



# CNC Controller Quick Start Guide

Following this quick start guide should get you up and running. Refer to the Buildbotics Controller Manual for more complete descriptions.

## Things you need



Buildbotics CNC Controller



Alternatively use a power adapter with a matching plug. The Meanwell GST280A24-C6P is an excellent choice.



Stepper motors (NEMA 23 or smaller)



Buildbotics premade motor cables



4 wire connectors for each motor. (16-22 AWG wire nuts work fine). You may want to solder final connections.



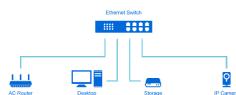
DC power supply that supplies between 12 and 36 Volts and a Buildbotics premade power supply cable.



USB gamepad (if you plan to do local jogging)



Ethernet cable



Ethernet local area network



A Computer on the same local network with a web browser installed.



Manual or datasheet for your stepper motor.



## Connections



### Connect motors

Refer to the motor manual or datasheet to identify the A+, A-, B+, and B- coil wires. Attach the motors to the Buildbotics premade cables using the following table.

Motor wire	Premade cable wire color
A+	Red
A-	Black
B+	Yellow
B-	Purple

### Attach network cable

Plug the Ethernet network cable into the RJ-45, "ENet" connector on the back of the controller. Plug the other end into a jack on the local area network.

### Connect gamepad (optional)

Plug the USB gamepad into a "USB" port on the back of the controller.

### Connect power supply

With the power supply unplugged, attach the red wires on the premade power cable to the V+ connections on the power supply and attach the black wires to V-. Plug the power cable into the power connector, "12-36VDC", on the back of the controller. Alternatively, if you have a power adapter with a compatible connector (e.g. Meanwell GST280A-C6P), just plug it directly into the power connector.



## Turn on “Enable” switch

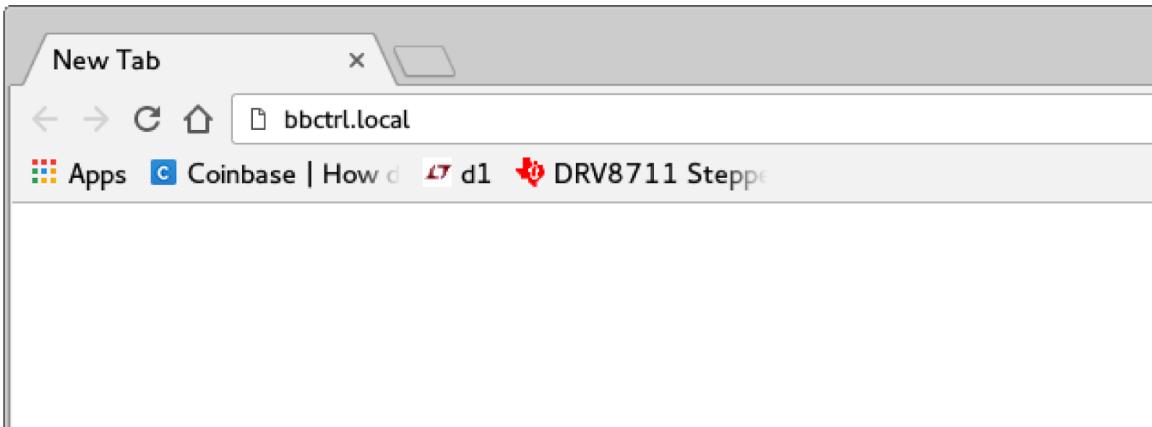
Plug in the power supply and turn on the “**Enable**” switch. The controller LCD screen will illuminate. When “**Ready**” appears in the upper left corner, it is ready to operate.

## Jog motors (if gamepad attached)

Use the joysticks on the gamepad to move the motors.

## Connect via web browser

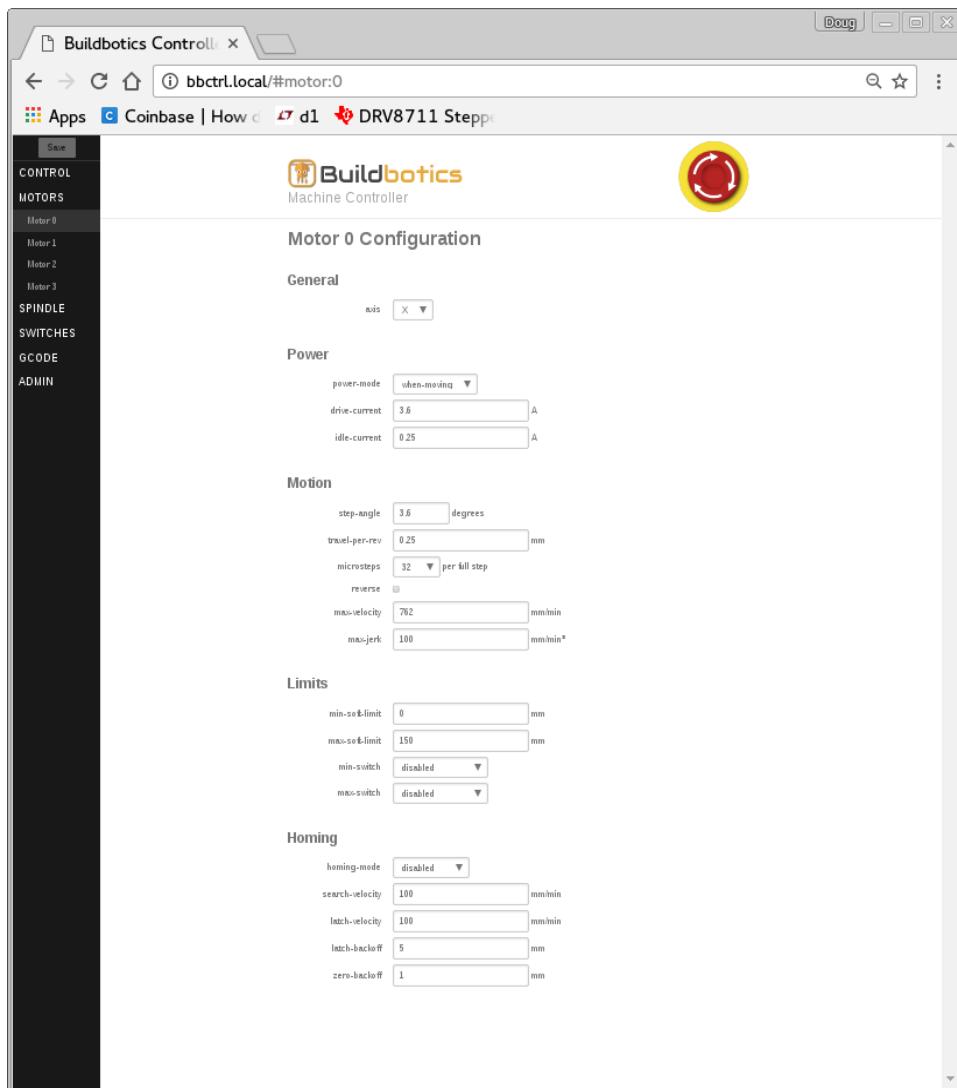
Open a browser on a computer that is connected to the same local network as the controller. Then, enter “**bbctrl.local**” in the address bar.





## Configure motors

Access the configuration screen by selecting the motor label in the left panel of the web page. Motor 0 is associated with the port labeled “X” on the back of the controller. Motor 1 is labeled “Y”, motor 2 is labeled “Z”, and motor 3 is labeled “A”.



Do the following things at the configuration screen for each motor port:

- Assign the axis to the motor
- Set the “**drive-current**” to the full load current found in the motor manual.
- Set the “**idle-current**” to approximately 20% of that value.
- Set the “**step-angle**” to the value found in the motor manual.

The remaining values can be set and adjusted based on experimentation with your machine.



## Gamepad

A gamepad can be used to control movement on the X, Y, Z, and A axes and to scroll through screens on the controller. The gamepad attaches to the Buildbotics CNC Controller via any of the four USB ports on the back panel. Once attached, the gamepad can be used to move the CNC head in any direction at various speeds.

While many gamepads can work, Buildbotics has tested the Logitech F310.

### Gamepad Controls

The following image shows the control positions on the Logitech F310 gamepad. The exact position of other gamepads will differ.





The following table describes the actions that can be achieved using the gamepad.

Movement	Buttons	Comments
Simultaneous X and Y movement	<b>X/Y stick</b>	Causes the CNC head will move in the direction that the X/Y stick is moved.
X movement only	<b>X/Y stick</b> and <b>Horizontal Lock</b> simultaneously	Restricts movement to X-axis only
Y movement only	<b>X/Y stick</b> and <b>Vertical Lock</b> simultaneously	Restricts movement to Y-axis only
Simultaneous A and Z movement	<b>Z/A stick</b>	Causes up and down and rotational movement.
Z movement only	<b>Z/A stick</b> and <b>Vertical Lock</b> simultaneously	Causes up and down movement only.
A movement only	<b>Z/A stick</b> and <b>Horizontal Lock</b> simultaneously	Causes rotational movement only.
Very slow speed	<b>Speed 1</b>	Set movement speed to 1/128 <sup>th</sup> of full speed.
Slow speed	<b>Speed 2</b>	Set movement speed to 1/32 <sup>nd</sup> of full speed.
Medium speed	<b>Speed 3</b>	Set movement speed to 1/4 <sup>th</sup> of full speed.
Full speed	<b>Speed 4</b>	Set movement speed to full speed.
Scroll to next LCD display	Press right side of <b>Screen selector</b>	Moves to the next LCD display (Initial Display, Status Display, or Network Display)
Scroll to previous LCD display	Press left side of <b>Screen selector</b>	Moves to the previous LCD display (Initial Display, Status Display, or Network Display)

Note - There is a small switch on the back of the F310 gamepad that is labeled "X" and "D". It must be switched to the "X" position.



## Run test program

Select “Control” from the left panel on the web page to open the Control screen. Then, use the “Auto” tab to upload new G-Code programs, select or delete existing programs. The G-Code program that is loaded into the “Auto” tab will be executed when the “Play” button is clicked.

