

# 4 Axis Offline Controller Board Manual

## A: Safety Tips

Before using this control system, please read this manual carefully before you perform related operations.

Carefully read the operating instructions and user safety instructions, to take the necessary safety precautions. If you have other needs, please contact the studio.

Operator to operate the first time, you should understand the corresponding function in the proper use, the appropriate action can be carried out, for the unfamiliar functions or parameters, non-random action or change system parameters.

System Maintenance:

When the system is not normal circumstances, the need to overhaul the appropriate cable or socket connection, it should first cut off the system power. And then carry out the necessary maintenance.

The operator did not conduct a rigorous training to get the studio or authorized units or individuals, can not open control system for maintenance operations, modification, repair, and other behavior.

Other matters:

Specifications subject to the system does not function, exhaustive place to system software functionality prevail.

Change or improve the control system functions (upgrade), without notice.

## B: Overview

The studio latest "motion controller" using high-performance 32 Cpu, equipped with LCD display, user-friendly windows-style interface, the use of external TF card memory, storage space is larger than 2G, the operating voltage and the control voltage only use isolation ways, touch keyboard. The system has high reliability, high precision, low noise, easy operation.

The controller may Axis, how the micro segment forward control algorithm can achieve multi-axis linear interpolation with a micro multi-axis continuous interpolation segment, and breakpoint carving control.

Simple, clear parameters for your operating convenience and quick. Input / Output Settings feature allows you to use and maintenance.

Main features:

Parameter settings: You can set the processing operations related to the various control parameters, so that the processing to achieve the best condition.

Manual operation: can be achieved manually, jog, back to the program zero, back to mechanical zero, coordinate clearing and other operations.

Program management: the program can create, delete, modify, read, save, save, automatic processing, continuous, pause, and other functions.

External Manual: define multiple external manual functions, to facilitate the use

Freedom to select the input function: the limited input port can achieve a variety of user needs

System components

CNC system mainly consists of the following components:

- High-performance, high-speed 32-bit ARM CPU

- A liquid crystal display (resolution:  $320 \times 240$ )

- Input / Output (10MA 16 opto-isolated inputs, 16 optically isolated output pull-down tank flow 500MA)

- Users machining program memory can be implemented in any storage TF card

Technical Specifications

- The smallest unit of data 0.0001mm

- The maximum data size  $\pm 99999.999$ mm

- Maximum pulse output frequency 50KHz (three-axis simultaneous 50KHZ)

- Number of control axes 4 axes (X, Y, Z, A)

- Number of axes 4-axis and has a multi-axis interpolation control micro multi-segment Preview

Appearance and Panel: Dimensions: length 165, width 101, thickness 50

## Pictures



## C: Operating Instructions

### Splash Screen



The following screen appears after the power-control system

The boot sector is divided into four zones

1, the top district: file name now opens the main display, real-time processing of the number of rows

2, the coordinate display area: The main display and real-time three-axis coordinate in real-time processing speed

3, the function key area: the main control function keys

4, file area: file name, or processing file

(Note: SD card supports hot-swappable, when a new SD card is inserted, due to be re-inserted after initialization, so sometimes prompts OPENER !, only a few multi-point "Open File" button)

For HDS (TF), in case the problem card and not fully understanding, to replace other cards and then read!



**Machine Configuration Click the "Advanced Features" below, then click the "motor parameters" to enter the following screen**

**Pulse equivalent:** the required number of pulses per unit length (pulse required for each millimeter) support floating-point input

**Maximum speed:** maximum speed of this motor can run

**Acceleration:** highest acceleration of this motor can run

**Pulse level:** 1 or 0, active high or active low, determined by the drive

**Direction level:** 1 or 0 active high or active low, this will change the direction of change

**Pulse width:** Pulse valid output time

Stepper motor driver pulse equivalent = number of subdivisions  $\times$  (360 / stepper motor step angle) / screw pitch

**Example:** Stepping angle = 1.8 screw pitch = 5mm segments = 8

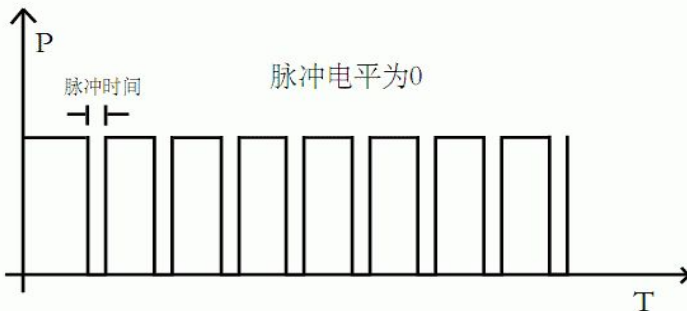
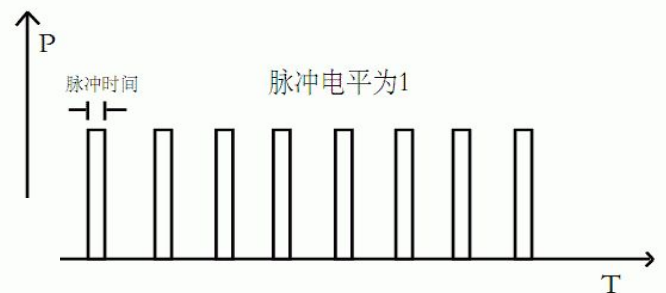
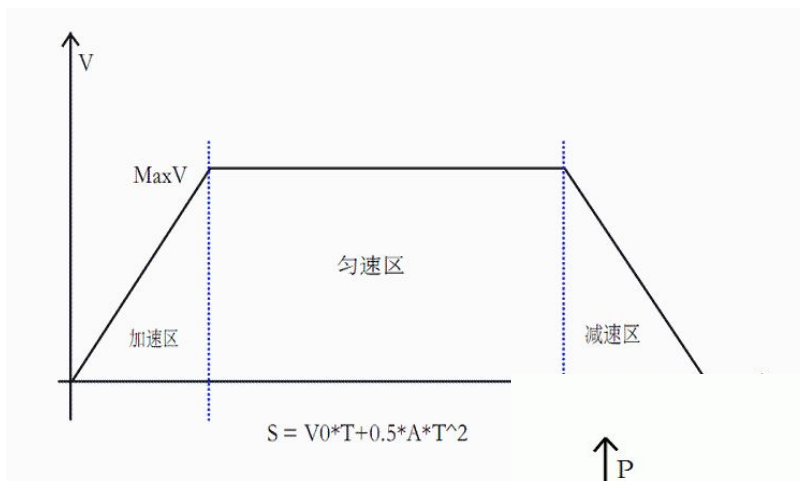
Pulse equivalent =  $8 * (360 / 1.8) / 5 = 320$

**Maximum speed value:** To finalize the ability of the motor in accordance to the principle of losing step, taking 70% of the maximum speed value, leaving 30% margin to (characteristic of the stepper motor) motor.

**T acceleration table is as follows:**

Ultimately determine the acceleration value 70% according to the maximum that can be tolerated by the motor acceleration value is appropriate, retain 30% mutated value to the motor, in order to ensure that the motor will not stall (stepper motor characteristics).

Relations pulse level and pulse width (Note: The actual width is the width added to the default of the system may be)



## Direction level:

When the direction is at the level of an axis is running, the output is high, reverse run low

When the direction is at a level of 0 axis is running, the output is low, the anti-run high

## Open File



File name appears in the display field, the file name format is the standard format 8\_3

8 character names, three suffixes

When displaying the Chinese can have four Chinese name, the three suffixes, more than four will not give the full name of the display, instead of using ~ N

Swirling advanced function keys, or function keys can scroll up and

down to display

Middle button click Advanced function keys or "OK" button to select the file, enter the following interface



At this point you can open the file, or return to the file selection (re-select), or exit to the main screen

Click "Open this file" access to the contents of the file are shown below



You can now browse the contents of the file, the screen, click on the Advanced Function button the middle button, or OK button brings up the start menu erupted:



You can choose whether to start from the first row, or N line begins, or point N lines are displayed, you can directly choose to re-select the file back to the file

The number of rows selected input basket after basket buckle selected, you can enter the desired, enter the election, "pointing to select the line" you can jump directly to a specified number of lines, such as for large, super multi-line, which will change along with time-consuming Great !!

If the number of lines is greater than the number of rows in the input file itself,

then will point to the end of the file.

Click on: "From the beginning of the first line beginning", "From the beginning of the line to select" These two will jump to the main interface, this opens the file is complete and has handed power to the primary key of the main screen area.

## Starts running



You can begin to run directly, and if there is a breakpoint before that too, and did not change over the file, then a window will pop up below!:

Height where the tool will be filed at the position of the current head having to be moved to the machining position, this height is safe altitude, can also be seen as a Z-axis: The first term is safe height, the height of the role of security

After deduction basket election can change this value is selected, you can

also change the default height of the advanced features in security.

"Continued Point Run": breakpoint point, will start directly from the N-point run in the subsequent point between N points to N + 1, which will be repeated N to N + has been processed through the track between 1:00 and pick the unfinished track.

"Continued point before running": When a breakpoint in the N point-to-point between N + 1, it will directly start discards N to N + 1 line processing path from N + 1 subsequent point before running, please pay more attention.

"Exit" to give up this operation.

**(Note:** When the breakpoint pick to run large number of rows, because from the beginning and continued to find coordinates point, there will be some computation

time, TF card reader speed will affect the current operation speed runs in the top left corner indicates. number)

## Limit Input



Enable: whether the selected limit function

Pin: For post-limit function is selected, the corresponding input pin (You can select 1-16)

Level: Input active high or active low (see the mimic diagram).

## Mechanical origin



Enable: whether the selected limit function

Pin: For post-limit function is selected, the corresponding input pin (You can select 1-16)

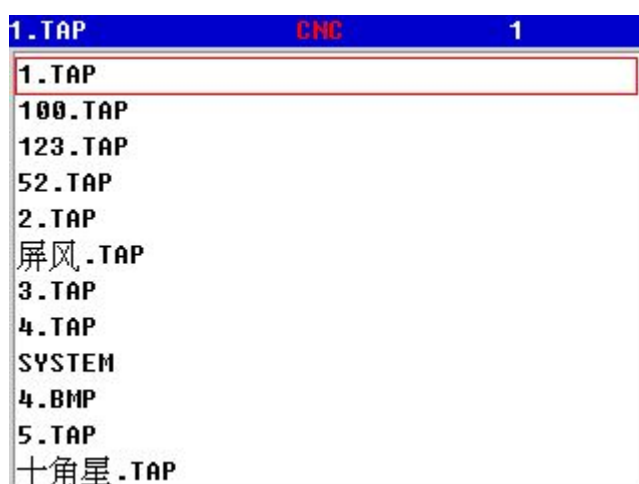
Level: Input active high or low level of efficiency, (see simulated image)

Directions: Return to the machinery when the XYZ direction, either positive or negative

And to speed the return to the machinery when the knife when: Return speed.

More input pin corresponding to eight inputs controller that can be specified are as current limit input pin.

## Document Management



Click on "File Management" as shown on the left into the file list screen, you can add new files, delete files, modify the file.

Click on the button will enter the selected file specified basket after following interface:





Edit this file ": You can edit the selected file

"Return the file selection": Re-select the file

"New File": Create a new document

"Delete Files": delete the selected file

"Return to the main screen": a direct return to the main screen

### Panel fast Xie key $\odot$ as "origin Operation"



"Return to origin" Z-axis height to rise to safety, XY axis back to the origin, Z-axis and then passed back to the origin.

"Return mechanical origin": Z axis retreated mechanical origin, Y-axis retreated mechanical origin, Y-axis retreated mechanical origin, (Note that the configuration foot level and enable)

"Knife" Z-axis decrease (or increase), when it comes to the probe, this process ends / (Note that the configuration foot level and enable)

### Panel fast Xie key $\text{¢}$ to "coordinate cleanup operations."



X-axis uniaxial cleared

Y-axis uniaxial cleared

Z-axis uniaxial cleared

All axes cleared

Drop out

Function with the same word meaning shown

## Panel fast Xie key ☒ "Jog"



"Manual" Recovery Manual

"1mm": When the time selected by pressing the corresponding arrow keys will move the corresponding length (incremental moves)

If the current X-axis coordinate X: 1.235 moment selected 1mm

If you press X +, X-axis that is immediately moved to 2.235,

If you press the X-, X-axis is moved immediately namely 0.235

If you want to move to a specific

length, you can enter the specific numbers in the input baskets (only press "OK" to enter the basket after become yellow, green and effective return), press the corresponding axis key, you can.

Corresponding X + X-Y + Y-Z + Z-A + A- are valid