The Manual of Mach3 Interface Board CM–201

1. Outline

This is a Mach3 Interface Board. It is linked with Parallel Port attached in PC. It was made that each signal of parallel port to be connected motor driver. Each port on Board can be connected with driver, limit & home sensor and it offers the Relay Contact Signal for controlling of exterior device & spindle speed.
2. Detailed Function

- **Parallel Port**
  It is a Port linking PC and the pin No. of PC parallel is as follows.

```
No.1 Pin : Pulse Output for the Charge Pump.
No.2 Pin : X Axis Clock Pulse Signal Output
No.3 Pin : X Axis Direction Signal Output.
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No.4  Pin : Y Axis Clock Pulse Signal Output
No.5  Pin : Y Axis Direction Signal Output.
No.6  Pin : Z Axis Clock Pulse Signal Output.
No.7  Pin : Z Axis Direction Signal Output.
No.8  Pin : A Axis Clock Pulse Signal Output.
No.9  Pin : A Axis Direction Signal Output.
No.10 Pin : Input Switch or Sensor.
No.11 Pin : Input Switch or Sensor.
No.12 Pin : Input Switch or Sensor.
No.13 Pin : Input Switch or Sensor.
No.14 Pin : Output Control Relay in exterior device 1
No.15 Pin : Input Switch or Sensor.
No.16 Pin : Output Control Relay in exterior device 2
No.17 Pin : Output PWM Pulse for controlling spindle speed.
No.18 ~ 25 Pin : Ground (GND) Pin.

This board has equipped with 25 pin Male Connector and the connecting with PC uses 25 strands, direct cable that both edges is made by Male–Female.

- **Switch or Sensor Input Port.**

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<th>Pin</th>
<th>24V</th>
<th>P15</th>
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It has 3 connectors as above and it has also 3 or 4 pins respectively.
It means that +24V pin provides the power supply of exterior sensor
And it can link sensor to be input +24V
If the sensor is the contact by type of switch, it’s ok that you do not to use the +24V pin among 3pins.
The signal to be input here can be connected with High, Low, & Switch contact. It can modify setting at Ports and Pins in menu after you check in Diagnostics(Alt–7) whether it is operate or not for each inputting.

For Home, Limit Sensor & emergency button, you can grasp the status by the LED. If it turned on, it shows that the sign of Low in the Pin detected.

- Spindle Speed Control & Relay Contact for Exterior Device.

Pin17. Relay Out
Pin16. Relay Out
Pin14. Relay Out
Pin17. PWM-DC Out

This is the port for spindle speed & exterior device control and it was made by the output used for relaying.
The Port for spindle speed control can output with DC voltage.
So, it can change motor’s speed by connecting the servo driver or inverter.
The output voltage is selected 0~5V or 0~10V range.
The relay contact are comprised of CM & NO and
The “NO” means that it is connected if the relay works but it is usually open by “Normal Open”

- Charge Pump Relay Port
Pin 1. Charge Pump Relay Out

This Port operates when charge pump moves & works together with Mach3 Reset. If Mach3 is “Reset”, relay does not operate and if the Reset cleared, it operates.

This is comprised of NC, CM, and NO
NC is “Normal Close” and is the closed contact usually.
NO is “Normal Open” and it is open with CM terminal normally and if the relay works, it is connected.

- Driver Connection Port.

Pin 2. X-Pulse Out
Pin 3. X-DIR Out

This is the port to be joined to driver in each Axis and is composed of Pin like the above picture.

The +24V & GND is the Pin to supply electric power to connecting driver.
If it is the driver consuming much electric current the thing like step motor driver, It is recommended that it will be connected power supply separately not to use power supply in this port.

For linking with driver, applies +/- Line Driver Way and output 1 pulse by DIR/PLS

(Example of Samsung Servo)
Both DIR & SIGN are same as a direction signal. PLS, PULS, CLOCK &. CLK are same as a pulse signal.

- Input port for power supply.

```
  +24V
 GND
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This is the port to permit +24V, to use in board. If don’t use the power supply for driver, There is a consumption around 50mA.
Representative Connecting Way

- The driver which current consuming much should use power separately.
3. Mach3 Run Screen

I explain mainly set-up here, hope that you refer to program manual in Mach 2,3 or ask me for detailed function & function setting. It has a bit differences depend on versions but it is applied almost in same way.

4. Mach3 Set-Up

Config in Menu ➔ Choose MM’s or Inches in Native Units as you want to.
Config in Menu → Set it in the Port and Pins as follows.

Confirm the Pin No. & Port No. exactly.

****** You have to press “Apply” Button without fail before going on to each tap. If it is not, it can’t be saved. ******

If it use A Axis, set up it but if it doesn’t use, make it by red “X” mark in the enabled. In “Dir Low Active & Step Low Active” case, it has to be set after distinguishing well Driver’s moving surroundings and the direction, each Axis. And the output Pin for spindle speed control designates by No.17. This process can be changed depends on each user so, it should be followed.
Setting efforts going through several trials.

Setup X Home, Y Home & Z Home.

If it uses A Axis, designate it. If it is not, make it by red “X” mark in the enabled. Also this set point can be much various in this part according to users or whether it is used by Home or Limit.
Specify EStop pin as above. In Active Low case, apply after differentiating that the emergency stop switch is Active Low or Active High too.

Set output #1, #2, charge pump pin as above.
In Active Low case, apply after discriminating in compliance with the exterior device connecting user's CNC.

This board uses function “Charge Pump” therefore it must follow to be set “Charge Pump Pin” and It is the No.1 pin and set it above.

If do Spindle & Flood / Mist, remove to have checked at the below picture.
If check it, it means that it is not used.
Do spindle speed control as above.
If you want to use “Pin17” by Relay Output not to use PWM-DC Output, in spindle speed control, should choose “Pin17 jumper” in board to Relay

- Pin17. Relay Out
- Pin16. Relay Out
- Pin14. Relay Out
- Pin17. PWM-DC Out

![Spindle Speed DC Range Select 0~10V/0~5V]

![Pin17 DC Voltage/Relay Out Select]
And you modify “Enabled Mark” in spindle by “X” as follows and set not to use.

You designate “17” (Output #3 Pin Number) in the Output Signal. If so, Pin 17 works with relay output.
5. Motor Tuning.

Config in menu ➔ Choose Motor Tuning.
Select X axis and set up it to fit user’s equipment.
It can use after the point of velocity or Acceleration modify adequately.

***** Must press “Save Axis Setting button” after inputting.
Select Y axis and set it to fit user’s equipment. The set point of velocity or Acceleration can be used after changing adequately.
Choose Z axis and set it to fit user’s equipment.
The set point of velocity or Acceleration can be used after changing adequately.
Select A axis and set it to fit user’s equipment.
The set point of velocity or Acceleration can be used after altering adequately.

Config in menu ➔ Choose Motor Homing and designate it as below.
For more closer explanation about each function, hope that you refer to Mach3 Program Manual.
6. How to adjust Spindle Speed.

Set up as follows after you finish setting in the former step.

- Config ➔ Click “Spindle Pulleys”

Input your spindle’s Max Speed as below.
If the maximum is 5000 RPM, Put 5000

If so, You can control spindle velocity in Mach Program.

And If it is S1000 in the G code, it means that spindle RPM is 1000
If it is S5000, it means that RPM is 5000
7. Further Information

Allotted pin for using Home & Limit Sensor is available in many ways. Both Home Sensor of each axis in CNC and Limit Sensor can connect to one pin together and in the rest of pins, also assign even inputting switch by setting MPG, Probe Sensor & OEM Trigger. For more detailed info. hope that you refer to Mach3 manual.

*** If you have any questions or concerns, send us email anytime.

Feel free to visit: www.cnc4youstore.com
Technical Support: jirobotics@gmail.com
Customer Service: percelain@hotmail.com