E-stop button and then "Unlock" so the Alarm box changes to green, then click on the Connections/ESP32 tab to access the wireless settings.

In the first drop-down box you will need to select Bluetooth and Commander will switch over to the Bluetooth settings tab.
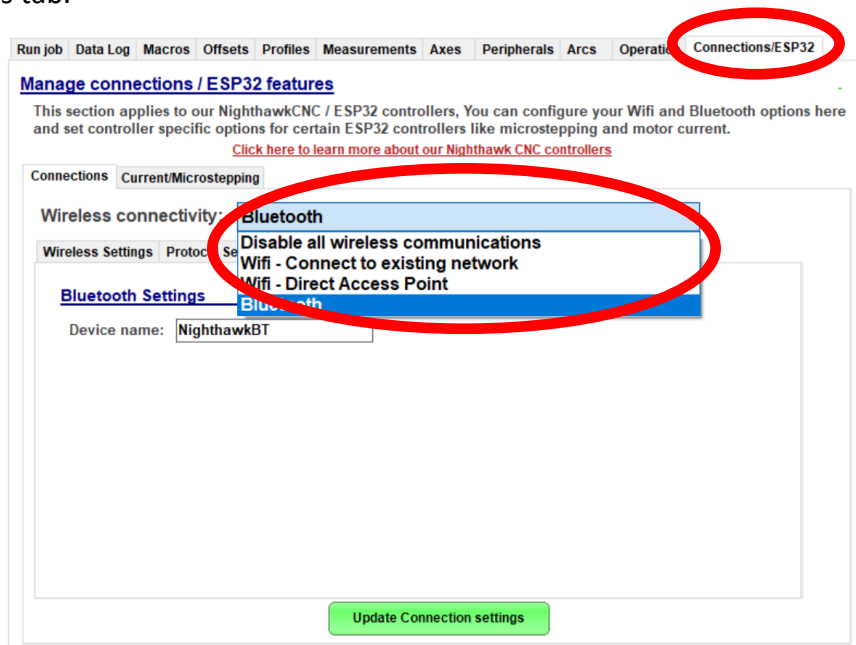
From here you can set the Device Name, however leaving it as the default **NighthawkScribeBT** is perfectly fine.

This will be all the settings you need to change in Commander so you can now click "Update Connection Settings" and look for the popup box confirming the settings have been updated and click "OK".

If you did not get a popup box telling you the settings have been updated, check to see if your machine is in an Alarm state in the bottom left corner of the Commander window next to the E-Stop. If you are in Alarm state you will need to clear it by clicking the E-stop button, then "Unlock" and re-do the process above to update your settings.
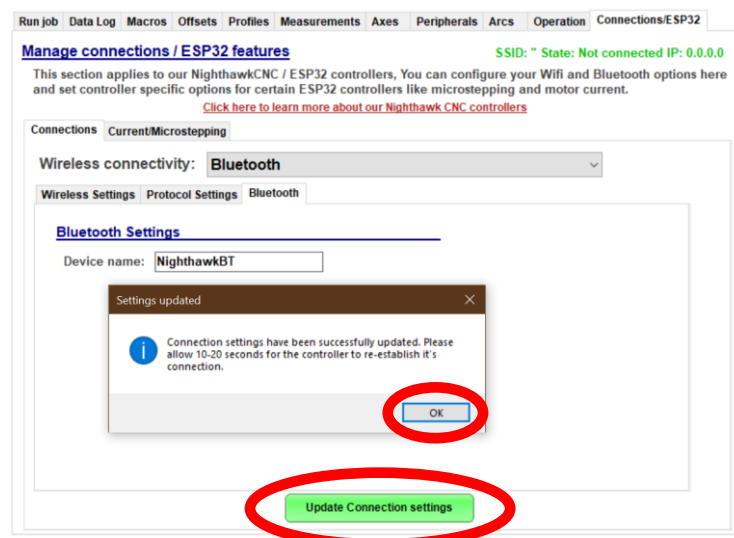
You should now click "Disconnect", turn off your Scribe controller, wait 10-20 seconds, and then turn it back on.

After powering your Scribe back on, you will need to connect your PC to the Scribe's Bluetooth signal. You will need to do this from your PC's Bluetooth selection settings, not in our Commander software.

Please Note: PCs will vary due to the different versions of Windows operating system that are available. Because of this yours might look a little different to the pictures below. If you are unsure on how to navigate the next step on your particular PC you may need to get help from your PC retailer's technical support as this is specific to your computer and is not a part of CNC3D Commander software.

Look for the Bluetooth symbol in the bottom-right corner of your computer screen. You may need to click the ^ to see it. Open the menu and select 'Add a Bluetooth Device' and another window will open. Click 'Add Bluetooth or Other Device' then 'Bluetooth'.

It will then search for available Bluetooth devices and should find the **NighthawkScribeBT** device. If you changed the device name in the previous step then you should see that name show up now. Click on it and it will attempt to connect. Once it shows as 'Paired' you have successfully connected, and it will show up in your 'Other Devices' section of the window.
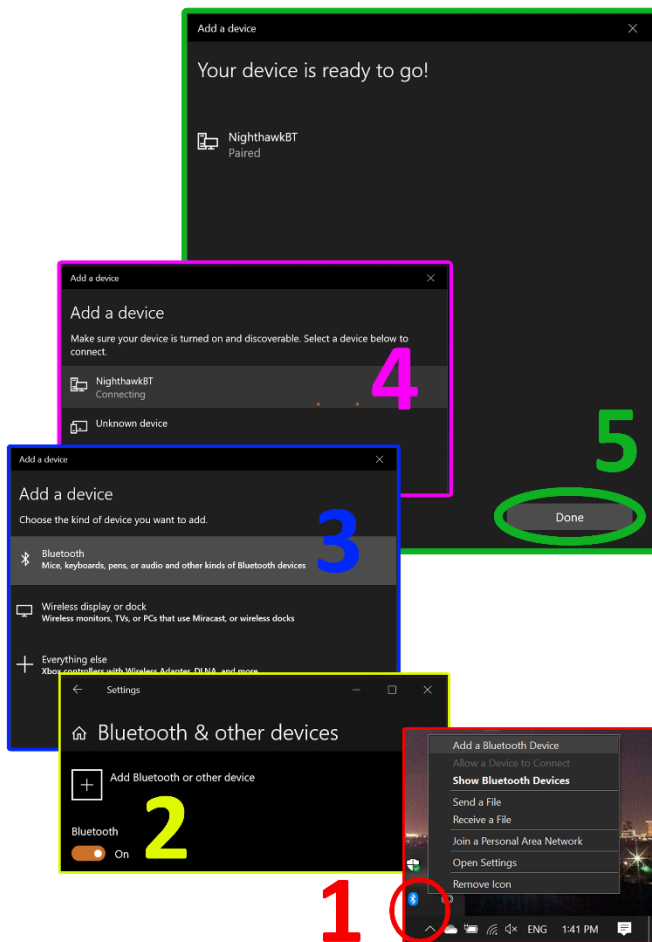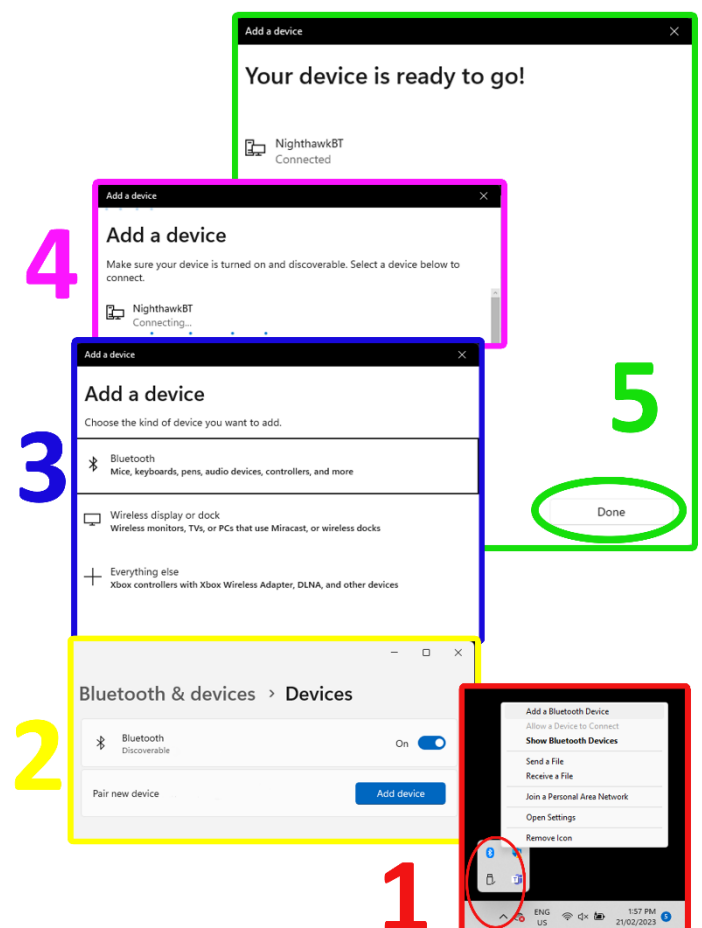

Windows 10	Windows 11

It may be necessary for you to wait a minute or two while your computer installs the device after the first time connecting. After the installation is complete you can switch back over to Commander.

Select COM in the first drop-down menu. In the second drop-down menu you should now see the option for 'Standard Serial over Bluetooth link'. There will be two different COM numbers associated with both links.
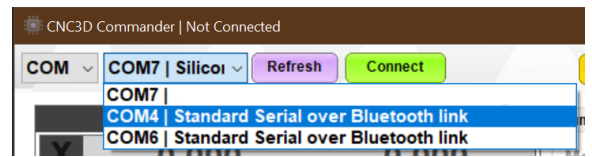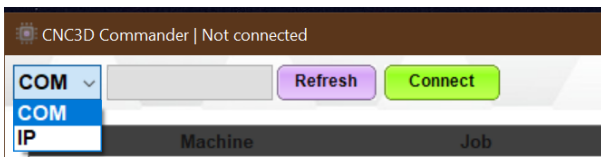

Unfortunately, it is not currently possible for Commander to tell you which is the correct COM port to select as your computer doesn't differentiate between them. One of them will work and the other will not, though often it's the lower number that is the correct one.

Choose one of the available Bluetooth link COM ports and click 'Connect'. If Commander stops responding for a few seconds then it is likely the wrong one and you can click 'Disconnect'.

Select the other Bluetooth link and click 'Connect'.

If everything was successful, Commander will light up and you will have full control of your machine. You will also see "Connected.. NighthawkCNC…" in the coloured bar above the "Disconnect" button. You can ignore the description in the brackets eg: 4 Axis.
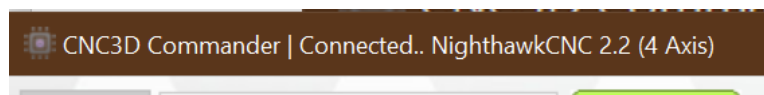
You can now unplug the USB cable from both the PC and the Scribe and continue to control your machine via your Bluetooth connection.

Note: If the connection to your Scribe drops by either turning off the machine, moving your PC out of range or by using the Emergency Stop button, you may need to go through the steps above to reconnect to your NighthawkScribeBT Bluetooth connection before attempting to connect to your Scribe in Commander.

USB

This connection method is only recommended if NONE of the wireless options work for you. We recommend trying the WiFi (Connect to Existing Network) option first.

USB is the last resort when choosing how to run your machine. We recommend USB for initial setup **ONLY** *and* **NEVER** *for running jobs.*

Spindles, routers, or plasma torches will create lots of Electromagnetic Interference (EMI) and electrical noise which can cause the USB connection to drop out resulting in random job stoppages or uncontrolled machine behaviour.

If you have no other choice but to use USB, for example in a secure area where wireless devices are not permitted, then you must use a high-quality USB cable that has magnetic ferrules attached to it, as well as disabling certain features of your PC.

USB connections work by sending every line of code to the Scribe one-by-one so if anything interrupts that connection you run the risk of your machine stopping mid-job or uncontrolled machine movement. This can be something as simple as your computer going to sleep, a laptop losing power or even just turning on the cutting tool. So, if you are certain you must use a USB connection to run your machine make sure you have disabled all power saving options in your PC and are plugged into power if using a laptop.

Contact your PC retailer's technical support if you need assistance with disabling these features as they are specific to your PC and not part of our Commander software.

To get started with this process you will need to have a Windows PC located near the machine so you can connect to it with a USB cable.

Plug in your USB cable, turn on your PC, turn on the Scribe and open CNC3D Commander.

Select COM in the first drop-down menu. In the second drop-down menu select the correct COM port, it should be the one that has CP210x in the description.
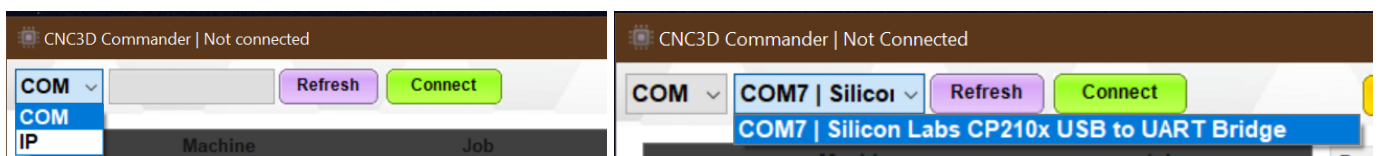

If you do not have any COM ports, or no COM ports with the CP210x description then it's likely that you do not have the correct driver installed. You will need to download the driver by clicking the link below or typing it into a browser window from your computer.

<p align="center"><a>https://libraries.sharpsoft.com.au/nighthawk/ch340.zip</p>

You will also need to turn off your Scribe and unplug the USB cable from your computer.

When the download is complete, navigate to your downloads folder and look for the **ch340.zip** file. You will need to 'unzip' this folder before you can use the contents. It's as easy as right-clicking on the file and selecting the 'Extract All' option. The next window will ask you to specify a location for the files to be saved. Take a note of the location and click 'Extract'. When the extraction process finishes it should open the location of the extracted files.
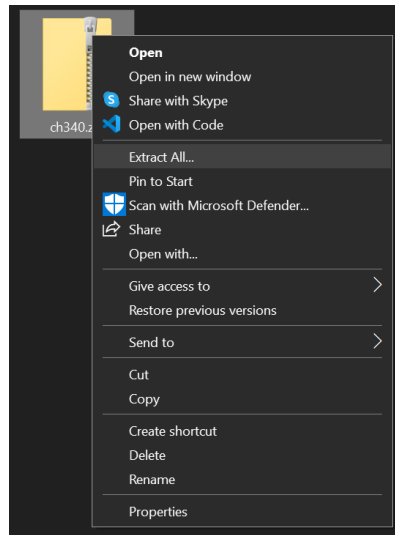
Open the 'CH340' folder, then open the folder called CP210xDriver (Nighthawk Scribe) and look for the file called **silabser.inf**.
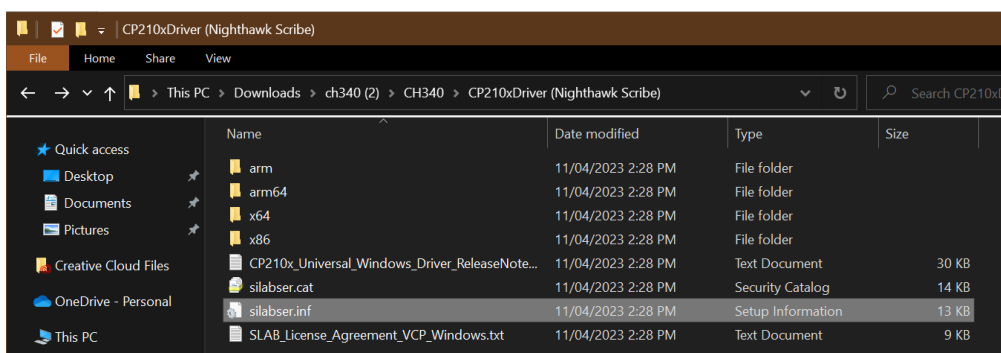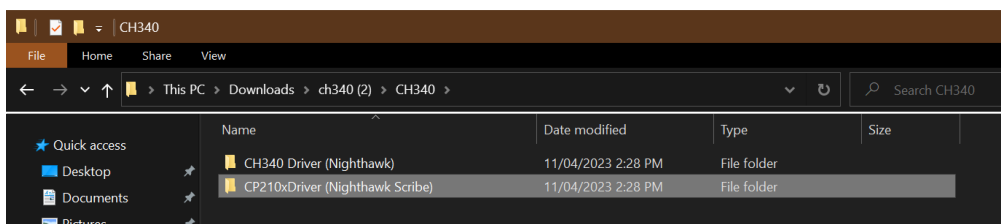

Right-click on the **silabser.inf** file and select 'install'

If you get a security popup asking if you would like to allow this program to run or make changes to your device, make sure you click 'Yes' or the program will not run.

When the driver is installed, and the message box pops up saying "Installation Completed" you can click on 'Ok' to close it.

Now that your CP210x driver is installed, you can turn on your Scribe, plug the USB cable back into your computer and switch back to our Commander software.

Select COM in the first drop-down menu. In the second drop-down menu select the correct COM port, you should now see one that is labelled CP210x. Click 'Connect'.
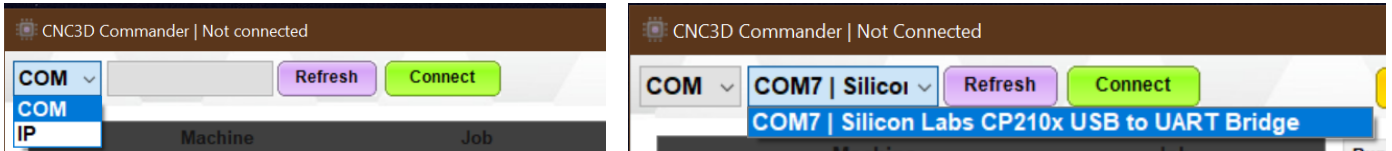
If everything was successful, Commander will light up and you will have full control of your machine. You will also see "Connected.. NighthawkCNC…" in the coloured bar above the "Disconnect" button. You can ignore the description in the brackets eg: 4 Axis.
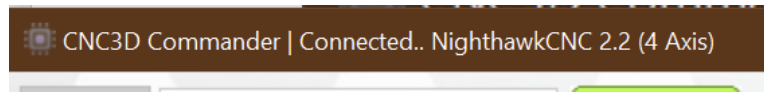
Accessing via Web-Portal (Any device with WiFi and a web browser)

If you have your Scribe controller connected to an existing network or in direct access point mode, you can use any device with a WiFi connection and a web browser to control your machine. For example, a smartphone or tablet.

If your Scribe is connected to an existing network you can access it using the assigned IP address from the connection steps listed above, so long as the device you're using is connected to the same WiFi network.

Note: Only one device can be connected to your Scribe through a browser at a time so if you can't connect from your mobile device, check to see if another device on your network is already connected.

If your Scribe is in direct access mode, you can connect to the NighthawkCNC WiFi from your smart device using the details set up in the steps above. You will need the WiFi name and IP address. The defaults are listed below for easy reference but if you have changed them from the defaults you will need to use those instead.

Pro tip for Mac users: We recommend using Chrome browser instead of Safari to get the most from your Scribe Controller.
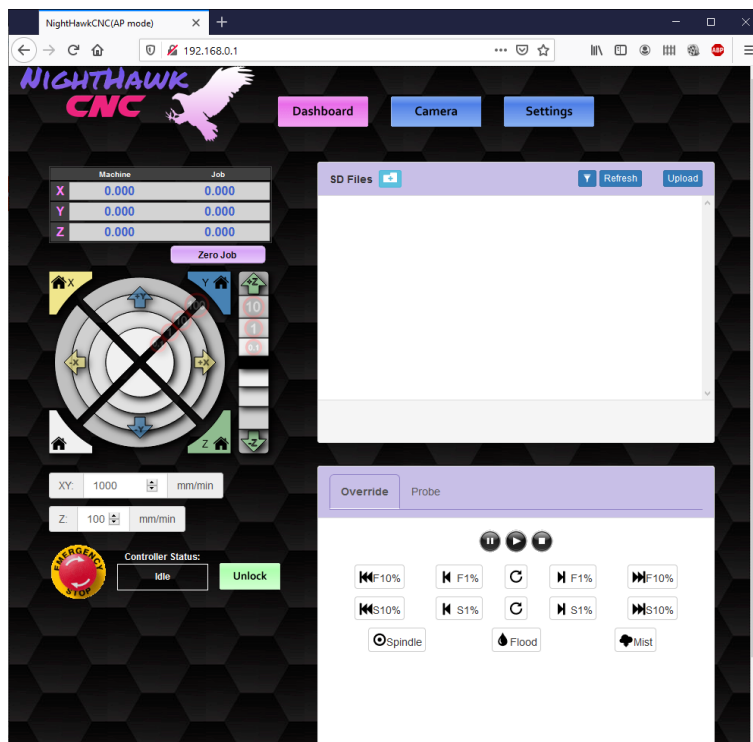
The default network details are:

Network: NighthawkCNC

Password: 12345678

**Default IP:** 192.168.0.1

Assuming you are using a browser on a PC, the interface looks should look like this:

To start configuring your controller Click on the "Settings" button at the top right. This will expose the network configuration options and general CNC settings. It is possible from the Web portal to configure any settings you would like to change including your connection type.
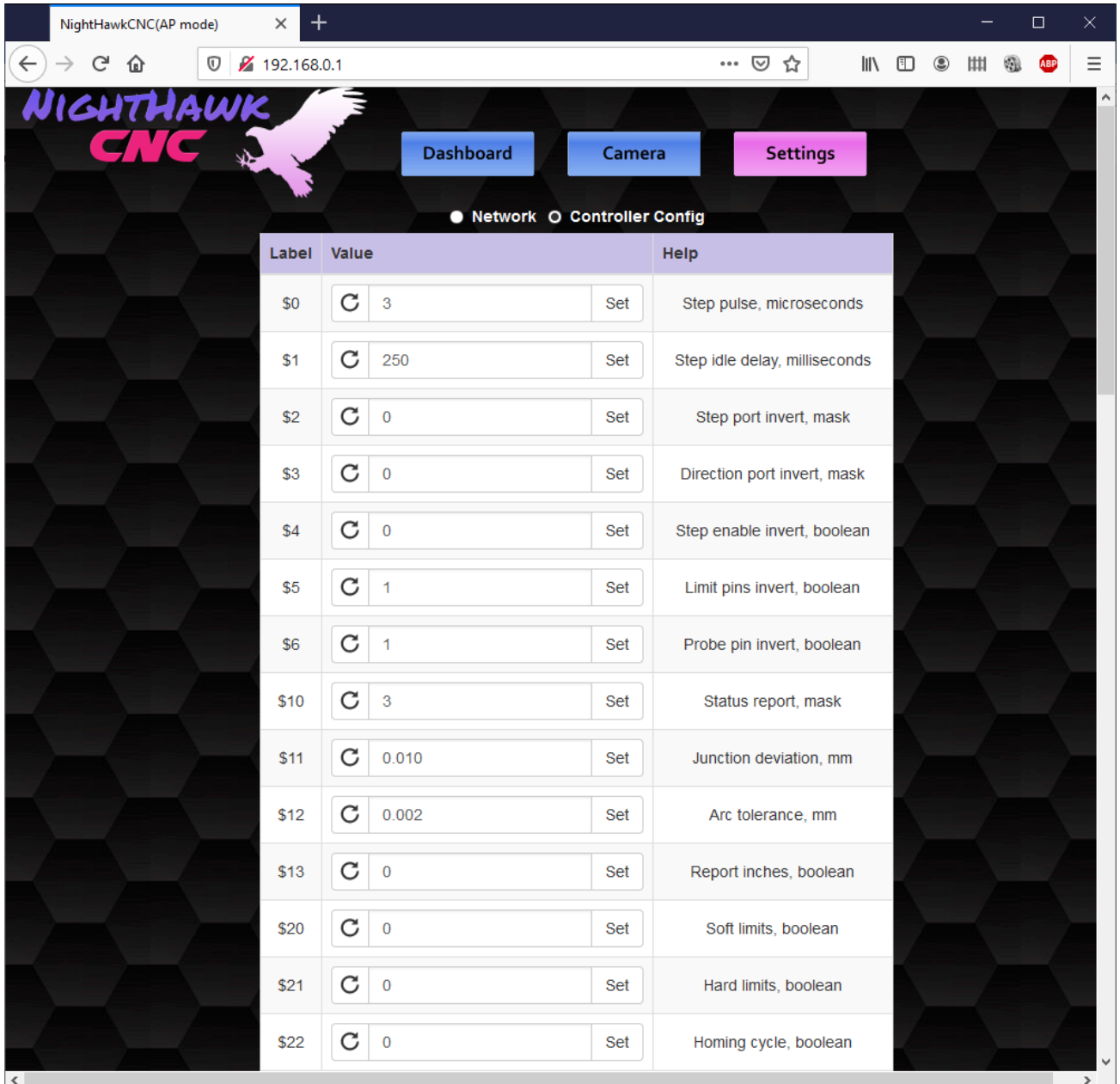
Note: If you have already set up your Scribe through our Commander software, do not change any of these settings.

Network settings
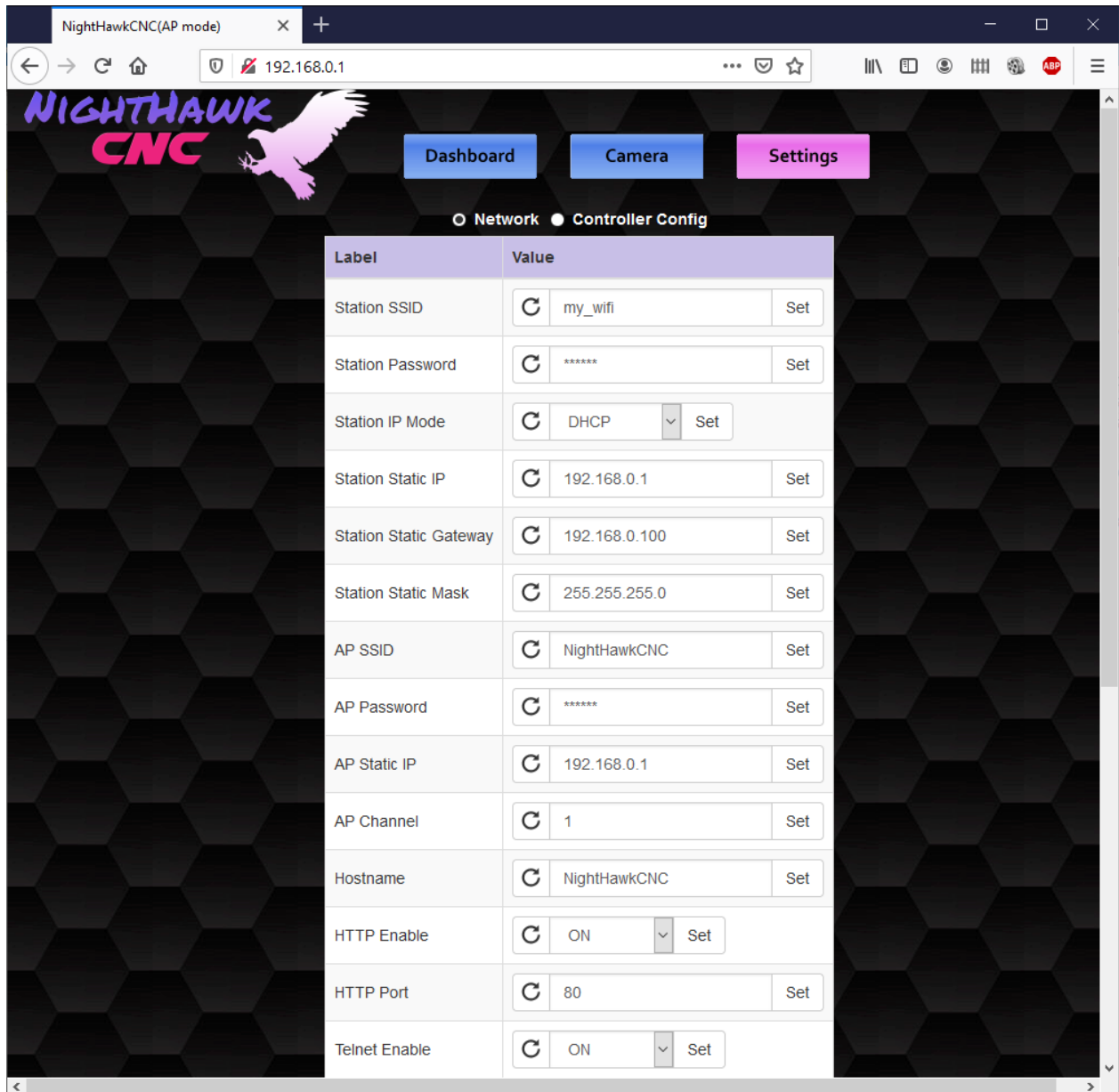
CNC Settings

Do not change these setting unless you are certain that you must! Setting these to the wrong values can cause your machine to behave unexpectedly or crash!

Need help?

Reach out to our friendly Support team.

Phone: +617 5522 0619 (9am-5pm AEST)

Email: solutions@cnc3d.com.au

Website: https://www.cnc3d.com.au/contact-us OR via our Chat.

Facebook: https://www.facebook.com/cnc3dau

Our FB Community: https://www.facebook.com/groups/cnc3dplayground

We are always looking for feedback! If you have any suggestions regarding how we can re-word our manuals or support pages to make them easier to understand please let us know using the links above!