Starting with Mach 4

and ICNC 2.X

Before you begin, it's crucial to note that any Mach 4 build prior to version 5103 is not compatible with Soprolec Products, and ICNC2 cards need firmware version V5.38 CNC or later.

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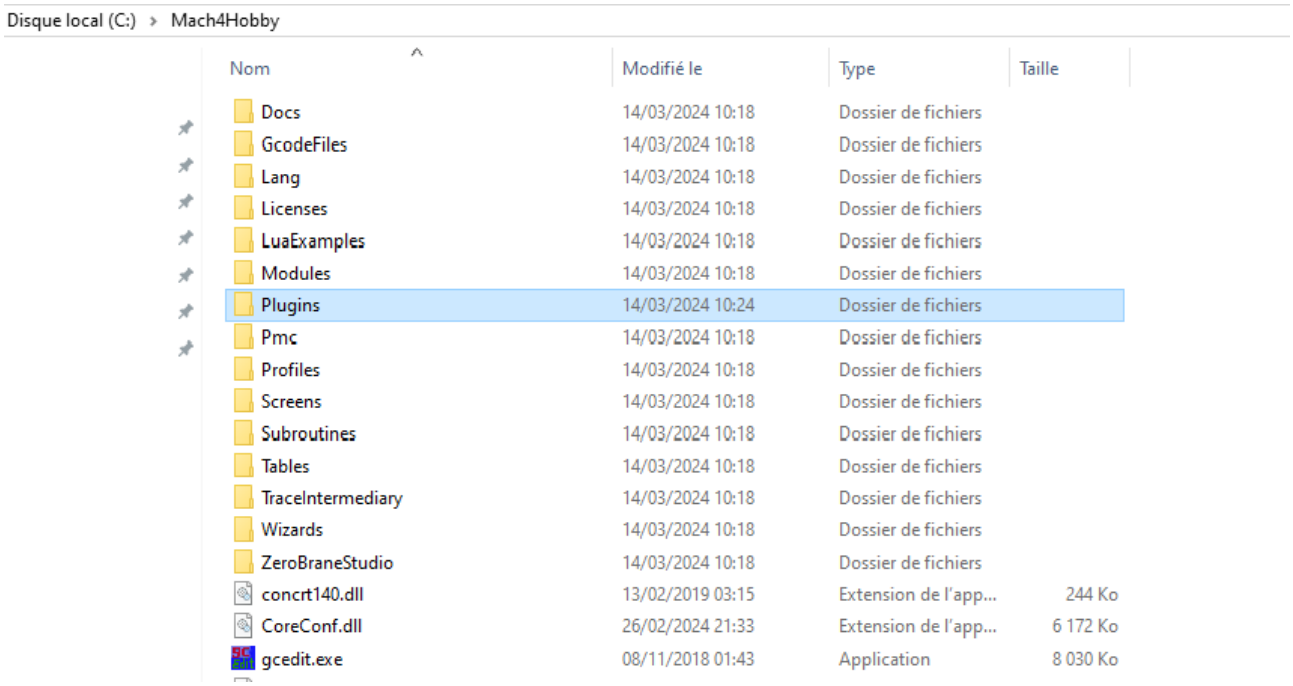
I – Plugin Setup

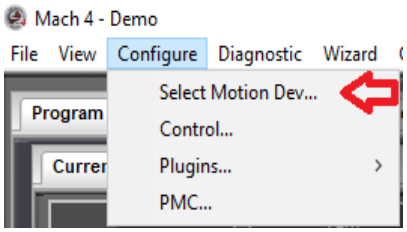
1 - Copy the following files:

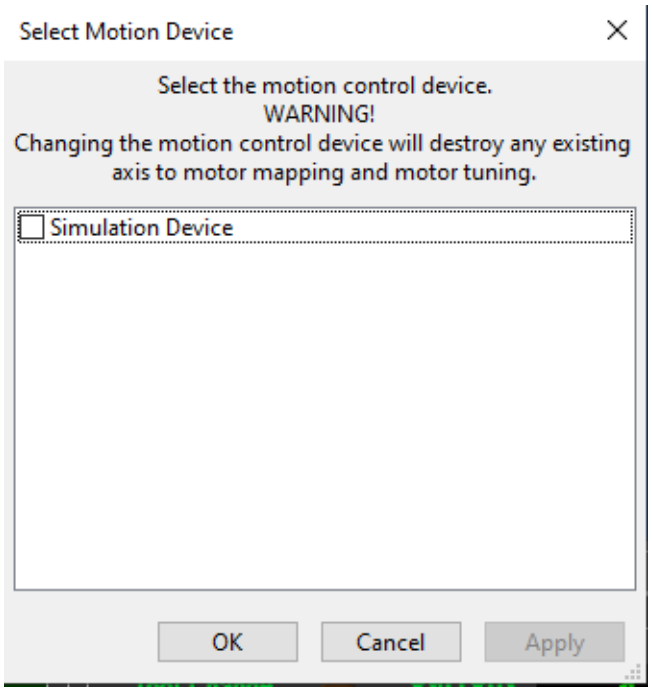
ICNC2Plugin4.m4pw, ICNC2_VS.dll, and ICNC2Plugin4.sig to the Mach 4 installation directory. Typically, Mach 4 is installed on the local disk C in a folder named 'Mach4Hobby' or 'Mach4Industrial.' You'll then paste these files into the 'plugins' folder within the Mach 4 directory.



2 - Uncheck the simulator device :

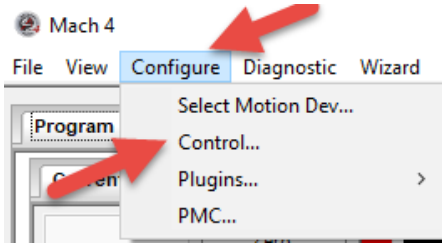
Navigate to Menu -> Configure -> Select Motion Dev, then deselect the simulation device to prepare for adding our motion controller in the next step.

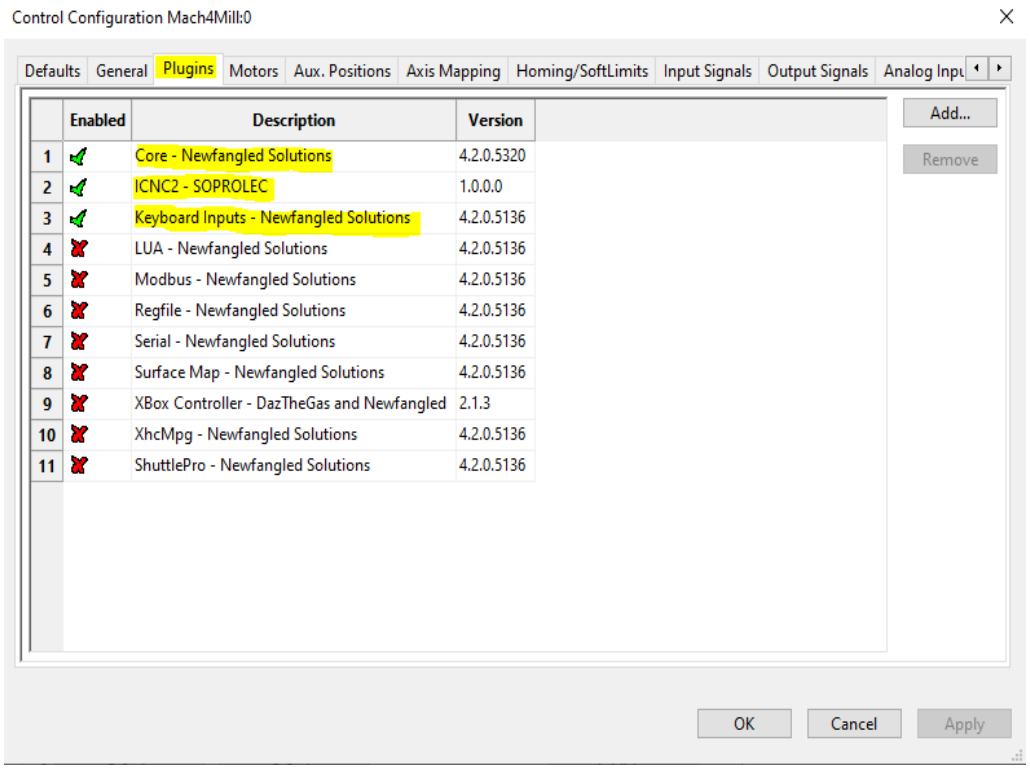




3 - Enable the Soprolec - ICNC2 Plugin:

- Navigate to Menu -> Configure -> Control -> Plugins tab.
- Ensure that the “Soprolec - ICNC2” plugin is enabled with a green checkmark. If not, click on it to enable it. Remember, you'll need to restart Mach4 if you've made changes to enable it.
- Additionally, enable the following plugins:
    - Keyboard Inputs (allows keyboard jogging)
    - Core – Newfangled Solutions



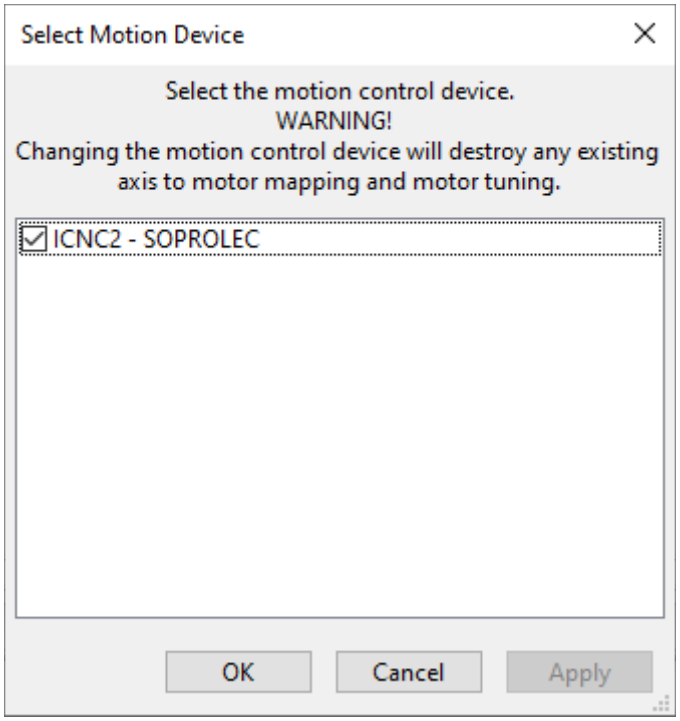


	Enabled	Description	Version
1	✓	Core - Newfangled Solutions	4.2.0.5320
2	✓	ICNC2 - SOPROLEC	1.0.0.0
3	✓	Keyboard Inputs - Newfangled Solutions	4.2.0.5136
4	✗	LUA - Newfangled Solutions	4.2.0.5136
5	✗	Modbus - Newfangled Solutions	4.2.0.5136
6	✗	Regfile - Newfangled Solutions	4.2.0.5136
7	✗	Serial - Newfangled Solutions	4.2.0.5136
8	✗	Surface Map - Newfangled Solutions	4.2.0.5136
9	✗	XBox Controller - DazTheGas and Newfangled	2.1.3
10	✗	XhcMpg - Newfangled Solutions	4.2.0.5136
11	✗	ShuttlePro - Newfangled Solutions	4.2.0.5136

4 - Selecting the motion controller:

After restarting Mach 4, follow these steps:

-Go to Menu -> Configure -> Select Motion Dev.
-Check ICNC2-SOPROLEC from the list of available motion controllers.
-Press "OK" to confirm your selection.



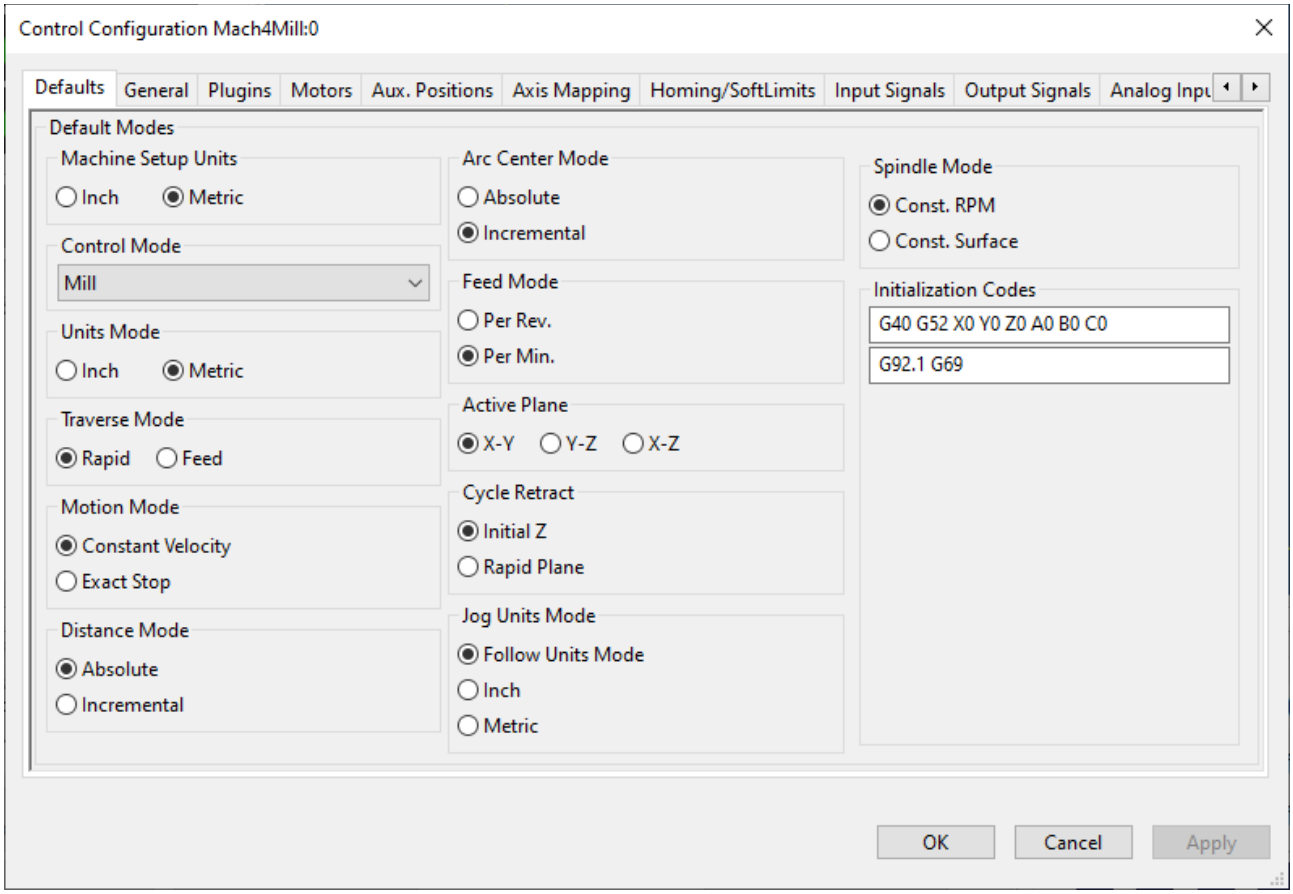
After this step, Mach 4 will be communicating with your ICNC2.X. You can verify this by checking the history button located at the lower left corner of the screen to visualize the received messages.

II – Configuration Example

The following steps outline the configuration process for your milling machine: we will configure our machine as a 3-axis milling machine with 3 homing sensors (NC), one for each axis. This machine does not have max limit sensors, so we will configure software soft limits and manage the emergency stop .

1 - Defaults:

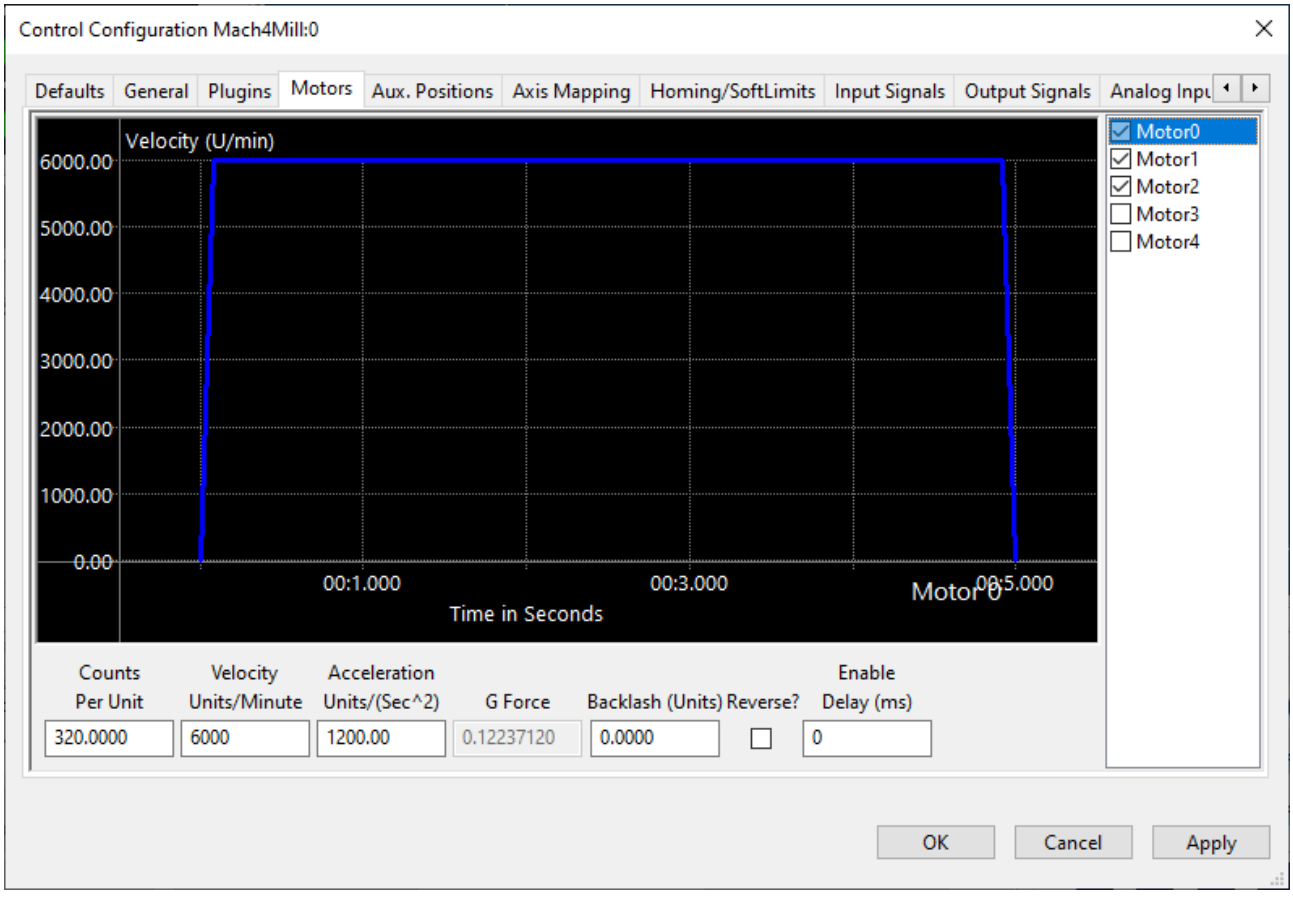
As you can observe, the units have been configured in the metric system (mm).



2 - Motors:

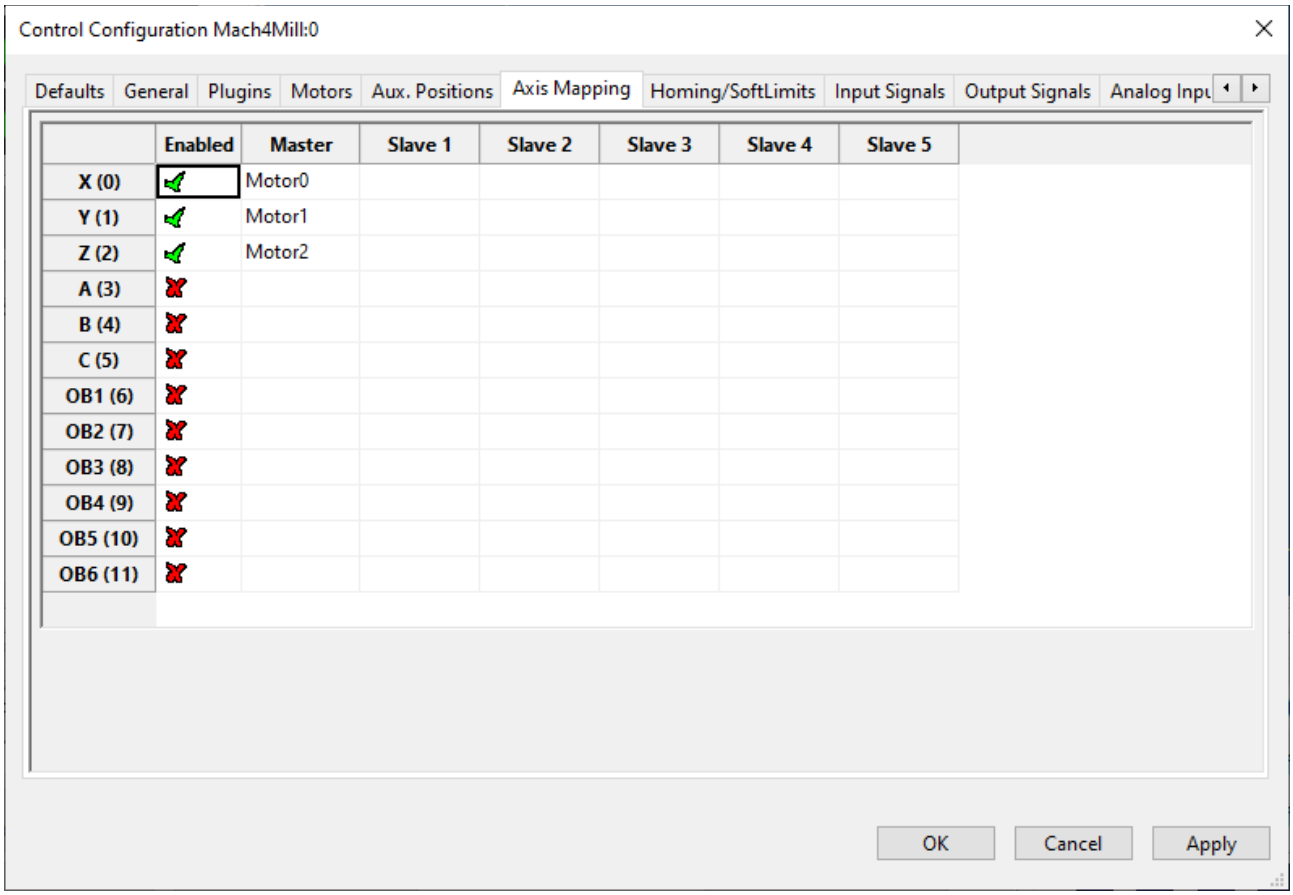
In this section, we will configure the motors. It's crucial to differentiate each motor from its corresponding axis. For instance, while a motor can only be configured for one axis, an axis can accommodate multiple motors.

First, we need to identify and check the first three motors since we are configuring a 3-axis machine. Then, for each motor, proceed to configuration. Begin by setting the counts per unit. Since we've configured the system in the metric system, this corresponds to pulses per mm. In my case, it's 320 because my drivers are set to 1600 pulses per rotation, and the screw has a pitch of 5mm per step, resulting in 1600/5 = 320 pulses per mm. Next, specify the velocity and acceleration parameters. Repeat this process for all three axes.



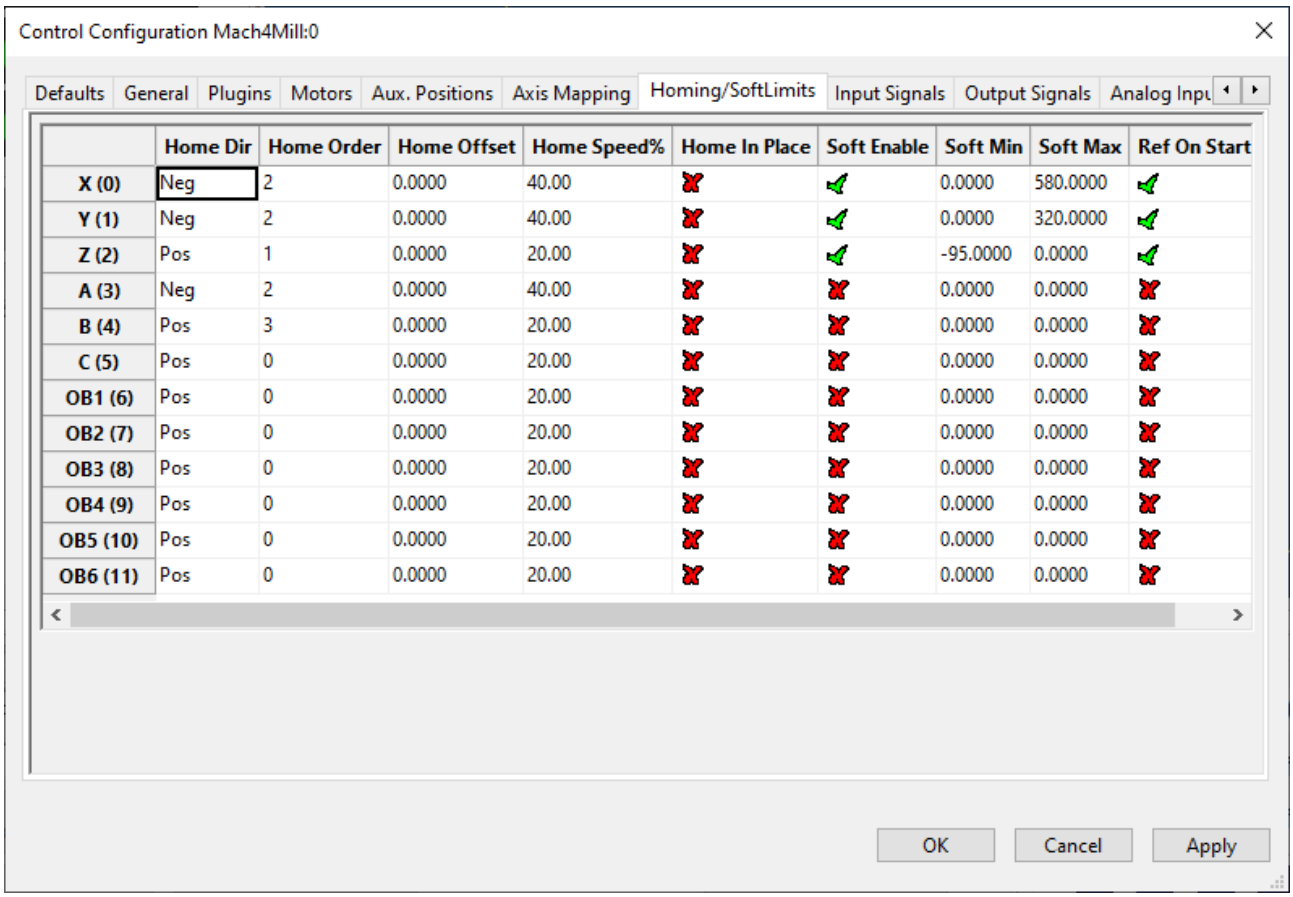
3 - Axis Mapping:

In this section, we will enable the axes and assign motors to them. (Don't forget, after completing this step, return to the Motors tab and reverse the motor assignment for the Z-axis if applicable.)



4 - Homing/Soft Limits :

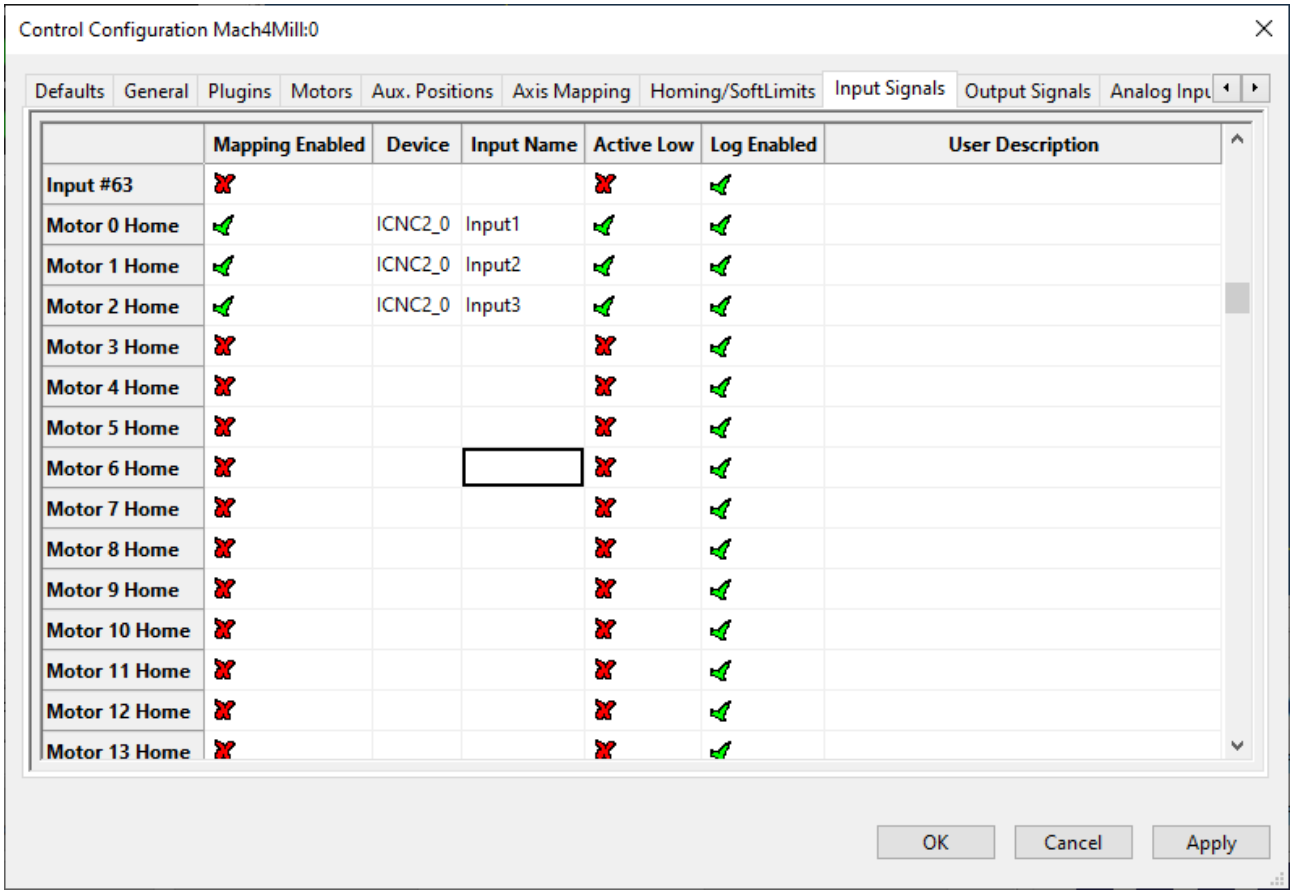
On this tab, it is essential to adjust your machine dimensions under the parameter soft limits, both plus and minus. Additionally, you can customize the homing direction for each axis and arrange the order of homing for your axes.



	Home Dir	Home Order	Home Offset	Home Speed%	Home In Place	Soft Enable	Soft Min	Soft Max	Ref On Start
X (0)	Neg	2	0.0000	40.00	✗	✓	0.0000	580.0000	✓
Y (1)	Neg	2	0.0000	40.00	✗	✓	0.0000	320.0000	✓
Z (2)	Pos	1	0.0000	20.00	✗	✓	-95.0000	0.0000	✓
A (3)	Neg	2	0.0000	40.00	✗	✗	0.0000	0.0000	✗
B (4)	Pos	3	0.0000	20.00	✗	✗	0.0000	0.0000	✗
C (5)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗
OB1 (6)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗
OB2 (7)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗
OB3 (8)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗
OB4 (9)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗
OB5 (10)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗
OB6 (11)	Pos	0	0.0000	20.00	✗	✗	0.0000	0.0000	✗

5 - Input Signals :

Among the crucial inputs in our setup are the three homing sensors and our emergency stop (e-stop) input. The e-stop input is a simulated input generated by our plugin, mirroring the Enable state of your ICNC2.X. This input operates as an active high input.



6 - Output Signals :

In our example, we will configure one enable output for our drivers and another for our spindle.

III - Restriction of our plugin

1 - Probe :

-Only the input probe, designated as G31, should be used with our plugin. Probe Inputs labeled as probe 1, 2, or 3 are not compatible. Specifically, using G31,1 or G31,2 will yield the same result as G31 alone, focusing solely on the input probe.

-The Gcode line featuring G31 for probing can only specify one axis at a time. If multiple axes are mentioned, only the axis associated with the lowest motor number will be probed.

-Probing is only effective on axes that are not linked to slave axes. If a linked axis is probed, it will result in an error message, and the probing action will not take effect.

2 - Homing :

-If your homing input is not assigned, the homing process will not take effect. If you initiate homing for an axis that has a slave axis, both homings will be launched simultaneously.