GENERAL DESCRIPTION

FIPBB02 is a simple , cheap , buffered nonisolated parallel breakout board . It supports four output control signal groups to drive up to four axis CNC machine. Each signal group supports three control signals (Enable , Direction and Clock) . Two output relays could be enabled via DIP switch for additional spindle control. FIPBB02 also supports five dry contact inputs for travel limit switches.

FIPBB02 features

- Four output control signal groups. labeled X-axis, Y-axis, Z-axis, A-Axis.
- Ena , Dir , Clk control signals are available. For pin assignment and address show table1.
- LED indicator for each output signal.
- Two output relays 5V coil / 3A contacts (resistive load).
- LED indicator for each output relay.
- Five external inputs (dry contact).
- LED indicator for each input status.
- All outputs and inputs are brought out via pin header and screw clamp connector for flexibility.
- Wide power supply range 12DCV to 48DCV.
- Dimension: 180 x 70 x 18 mm.

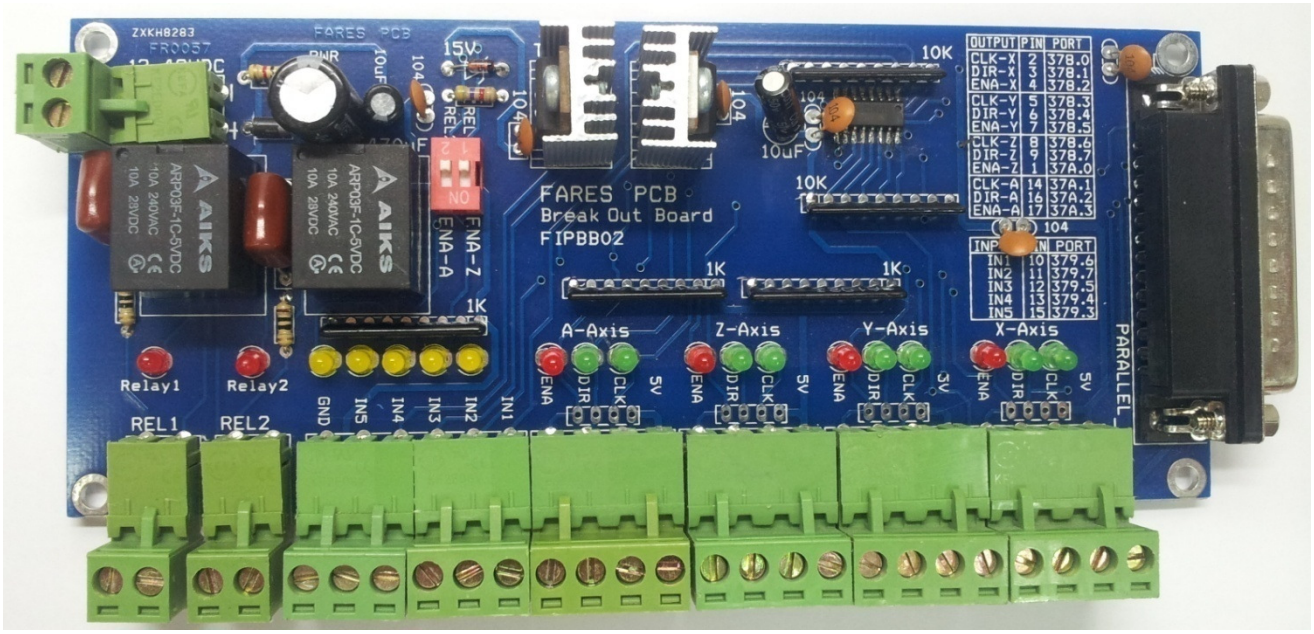
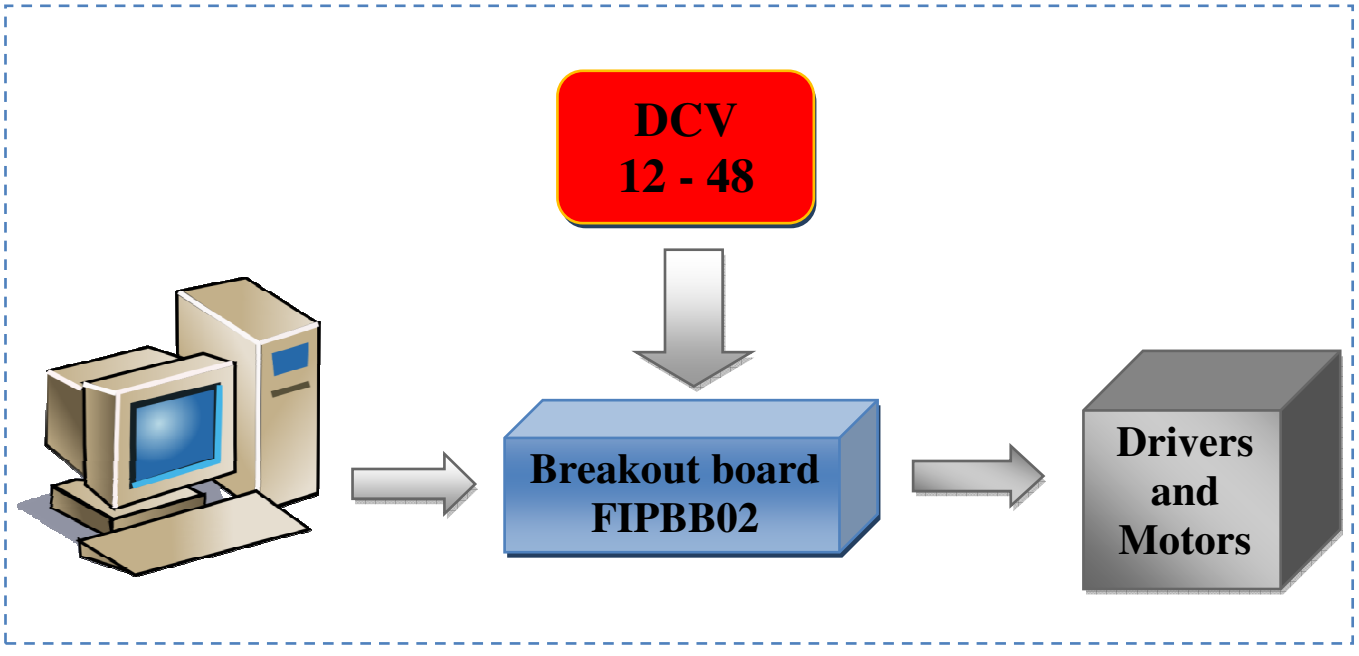


Table1 shows each output and input port, its pin number on DB25 socket and its function. Use this table to configure the software that interface FIPBB02 card.

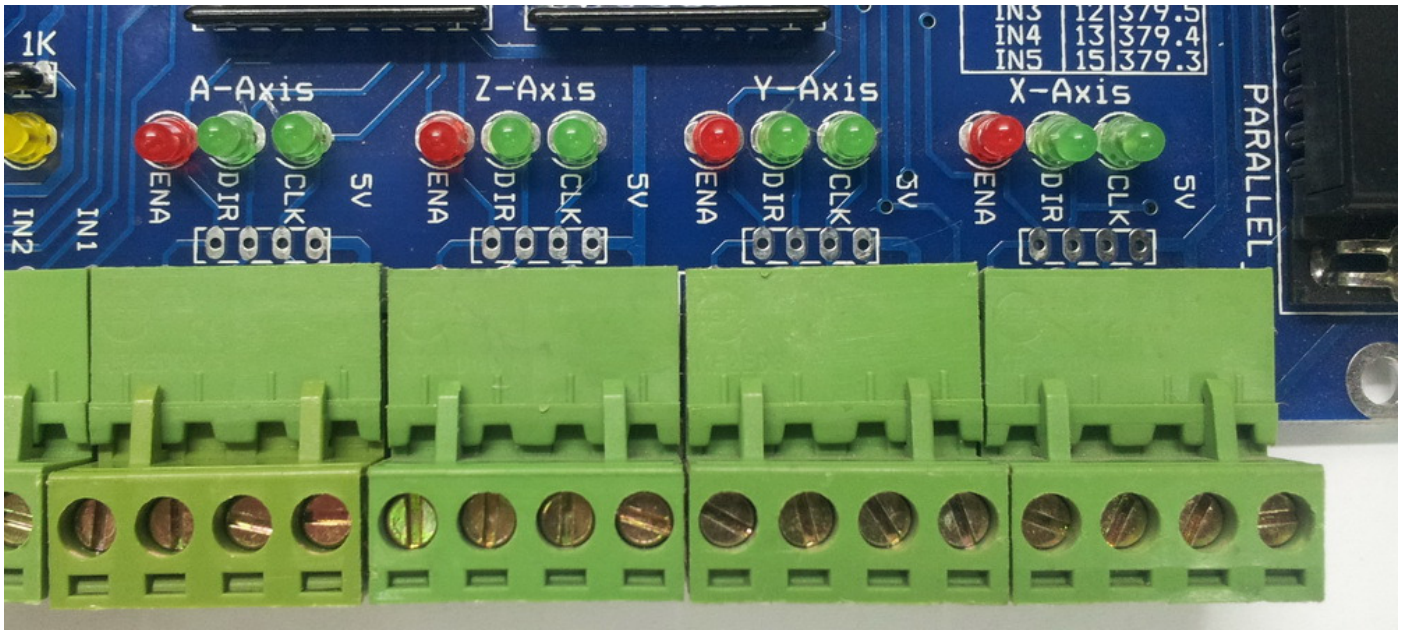
Table1.Input and output ports

Port #	Pin#	Function	Direction
378.0	2	CLK_X	Output
378.1	3	DIR_X	Output
378.2	4	ENA_X	Output
378.3	5	CLK_Y	Output
378.4	6	DIR_Y	Output
378.5	7	ENA_Y	Output
378.6	8	CLK_Z	Output
378.7	9	DIR_Z	Output
37A.0	1	ENA_Z	Output
37A.1	14	CLK_A	Output
37A.2	16	DIR_A	Output
37A.3	17	ENA_A	Output
379.3	15	IN5	Input
379.4	13	IN4	Input
379.5	12	IN3	Input
379.6	10	IN1	Input
379.7	11	IN2	Input

System Overview

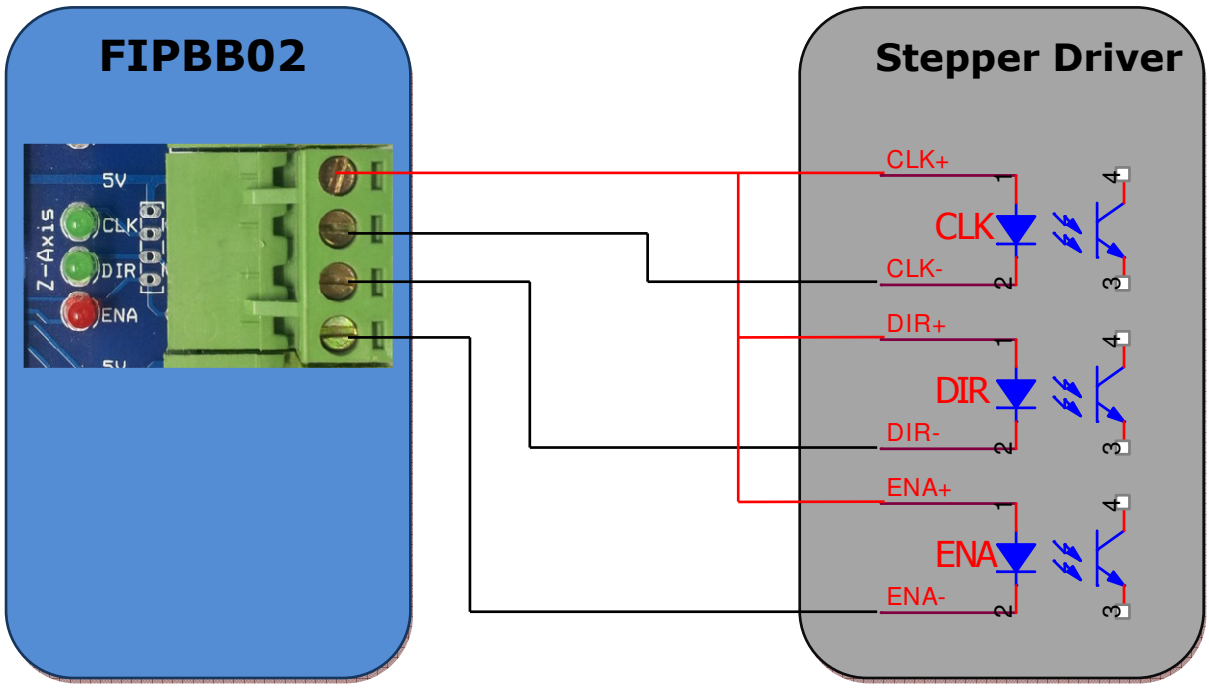


Output connections



How to connect control signals?

1. Connect "5V" output power from FIPBB02 card to all positive inputs of stepper driver.
2. Connect output "CLK" to negative input of "Pulse", "step" or "clock" labeled input in stepper driver.
3. Connect output "DIR" in FIPBB02 to Direction input in stepper driver.
   here's an example of Z-Axix conneting



Z-Axis connection

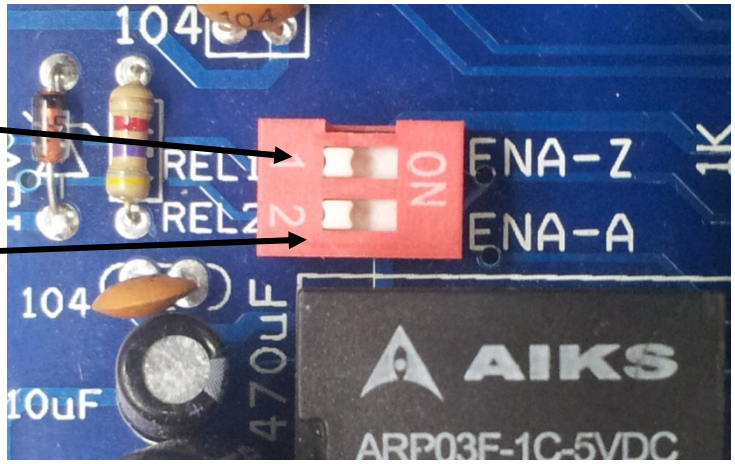
How to connect spindle and coolant fan?

Two optional relays embedded in FIPBB02 to drive Spindle and Fan. The control signals that drive relay1 and relay2 are multiplexed with the outputs ENA-Z and ENA-A respectively. Follow the next steps to enable the output relays and spindle/fan connecting

1. Enable the two output relays by setting DIP switch as seen in figure 5.

To enable Relay1 set SW1 to "ON" state.

To enable Relay2 set SW2 to "ON" state.



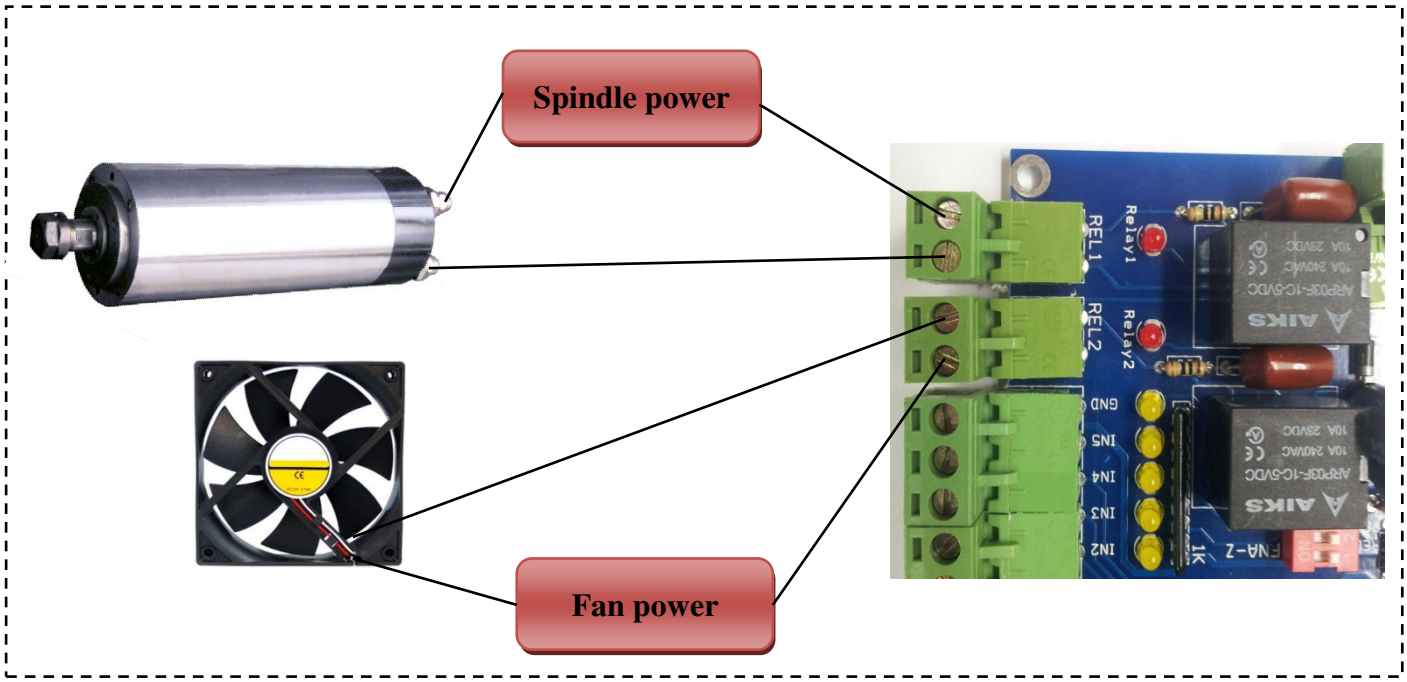
Note: If relay1 is enabled then ENA-Z control signal can't be assigned as stepper driver enable signal for Z axis. If relay2 is enabled then ENA-A control signal can't be assigned as stepper driver enable signal for A axis.

2. Set the output Pin1 and/or Pin17 as control signals for Spindle and fan in software program using the next table

SW1	Function
OFF	PIN1(37A.0) is dedicated for ENA-Z
ON	PIN1(37A.0) is dedicated for Relay1 (Spindle Or Fan)

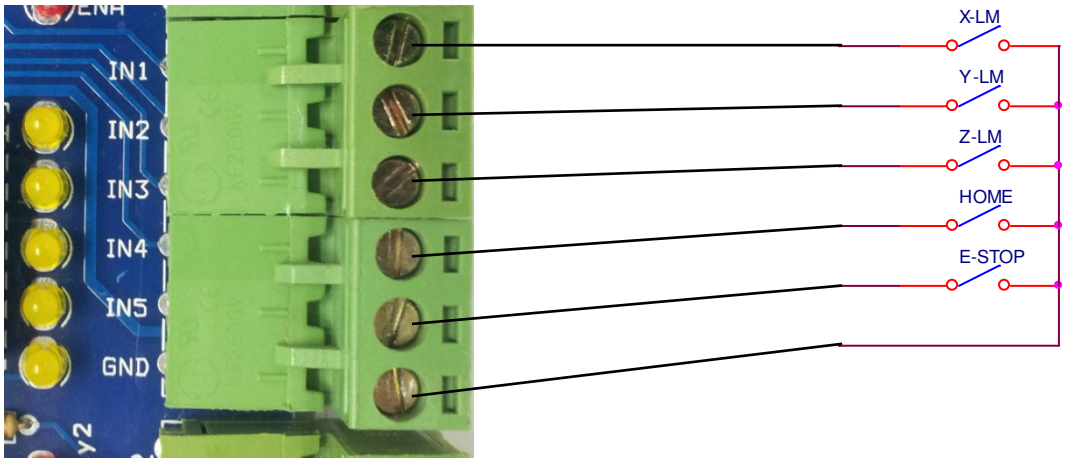
SW2	Function
OFF	PIN17(37A.3) is dedicated for ENA-A
ON	PIN17(37A.3) is dedicated for Relay2 (Spindle Or Fan)

3. The output is dry contact and rated for 3A max. So if the load needs more current use external relay or contactor.



How to connect input limit switches?

1. Connect one terminal of each switch to an input on FIPBB02.
2. Collect all other terminals of limit switches and connect them to "COM" output terminal on FIPBB02.



Connection of standard limit switches

How to Install

1- Hardware installation

- Connect one end of the USB cable to the USB connector on the board, and the other end of the USB cable to a USB port on the PC.
- Connect on end (female) of the parallel cable to the parallel socket (DB25 male) on the board, and the other end (male) of the parallel cable to the parallel socket (DB25 female) on the PC.

2 – Software installation

- Insert the CD-ROM into your PC's CD-ROM drive.
- Install the demo test program (LPTTest Program).
- Work under XP operating system only.

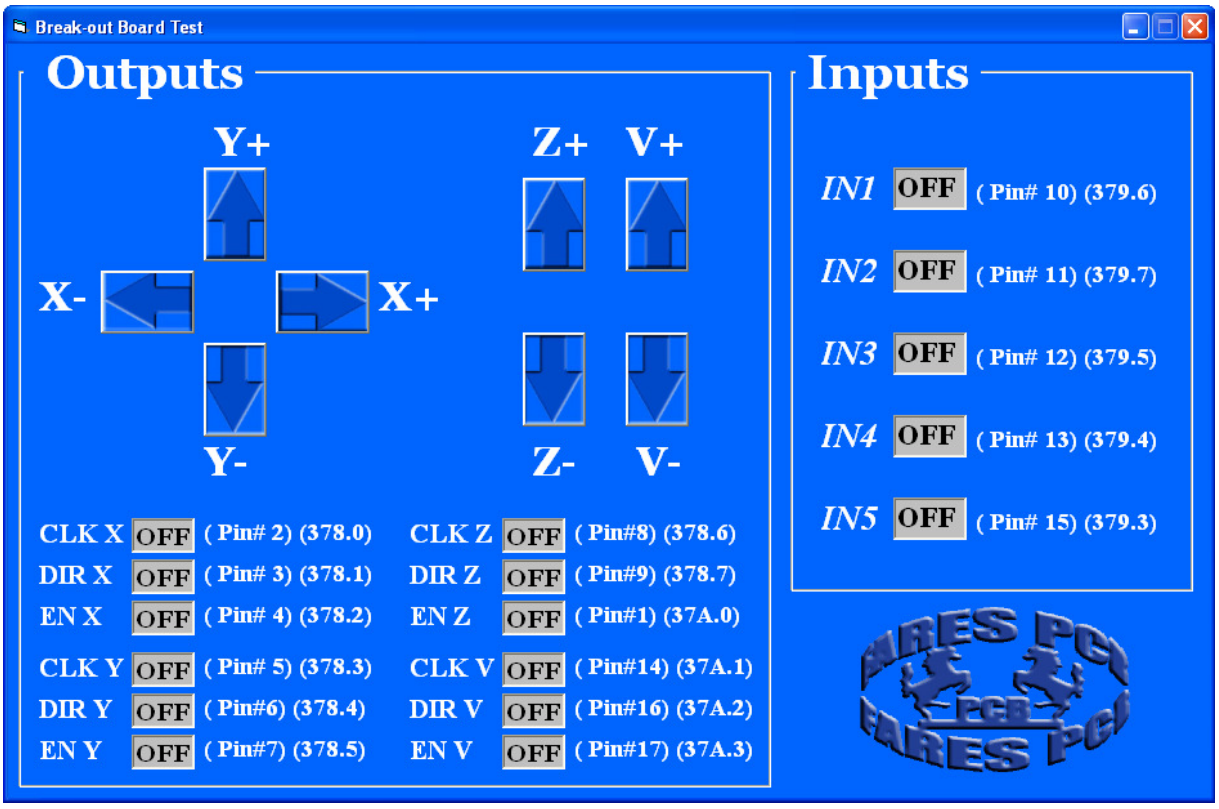
System Requirements

- One available LPT port.
- 64Mb RAM and 20MB free HD space.
-

Card Test

1 – Run the demo test program from Start → All Programs → BBTest → FIPBB01. The main window of the software will be opened as shown in figure2.

FIPBB01 test program window



2 – To test motor **X** click the associated buttons for X axis (up button labeled (X+) and down button labeled (X-)).

When up button is Pressed

1 – Green LED labeled **ENA** is turned on.

2 – Yellow LED labeled DIR is turned on.

3 – Red LED labeled CLK is flicked.

When down button is pressed

1 – Green LED labeled **ENA** is turned on.

2 – Yellow LED labeled DIR is turned off.

3 – Red LED labeled CLK is flicked.
The activated outputs also are highlighted on main window.

3 – To test motor **Y** click the associated buttons for Y axis (right button labeled (Y+) and left button labeled (Y-)).
When right button is pressed
1 – Green LED labeled **ENA** is turned on.
2 – Yellow LED labeled DIR is turned on.
3 – Red LED labeled CLK is flicked.
When left button is pressed
1 – Green LED labeled **ENA** is turned on.
2 – Yellow LED labeled DIR is turned off.
3 – Red LED labeled CLK is flicked.
The activated outputs also are highlighted on main window.

4 – To test motor **Z** click the associated buttons for Z axis (up button labeled (Z+) and down button labeled (Z-)).
When up button is Pressed
1 – Green LED labeled **ENA** is turned on.
2 – Yellow LED labeled DIR is turned on.
3 – Red LED labeled CLK is flicked.
When down button is pressed
1 – Green LED labeled **ENA** is turned on.
2 – Yellow LED labeled DIR is turned off.
3 – Red LED labeled CLK is flicked.
The activated outputs also are highlighted on main window.

5 – To test motor **A** click the associated buttons for V axis (up button labeled (V+) and down button labeled (V-)).
When up button is Pressed
1 – Green LED labeled **ENA** is turned on.
2 – Yellow LED labeled DIR is turned on.
3 – Red LED labeled CLK is flicked.
When down button is pressed
1 – Green LED labeled **ENA** is turned on.
2 – Yellow LED labeled DIR is turned off.
3 – Red LED labeled CLK is flicked.
The activated outputs also are highlighted on main window.

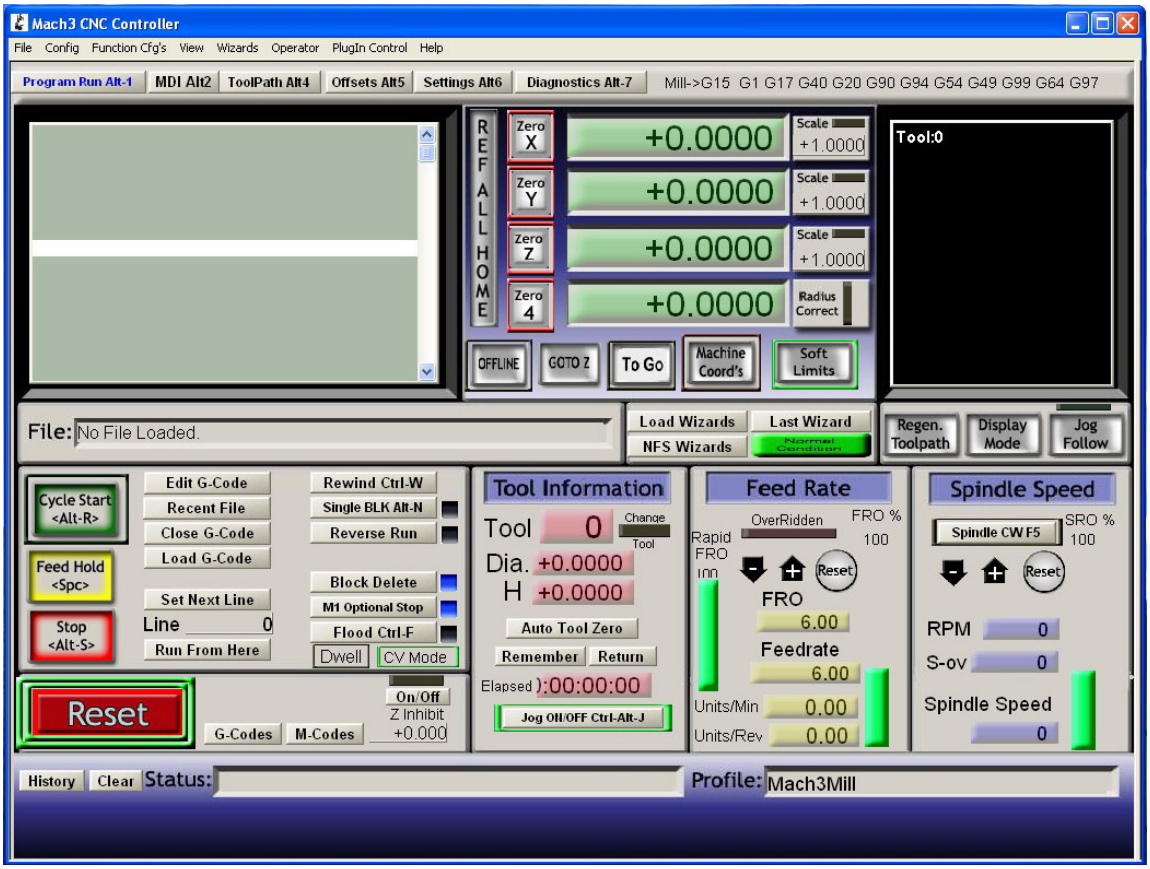
6 – To test the input just apply the input and the state of inputs will be updated continuously every 100 msec.
The activated inputs appear as highlighted boxes labeled (ON), and the inactivated inputs appear as dimmed boxes labeled (OFF).

Note

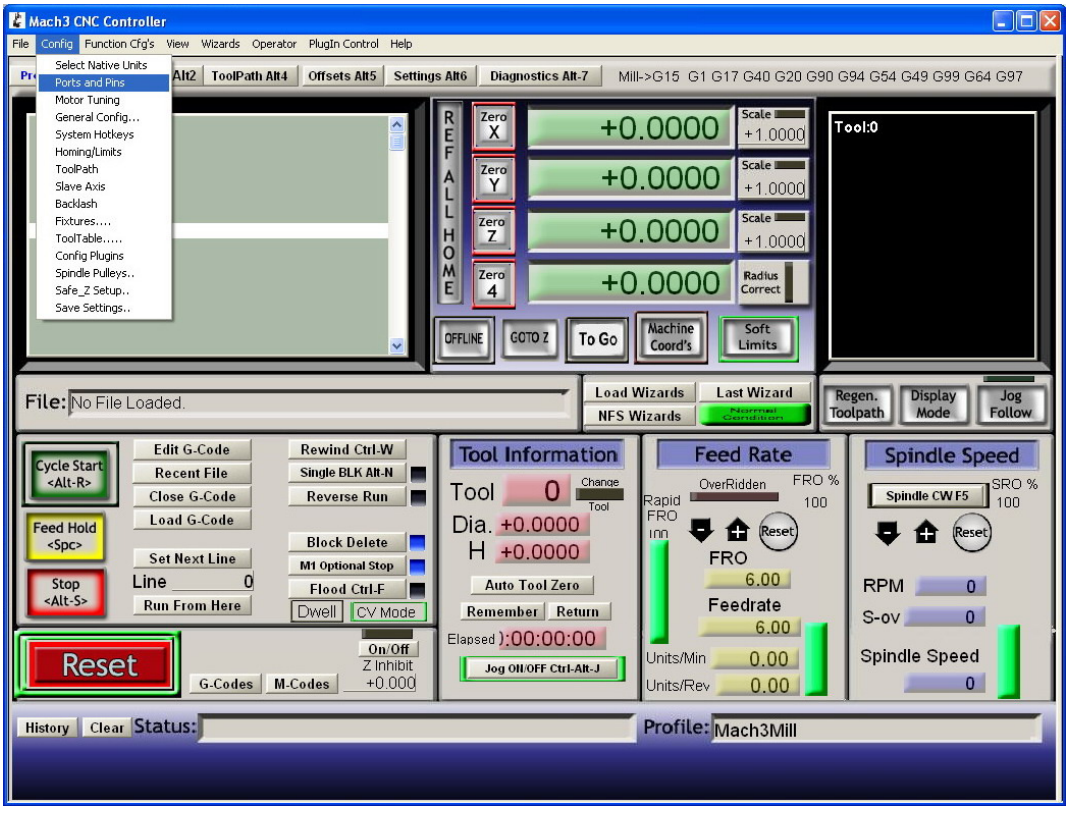
1 - All inputs are active low. I.e. to active an input apply ground (**GND**) to it.
2 – The status of input LED is opposite to the input state. I.e. if the input is activated (connected to ground), then the LED is turned off and vice versa.

To test FEPBB01 on Mach3Mill software, follow the next configurations

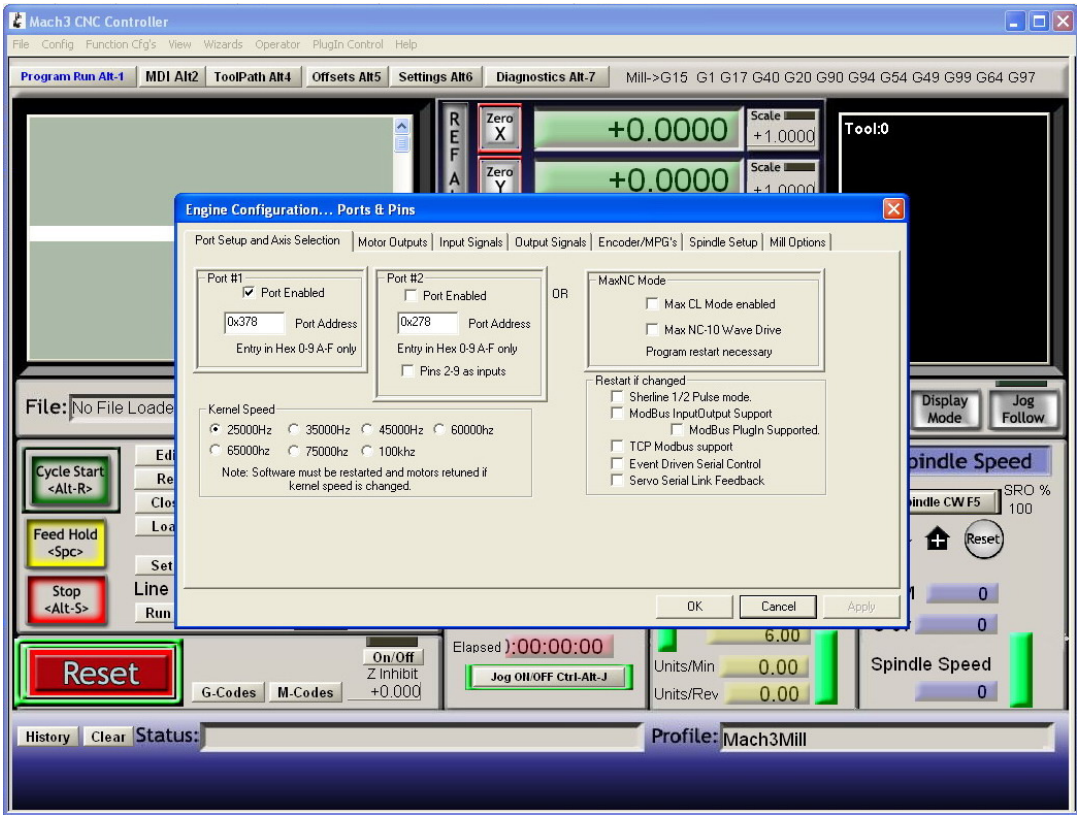
1 – Setup the **Mach3** program and open **Mach3Mill**. The following screen will appear



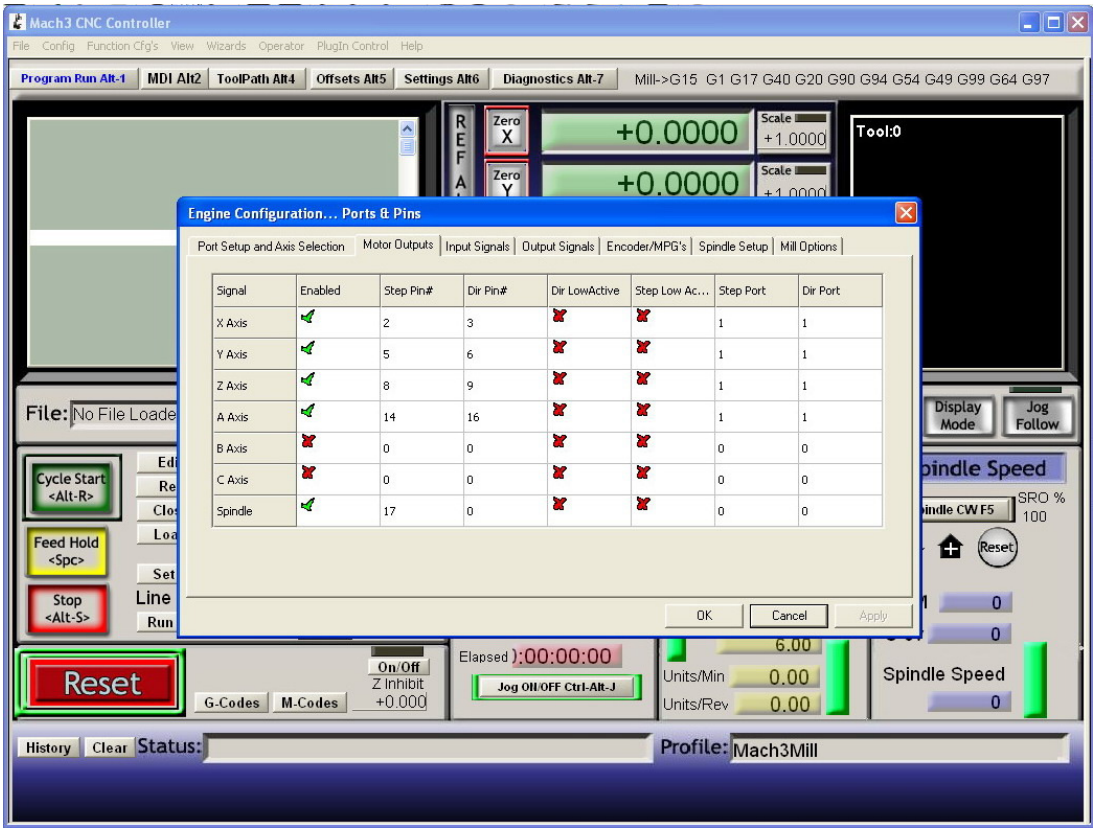
2 – To configure output ports open **(Config)** – **(Ports and Pins)**, as shown in figure



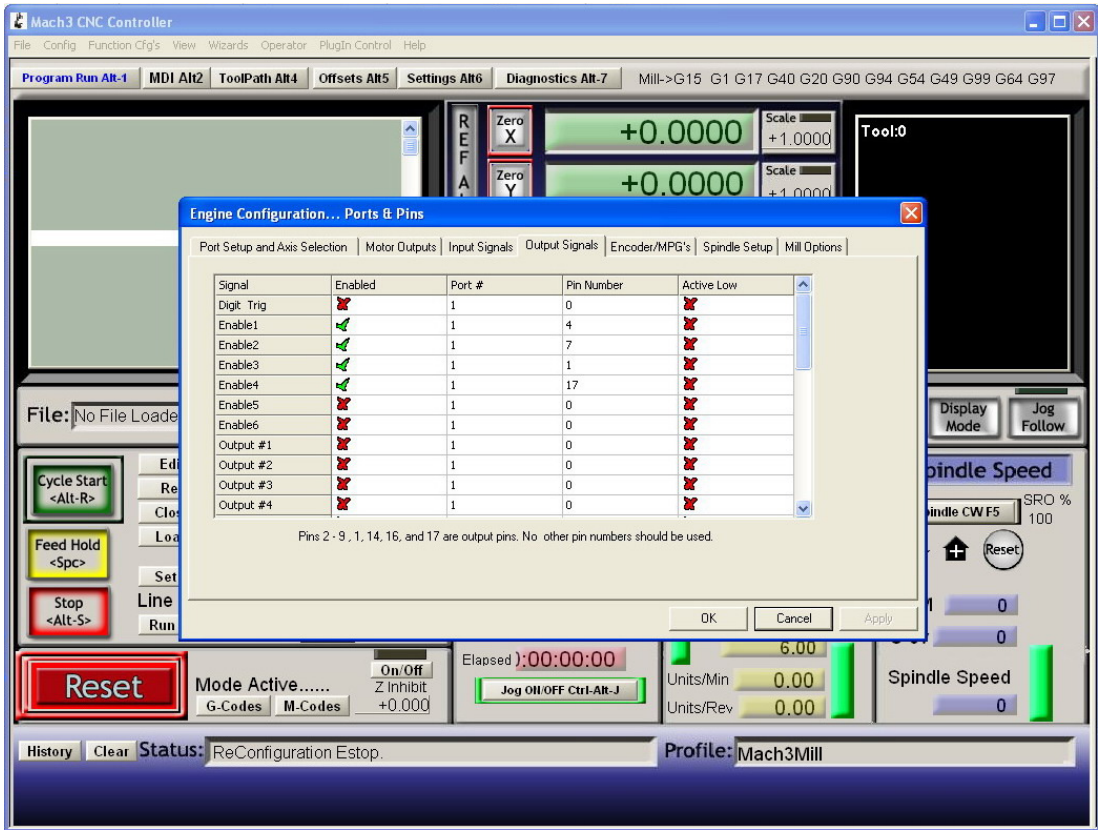
3 - The following screen will appear. Check **(Port Enabled)** box and set the port no to 0x378.



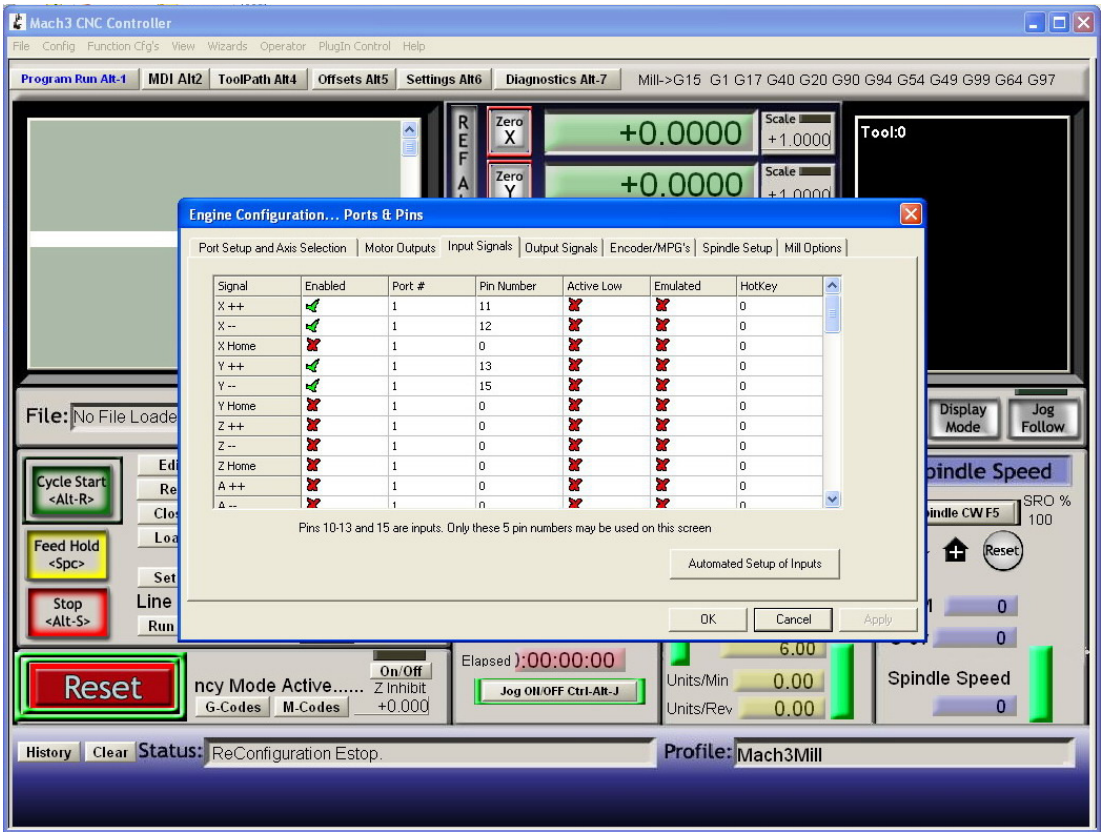
4 – Select **(Motor Outputs)** tab as shown in figure. Enable the required axis and set Step Pin# and Dir Pin# as shown in figure



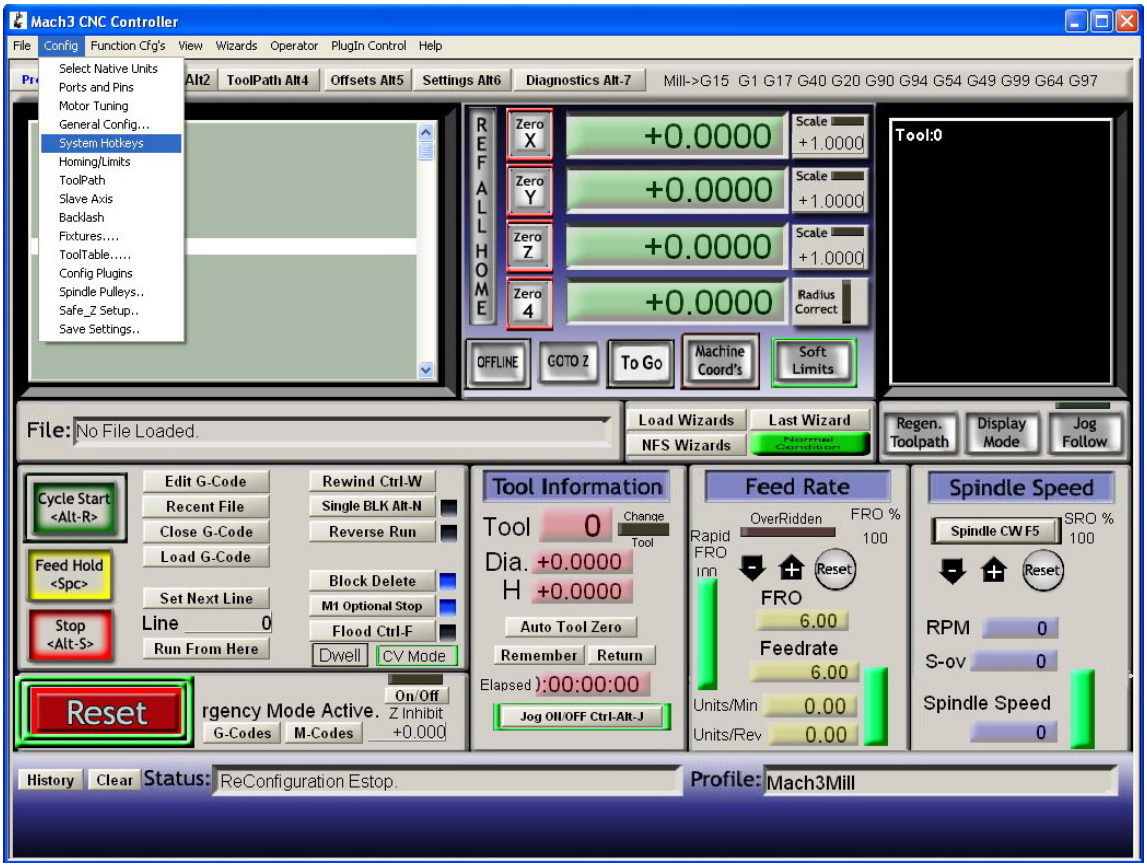
5 – Select **(Output Signals)** as shown in figure and assign pin number for each output enable.



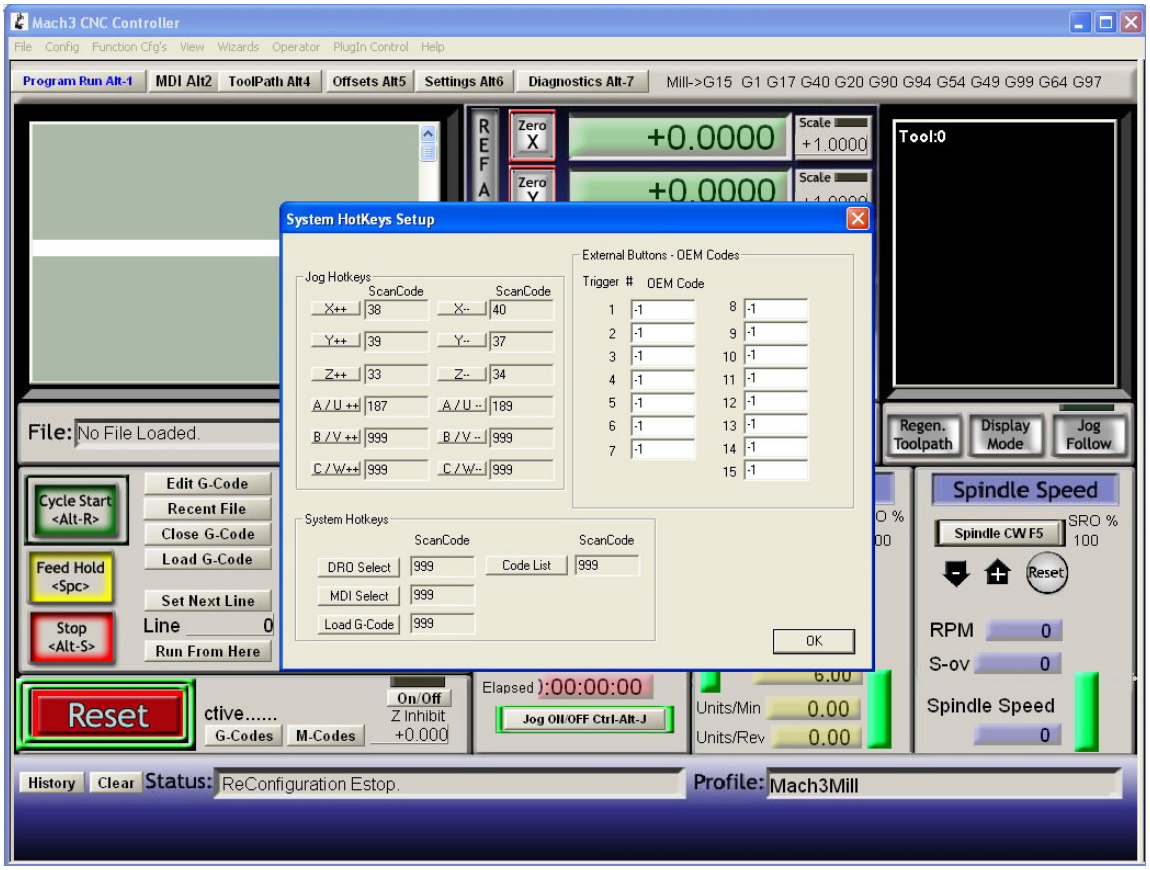
6 – Select **(Input Signals)** as shown in figure and assign pin number for the input correspond to axis.



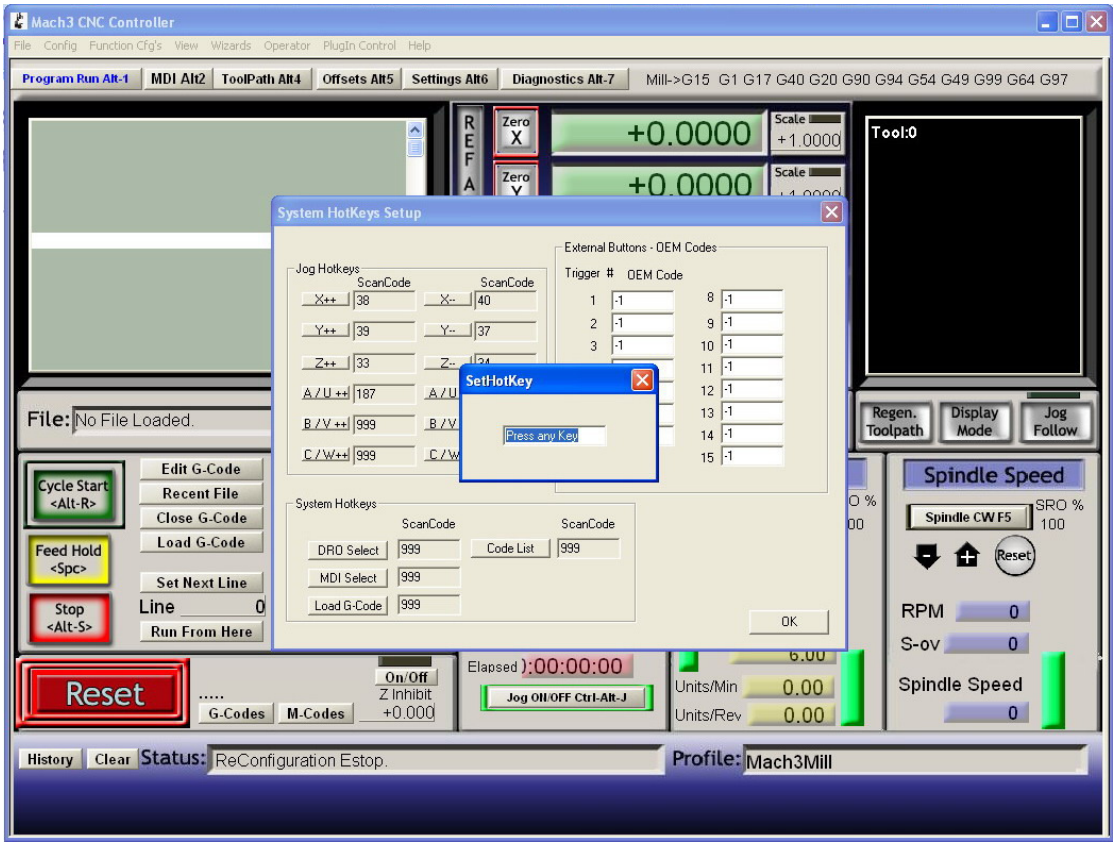
7 – To configure the operating keys used in manual testing open **(Config)** – **(System Hotkeys)** as shown in figure



8 – The following screen will appear



9 – Click X axis in the increment direction **(X++)** then the following screen will appear



10 – Press right arrow on the keyboard to assign this key to move the X motor in the increment direction

11 – Repeat steps 9,10 to assign different key for each movement and direction for every axis(table shows the recommended keys to use in control motors in X,Y,Z axis)

Table2. Keys assigned to motor movements.

Axis	Increment (++)	Decrement (--)
X	Right	Left
Y	Up	Down
Z	Page Up	Page down
V	+	-

12 – Press **(RESET)** button to inactive emergency stop and start move the motors by clicking the above selected keys.

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