The motion control card for machine control, with strong professional. Requires the operator to have the relevant expertise! When using a laser, you need to be protected against laser damage to your eyes. Before using the tool for engraving, familiar with the software operation, be careful to operate to prevent accidents.
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Features:

1. Application: use for DIY mini Engraving machine or Toy laser engraving machine
2. Applicable software: GRBL control、Un Gcode Sender、GRBL controller.
3. Communication: USB（USB-CH340）.
4. Power supply: voltage: 12V current about 4A , according to the load to increase or decrease the power supply.
5. Stepper motor driver: A4988 motor driver, 16 microstep 1.5A phase current output
6. Support stepper motor: NEMA17 NEMA23 stepper motor, phase current less than 1.5A.
7. Laser interface: 12V or 5V, power less than 18W laser module.
8. Spindle motor interface: the maximum support 400W DC spindle motor.
9. With fan interface and TTL signal output interface (for controlling the laser module with TTL module).
10. Limit interface: 3-axis limit interface.
12. Power interface: DC-005 2.0 interface
Basic connection diagram (an Overview):
Mechanical dimensions diagram:
CNC LASER Control mode selection:

Controller has a selector jumper, select the **CNC mode**, Controller control relay work, select **LASER mode**, Controller control the laser interface, fan interface output. As shown below:

![Diagram showing CNC and LASER modes with selector jumper](image)

Laser interface output voltage selection:

DIY commonly used laser module supply voltage 12V and 5V, Controller provides two kinds of voltage options, according to the need to choose, as shown below:

![Diagram showing output voltages 5V and 12V](image)

Driver microstep Selection:

Microstep selector jumper under the X-axis driver board, remove the driver board to select microstep, the factory default for 16 microstep. The Jumper location and microstep table are as follows:

<table>
<thead>
<tr>
<th>Jumper location</th>
<th>Microstep</th>
</tr>
</thead>
<tbody>
<tr>
<td>L H MS1 MS2 MS3</td>
<td>16</td>
</tr>
</tbody>
</table>
Spindle motor wiring diagram:

Use the relay on the controller to control the spindle to start and stop, the maximum can be connected 400W DC Motor wiring as shown below:
Probe, limit switch wiring:

1> At the command line, enter: $ 21 = 1, start the limit function, limit wiring as shown below:

![Limit Switch Wiring Diagram]

2> Input probe code: G38.2 Z-20 F3, Z axis start probe, the probe device wiring as follows:

![Probe Wiring Diagram]

How to control relay and laser work

Code **M3** controls the relay and laser output, **M5** turns off the relay and laser, and can also be realized by operating the buttons on the software.

A4988 driver board, the output current adjustment method:

Clockwise rotation of the potentiometer on the drive board, the output current increases, counterclockwise rotation potentiometer, the current decreases. Measure the voltage between the potentiometer and GND, calculate the specific current value, as shown below:
Output phase current: $I = \frac{V}{0.8}$