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**NAIKY® ENGRAVING MACHINE'S  
MOTION CONTROL SYSTEM**

**NCSTUDIO™ USERS' MANUAL  
(FOR GEN-6A SOFT VERSION)**

Thank you for choosing our product.

This manual helps you acquaint the product of our company and understand the information of system constitution and configuration. It introduces the process of system installing and various functions. Before using this system, please read this manual in detail. It is beneficial for you to use it.

For the hardware and software update continuously, it is possible that the software and the hardware you have received differ from the statement of this manual. We feel apology for your inconvenience.

We list company address, linkman, telephone number and Web site. You will be always welcomed.

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Pay attention to the following:

- I Please don't plug or pull out the cable connected with the computer when power on.
- I Please don't plug or pull out the cable of Manipulation boxes when power on.
- I In order to guarantee safety and reduce disturbance, the shell of computer and engraving machine must be grounded.
- I When on the fly, please shut off the power.
- I Please pull out the BNC connector plugs, when the machine is not used for a period of time.
- I The spindle's life-span is inversely proportional to its rotation speed.
- I The cutter is very sharp. In order to prevent involvement which can result in injury and the equipment's damages, don't touch by hand, the handkerchief, the silk kerchief while rotating.

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# 7 Summarization

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The software of NcStudio is developed by Shanghai Naiky technology limited company and the company has its own copyright, that system can support the code of G and PLT format which can be produced by the CAD/CAM applications such as UG, MASTERCAM, CASMATE, Art CAM, AUTOCAD and COREDRAW etc.

NcStudio can be runned on Microsoft Windows and take the great advantage of 32bit computing and multi-tasks. At the same time, the standard style of Windows interface is simple and easy to learn and operate.

In addition to manual mode, stepping mode and automatically returning to the origin of machine, the digital motion control system has simulation, dynamic track, automatic emendation of Z-axle, remembering of break-point (the procedure jumps a segment), and the function of turning back to continue proceeding.

That system can be used with all kinds of three-dimensional engraving machine and three -dimensional milling machines etc.

Being applicable to all kinds of complicated processing of tooling, advertisement and upholster decorating and the industry of incision.

## 1.1 Software characteristic

The software has the following functions:

- I It is basic to install three axles and can be extended further. It is possible that the software received differ from each other.
- I Support digital control rotating platform.
- I Process automatically. Completely support G instruction and the HP PLT format of ISO standard.
- I Manual function. It can support to control the machine tool not only by input equipment of machine tool but also by input equipment of computer to complete manual operation. For example: keyboard and mouse.
- I The function of the array process. It can execute the procedure again and again; through appoint the number of rows and lines of the array by customer.
- I The function of incremental feed. It can make the customer convenience to set the



amount of feed, and the length of step can be adjusted agilely.

- I The function of the manual data input (MDI). Customer can input and immediately execute G-instruction online.
- I Advanced processing instruction. As long as you input several parameters, you can complete the function of milling or drawing.
- I Single step mode. Customer can set the processing assignment as a single step mode thereby it will provide a good support for diagnosis mistake and malfunction restoring.
- I The advanced automatic function of breakpoint remembering and separate segment executing.
- I The feeding axle can come back to the machine original point accurately.
- I The function of auto to calibration. It provides the tremendous convenience for the customer.
- I The function of preserve/resume the spot of work. The system is well considered the power breaking problem which commonly exists in the southern customer of our country. Files of the system won't be damaged by power breaking. The functions of breakpoint remembering and separate segment executing can fully guarantee the dependable instauration of the spot after restart.
- I The online adjustment of feed rate. Customer can adjust the feed rate at any time in processing from 0 %( the smallest) to 120 %( the biggest).
- I Characteristics of the high smooth connection speed. In general numerical control system, there is a constant speed between two pieces of G instructions, for example it will equal to zero or a quite small number. In new version, it adopts a special suitable forecast-arithmetic of processing speed. That arithmetic is according to the connection speed of magnitude, direction, the biggest acceleration and the fore forecast function, to adjust itself and decide the joining speed between the current instruction and the next instruction. This special character not only improves the processing efficiency (about from 30% to 300%) consumedly, but also improves the function of processing and removed the exterior veins in processing.
- I The function of three-dimensional simulation show. Through simple operation, you can observe the result of three-dimensional process and then you can realize the result more accurately and more frankly.

- I The function of simulation. It can make a fast simulation of the processing procedure to process and complete in a cutty time, checking whether the processing procedure comes true or not at the same time, whether the result of processing is satisfaction or not, and can compute accurately how long we need in fact in processing.
- I The strong and agile keyboard supports. The new version gives very strong support to the keyboard operation. It satisfies the customer's demand in operation in processing.
- I Log function. The system provided the mighty daily record function, helping the customer inspect the processing information and system diagnosis detailedly.
- I The inside processing files manager. NcStudio can manage documents in the processing files manager inside , as long as Customer put the processing procedure to the appointed catalogue.
- I The inside files editor. Customer can load the processing procedure to the editor to edit and modify.
- I The file information of processing. Through simulate or actual processing, the windows of file processing information can help customers count the file running time and the range of processing etc.
- I PCI motion control card.

## 1.2 Improvements and new functions

The following improvements and new functions are applied in vision 8.5 or above.

- Ø New function: taking account of workpieces when machining. The software will take account of workpieces automatically when finishing every processing assignment. User can clear away the result at any time.
- Ø New function: when finishing the assignment, the buzzer will sweet in order to prompt user. At the same time, the red lamp will glitter one time.
- Ø New instructions: G34, G35, G36, G37. The details can be found in programme manual.
- Ø New instructions: If current coordinates system is not G54 system when machining, the CNcStateView Window will turn light green to prompt user.

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- Ø Improvement: the catalog browsing dialog box of the file management can remember the file path selected last time.
- Ø New instructions: G923, in order to set the tools offset. The details can be found in programme manual.
- Ø Improved instructions: G906, it can also be used to check the ports appointed whether they are overtime.
- Ø New function: can name the subprogramme with the character strings. Such as: O"SubProgName". The details can be found in programme manual.
- Ø New instructions: M903, in order to change tools, The details can be found in programme manual.
- Ø New function: change tools function can also be applied in rotundity tool tray.
- Ø Improved function: there will be an option dialog box fipped out when pausing; the user can decide whether the mainspindle moves to the fixed workpiece coordinates.
- Ø Improved function: unlimited subprogramme number, user can use any integers.
- Ø Improved function: when change the polarity of the ports, there will be records in log automatically.
- Ø New function: the software will give an alarm when the lubricating oil level is below guard line.
- Ø Improved function: the interface is friendlier.

## 2 Installation

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## 2.1 The basic configures of NcStudio

### Host computer

CPU:	Pentium (586) or above.
EMS memory:	32 M or above.
Hard disk:	2 G or above
Display adaptor:	support 800*600 at least, enhanced color mode
Display:	14" VGA or above
CD-ROM driver:	4X or higher
Main board expanding slot:	one slot of PCI or ISA

### Operation system

Microsoft Windows 2000 Professional or

Microsoft Windows XP Professional

## 2.2 The installation of NcStudio

Before install the new version of NcStudio, please delete the old version of NcStudio. Please consult the section of uninstall procedure. (Section 2.3)

NcStudio includes two parts: the software and motion control card. So, the setup of the system also is divided into two stages: The software setup and the motion control card installation.

Please setup the software after installs the motion control card Say in brief; it can divide into the following steps:

- I Shutdown the computer, install the motion control card.
- I Restart the computer, wait for a moment after enter the Windows operate system, put into the CD for setup, choose auto update package, the installation will begin after double click auto update package, and finally restart the computer

automatically.

- I Run NcStudio.

The key steps are introduced detailedly as follows.


### **Install NcStudio™ motion control card**

Close the host PC's power supply, open the cover, and insert the motion control card into an empty PCI slot.

While installing the motion control card, lightly press two side of the motion control card by hand, insure the motion control card is firm insert in the slot, and get in touch with computer main board dependably without fluttering, then tighten the locknut of the card and finally lid it. The installation of motion control card complete.

### **Install the NcStudio Software**

Please install the software according to the nether step:

- I Open the computer's power supply, start the computer, the system enter into the Windows operation system automatically. Please setup the operation system at first if you have not done so. (8.3 editions temporarily support the WINXP/2000 only)
- I After Windows operation system startup, please close other applications that are running.
- I Put the setup CD-ROM of NcStudio system into the CD-ROM driver.
- I Double click the "My computer" icon, then doubled click the CD-ROM driver icon. Find out the SETUP.EXE file after the CD-ROM disk is opened. (Icon displays as ) At this time the setup interface will display.
- I Choose "No, temporarily not".
- I Single click "next", the system guide will help you to install the software of Naiky motion control card.
- I Choose auto install software (recommended).
- I Single click "next", the system starts install the software, the software installs under the system dish.

- I Single click "next ", the system guide will clue on that the installation complete.
- I Click to "complete", the system auto restarts. The installation of whole system completes. Start use.

### **Install customized keyboard**

NcStudio Version 5.4.53 and above support customized small keyboard , which is used to operate the machine tool conveniently.

Before Install the NcStudio™ customized small keyboard , please exit the objective computer's operation system in running (Windows usually) if the PC is power on, then turn off the computer's power supply. Pull out the keyboard's attachment plug from the computer, insert it into the small keyboard's receptacle with one wing of electrical cord, then insert the small keyboard's attachment plug with two wings of electrical cord into the female receptacle of the computer's keyboard. Pay attention to keep the attachment plugs touching the female receptacles well. After finished installing the keyboard, you can startup the computer, run Windows, make sure the keyboard and the mouse work well, execute NcStudio™ if necessary.

#### **Attention:**

It is different that above giving out of the installing appearance is according to the different edition, here of the contents provided can be consulted only.

### **2.3 Uninstall the NcStudio™ System**

The software of that edition is green software, the advantage of green software is: NcStudio will not register the information of installation into Windows registration. It's convenient to uninstall, easy to take, facile to copy to flash disk. If to delete the system of NcStudio, customer can delete the document folder of the software directly. It is generally installed under the document folder of system dish: Program Files\Naiky. When update NcStudio with new version, the installation software will update and overlay the document within old edition automatically.

#### **Attention:**

It is different that above giving out of the uninstall process is according to the different edition, here of the contents provided can be consulted

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only.

## 2.4 The conjunction of Devices

The mechanical motion control signal of NcStudio implement the communication between NcStudio™ software system and stepping motor driven system which is installed in the machine tool electric box through the motion control card inserted in the PCI.

Before the conjunction of NcStudio motion control card and the motor driven system, you should complete installing the machine tool and the electric box, and use the special cable to connect the jack of motion control card and the jack of electric box, and then the conjunction of the system is completed.

### Attention:

For the conjunction of adaptor with electric system, please refer to the adaptor manual of concrete model.

The different model has different work mode and different function.



## **3 Basic concept of NcStudio**

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### 3.1 Operation mode and operation state

#### Operation mode

It is necessary to understand operation mode to operate the machine accurately. There are four operations mode as below.

##### Ø AUTO

Under the automatic operation mode, the machine tool generates motions through the procedure loaded in advance. So the processing procedure must be loaded already.

##### Ø JOG

It is one type of manual operation. Under this kind of operation mode, user can directly control the motion of the machining tool via a computer's keyboard, a customized control panel, or a MPG (manual pulse generator), and so on. When the user sends out motion signals through these equipments, for example the user press down a manual motion button, the machine tool will moves continuously until the signal disappears, for example the user loosen the manual button.

##### Ø INC

INC mode is another kind of manual operation mode. User also directly controls the motion of the machining tool via manual input devices such as computer keyboard, handy box and manual pulse generator. The difference from JOG mode is that each manual action causes the machine tool to move a given distance, which is called step length.

##### Ø MDI

It is a kind of manual operation mode too. User also controls the motion of the

machining tool by on-line input a G-code format instruction. When the system under some conditions carries out some established procedure to operate the machine tool (Such as return to work piece origin), it would be automatically switch to the mode of MDI also, but it will not affect the user to use it.

### **Operation state**

Each operation mode can be divided into a few of operations states; we can say that both operation mode and operation state decide the state of a machine tool.

#### **∅ IDLE**

This is a most normal state of the control system, whenever the control system doesn't output the motion instructions and is ready to output them; we call the state as an IDLE state.

#### **∅ ESTOP**

This is an abnormal state. Whenever there is a machine fault or a user presses the emergence-stop button, the system enter ESTOP state, and some certain protection action will carry out, such as turn off spindle motor and cooling pump. In this state the machine tool is locked and cannot carry out any new motion. After the machine fault or hardware fault is obviated, the system will return to the IDLE state after carry out "Reset" action automatically.

#### **∅ RUNNING**

While a machine tool is executing the outputs, the system enters into the running state.

#### **∅ PAUSE**

While a machine tool is moving and then a user send a "Pause | Resume" command or the system parse a M01 command (waiting command), the system enters PAUSE

state, waiting for user's more inputs. If a continue command is sent subsequently, the system switches back to RUNNING state, or the system will enter IDLE state by execute "Pause" or "Reset" command to stop the current operation.

## ∅ LOCK

Lock state is an inner state, which usually appears between the system switches from one state to another state, so the user cannot contact with it.

## 3.2 The reference frame of machine tool

The coordinate system is a glossary of describing the motion of the machine tool. For the sake of unification, the standard coordinate system adopts the right hand principle. It is shown as below:

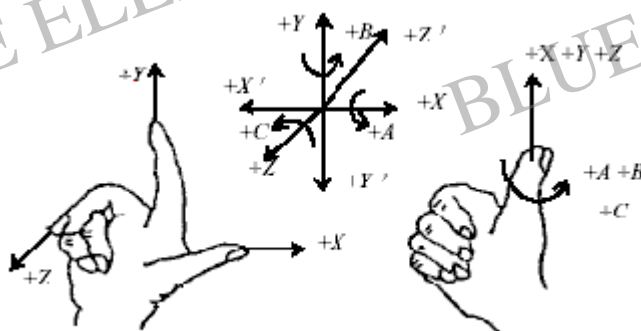


Figure 3- 1: The right hand principle of standard coordinate system

Among milling type machine, the direction of machine tool coordinate axis is decided by both the types of machine tool and each composing part of layouts, to milling machine, the basic coordinate axis is X, Y, Z:

——The Z-axis is superposition with the spindle .the direction of far away from the work piece is a central direction (Z+).

—— The X-axis is perpendicularity to the axis of Z and parallel with interface of work piece, for a single column milling machine, facing the spindle of cutter and watching towards the column direction, its right motion direction is the central direction of X-axis(+ X).

—— The Y-axis, X-axis and the Z-axis are together made up of the coordinate system

of keeping to the right hand principle.

### **The mechanical coordinate system**

The mechanical coordinate system is a certain and aptotic right hand coordinate system, its coordinate origin is an opposite and aptotic position to the machine tool. So, at any time, a certain point in space can be confirmed exclusively with the mechanical coordinate system.

To complete support of the mechanical coordinate system demands the capability of returning to the mechanical reference point. Otherwise, the concept of the mechanical coordinate system will be incarnated in software.

### **The work piece's Coordinate system**

It is further usage of the work piece coordinate system at processing all kinds of work pieces. The processing position that we described is usually comparative to the certain point of work piece. But the installing position of the work piece on the machine tool relates to the mechanical coordinate origin is always alternate, so it is necessary to import a set of more convenient coordinate system and namely is the work piece coordinate system. It is also a right hand principle coordinate system, its origin fixed on is relative to a certain point of work piece, but is floating relatively to the mechanical coordinate origin.

## 4 Interface of NcStudio

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After installed the software of NcStudio to windows according to the introduction ahead, it can be run by double click the hot key of NcStudio. NcStudio interface components are composed of title bar, menu bar, tool bar, status bar, and function windows. The main operation interface of NcStudio is shown as below.

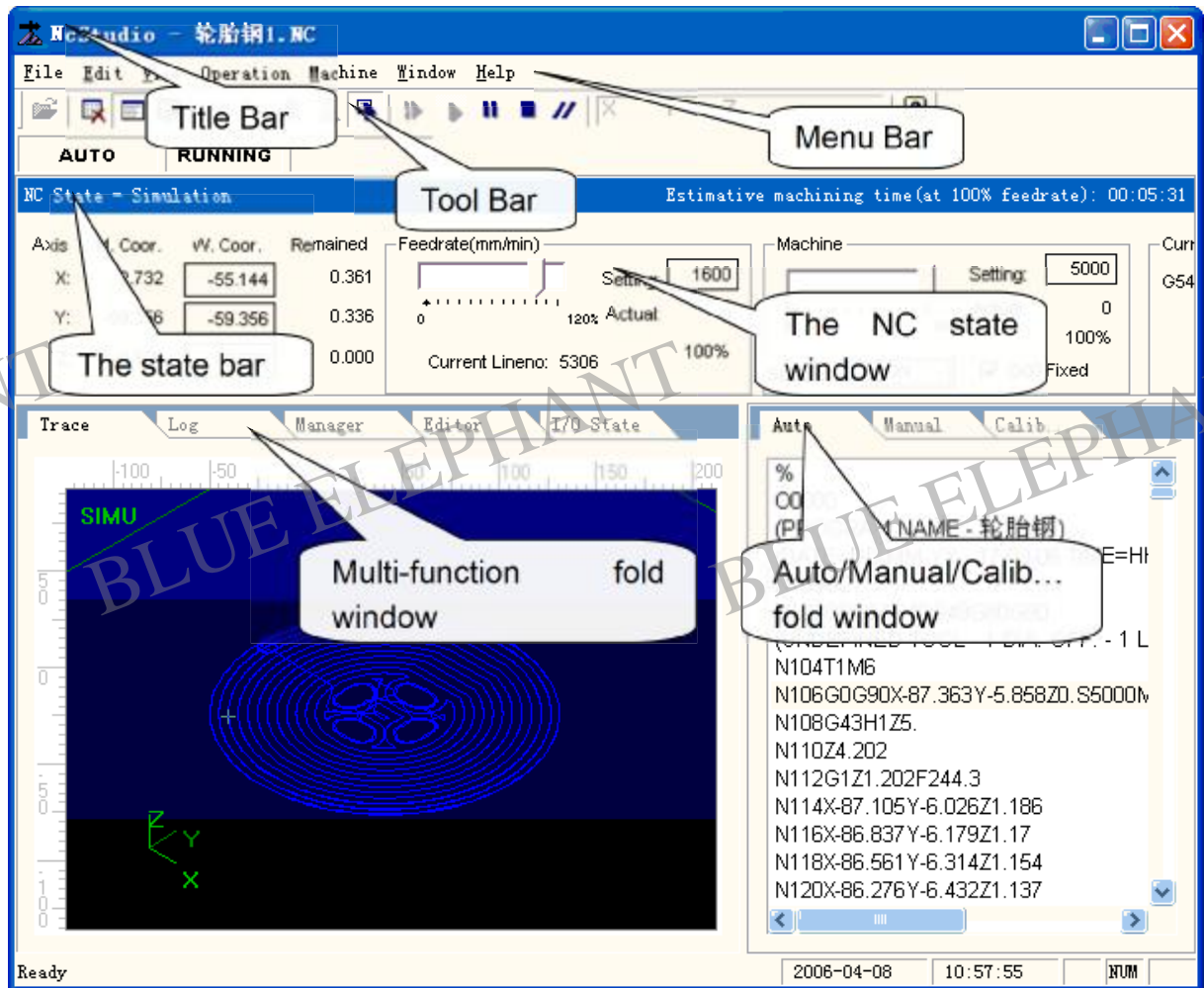


Figure 4- 1: Interface of NcStudio

The function windows are divided into three areas, including:

- Ø The first areas: state window
- Ø The second areas: track window, log window, procedure manager window, editor window and I/O state window
- Ø The third areas: auto window, manual window and calibrator window

## 4.1 Title bar

The first column of NcStudio software interface is a title bar, and it used as a show of the software name and the name of processing procedure, the color of title bar indicate that the relative window is activated or not.



Figure 4- 2 Title bar

### Attention:

In Windows system, the concept of active window and inactive window is very important. The meaning of an active window is acceptable to input of keyboard at present, at any time there is only one active window. You can distinguish the active and inactive windows from the different color. In the default setting of windows, the title bar of active window is blue but inactive window is gray.

The left icon of title bar is a menu column of the system, it can be used to open the control menu of the windows, and you can click the icon with mouse or press "Alt + spacebar", which will drop down a system menu.

That menu can control the position and the size of the windows. For example, restore, move, close, maximize, minimize and etc. At the right side of the title bar, there are three buttons like the button of restoring, the button of maximizing and the button of minimizing. These buttons can be used to set the size of the windows quickly. The detailed operation method you can consult the on-line help in MS Windows.

In addition, each sub-window also has a relative title bar. The active sub-window and the inactive sub-window can be distinguished from the color of the title bar. Please refer to the describing of chapters below.





Figure 4- 3: System menu (In the MS-Windows of Chinese Version, it can not translate into English)

Prompt:

The key of ESC can switch the active sub-window of three windows area.

## 4.2 Menu bar

The title bar underneath is a menu bar, it includes many concealed menus, shown as diagram.

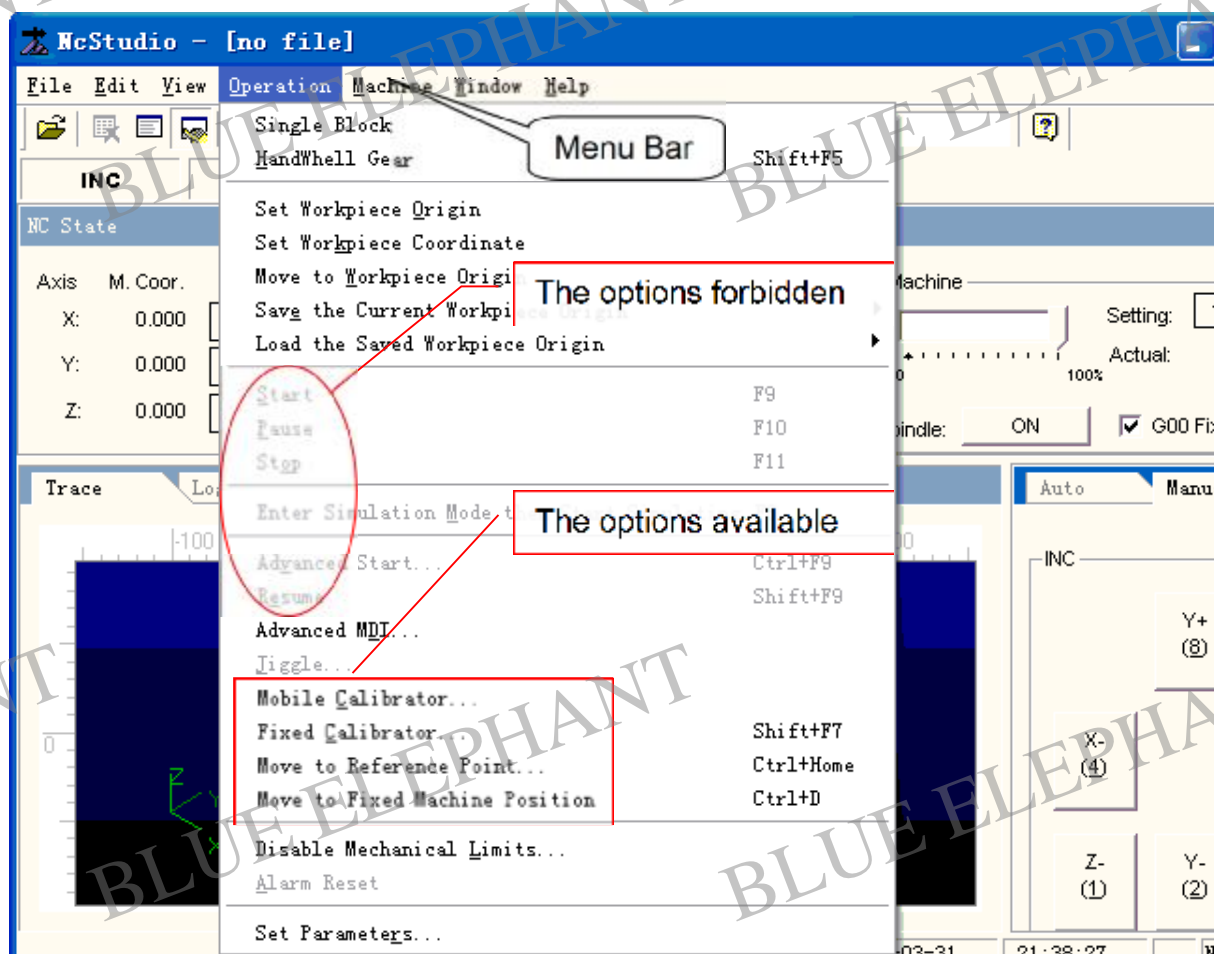


Figure 4- 4: Menu bar

Each drop down menu is composed of several items; each item has a special function, action, or state which is relative to a certain procedure. You can choose one item to implement the relative function, action or change the enactment of the state. You can choose the title bar not only by the mouse but also by the keyboard.

### Mouse operation

At first, you can click main menu of the menu column with the left key of mouse, after the drop down menu is flipped out, you can click the item with left key.

### Keyboard operation

Press down the key of ALT and the hot key alphabet of the chosen menu at the same time (for example "file" can be instead of "ALT+F") and then a relative menu is

appeared.

### Hot key operation

In the drop down menu there is a relative hot key at the right of some menu options, for example: F9 is the hot key of "beginning ..." in the menu of "operation", that is to say the hot key will implement the order directly.

Three dots behind some menus options (such as "open and load ..."), mean that will flip out a dialog box automatically after choosing the option. If the color of some options in drop down menus is gray, it shows that the item can't be chosen in current condition.

In addition, it will flip out a shortcut menu at the different position with the right key of the mouse, from which you can implement the relative order in current position.

## 4.3 Tool bar

The underneath of the menu bar is a toolbar. The toolbar is composed of operation buttons, which can implement the order of menu or the options of the menu with the mouse directly.

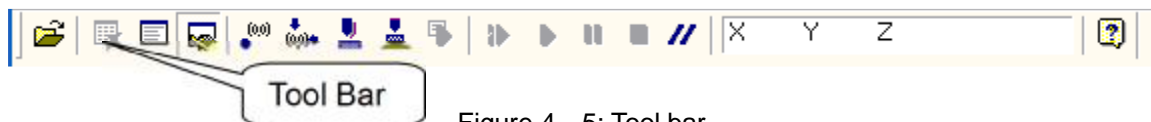


Figure 4- 5: Tool bar

The toolbar button simplified the operation process of the customer consumedly, and makes the whole operation process visual instead of the tedious order list.

### Ø Direct appoint position

Under the idle state, customer can enter the work piece's Coordinate correspondingly in "direct appoint position edit frame", after carriage return is entered, the system will control the machine knife to move to the appointed position quickly.

### Ø Origin setting

This button will set the nonce point as the work piece's Coordinate directly.

The other buttons all on the tool column are the options that the menu columns up correspond. Please pay respects to chapter follow up.

### 4.4 The state bar

The state bar is underneath the toolbar, showing that the current states and some alarm information.

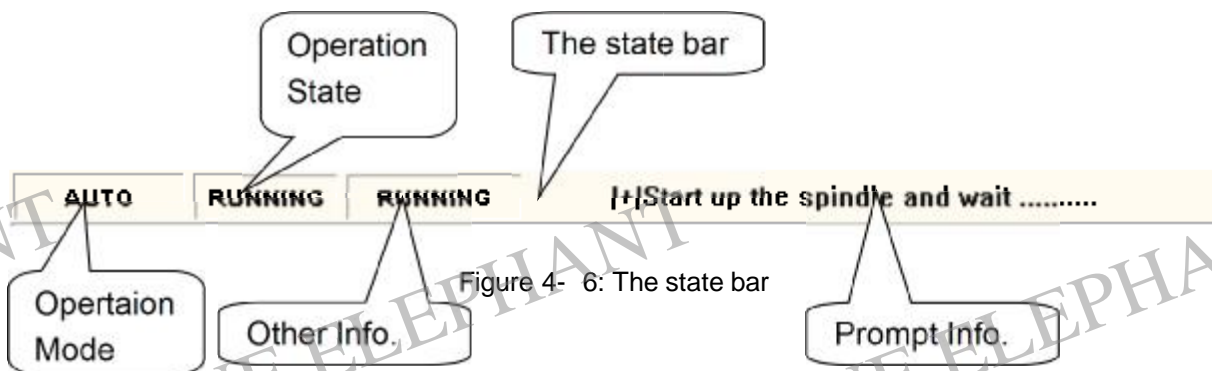


Figure 4- 6: The state bar

### 4.5 Status bar

The bottom of the screen is a status bar, shown as diagram:



Figure 4- 7 Statue bar

Ø Prompt area:

It gives the prompt information of current operation or chosen order.

∅ Designation of date and time:

Show the current information of date and the time.

∅ Designation of keyboard lock:

Show the current state of the keyboard capital lock, the num lock and the scroll lock.

### 4.6 The NC state window

The NC state window is underneath the state bar, which can divide into four areas according to their functions: "current position of the main spindle" area, "the stepping motor speed" area, "the feed rate of stepping motor" area and "the order of current interpolation" area.

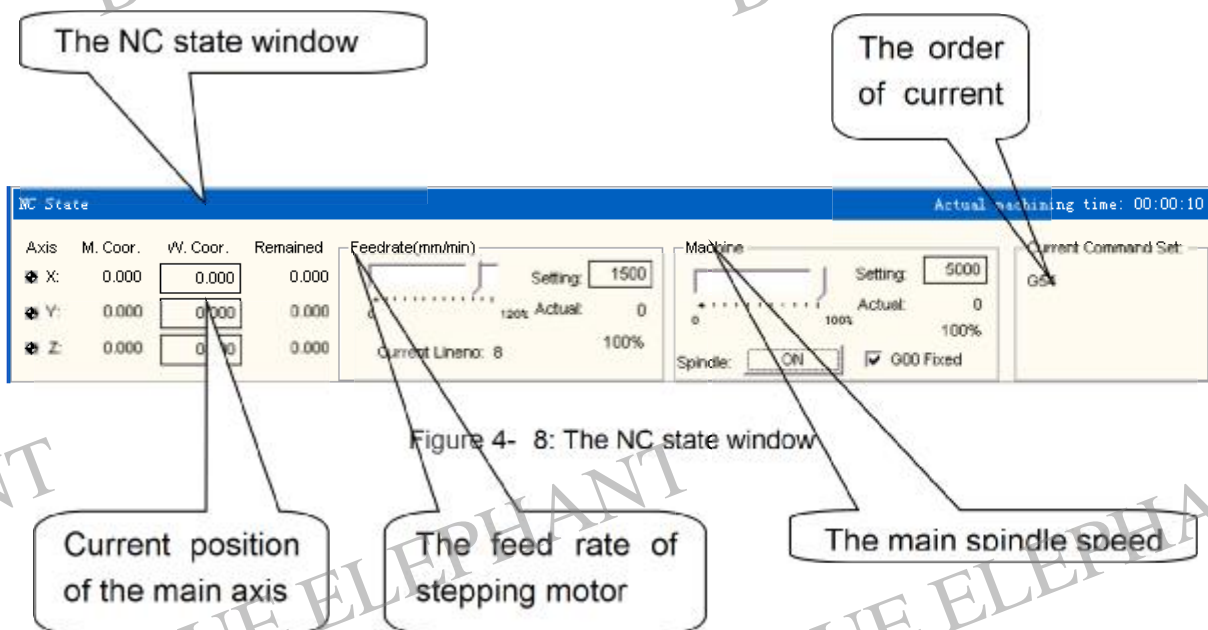


Figure 4- 8: The NC state window

∅ Current position of the main spindle

Shows the current position of main spindle include work piece coordinate, machine coordinate and residual distance in the area and can set current point the original point of work piece.

### ∅ The stepping motor speed

Can set feed speed, feed rate, and also can show the actual value of feed speed in the area.

### ∅ The feed rate of main spindle

Can set the speed, percent rate of main spindle, can show the rate and actual value of main spindle, and also can manipulate the circumrotating of main spindle.

### ∅ The order of current interpolation

Show the state of performing order currently, such as: G54, mode/modeless, G01, G17, G18, G19 and etc.

#### Note :

The contents of that window showing is different according to the different card setting and the different demand of customers, here the provided contents can be consulted only.

## Processing state and time information

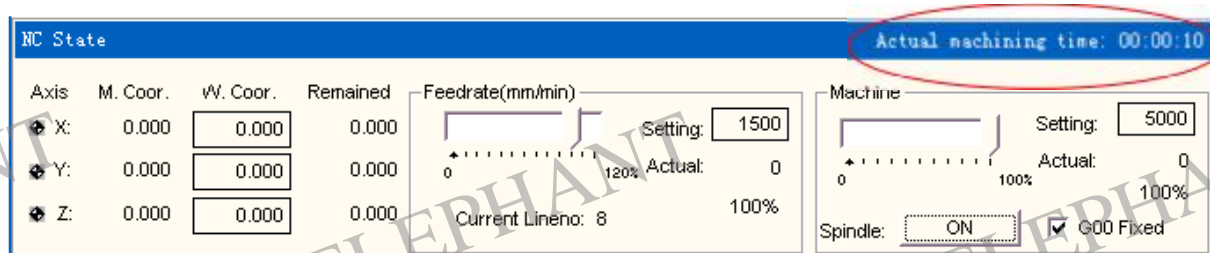


Figure 4- 9: Processing state and time information

The title bar of NC state windows also shows some state information. Shown as diagram above, for example when system simulating, the title bar show the typeface of "simulating mode", at the same time right side in title bar shows the advance implementation time (according to the feed rate of 100%). At actually processing, the right side in title bar shows the actual time.

## Current position

For describing each kind of position expediently, NcStudio shows two sets of coordinate systems at the same time: The mechanical coordinate system and the work piece coordinate system. NcStudio provides many functions to support two sets of coordinate system; the user can examine two sets of coordinate system at the same time, switch it from one to another and intercalate the opposite deflection between them.

At the front of each axis name, it will appear icon “availability of mechanical coordinate system”, when user carries out the operation of back to reference point. It is shown below:

NC State			
Axis	M. Coord.	W. Coord.	Remained
X:	0.000	<input type="text" value="0.000"/>	0.000
Y:	0.000	<input type="text" value="0.000"/>	0.000
Z:	0.000	<input type="text" value="0.000"/>	0.000

Figure 4- 10: Current position

The system provides the convenient method of intercalating and modifying the work piece origin: regarding the current point as the work piece origin i.e. reset the relative position of single axis. Nothing but to move the cursor to the show area of that coordinate axis, you can see the coordinate of that axis is zero after clicking it with left key of mouse. If you wish the current position of all 3 axes would be 0, only needs to click in each area of coordinate.

### Prompt:

Choose the menu of “Operation| Set Work piece Origin ...” is another method of resetting the work piece coordinate system, or press the button of equipollent on the tool bar.

## The feeding speed

At the area of stepping motor, it shows the setting speed, moment speed, speed rate

and etc. It can also modify the setting value of speed and the feeding rate.



Figure 4- 11: The stepping motor speed area

Sliding pole of the feeding speed

#### Ø Sliding pole of the feeding speed rate:

Pulling the sliding pole can regulate the speed of current motion within the scope of 0~120%. It can be shown with the percentage style.

#### Ø Setting value:

The feeding speed is given by the number of F parameter on G instructions.

#### Ø Actual value:

It is an instantaneous speed of the stepping motor, and it is changed following by the change of setting speed, the current accelerating speed, and the feeding rate.

When system is idle, clicking the button of the setting value, that will flip out the dialog box of speed setting. The flipping dialog box is used to set the default speed of self-motion, shown as below.



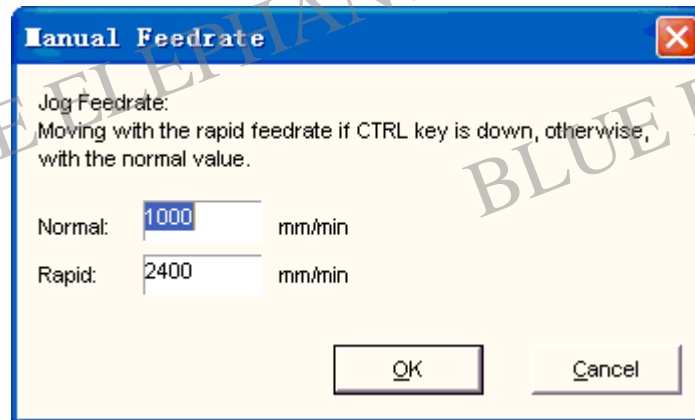


Figure 4- 12 Manual Feedrate Dialogue

Customer can modify the speed according to the instructions of dialogue "Auto Mode Feed rate".

When the system is under the manual setting mode, the button is invalid, and clicks the button won't flip out the dialog box of speed setting.

Note that, here the setting parameters are the same as the column of "Machining Parameter" in parameter windows.

### The main main spindle speed

The main spindle speed area is similar to the feed rate area, it display setting speed, actual value, feed rate and etc. It can also modify the setting speed and the value of feeding rate.

#### ∅ The main spindle revolving button:

This button is the same as the on-off of main spindle.

#### ∅ Setting speed of main spindle:

Clicking this button can flip out a dialog box of main spindle speed enactment, customer can modify the speed of main spindle on the dialog. (Shown as a figure below)

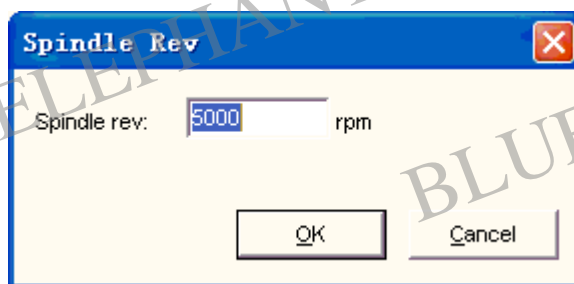


Figure 4- 13: Spindle Rev Dialogue

### ∅ The order of current interpolation

This area displays the state of current order, for example: G54, mode/ modeless, G01, G17 and etc.

## 4.7 Automatic operation window

It shows the current opened processing procedure file. NcStudio supports the two kinds of processing procedure format now: ISO standard G instruction format and HP PLT. The user can look into the current processing procedure from this window.

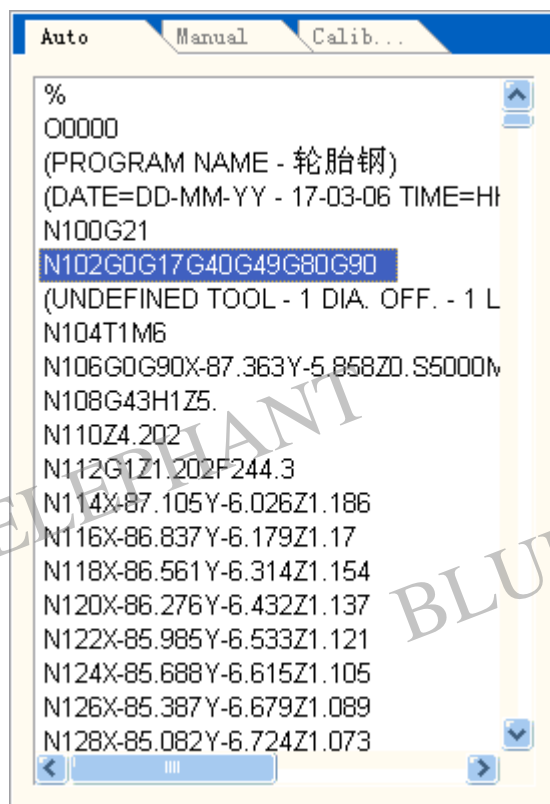


Figure 4- 14: Automatic operation window

Right click the mouse in this window, the system flips out the context menu, as follows:

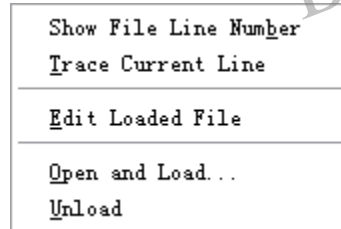


Figure 4- 15: Context menu of automatic operation window

These items of the menu colligate common operation that is correlative with automatic operation, at the same time these menus can be found in standard menu, which is convenience for customer to operate with the keyboard. The items both “Show File Line Number” and “Trace Current Line” can be found in the menu of “View”; Three residual items can also be found in “File”. Consult Section 5.1 and Section 5.3 you can find the explanation about them.

Because the “Auto” window locates in the area of main window’s function window, the customer needs to switch it among several windows, the methods of activating the “Auto” window are:

#### Menu method

Choose" window| Show Auto Window ";

#### Hot key method

Click the key of “Ctrl+1” and activate that window;

#### Prompt:

The processing procedure shown in that window is only provided for looking into, can't be edited and modified. If you need to edit the file, please click “file| edit loaded file”; If you only want to edit a procedure or a file, you can click “file| open and edit...”

## 4.8 Manual operation window

Manual window is an interactive operation environment which the user operate the machine tool with manual manner.

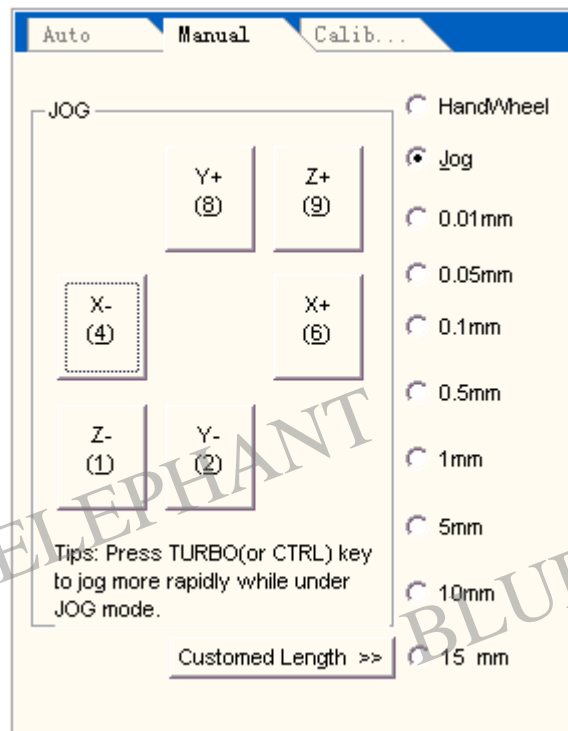


Figure 4- 16: Manual operation window

Because manual window locates at the area of function of the main window, the customer need switching in several windows, the methods of activating manual window are:

### Menu method

Choose " window | Show Manu Window";

### Hot key method

Click the button of "Ctrl+2" and activate that window;

In the areas of manual button window there are six manual buttons that represent three directions of X, Y, Z axis.

## Manual

---

There are two methods to operate the machine tool manually: one is continuous point-motion operation the other is increasing stepping operation.

### ∅ Continuous point-motion operation

In this mode, you can drive the machine tool by pressing down relative number while the manual window is activated.

#### Note:

The manual window should be active which can be distinguished by the title bar color of the manual window. Take no account of the appearance of the number lock when manual window is activated.

When implementing the action of point-motion, the Trace view window shows the track with the color of G00 instruction.

### ∅ Increasing stepping operation

It is another manual operation mode that is similar to manual operation. But what different from continuous point-motion operation mode is that it can control the stepping distance of machine tool's motion-axis accurately.

The user can carry out the increasing stepping operation with mouse and keyboard through the interface, also can do it by manual operation panel or operation box. When pressing the manual button the relative axis will move a certain stepping length.

Before using this way to operate machine, you must set the fit step length, by adjusting the point-motion step length you can set the length of point-motion feeding.

#### Keyboard method

When the point-motion window is the active window, you can notice the change of point-motion stepping length button by increasing or decreasing the step length with direction key.

## Manual

---

### Mouse method

Click the fit stepping length button with mouse directly.

### Self-definition method

Click the "Self-define step length" button, it will flip out a dialog box, customer can modify the step length properly, and then key in carriage return, the system will step to according to the modified step length.

#### Note:

Avoid setting the point-motion step length of Z-direction too long to damage the machine tool with misoperation.

After setting the fit step length, you can operate the machine tool with keyboard, mouse or the button of manual control panel.

### Keyboard method

When the manual window is the active window, clicking the number button corresponding to the button will trigger the button of manual control panel, keying in space bar will trigger the button with focus.

#### Note:

Emphasize again, the current active window is an important concept of the system, until window is on activity, the relative action of keyboard will be valid which can be distinguished by the color of the title bar.

### Mouse method

Clicking the button with the left key of mouse, the button is triggered.

#### Note:

Due to the system needs a certain time to carry out the point-motion

instruction, if you send out point-motion instruction too frequently the system will give you mistaking information: "system is busy now and the operation is invalid."

### Ø Increasing/decreasing depth

Using the key of "+/-" working in the number key can increase or decrease the depth quickly.

## 4.9 Calibrating Window

Manual window is an interactive operation environment which user can perform the different kinds of calibrating functions.

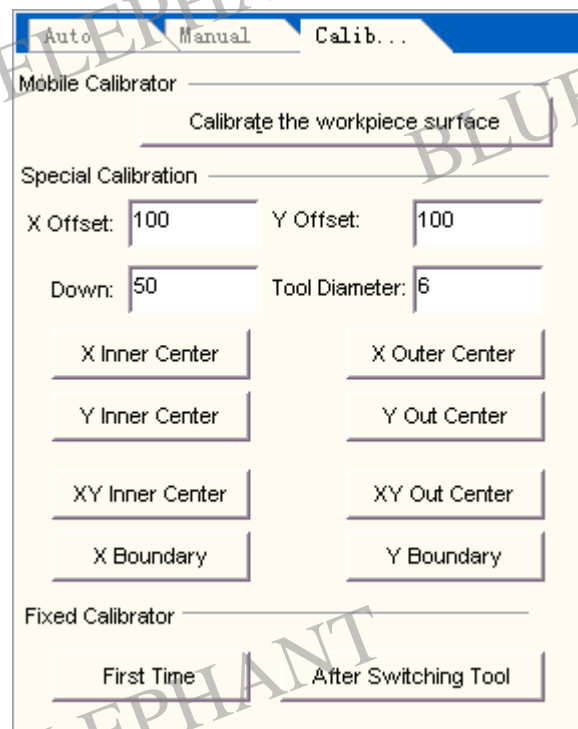


Figure 4- 17: Calibrating Window

Because calibration window locates at the area of function of the main window, the customer need switching in several windows, the methods of activating calibration window are:

## Manual

---

### Menu method

Choose" window | Show calibration Window";

### Hot key method

Click the button of "Ctrl+3" and activate that window;

Customer can perform three different functions through knock down the button of calibration window.

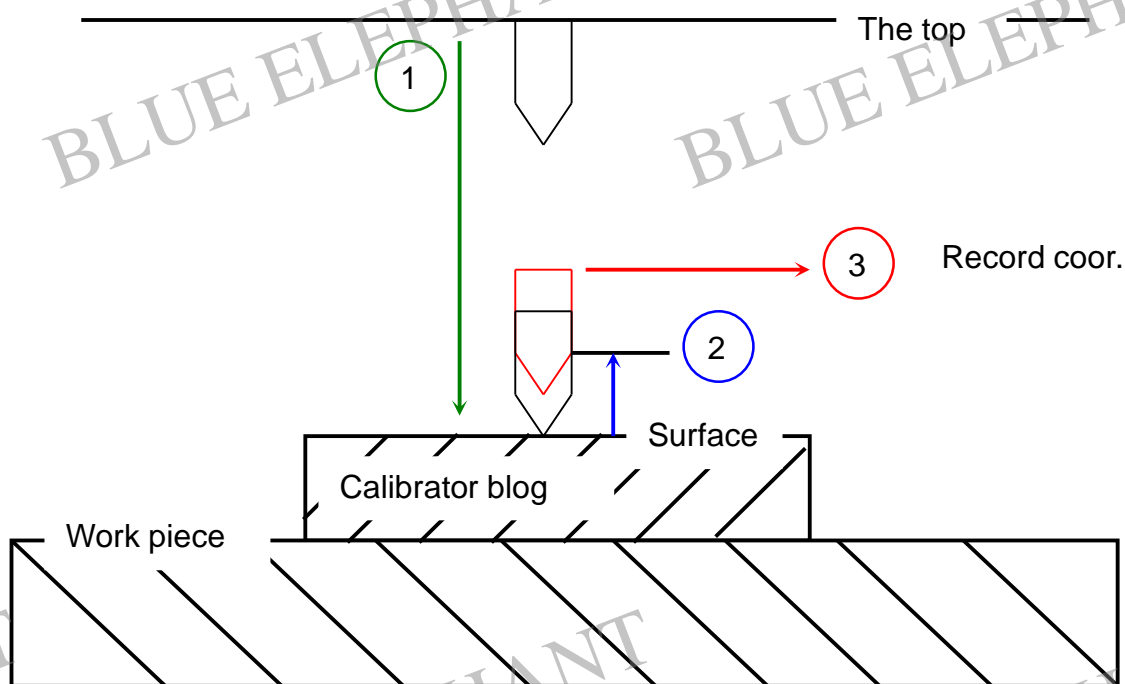
The three functions are: Mobile calibrator, Special Calibration, Fixed calibrator.

### **Mobile calibrator**

The function is in order to calibrator the surface of work piece. When customer knocks down the button, the system will flit out a dialogue requiring whether perform a calibrator action. Knock down the "Yes" button will complete the function. The state bar will show the information "waiting for the calibration single". The function is corresponding to the item "Mobile calibrator" of menu "operation" and to the button

 "in the toolbar. See chapter 5.4 in details.





### Special Calibration

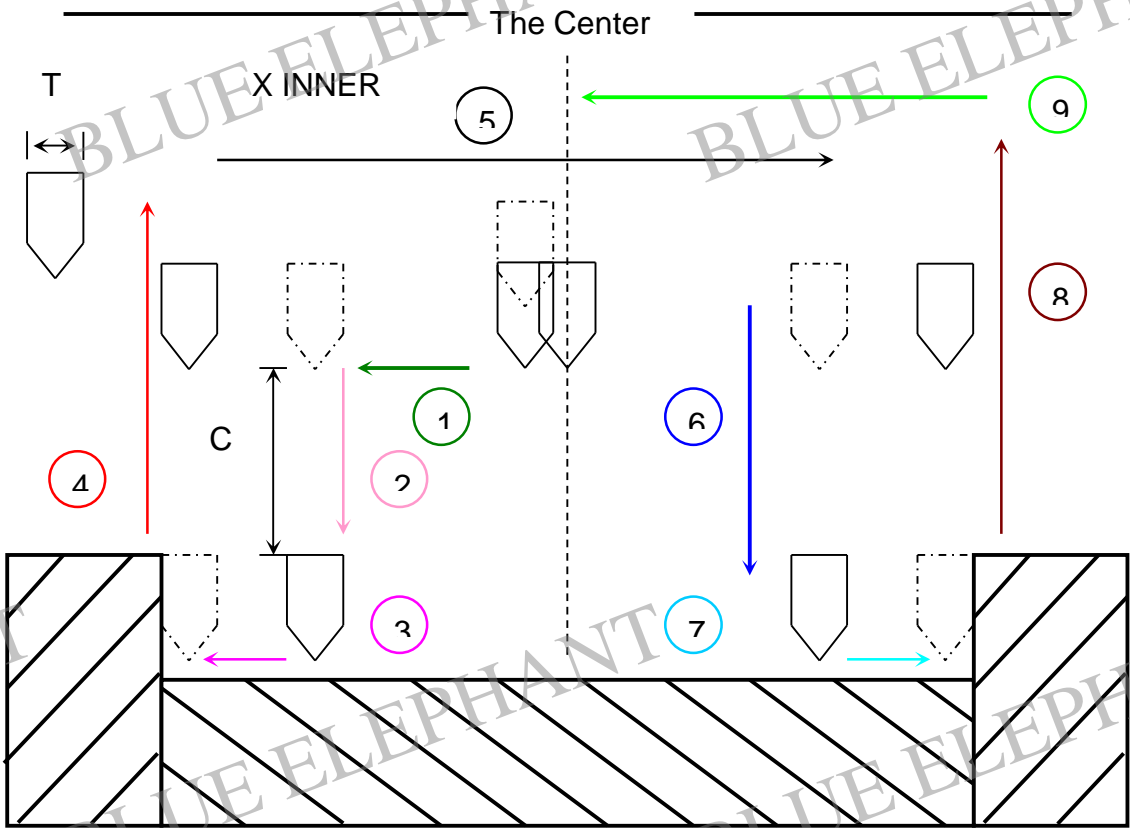
The function is in order to locate the boundary and the center of the work piece conveniently.

Before use the function of special calibration, please input the center distance of x axle, the center distance of y axle, descending distance and tool diameter. When use the center calibration, the customer should evaluate the center point of work piece. The descending distance is the distance Z axle descending or ascending when calibration, it should be less than the distance form original point to the surface when perform inner calibration. It should be larger than the distance form original point to the surface when perform outer calibration. The center distance is the evaluate distance from center point to boundary, it should be larger than actual distance when perform inner calibration, it should be less than the actual value when perform outer calibration.

#### Ø X Inner Center

Knock down this button, the system will perform X axle inner center calibration.

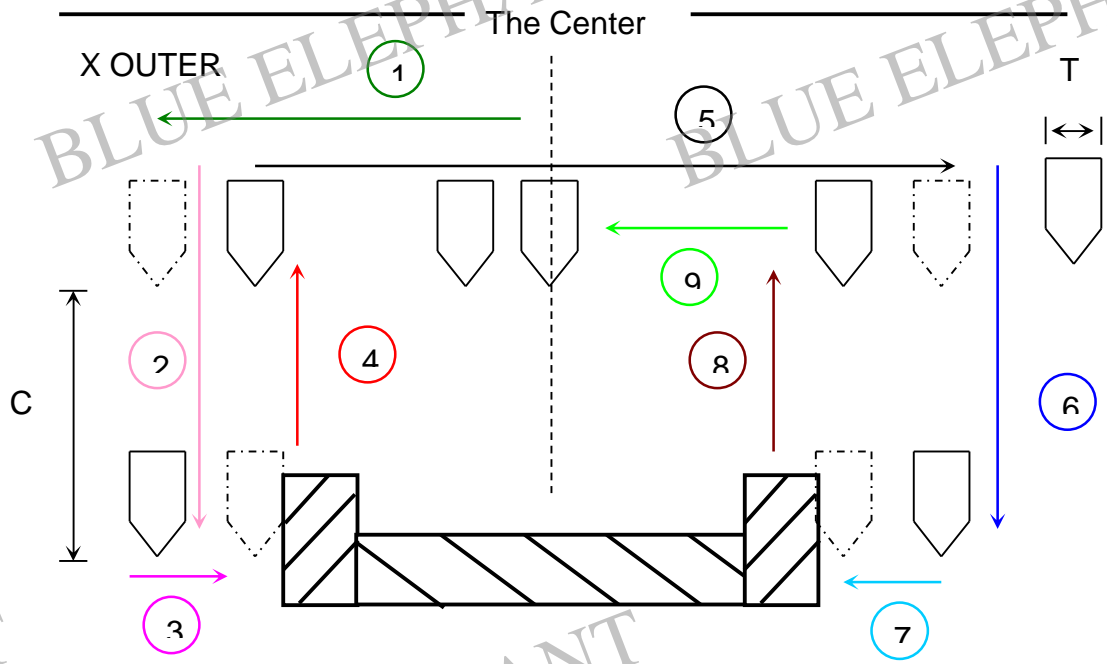
The procession of X axle inner canter calibration is shown below:



The calibrations below are the same to the X inner center calibrating.

Ø X Outer Center

The procession of X axle outer canter calibration is shown below:



Ø Y Inner Center

It is the same as X Inner Center Calibration.

Ø Y Outer Center

It is the same as X Outer Center Calibration.

Ø XY Inner Center

It is the same as X Inner Center Calibration.

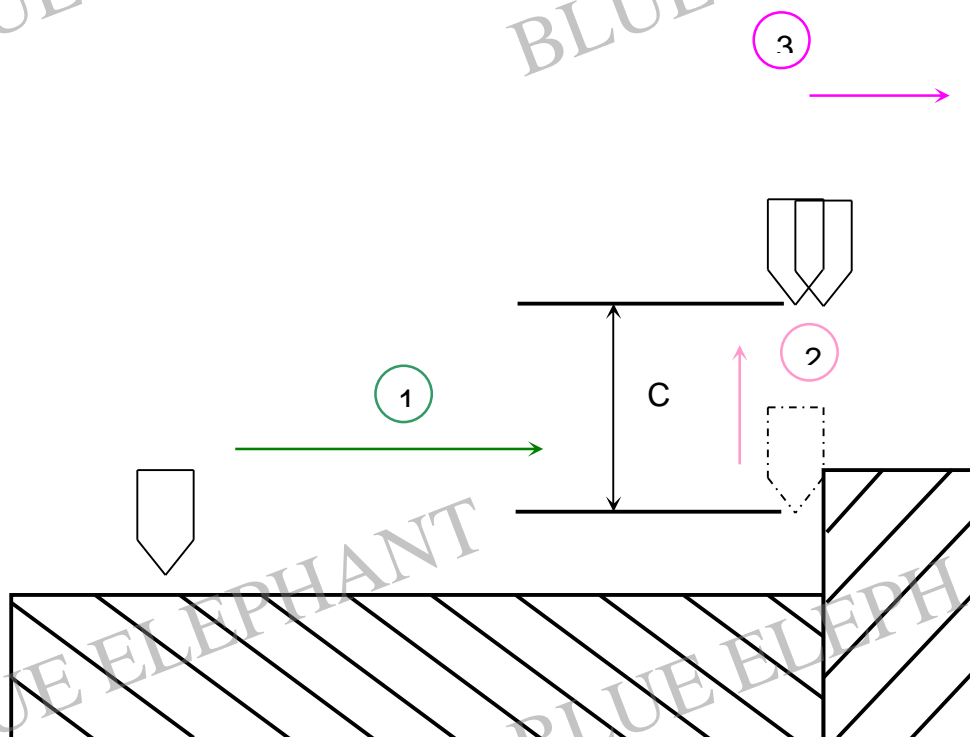
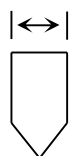
Ø XY Outer Center

It is the same as X Outer Center Calibration.

Ø X Boundary

X BOUNDARY

T



Ø Y Boundary

It is the same as X Boundary Calibration.

The boundary calibration is in order to modify the boundary point as Zero point of origin point corresponding to X or Y axle.

**Fixed calibrator**

This function can help the user set the suitable Z-axis of work piece origin and readjust the z-direction coordinate after switching the cutter.

The function is corresponding to the item "Fixed calibrator" of menu "operation" and to the button "🔧" on the tool bar.

See chapter 5.4 in details.

|| Attention:

The NcStudio of vision 8.3 (and above) can perform “pause” and “stop”, functions when calibration (include Special Calibration)

## 4.10 Machining trace window

When the machine tool implementing processing procedure or simulating, the Machining trace window can follow the cutter-processing track real-time. The ability of three-dimensional real-time showing of following processing track can check the cutter's track more visually to ensure the processing correct.

The trace window adopts three-dimensional view mode. You choose the menu of “View/Customize...” to set it characteristically. You can refer to forward section “Customize parameters” .

### Three-dimensional view mode

This mode provides user abundant operation to examine the sketch from different angles and in fit scaling.

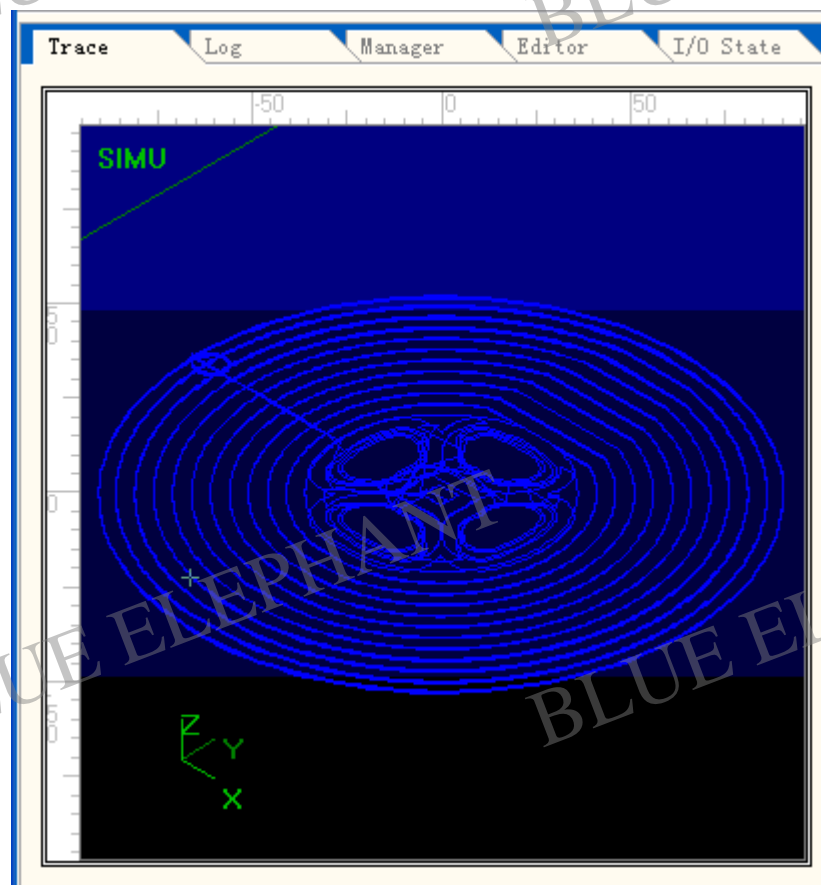


Figure 4- 18: Trace Window

## Clear function

After a long time of processing, the imitating figure becomes very complex and the temporary folder used to record processing track becomes more and more bulkiness. It will spend a lot of time in redrawing, moving, or revolving the imitating figure. That will need user to clean the tracking window.

There are many methods to clear the tracking window. You can complete it by menu, toolbar button, hot key, and the keyboard.

### Menu or toolbar method



Choose the menu of "Edit| Clear View", or choose the relative button on the toolbar.

The corresponding mark of this button on the tool column shows as: 

### Hot key method

Press down the key of "CTRL+ DEL" to realize the clearance of tracking window at anytime.

### Mouse method

Moving the mouse into the manifestation area, when the mouse shows  or , clicking the right key of the mouse, then it will flip out a context menu, chose the option of "Clear".

### Keyboard method





Press the key of DEL while the trace window is current active window.

## Moving function

### Mouse method

## Manual

---

By dragging operation of the mouse's left key can move the tracking figure: Moving the mouse to the manifestation area, the mouse shows  or . Clicking the right key of the mouse, then it will flip out a context menu, chose the option of "Move". The mouse shows . Clicking the left key of the mouse, the mouse shows . Press down the left key of the mouse and drag the mouse slowly, and keep dragging it. After completing the moving of the whole following figure, loose it.

Prompt:

Please practice it for several times, you will find this method is very convenience!

### Keyboard method

Complete the moving of the following figure by the four directions key in keyboard.





### Zoom function

You can use three methods like the menu, keyboard, and the mouse added keyboard to realize the zoom of the following track figure.

### Menu method

Choose "View| Zoom Ratio ..." to set the fit scaling.

### Mouse plus keyboard method

Move the mouse into the manifestation area, when the mouse shows , clicking the left key of the mouse, the figure will be enlarged, when the mouse shows , clicking the left key of the mouse, the figure will be reduced. If you press the CTRL key, the mouse shows  and  between which can be switched.

Prompt:

While zoom the window with mouse, don't move the mouse as click, otherwise it becomes the moving operation.

### Keyboard method

Activate this window first, then choose the key ("+" "-") on small keyboard to realize zoom.

#### Note:

On the main keyboard the key of "+" and "-" are invalid.



### The center view function

Show the center of the scope of processing at present.

#### Menu method

Choose "View | Center View" to perform.

#### Mouse method

Moving the mouse into the manifestation area, the mouse shows  or  at this time, clicking the right key of mouse, flip out the context menu, choose "in the center" option.

#### Keyboard method

First, activate this window, chose "Home" key on the keyboard.

### Adjust to the window size function



The function will show the trace figure into the trace window self-adopted. Customer can see the entire content of the trace without rolling over the scroll bar.



### Menu method

Choose "View | Fit to window".

### Mouse method

Move the mouse into the manifestation area, the mouse shows  or  at this time, clicking the right key of mouse, flip out the context menu, choose "Fit to window" option.

### Keyboard method

First, activate this window, chose "\*" key on the keyboard.



### Show current point function

The function will show current point of the processing into the center of trace window.

### Menu method

Choose "View | Show current point " to perform.

### Mouse method

Move the mouse into the manifestation area, the mouse shows  or  at this time, clicking the right key of mouse, flip out the context menu, choose "Show current point" option.

### Keyboard method

First, activate this window, chose "End" key on the keyboard.

## Customize parameters.

Customizing parameter through “Customize” Dialog can set the system at the aspect of showing the trace window. It is aimed to the characteristic setting of the window to realize the user-defined of tracking mode and color. Customer can select “View|Customize...”, or click the right key of mouse, flipping out a context menu, select “Customize” to perform the function, when trace window is active.

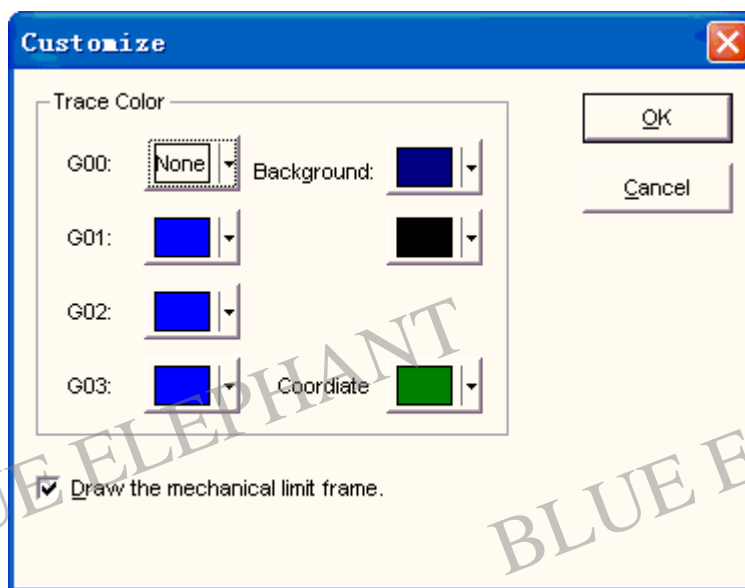


Figure 4- 19: Customize Dialogue

### Ø Tracking color:

In the trace window, you can allocate each different display elements respectively. Include:

Color of G00 instruction: This color indicates the color of G00 instruction's track

Color of G01 instruction: This color indicates the color of G01 instruction's track.

Color of G02 instruction: This color indicates the color of G02 instruction's track

Color of G03 instruction: This color indicates the color of G03 instruction's track

### Ø Background color:

Background color of trace window has two kinds of colors, the user can collocate the different color to realize two kinds of colors changing gradually.

### Ø Coordinate color:

It is the color of the hint coordinate protracted in the Trace window.

In addition: The manual track or point-motion track is shown with the color of G00.

Click the choosing color button, the system will flip out a pulling-down frame of choosing colors, shown as below:

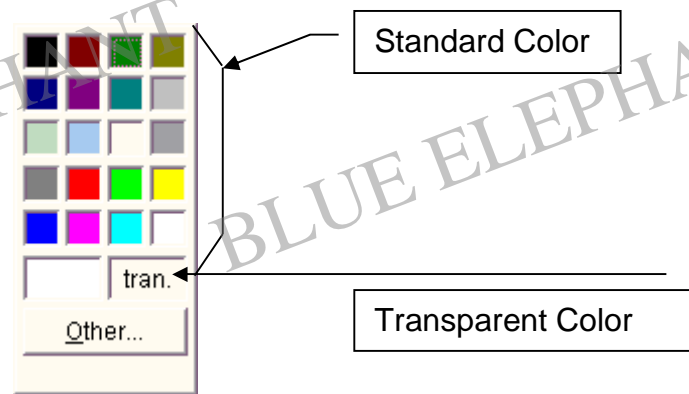


Figure 4- 20: Choosing Color

### Ø Draw the mechanical limit frame

The customer can select the “Draw the mechanical limit frame” option at the bottom of “Customize” dialogue. When the option was selected, the system will show the mechanical limit frame, please pay attention to the change of Trace Window.

#### Prompt:

If the chosen color is transparent, conceal the homologous instruction track. However, it is not a good idea to set background transparent, because this usually cause window can't be refreshed correctly.

## Revolving function

It can be completed by keyboard operation only (viz. Alt + direction keyboard). At the same time of pressing the key of ALT, press down the direction key and complete the revolving operation of the tracking figure.

The system provides the view observation direction in common use; you can switch it quickly by the number key on the small keyboard.

∅ Front View	5
∅ Top View	8
∅ Bottom View	2
∅ Left View	4
∅ Right View	6
∅ Southwest View	1
∅ Northwest View	7
∅ Southeast View	3
∅ Northeast View	9

## Context menu

Click the window with the right key of mouse, the context menu will be flipped out. Here, the detailed function will be omitted which is introduced in the front.

C <u>l</u> ear	Ctrl+Del
✓ M <u>o</u> ve	
Z <u>o</u> om <u>O</u> ut	Num+
Z <u>o</u> om <u>I</u> n	Num-
C <u>e</u> nter	Home
<u>F</u> it to Window	Num*
S <u>h</u> ow Current <u>P</u> oint	End
S <u>e</u> t Zoom <u>R</u> atio...	
C <u>u</u> stimize Trace View...	
<u>F</u> ront View	Num5
<u>T</u> op View	Num8
<u>B</u> ottom View	Num2
<u>L</u> eft View	Num4
<u>R</u> ight View	Num6
<u>S</u> outhwest View	Num1
<u>N</u> orthwest View	Num7
<u>S</u> outheast View	Num3
<u>N</u> ortheast View	Num9

Figure 4- 21 Context menu of Trace window

## 4.11 System log window

This window records the important operation and happened events, from it not only can you browse the log information that is happened from this start, but also you can review the historical records. With the using experience becomes abundant, you will find the system log information becomes more and more helpful.

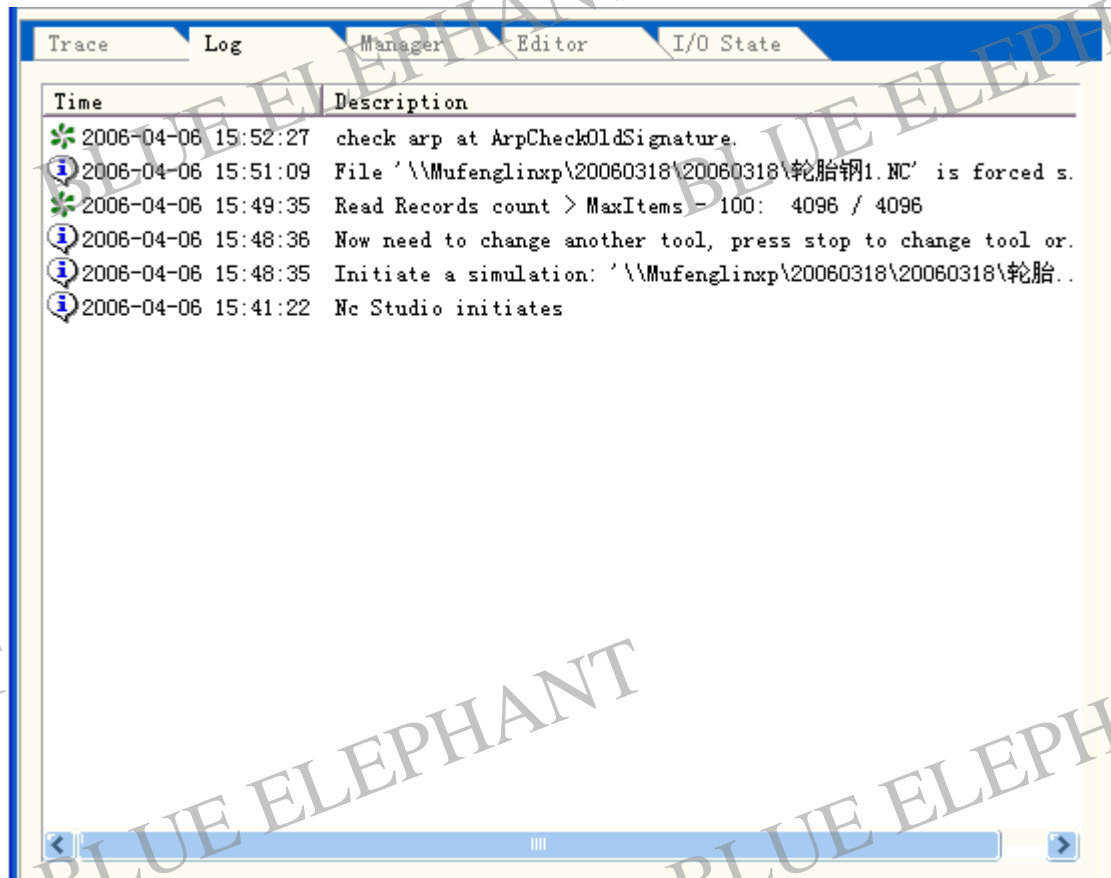


Figure 4- 22: System log window

The log information of current record in system includes:

- I Start and close.
- I Information of the beginning automatically and ending in processing automatically.
- I Change of the working coordinates.
- I Alarm information of the system.
- I Other system information.

### Log clearance function

Delete the log record within current system in the system log window.

### Menu method

Choose" Edit| Clear log "to perform.

### Mouse method

Move the mouse into the log manifestation area; click the right key of the mouse, when flip out a context, choose "Clear log" option.

#### Note:

Remember to periodically clean up the system log record! Otherwise the file of the system log record will be too big to affect the function of the system and the responding time.

### The log manifested options

Picking out following options, there will appear " ✓ " sign in the front of the options. Carry on the operation again; the sign in the front of the options' disappear, expressing to uncheck.


#### ☐ Show this session:

Customer can click the right key of the mouse in the log window, when flip out a context menu, choose "Show this session" option, and also can choose "View | Show this session" by menu method to perform.

Pick out that option, the customer can look into a log record for operate of this session only; do not pick out that, the customer can look into an operation log record of this session and the past log record records.


#### ☐ Show information item

Customer can click the right key of the mouse in the log window, when flip out a context menu, choose "Show information item" option, and also can choose "View | Show information item" by menu method to perform.

Pick out that option, the customer can look into a log record for start and stop information of system; do not pick out that, the log record for start and stop information of system will not be shown in the log window. Information diagram mark is .


### Ø Show warning item

Customer can click the right key of the mouse in the log window, when flip out a context menu, choose "Show warning item" option, and also can choose "View | Show warning item" by menu method to perform.


Pick out that option, the customer can look into a log record for warning information of system; do not pick out that, the log record for warning information of system will not be shown in the log window. Warning information diagram mark is .

### Ø Show error item

Customer can click the right key of the mouse in the log window, when flip out a context menu, choose "Show error item" option, and also can choose "View | Show error item" by menu method to perform.

Pick out that option, the customer can look into a log record for error information of system; do not pick out that, the log record for error information of system will not be shown in the log window. Error information diagram mark is .

Prompt:

Basic log information diagram mark is .

## Context menu

Click the window with the right key of mouse, the context menu will be flipped out. Here, the detailed function will be omitted which is introduced in the front.

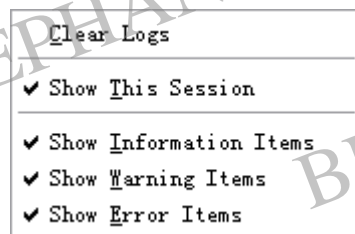


Figure 4- 23: Context menu of System log window



## 4.12 Procedure file manager window

The procedure file manager window mainly used for the management of processing file. Customer as long as appoint the procedure document to the fixed catalogue; NcStudio Can manage these documents in a manager inside. In the manager window, customer can complete creating, using, editing, delete renaming, loading procedure file and etc. It is extremely convenient to customer.

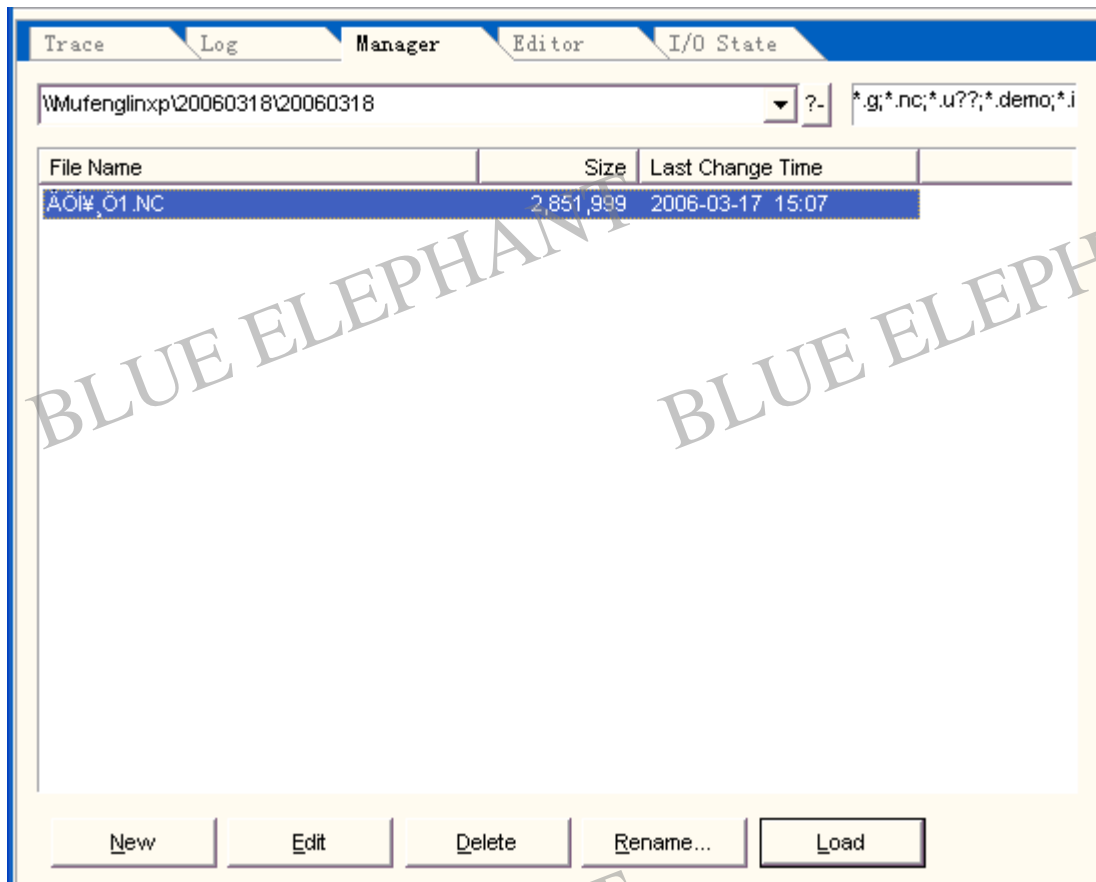


Figure 4- 24: Procedure file manager window

### Create new procedure file

The customer can create the procedure file immediately; click "New..." button that under the manager window, then customer will create the procedure file with the name "Untitled1. nc" in the special catalogue ( customer can enter appointed path in the combine box, also can click the " ... " button then specify the appropriate path). If need to modify the created file, customer can choose other operations, such as edit, delete, rename, load and etc. The detailed contents see the follow-up chapter.

**Prompt:**

Customer also can choose "File |New" by menu method, or use Short cut key: Ctrl + N, or move the mouse into the file list frame of manager window, clicking the left key of the mouse, choose "New" option in the context menu flipping out to create a new procedure file.

**Open a procedure file existed**

Customer can open a procedure file existed with specified path in the manage window. Customer also can click the "... " button near the combine box to find the procedure file existed that can be supported by NcStudio system (The extended names of files that is supported by NcStudio system are listed in the edit box near the "... " button. Customer can modify and add the extended names of files. ).The file list box under the combine box will list files' names. Customer can hand with the file specified.

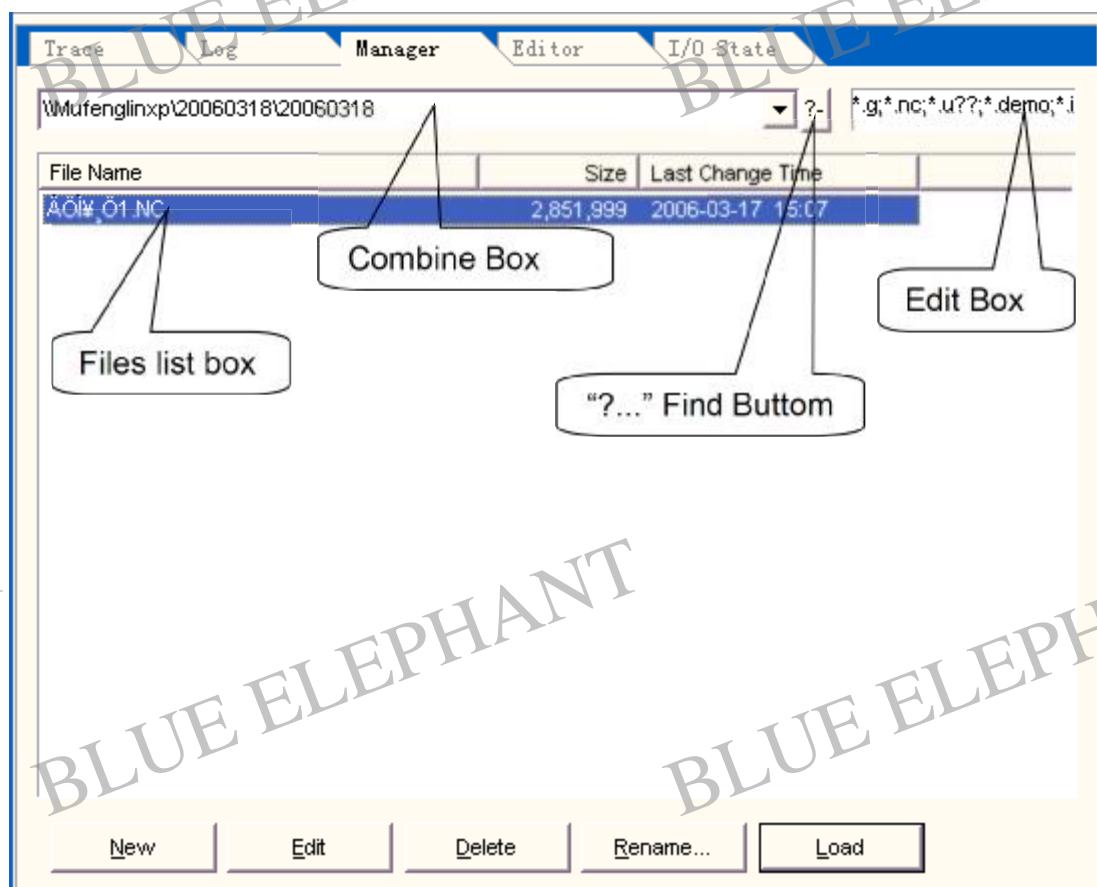


Figure 4- 25: Open a procedure file existed

**Prompt:**

Customer also can choose “File |Open and Load” by menu method, or use Short cut key: Ctrl +O to open a file existed and load it, or choose “File |Open and Edit” by menu method, or use Short cut key: Ctrl +E to open a file existed and edit it.

### Edit a procedure file

Customer can edit content of procedure file specified. First, choose the procedure file need to edit, second, click “edit” button, then the system will jump into file edit window. See detailed content in following chapter (4.12).

Prompt:

Customer also can click the procedure file need to edit in the file list box first; the color of file specified turn to blue right now; then clicks the right key of mouse; choose “Edit” option, the system will jump into file edit window.

### Delete procedure file

Customer can delete procedure file specified. First, choose the procedure file need to delete, second, click “delete” button; then the system will flip a dialogue box requiring “Be sure to delete the file? ” and “Before deleting it ,please confirm it is not edited or being used by others.”; customer can make a decision by practice.

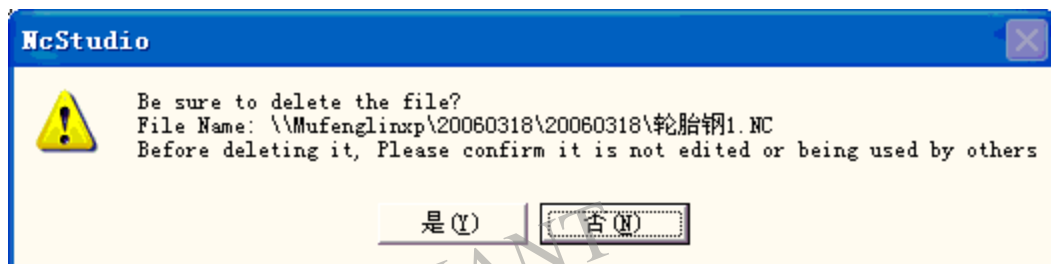


Figure 4- 26: Prompt window of delete procedure file

Prompt:

Customer can click the procedure file need to delete in the file list box first; the color of file specified turn to blue right now; then clicks the right key of mouse; choose “Delete” option to complete the function. Customer also can choose “Edit |Delete” to perform the function by

menu method.

### Rename procedure file

Customer can delete procedure file specified. Choose the procedure file need to rename first, then click "Rename" button, rename the file to complete the function.

Prompt:

Customer also can click the procedure file need to rename in the file list box first; the color of file specified turn to blue right now; clicks the right key of mouse; choose "Rename" option, then rename the file.

### Load procedure file

Load procedure file means that the system will load the file into the buffer waiting for translation and then the system is ready to process. Customer can load the procedure file specified. Choose the file need to load; click "Load" button; system will complete the load function.

Prompt:

Customer also can click the procedure file need to load in the file list box first; the color of file specified turn to blue right now; then clicks the right key of mouse; choose "Load" option to complete the function. Customer also can choose "Edit |Load the Selected File" to perform the function by menu method.

## 4.13 The procedure file edit window

Above the edit window is the file name being edited. Underside is a standard style edit window.

The edit ability of this editor is more powerful than Windows NT default Notebook. Theoretically, this editor can edit over 1000M of processing procedure and satisfies the requirement of editing any complex procedure.

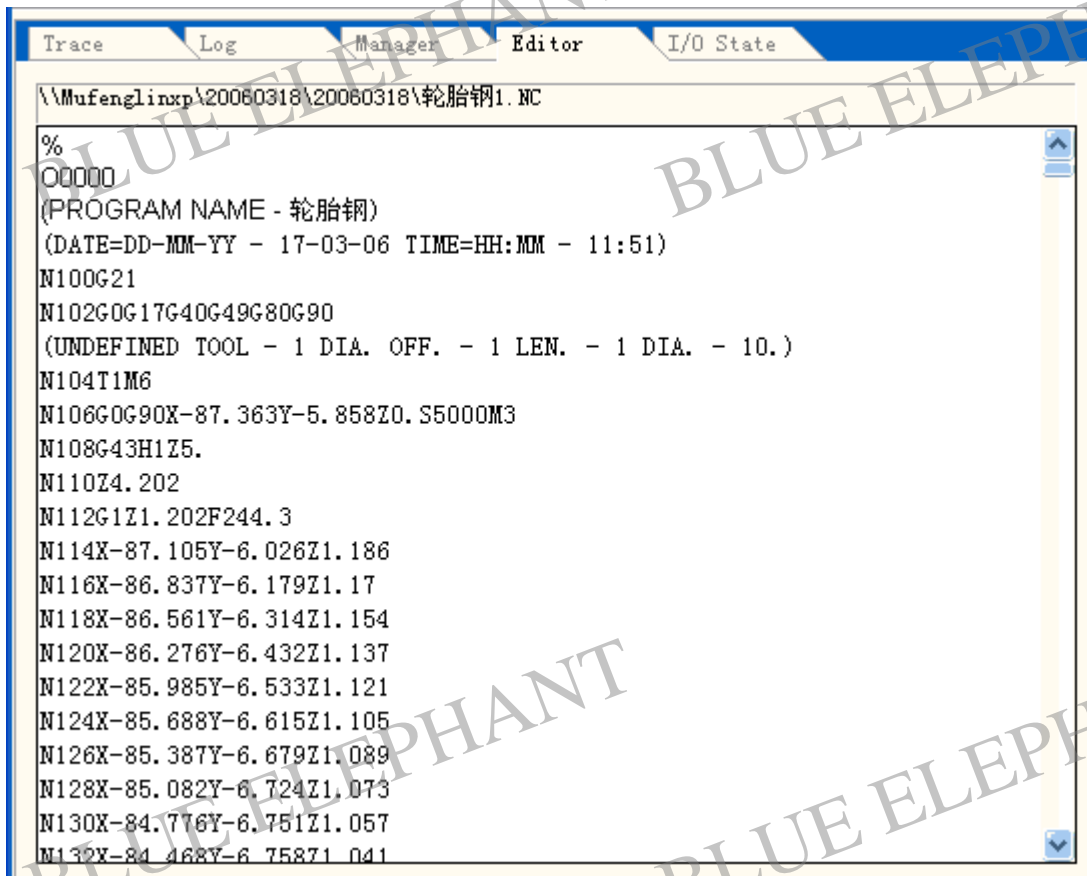


Figure 4- 27: The procedure file edit window

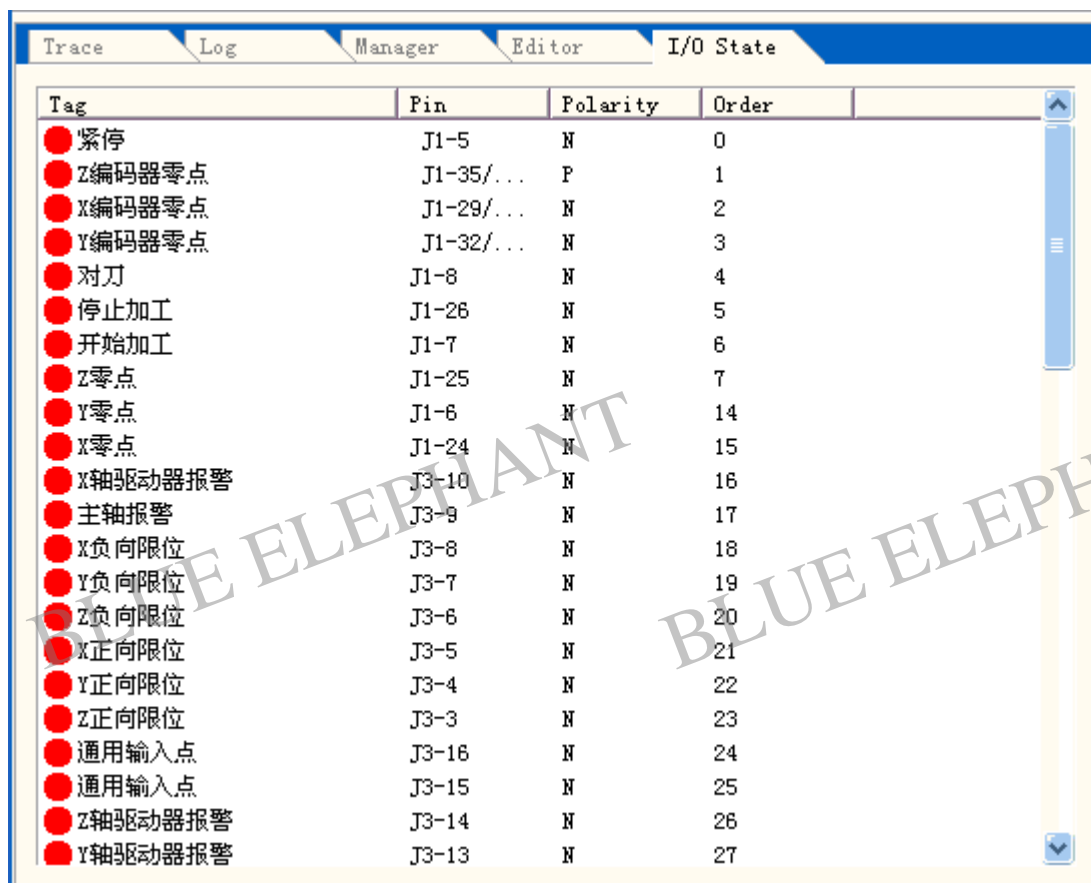
Clicks the right key of mouse in the editor window, system will flip out a context menu, the options in the menu is the most in common use, customer can choose the option according to own demand, so it does not give unnecessary details.

U <u>ndo</u>	Ctrl+Z
C <u>ut</u>	Ctrl+X
C <u>opy</u>	Ctrl+C
P <u>aste</u>	Ctrl+V
S <u>elect All</u>	Ctrl+A
F <u>ind...</u>	Ctrl+F
Find the Next	F3
R <u>epat...</u>	Ctrl+H
S <u>ave and Load</u>	
S <u>ave</u>	
C <u>lose</u>	

Figure 4- 28: Context menu of procedure file edit window

## 4.14 State of input or output (I/O) window

The input/output state window displays the current states of I/O, which is very beneficial to the system monitoring and malfunction checking.



Tag	Pin	Polarity	Order
● 紧停	J1-5	N	0
● Z编码器零点	J1-35/...	P	1
● X编码器零点	J1-29/...	N	2
● Y编码器零点	J1-32/...	N	3
● 对刀	J1-8	N	4
● 停止加工	J1-26	N	5
● 开始加工	J1-7	N	6
● Z零点	J1-25	N	7
● Y零点	J1-6	N	14
● X零点	J1-24	N	15
● X轴驱动器报警	J3-10	N	16
● 主轴报警	J3-9	N	17
● X负向限位	J3-8	N	18
● Y负向限位	J3-7	N	19
● Z负向限位	J3-6	N	20
● X正向限位	J3-5	N	21
● Y正向限位	J3-4	N	22
● Z正向限位	J3-3	N	23
● 通用输入点	J3-16	N	24
● 通用输入点	J3-15	N	25
● Z轴驱动器报警	J3-14	N	26
● Y轴驱动器报警	J3-13	N	27

Figure 4- 29: State of input or output (I/O) window (You will see the English Version in received software)

### Attention:

The contents of that window are different according to different panel-card set and the different requirement of the user. Here the contents provided you can consult only.

## **5** NcStudio Menu system

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## 5.1 "File" menu

This menu includes order options used to operate file.

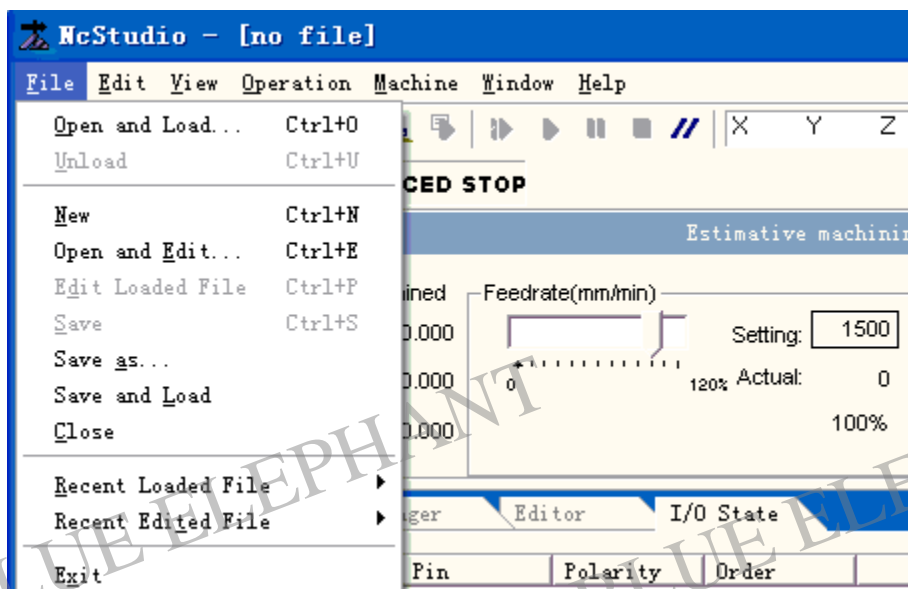


Figure 5- 1: "File" menu

The two former items of pulled down menu is used to load or unload the procedure files. Functions of load in or unload relate to processing automatically. It means that the procedure documents can be loaded into or unloaded from digital control procedure explanation buffer. After loaded into, the sign of that procedure is displayed on automatic operation window.

The middle seven menu items of the window are used for the file operation. The file opened by the edit function is shown in editor window. Please pay attention to distinguish difference between load and unload.

### Open and load

This item also can be carried out quickly by hot key" CTRL+ O".

That menu is used for opening the processing procedures from disk and loading it to the digital control procedure explanations buffer of the system. Then the explanation engine will explain the parameters from the buffer, and transfer the producing instructions to digital motion control card. After completing these operations, the whole



processing procedure is realized.

Choose the menu item and flip out the "Open" dialog box, is shown as below:

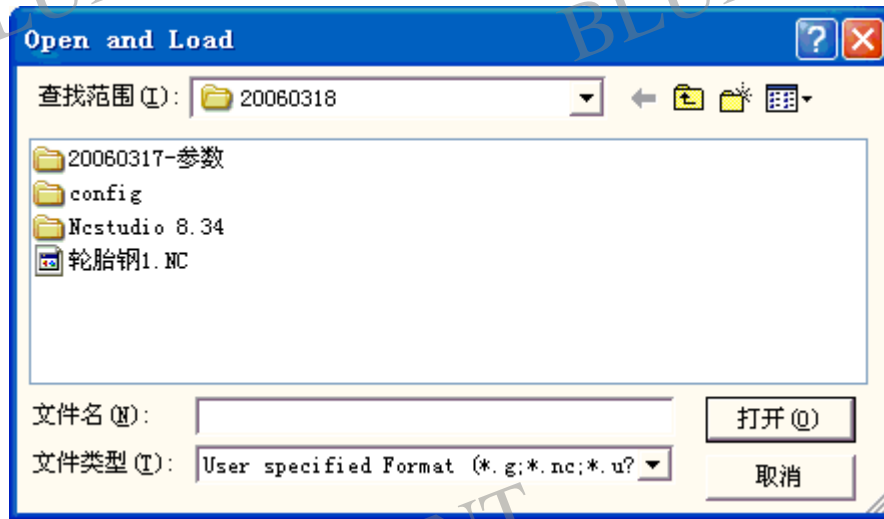


Figure 5- 2: Open and Load Dialogue

User can choose the disk-driver, path and the file name of the file. User can see the file in the automatic operation window after open it.

Moreover, you will find that the title bar of the system window is changed after opening a file

The postfix of the opened procedure is behind the procedure name, and the contents of current procedure will be displayed on the file window. Some menu items are enabled while they are disabled at automatic processing, such as the "start" menu item at "operation" menu and it indicates that user can operate these items.

In old version of Ncstudio, once a processing procedure is loaded into Ncstudio, the file will be actived, and it can not be modified but just to be read. So if you want to modify the processing procedure, you must close it. And this limitation is removed in new version ultimately.

In new version(above version 5.0), to realize procedure modification after the procedure being loaded into NcStudio, we just load all procedure into explanation buffer, and all processing information is based on the explanation buffer. So any procedure modification will not affect current processing. If you want to apply the modification, you must reload the modification procedure into NcStudio.

Custom also can perform the function through using the button in the tool bar.

The icon of the "Open and Load" button is shown as: 

### **Unload**

After loading processing procedure in system, user can choose "Unload" to close the current loading file.

#### **Note:**

If current document is being implemented, it can't be closed.

### **New**

Choose that function, the system opens an editor window that provides user to edit new file. During editing, user can save file at any time.

### **Open and edit**

This menu item is used to open procedure file saved in disk and load it into editor window. User can edit in editor window.

### **Edit loaded file**

That function can load the procedure file that has already been in digital control procedure explanation buffer into the editor window. That menu item is valid only when there are procedure files in digital control procedure explanation buffer.

### **Save**

That function can save the current procedure files of editor window into computer. If the edited file is a new one, the function will prompt the dialog box of "save as".

### **Save as**

That function can save the current procedure files in the editor window into computer with another name. While carrying out this function, the system will flip out a dialog box of "save as", user can choose the button of "save" under the appointed path and filename, then the document will be saved with the new name, otherwise you choose the button of "cancel", the document will not be saved.

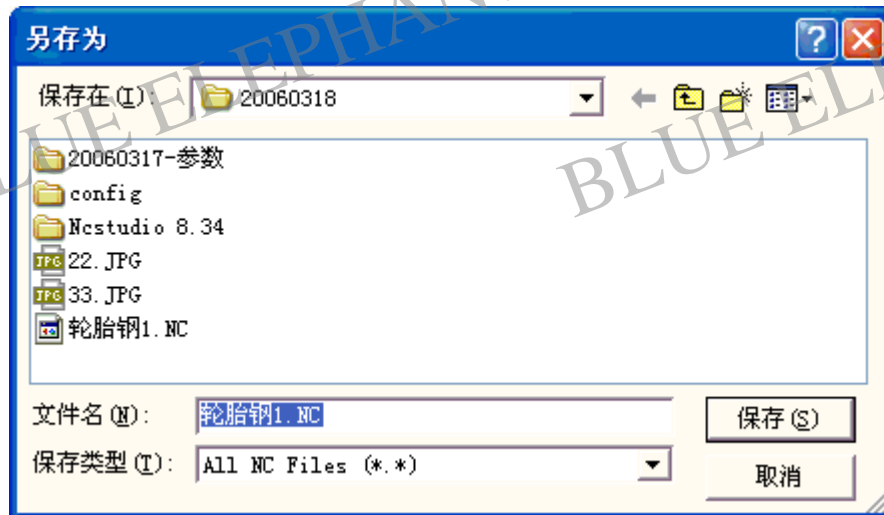


Figure 5- 3: Save as Dialogue (In MS-Windows of Chinese Version, it is can not convert into English)

## Save and load

That function includes "save" and "open and load".

It is Similar to the function of "save", but in this function the saved procedure files will be loaded into the digital control procedure explanation buffer of the system.

## Close

It can be used to close the current procedure files in editing.

## Recent loaded file

The menu item opens a new submenu and the submenu shows the name of recently ever loaded processing procedure. If user wants to load again, directly clicking the name of the document which will be loaded quickly.

## Recent edited file

The menu item opens a new submenu and the submenu shows the name of recently ever edited processing procedure. If user wants to edit again, directly clicking the name of the document which will be loaded quickly.

## Exit

Choose this option; user can close the system of NcStudio. Before closed, the system would flip out a dialog box to choose whether to save it or not. You can choose "yes" to save it or "not" to exit this window.

If processing automatically, the system will prompt to end the processing mission first and then exit.

## 5.2 "Edit" menu

In this menu, the items will be changed along with the current active window of the second window. Because in these options are some certain editor functions.

The figure below is an editor menu when the window of system parameter, the window of I/O status, and the window of procedure editor are active. In this window only include some basic items.

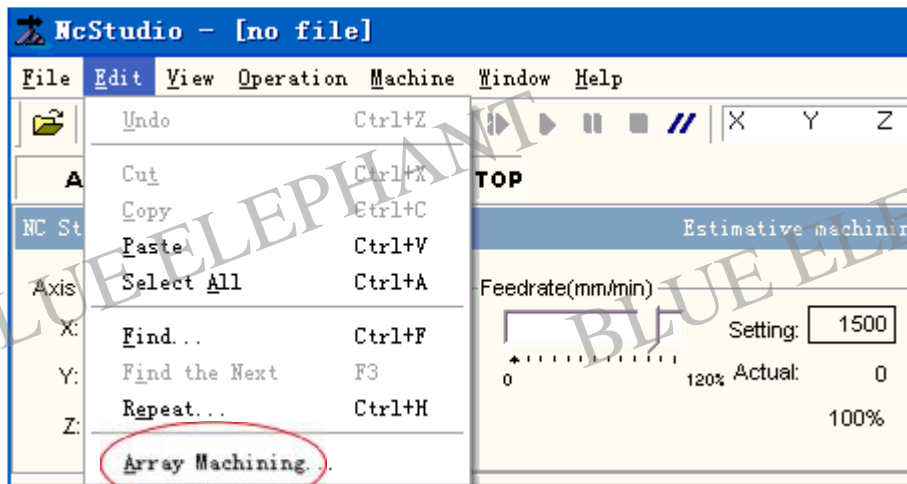


Figure 5- 4: "Edit" menu

The figure below is an editor menu of valid system trace window.

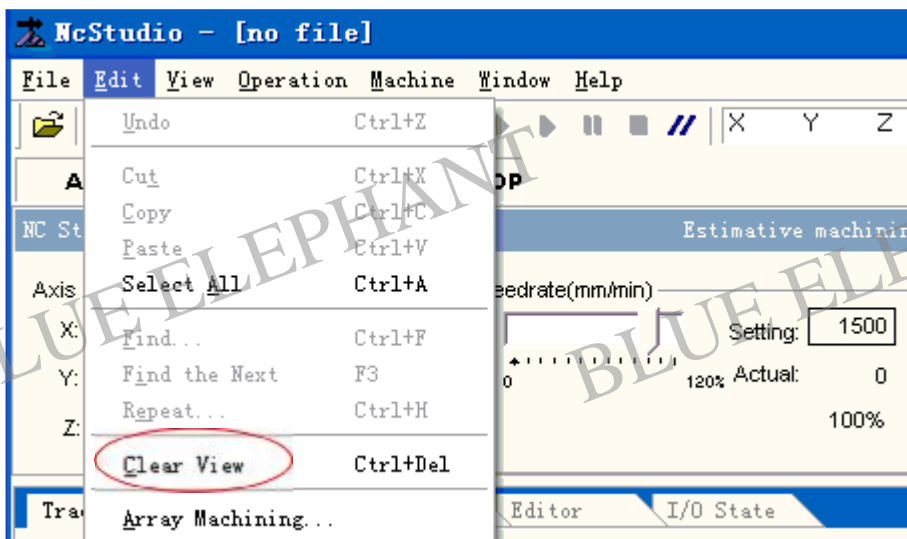


Figure 5- 5: "Edit" menu of Trace window

The figure below is an editor menu of valid system log window.

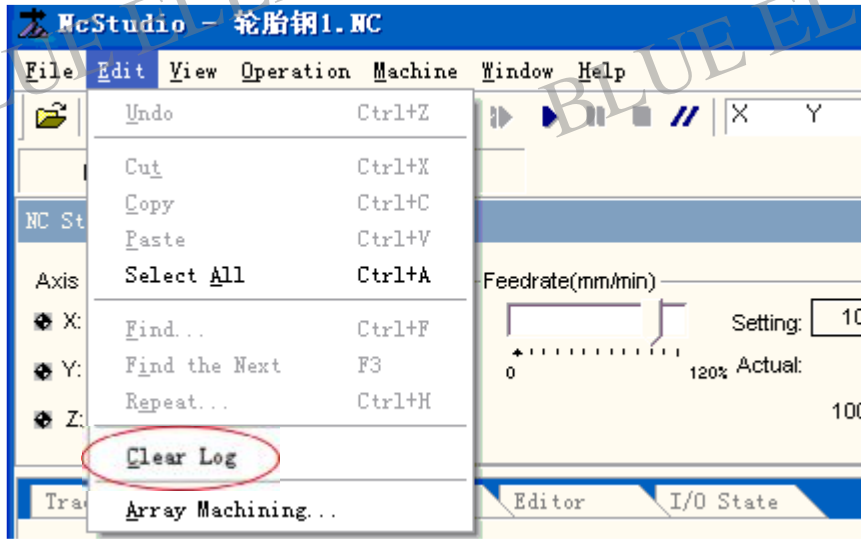


Figure 5- 6: "Edit" menu of log window

The figure below is an editor menu of valid system manager window.

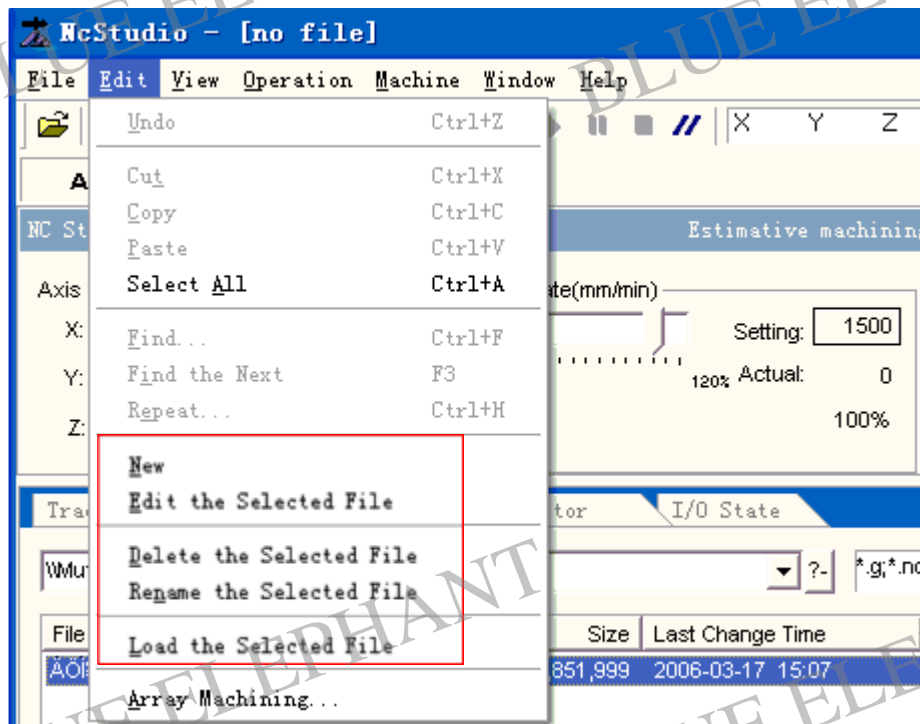


Figure 5- 7: "Edit" menu of procedure manager window

The NcStudio of the new version increases the array processing function, see diagram below:

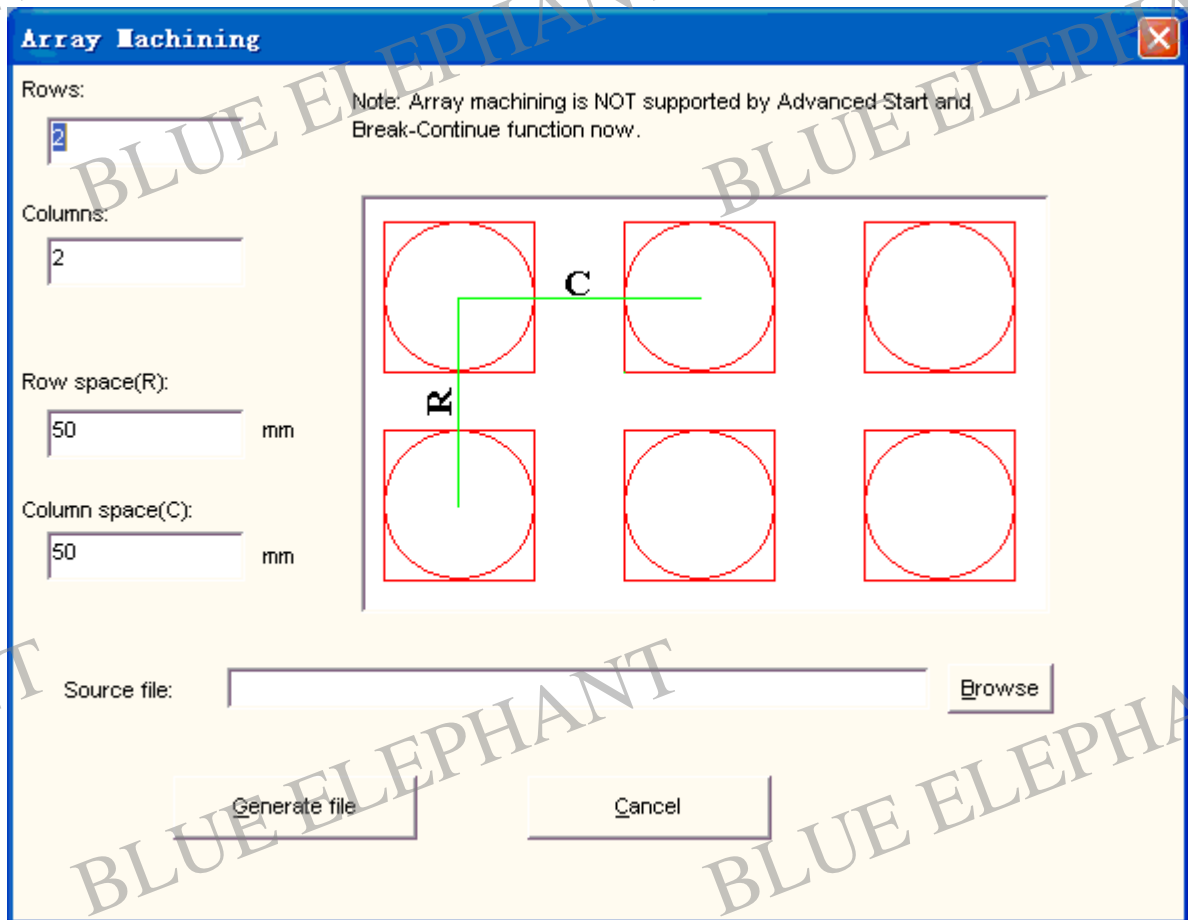


Figure 5- 8: Array Machine Dailogue

For same processing document, while the lines and rows of the array specified, the system of NcStudio will repeat to process that document, and the result of processing is a matrix diagram with m lines and n rows.

The NcStudio of Vision 8.3 modified the Array machine function. When perform the function the system will clear the "start main spindle" and "stop main spindle" commands in procedure file. Array machine does not support G92 command, so please delete the command manually.

### 5.3 "View" menu

In "view" menu includes the order options that is used to adjust the shown contents of main window.

In this menu, the items will be changed along with the current active window of the second window. Because in these options are some certain editor functions.

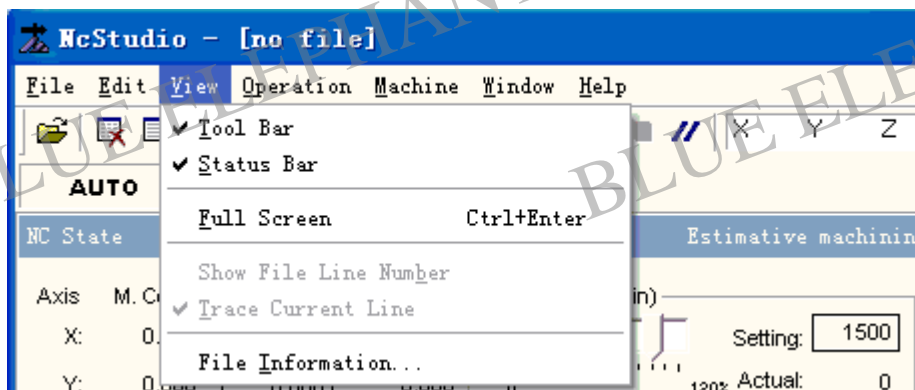


Figure 5- 9 “View” menu

When the trace window is activated, the “View” menu is:

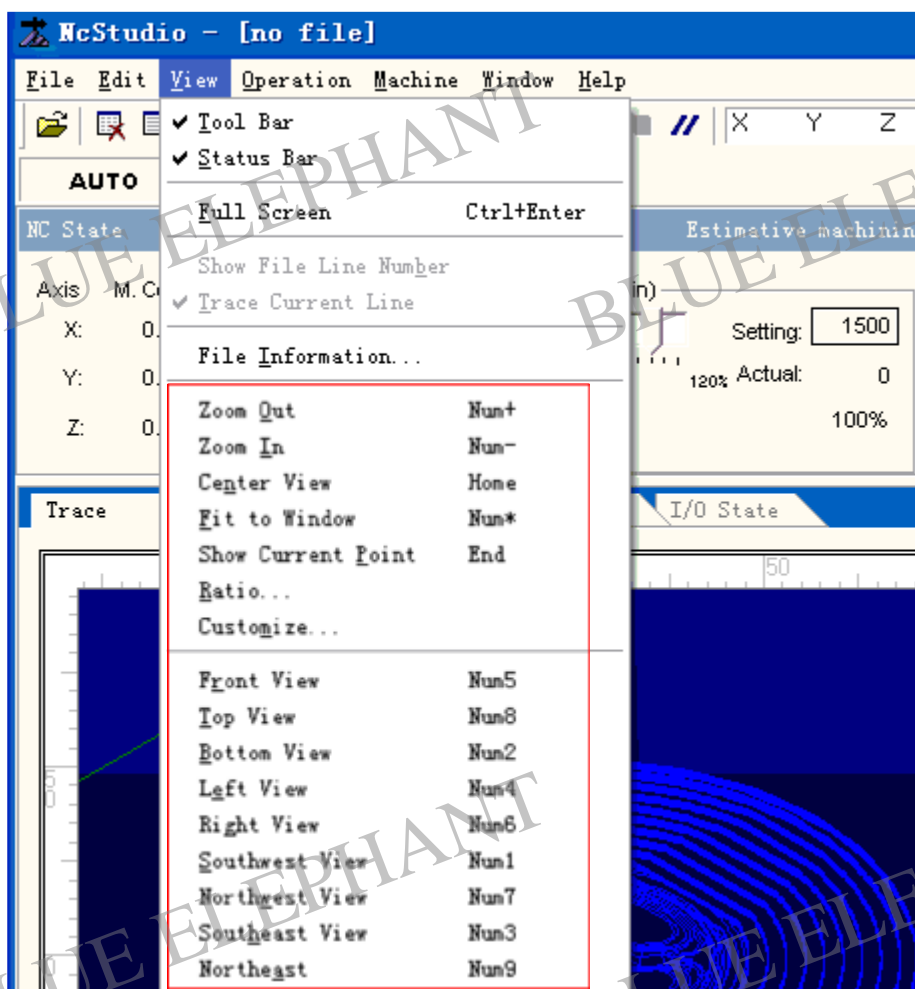


Figure 5- 10: “View” menu of Trace window

When the log window is activated, the “View” menu is:

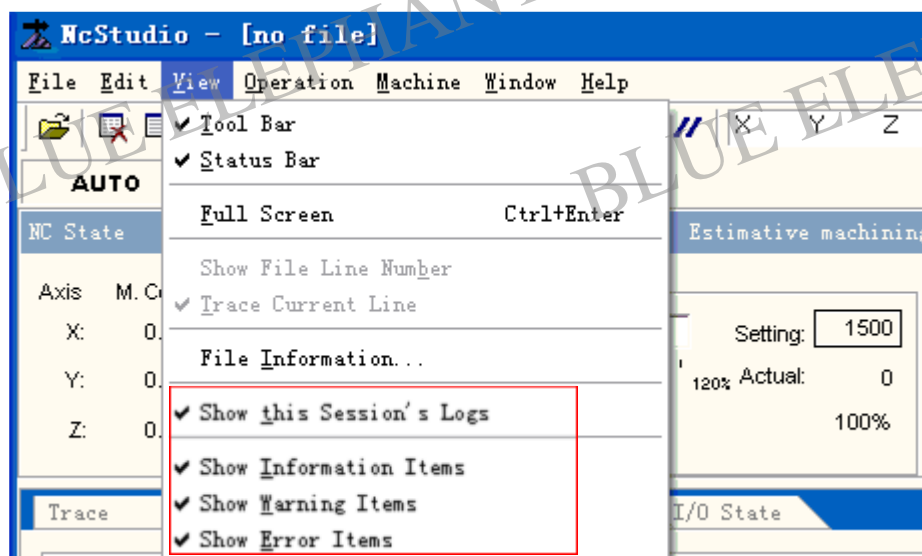


Figure 5- 11: "View" menu of System log window

These items will be changed along with the main window. At any instance, it will have these items as upper figure.

### Tool bar

If the tool bar is shown, clicking it will be hidden. If it is hidden, that will be shown.

### Status bar

If the status bar is shown, clicking it will be hidden. If it is hidden, that will be shown.

### Full screen

This item is used to open a restore the mode of "Full screen". Under that mode, the interface will be enlarged to the whole screen, at the same time the menu and the title bar will be concealed.

#### Note:

Once entering the full screen mode, the system menu can't operate with mouse. Here, you will use the hot key (Ctrl + Enter) to exit from the full screen mode.

### Show File Line Number

This function shows or conceals the line number of processing procedure in processing procedure window. This item is valid only at the state of appeared



processing procedure window.

### **Trace Current Line**

This window will ask you whether to trace and show you the current processing line or not in the processing procedure window. When you choose this function, the content of the processing procedure window will roll up and down automatically and make the current line appeared all the time. If you close that function, this function is disappeared.

### **File Information**

If you choose this command, the system will open a dialog box of File Information. The figure is as below.

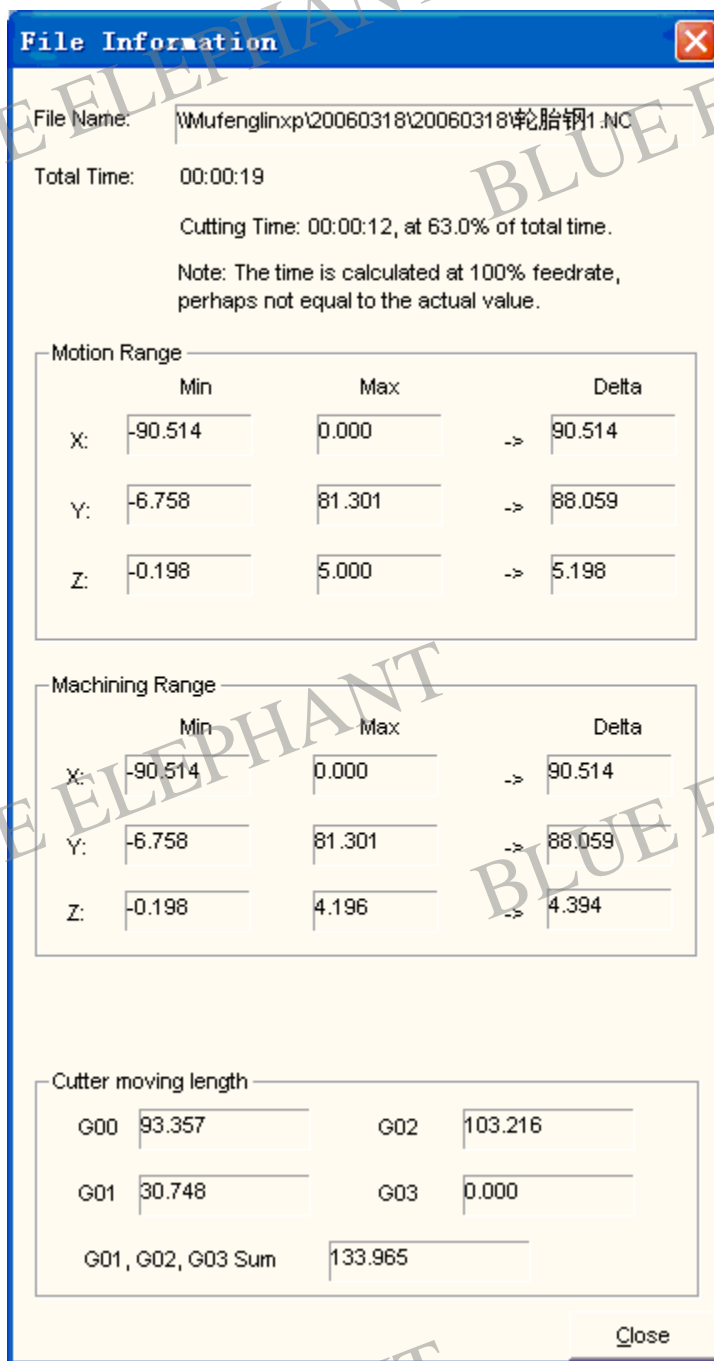


Figure 5- 12: File Information

The dialog box will show the processing procedure Stat. information in automatically processing, for example, the processing time or processing range etc. That function joined with simulation will be fast to understand every kind of procedure information in processing accurately.

## 5.4 "Operation" menu

In this menu you will realize all kind of operations of machine tool. But that can not control the feed rate of direct output and the spindle which will be arranged at the menu of "Machine".

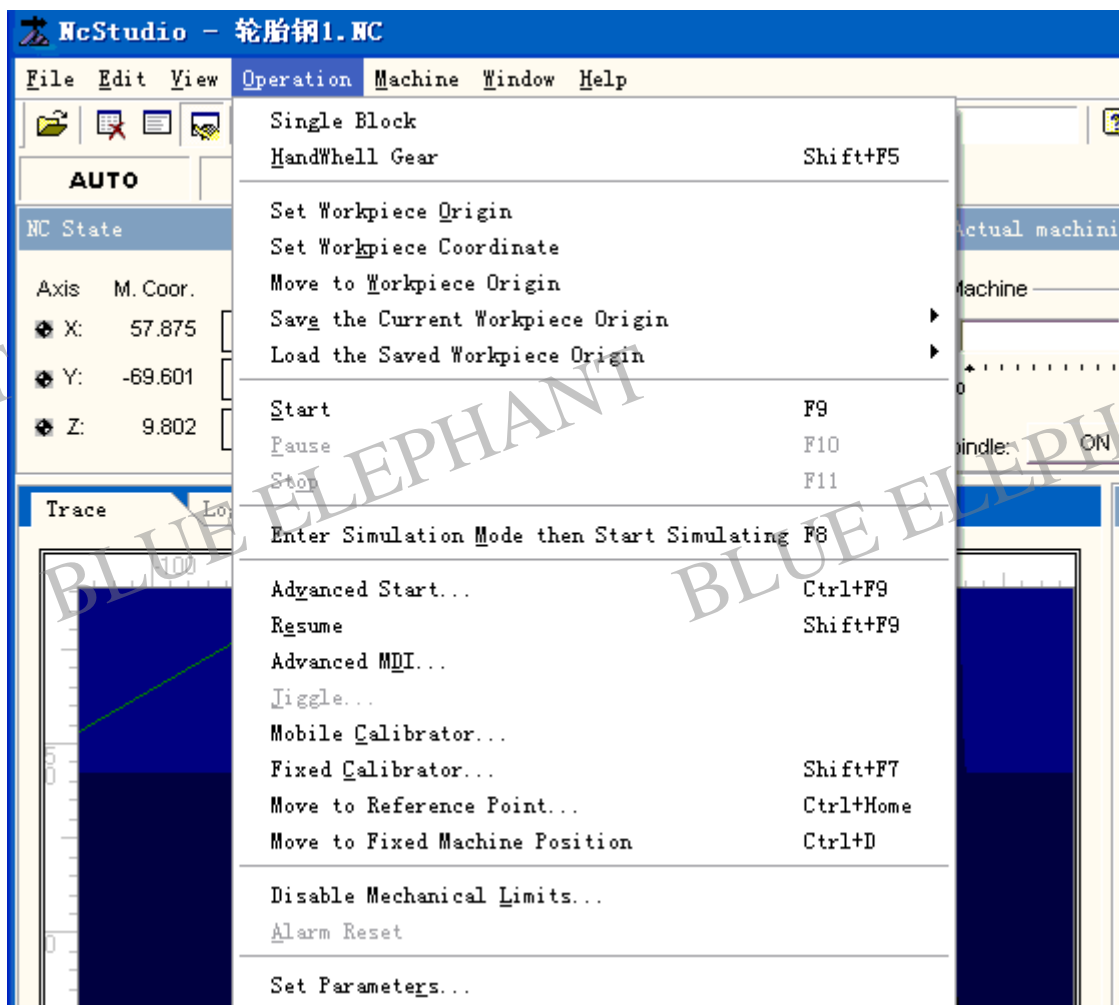


Figure 5- 13: "Operation" menu

### Single block processing

Customer can set the processing assignment as a single step mode thereby it will provide a good support for diagnosis mistake and malfunction restoring.

Once in the single step mode, Carry out an order each time, enter the pause mode, the customer must click "start" button to execute the next order, once next performance is over, the system will enter the pause mode again.

## MPG guide

New version NcStudio supports MPG (manual pulse generator) equipment. Selecting this order, system will change single step mode into hand wheel mode.

## Set Work piece Origin

It means that set the work piece cooperation where the current point lies as zero. That will not cause moving the actual location of current point.

## Set Work piece coordinate.

To use this function, user can set current position as origin of work piece coordinate. If you choose that function, that menu can help you change the origin of coordinate that the current cutter lies in. After you choose the menu, the system will flip out a dialog box of "Set the current workpiece coordinate", the figure is as below.

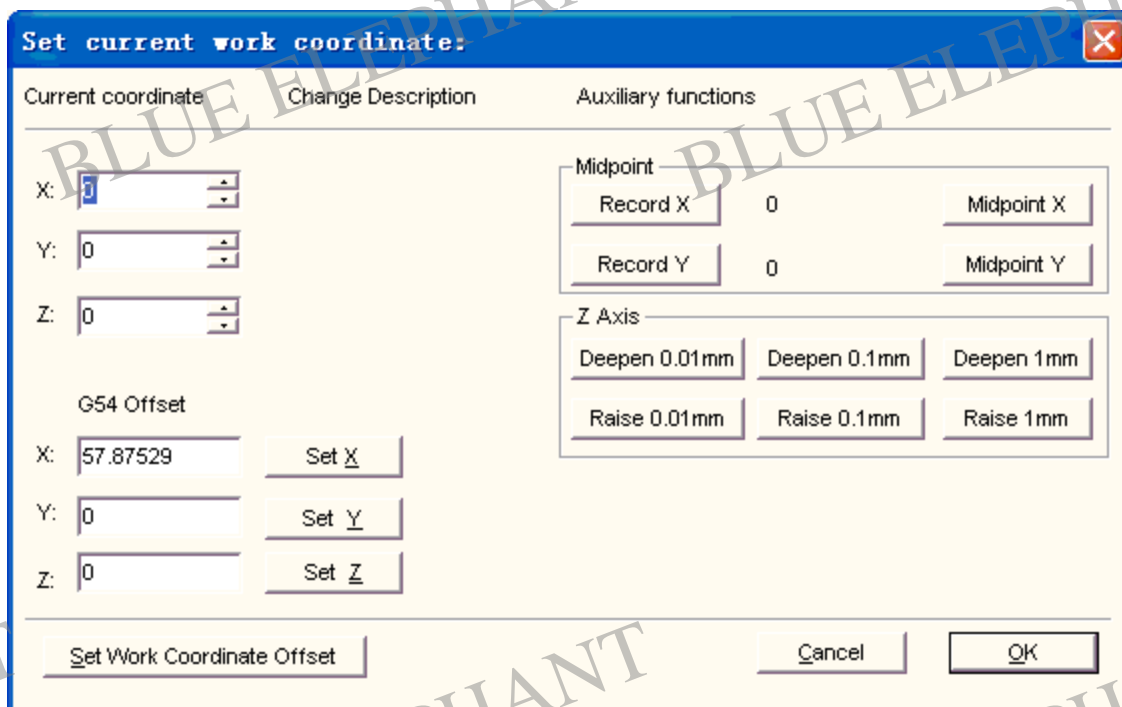


Figure 5- 14: Set current workpiece coordinate Dialogue

### Ø Revise the work piece coordinate

Input the suitable value into the X, Y, Z-axis relative editor dialog box, the coordination of current place is changed.

### Ø Midpoint

This command is in order to get the middle point of two points. First, let the main spindle move to the first point; then click the "Record X" button; the system will record the coordinate of X axis. Second, let the main spindle move to the second point, and then click the "Midpoint X", the system will compute the middle point's coordinate of the two points automatically. "Record Y" button and "Midpoint Y" are the same with "Record X" and "Midpoint X" button, but aim at Y axis.

### Ø Revise the coordinate of Z axis

Deepen or drive up Z axis with specified distance.

### Ø Set work piece coordinate offset

In order to set the offset of work piece coordinate system and machine coordinate system in G54, G55, G56, G57, G58, and G59 orders. When click this button, the system will flip a dialogue box with title "Set work piece coordinate offset". It's shown below.

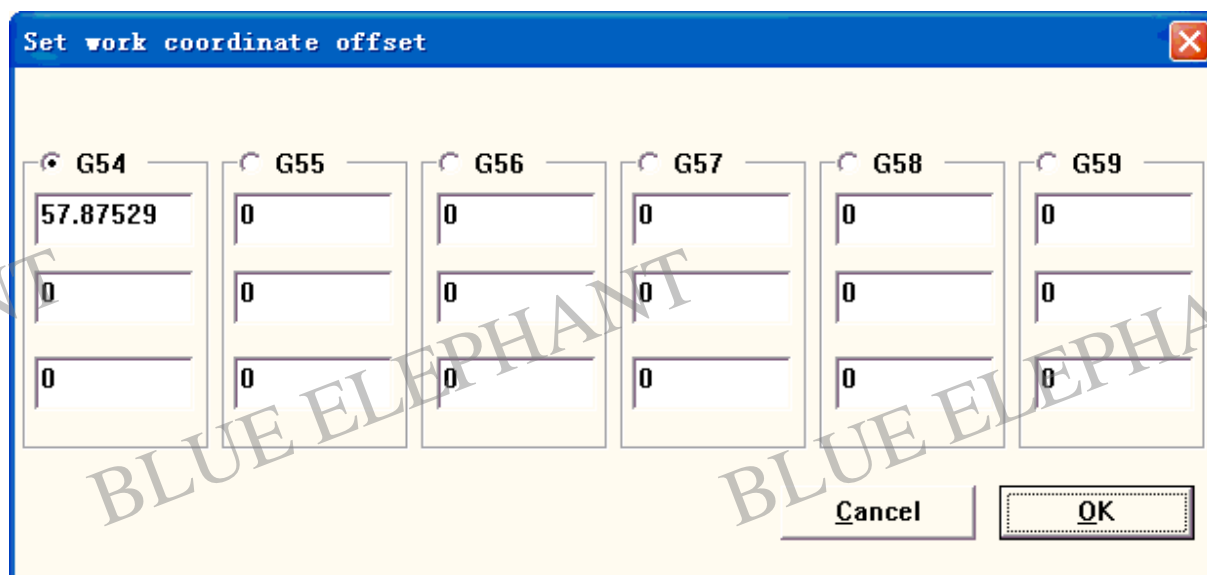


Figure 5- 15: Set work coordinate offset

The system scheduled six work pieces coordinate, from G54 to G59. Customer can modify the offset of work piece coordinate system and machine coordinate system through choosing the scheduled work piece coordinate. The offset modified will be auto saved in the system, and it will be valid in next usage. When customer selected the work piece coordinate, the current interpolation panel will show them; the customer can see them in the state bar.

**Note:**

In this processing, the machine tool doesn't carry out any actions. In fact, the system will reach the intention of adjusting the current point coordination by modifying the location of work piece origin. Once the work piece origin is selected, when the procedure followed up programmed with absolute value, the coordinate value of the order is relative to the origin in this work piece coordinate system.

**Move to Work piece Origin**

The work piece origin is an origin of work piece cooperation which is set for editing the work piece size; generally, it is a start-point of work piece. Programmer can choose the work piece origin freely; its relation with mechanic origin is confirmed by "Set the work piece cooperation of the current point".

If choose the option of "Back to work piece...", the knifepoint will return to the work piece origin automatically from current place with the order of Z, X, Y.

The corresponding icon of this button in the toolbar shows as:

**Prompt:**

For the sake of making knifepoint passed work-space safely in the cause of back to work piece origin but avoiding happened malfunctions for the reason of meeting the work piece or clamp etc., So you can optimize the operation to return to zero path, as below:

If the value of terminal Z-axis direction coordination is bigger than that

of the jumping-off point of Z-axis direction coordination, the Z-axis will step to the terminal location of Z-axis at first, and then X-axis reach the aim place together with Y-axis.

If the value of terminal Z-axis direction coordination is less than that of the jumping-off point of Z-axis direction coordinate, the axis of X, Y will get to the aim point of the coordinate together and then, the Z-axis will independently step into the end of the coordinate.

For the reason of the terminal of the z-axis is always on the surface of the work piece, the Z-axis will return to the deviancy value of zero point to avoid to damage the knifepoint and the surface of the work piece.

The contiguous zero point is set by "Safe Height" in the windows of system parameters.

### **Save the Current Work piece Origin**

This function is used to save the current work piece origin into the processing system file.

### **Load the Saved Work piece Origin**

This function is used to load work piece origin data from the processing system file and set it as the current work piece origin.

### **Start**

This menu item includes two functions:

First: If a certain processing procedure has been loaded in, and the current system appearance is "idle", choosing the menu's item, machine tool will carry out the processing procedure automatically from the first section. Once starting the process, the system will enter the status of "Auto/run". If the system is in the status of simulation, the system starts to simulate.

The second: If the system is placed in the "auto| pause" appearance, choose so, the system will carry out continuously from the pause into "auto| run". If the system is in the status of simulation, the system starts to simulate.

The corresponding icon of this button in the toolbar shows as: 


#### Prompt:

The system have tow ways to enter "pause" state, the first one is that the system is placed in "the single step processing" mode and the second one is that user chooses the "pause" function to pause the system at processing.

### Pause

In automatically processing, the "pause" function is valid. Choose the menu item of "pause", the machine tool will pause and raise the cutter and then turn to the state of "Auto/pause". And then if you want to keep on processing, you can choose "start".


If the system is in the status of simulation, choose "pause", it will be paused. And then if you want to keep on simulating, you can choose "start".

The corresponding icon of this button in the toolbar shows as: 

### Stop

In automatically processing, when the system in the state of "Auto/run", the function of "stop" is valid. Choose the menu item, the machine tool will stop and raise the cutter and then end the whole assignment, the system enters the state of "Auto/idle". This method is to break off the processing procedure normal in processing.

But the "reset" function discussed forward is an abnormal way to break off processing when the system is under abnormal situation. If the system is simulating, the system will be paused simulating and enter to the state of "Auto/idle" after choosing the menu of "stop". That will not make you exited the simulating status but for analysis the result of imitating. If the user wants to re-simulate, you can choose the "start", "Advanced start" or "continue from the breakpoint" and etc.

The corresponding icon of this button in the toolbar shows as: 

### Enter Simulation Mode and Start Simulating

Similar to "start", if a certain processing procedure has been loaded in, and the current system appearance is at an "idle", choosing the menu's item, machine tool will carry out simulating in high speed automatically from the first section.




## Manual

The function of simulating provides a fast but lifelike simulate processing environment for the customer.

Running under the mode of simulating, the system will not drive the machine tool to do the relative actions but to show the processing trace of the cutter in high speed in the trace window. By simulating, the user sees which the moving form the machine tool will do in advance to avoid damaging the machine tool for the reason of mistakes in weaving the processing procedure. By simulating you can also know the additional information.

Once starting the simulation, that menu becomes "Stop Simulating and Leave Simulation Mode". If you carry out this function, simulating will be terminated immediately.

The corresponding icon of this button in the toolbar shows as  .

### Advanced Start

That function realizes the function for jumping section and carrying out.

Choose that function, the system flip out dialog box of "Start (with advanced options)", shown as below.

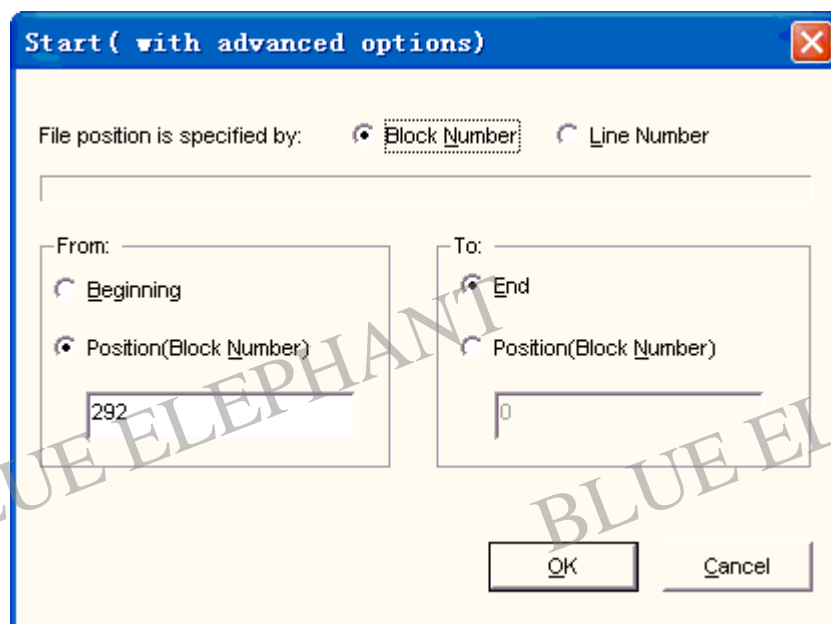


Figure 5- 16: Advanced Start

## Manual

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User can set the start position and the ending position for current procedure, and then click "OK", the machine tool will carry out the appointed section in whole processing procedure according to your requirement.

That function can also be used for simulating.

### Resume

The menu item is actually a simplified function of "Advanced Star". When you carry out this function, system will carry out from the breakpoint that is broken off last time.

That function can also used for simulating.

The corresponding icon of this button in the toolbar shows as .

### Advanced MDI

The function of this menu item is:

- I The system supply some typical procedure file for customer to simple processing. It will flip out a dialogue box with title "Advanced MDI", when the option is selected. The dialogue includes 5 tab options: "Rectangle Mill", "Rectangle Frame Mill", "Round Mill", "Round Frame Mill" and "MDI". As long as customer input several parameters in ex-four tab options, can complete the function of milling or drawing. The NcStudio of vision 8.3 and above add a new function in the Advanced MDI ----- delamination processing.

Ø Rectangle Mill Window

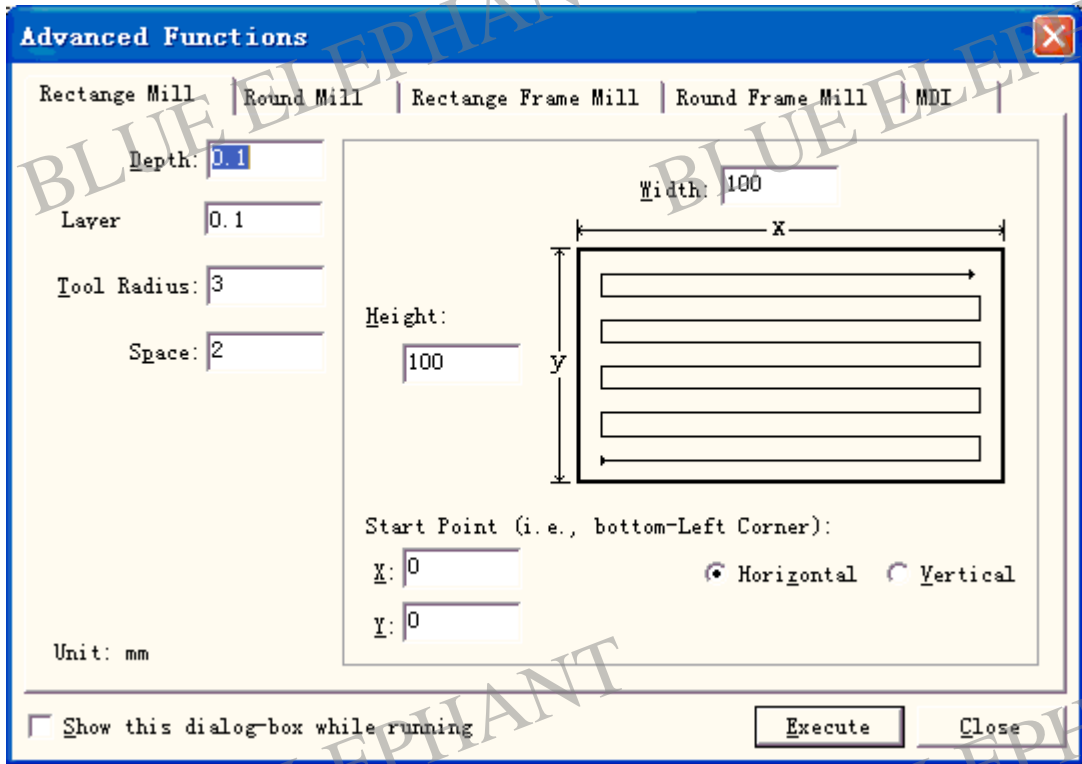


Figure 5- 17: Rectangle Mill Window

Ø Rectangle Frame Mill Window

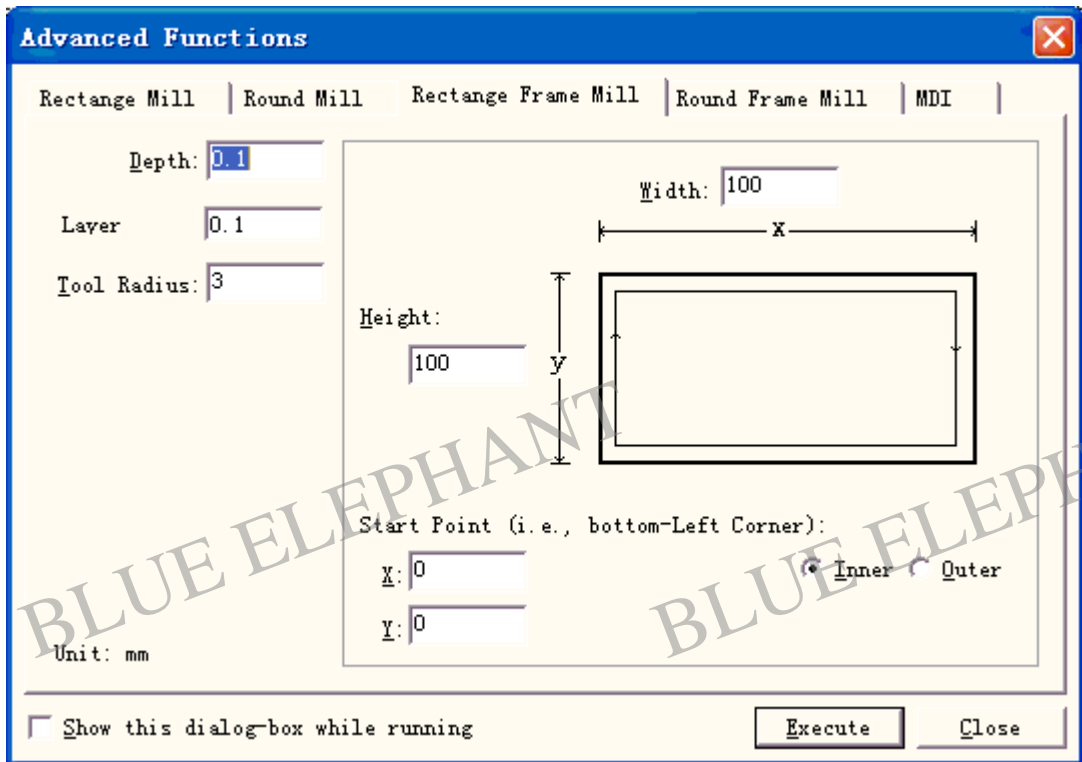


Figure 5- 18: Rectangle Frame Mill Window

Ø Round Mill Window

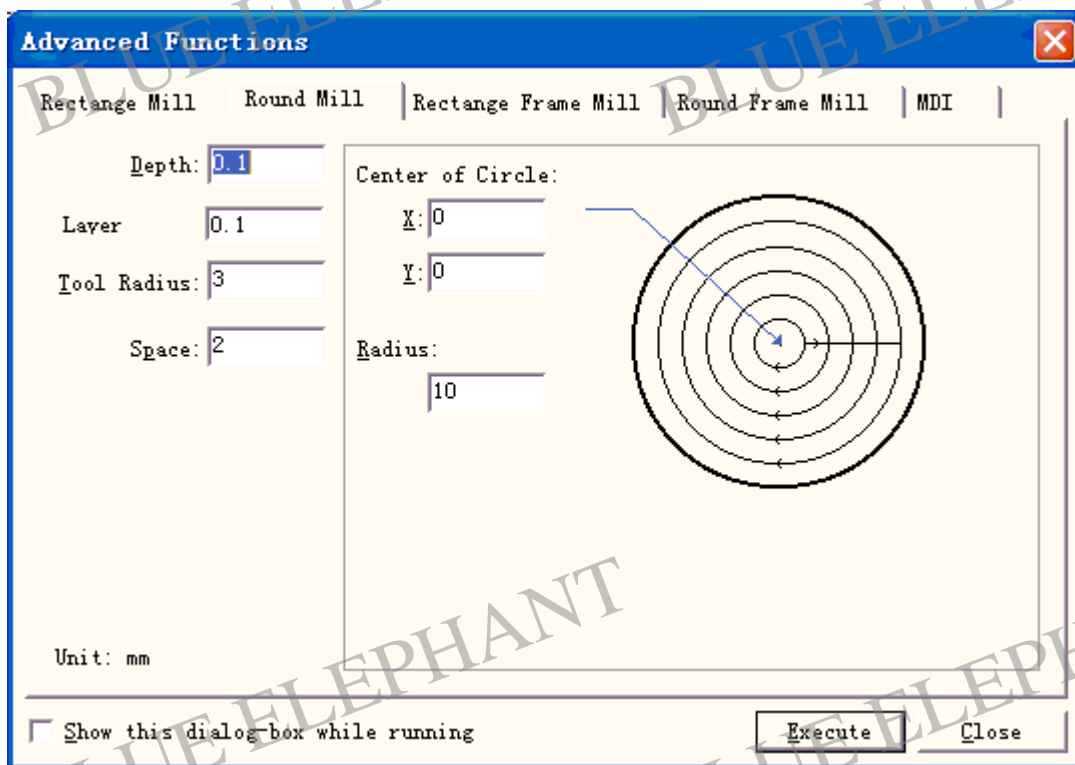


Figure 5- 19: Round Mill Window

Ø Round Frame Mill Window

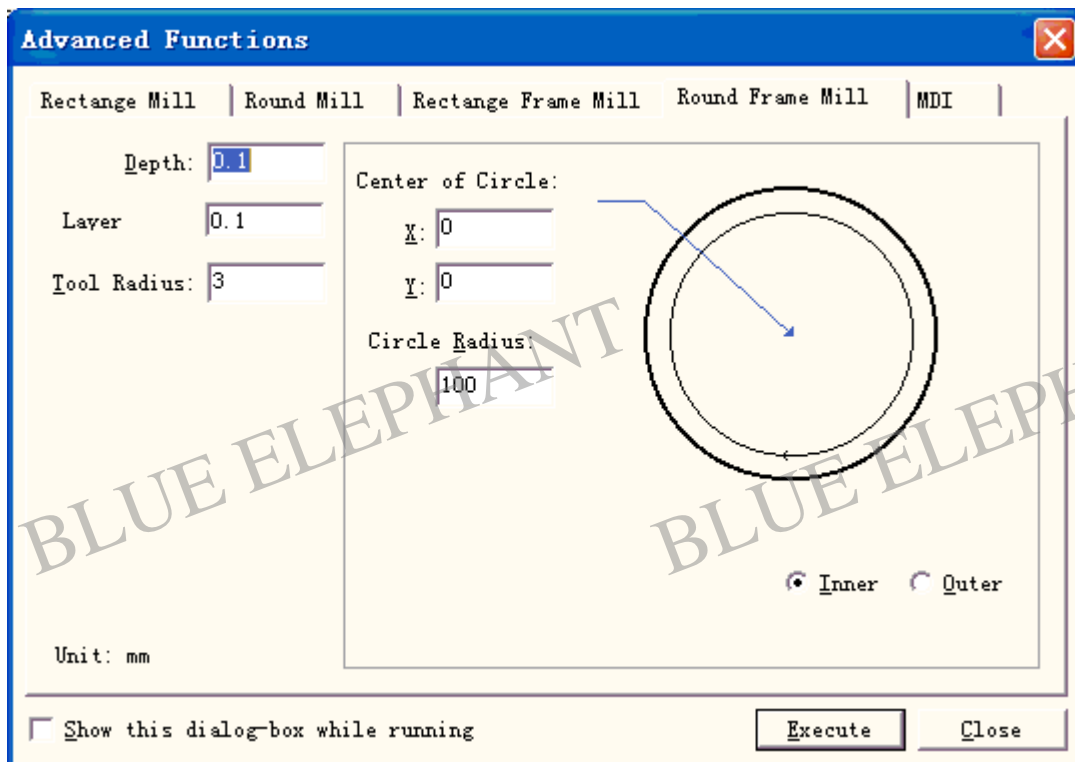


Figure 5- 20: Round Frame Mill Window

- I Put in correct G command in edit box of the MDI window, hit the “carriage return” key. The system will execute the command inputted immediately. The file list box below will show the executed order. It is convenient for customer to search for the record of order inputted.

## MDI window

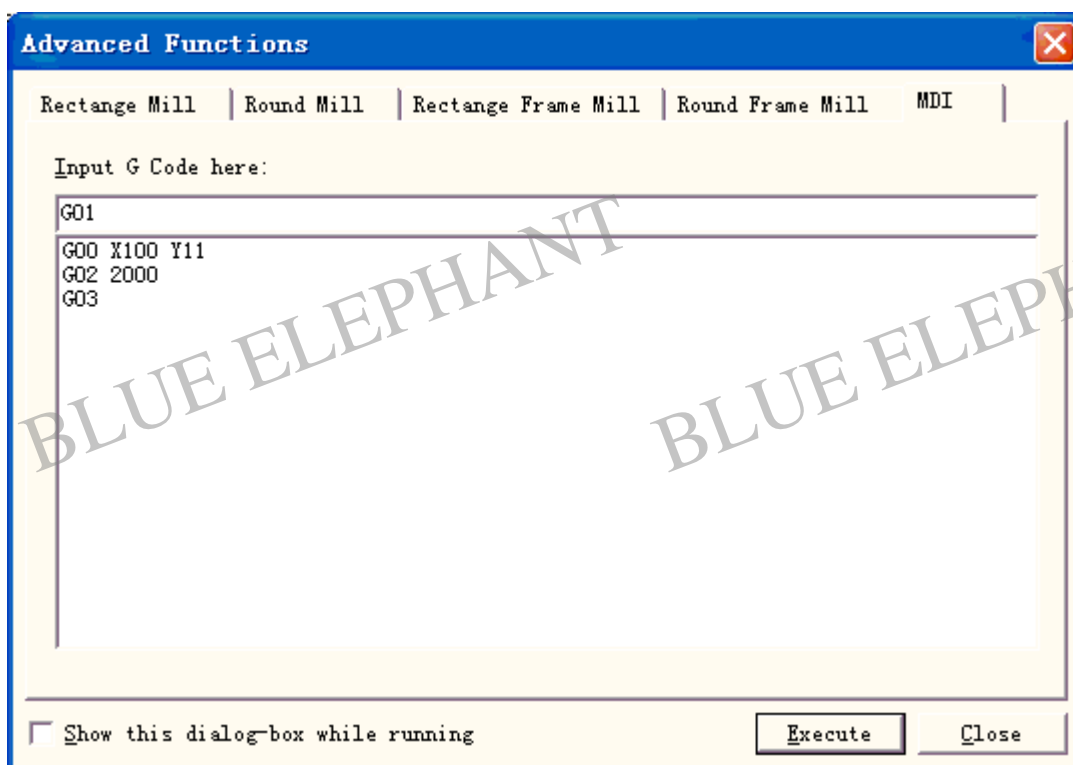


Figure 5- 21: MDI Window

At the bottom of the dialog box, there is a “Show this dialog -box while running.” option. Select the option, the system can display the MDI window when executing G command. It is convenient for customer to modify, transfer the parameter of default processing procedure file and input G command immediately.

## Jiggle

This function is only valid under the state of pause in the course of processing. This function is used in the course of unbroken off processing but to realize the tiny regulation of the depth. The operation interface is similar to the manual windows:

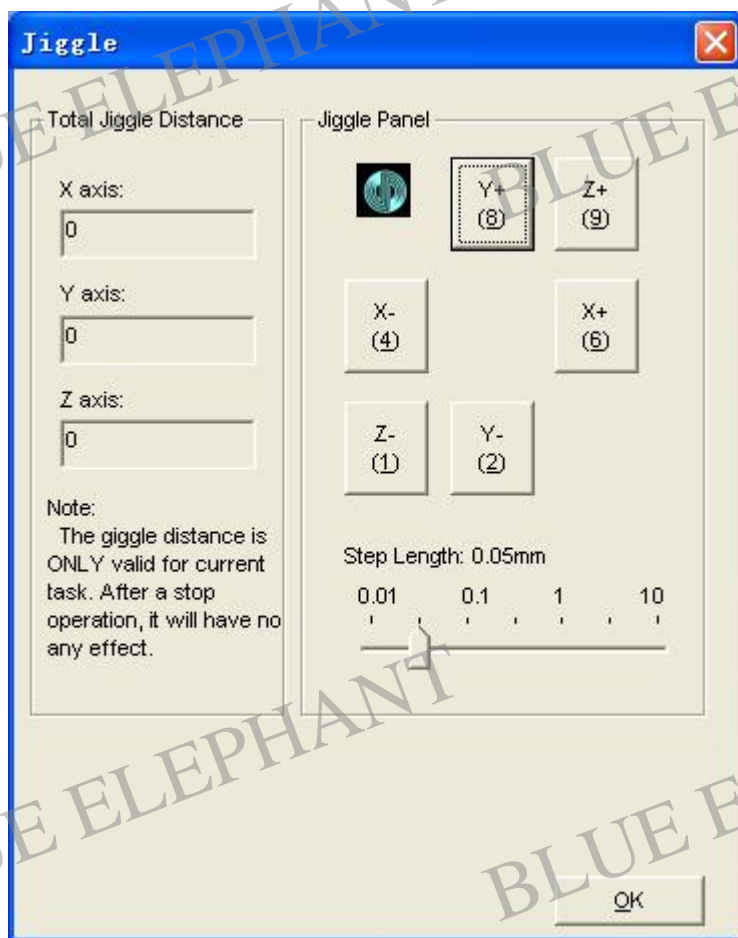


Figure 5- 22: Jiggle dialog

### Mobile calibrator (Choice)

This function can help the user to locate the surface of the work piece conveniently. The method of Mobile Calibrator is to put the feeler block on the surface of the work piece, then operate the machine, move the Z-Axis to make the tool nose come up against the feeler block, stop calibrating. The system will measure the position of the tool nose, it then subtracts the thickness of the feeler block from the height position, and then the Z coordinate of work piece origin is determined.

Selecting this option, the system will flip out a dialogue box requiring "performing a calibration action. Continue?" Customer can decide whether performing the function in practice (If customer didn't complete "Move to Reference Point" function, the system will flip a dialog to prompt you to complete the function first, then the system permits you to perform calibrator function).



Figure 5- 23: Prompt Dialogue

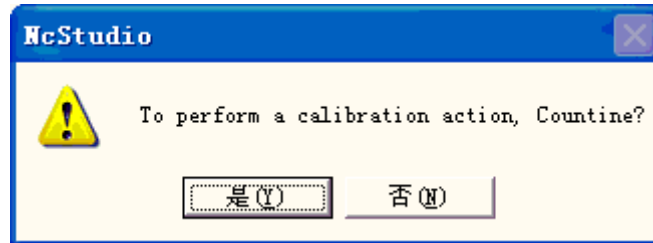


Figure 5- 24: Prompt Dialogue

The corresponding icon of this button in the toolbar shows as .

### Fixed Calibrator (Choice)

This function can help the user set the suitable Z-axis of work piece origin and readjust the z-direction coordinate after switching the cutter. The relative function is shown as below:

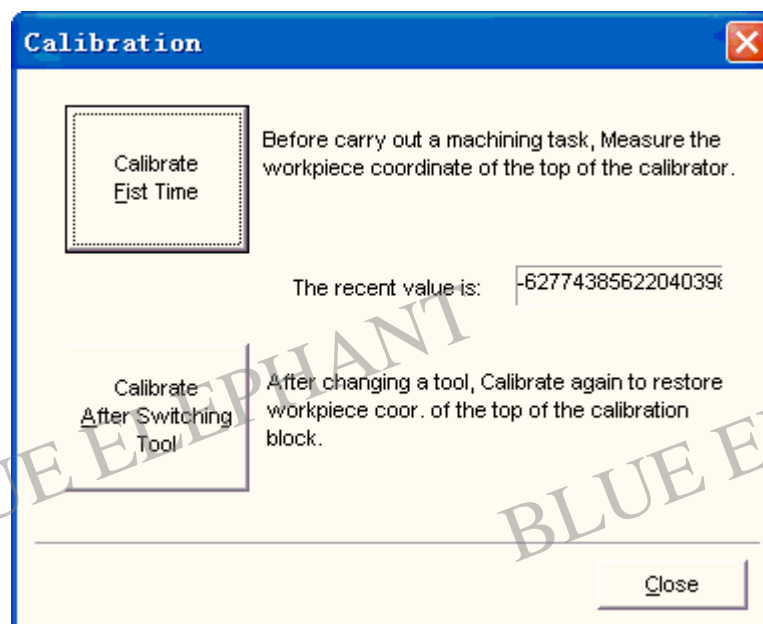


Figure 5- 25: Fixed Calibrator Dialogue

When adjusting, you should confirm the processing surface by yourself, and set the


processing surface as the work piece origin of the Z-axis. And then carry out the first adjusting, and the second adjusting after switching the cutter. Operate the perform according to diagram of prompt to

Ø Calibrate at the first time

Before carry out a machine task, measures the work piece coordinate of the top of the calibrator.

Ø Calibrate after switching tool

After changing a tool, calibrate again to restore work piece coordinate of the top of the calibration block.

The corresponding icon of this button in the toolbar shows as .

### **Move to Referenced Point**

The machine origin is a fixed position of machine tool and also is a zero point of the machine coordinate system, which is set by machine switch and the electric system together. About the machine coordinate system you can refer to section 3.2. Carry out this function demands machine hardware to support, so some machine tools have not this function. It is important to adjust the current coordinate for the reason that the machine origin is the basic of the whole machine tool. Customer can select the mode of moving to reference point in practice.



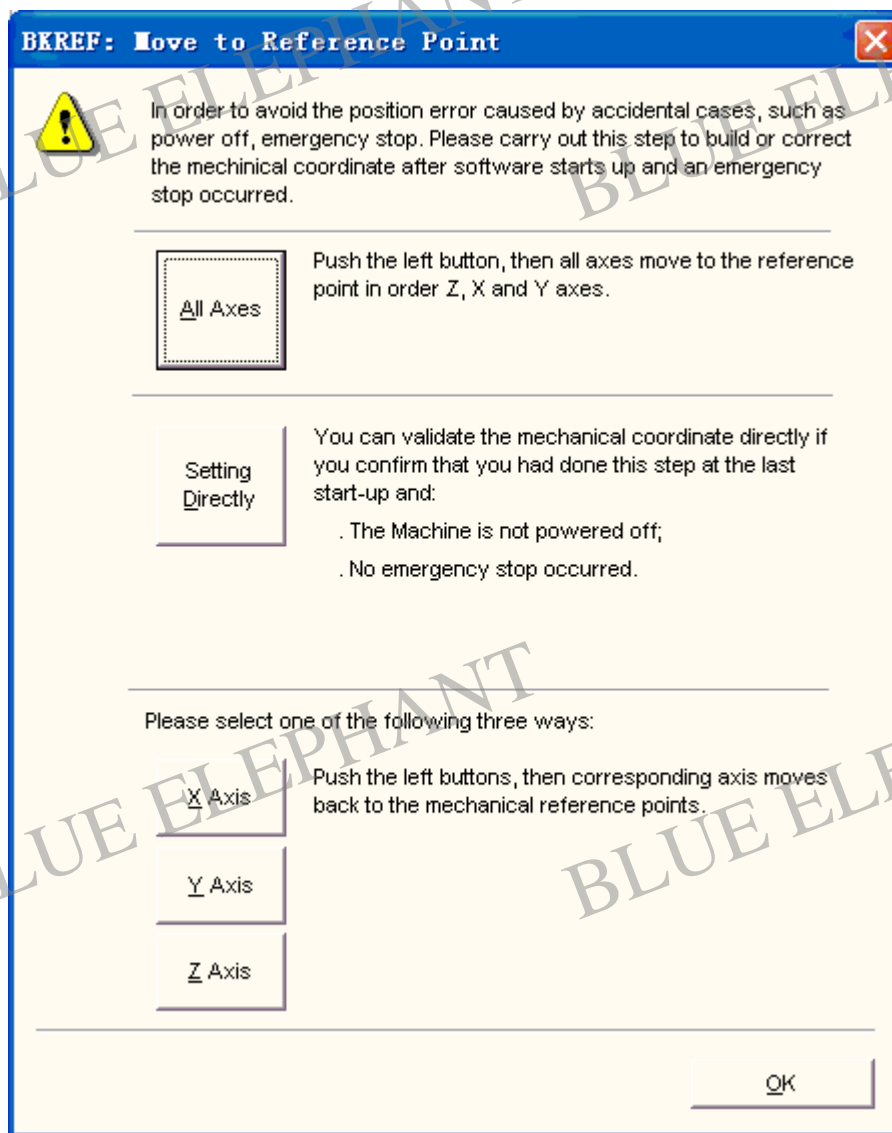


Figure 5- 26: Move to Reference Point Dialogue

Ø X axis move to referenced point

When click this button, x axis will move to referenced point.

Ø Y axis move to referenced point

When click this button, y axis will move to referenced point.

Ø Z axis move to referenced point

When click this button, z axis will move to referenced point.

Ø All axes move to referenced point

When click this button, all axes will move to referenced point.

Ø Setting directly

If customer confirms that current coordinate is the same with machine coordinate and can also confirm that the machine tool did not close and stop urgently, he can modify current coordinate into machine coordinate accurately.

### Move to Fixed Machine Position

When the reamer have damage or the customer need to be change the reamer, can select the option to change the reamer at a fixed position.

### Disable Mechanical Limits

When the system meets the forcible limitation, that function can shield it temporarily. You can regard it as a skill to make the machine tool restored to a normal position. For the function of limitation is screened, the user should pay attention especially.

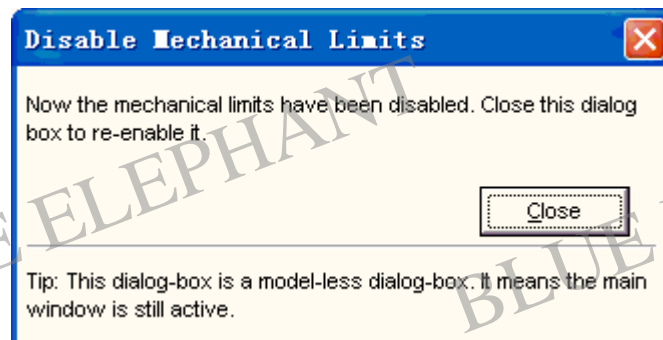


Figure 5- 27: Disable Mechanical Limits

## Alarm Reset

When the system examines that workbench moves over the software forcible limitation, system alarms. Select this option; customer can change the state of alarm into the state of idle.

## Setting parameters

This function is used to open System Parameters window to configure parameters. And it is divided into three parts: processing parameters, manufacturer parameters and develop parameters. Please see the chapter 6 "System Parameters Configuration" ahead to get detailed explanation.

## 5.5 "Machine" menu

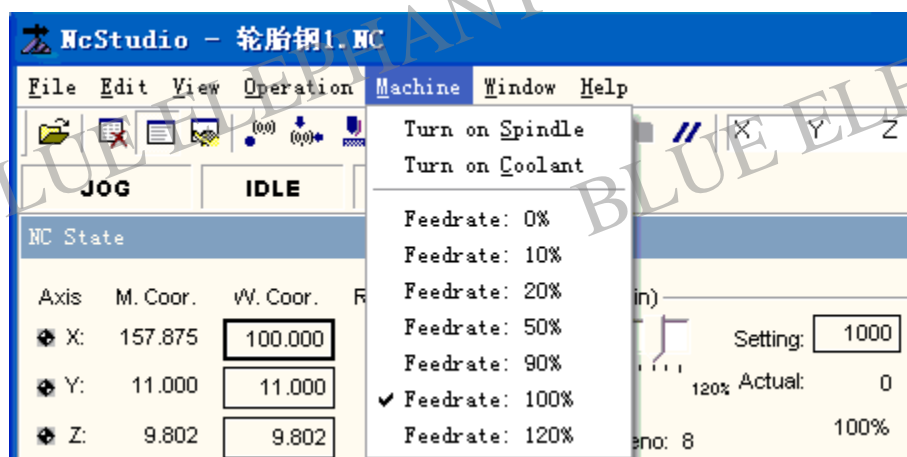


Figure 5- 28: "Machine" menu

Here the function that provided can also be realized in " NC status window ". For the reason that the system provides the function alike is for the user operate with the keyboard conveniently.

### Turn on coolant

Select this option; system will turn on the switch of coolant.

## 5.6 "Window" menu

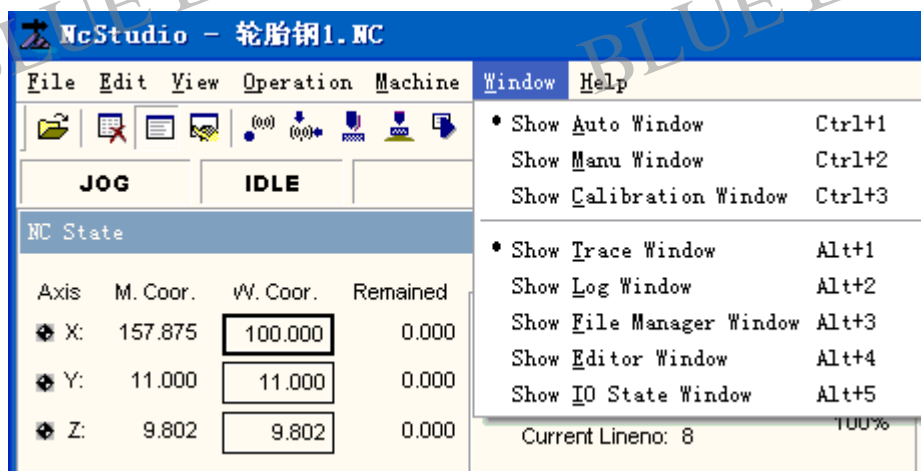


Figure 5- 29: "Window" menu

That menu is used for proceeding to switch in each window. The function of each item is corresponding to its name.

### Show Auto Window

The button corresponding icon of this option in the toolbar shows as  .

### Show Manual Window

The button corresponding icon of this option in the toolbar shows as  .

Show Calibration Window

Show Trace Window

Show Log Window

Show File Manager Window

Show Editor Window

Show IO State Window

## 5.7 "Help" menu



Figure 5- 30: "Help" menu

Help menu now has three items: "Tip of the Day..." "Keyboard Map..." and "About NcStudio".

"Tip of the Day" is used to introduce the software of NcStudio. The "Keyboard Map..." is used to introduce the short cut key. About NcStudio option is used to prompt the information of system hardware, software and so on for customer.

## 6 Parameter configuration

---

The NcStudio have abundant processing parameters; they can make the system be competent for each processing mission. Here lists just some parameters for common use, the other parameters omit to void that customer feels perplexity.

This chapter will specialized explain in detail the parameter information involved in the system of NcStudio for the customer.

NcStudio parameter is divided into three parts: processing parameters, manufacturer parameters and develop parameters.

If customer wants to look into or modify some kinds of parameters, he must have the right that permits him to do so. Here introduces processing parameters and manufacturer parameters only.

## 6.1 Legal right of parameter modification

List 6-1 Parameter modification legal right

Level	The parameter that can look into and modify
Visitor	none
Operator	processing parameters
Manufacturer	processing parameters, manufacturer parameters,
Developer	processing parameters, manufacturer parameters, impolder parameters

## 6.2 Parameter modification methods

The method of the modification parameter is select the parameter need to modify by arrow key on the keyboard, hit the "carriage return" key; or double click the line show that show parameter, then input the value into the input area.

For the parameter whose value is "true" or "false", inputting "1" means "true", inputting "0" means "false", customer also can input "true" or "false" to modify the parameter.

|| Prompt:

All parameters can't be modified while process; they must be modified after the processing or before the processing.

### 6.3 Processing parameters

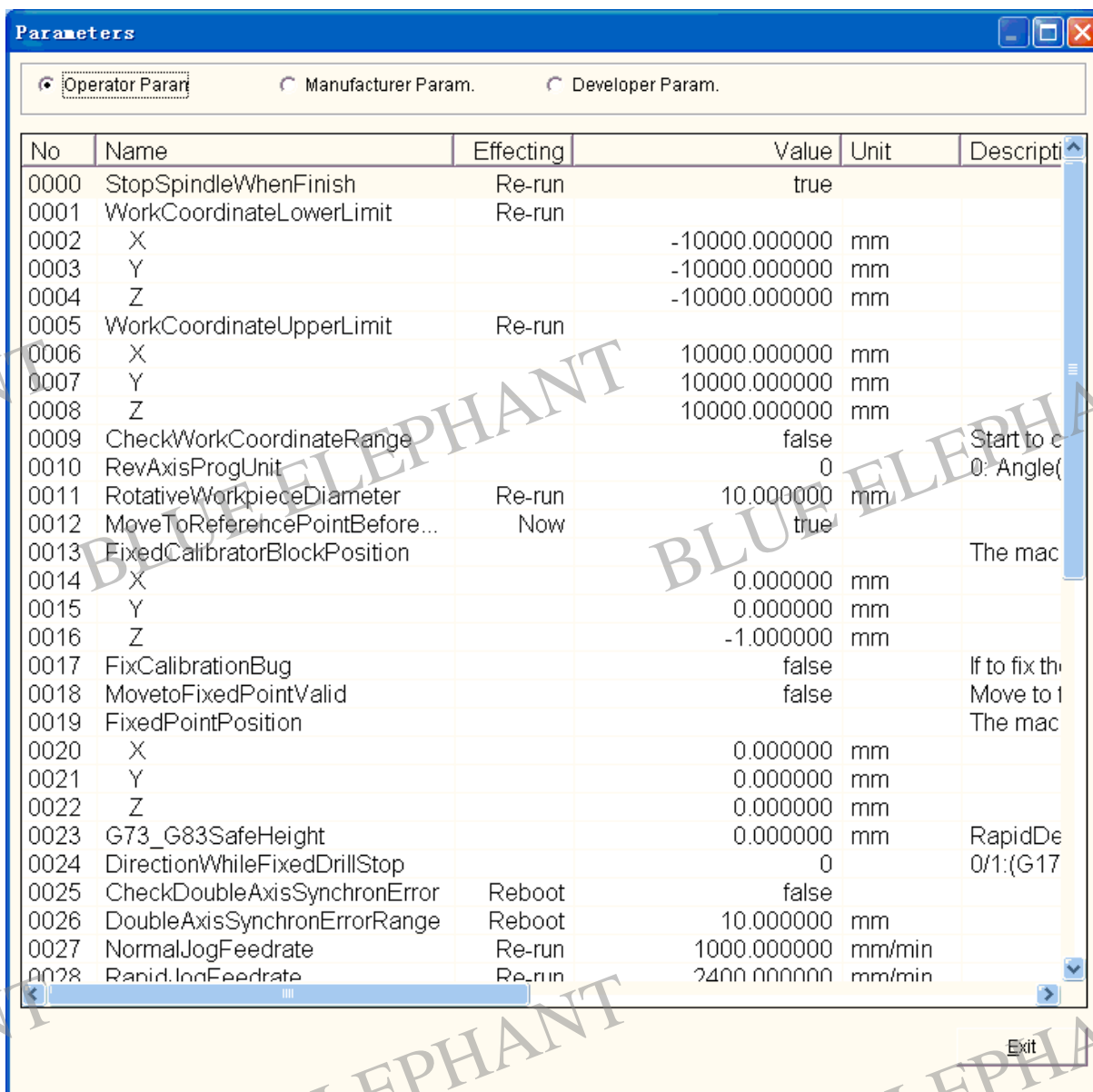


Figure 6- 1: Processing parameters Dialogue

#### StopSpindleWhenFinish

Type Bool

Unit None



Range	0(false):Don't stop spindle when finish. 1(true): Stop spindle when finish.
Default	1(true)
When to became valid	Available swiftly. Needn't to restart.
Instruction	Under the automatic mode, specify whether the spindle stop automatically when finished processing. When the stop button was knocked down, whether stop the main spindle is according to this parameter.

**WorkCoordinateLowerLimit**

Type	Double
Unit	mm. (millimeter)
Range	-99999~99999
Default	-10000. 000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify the work piece coordinate lower limit on each axis.

**WorkCoordinateUpperLimit**

Type	Double
Unit	mm. (millimeter)
Range	Workbench displacement lower limit ~ 99999
Default	10000. 000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify the work piece coordinate upper limit on each axis.

**CheckWorkCoordinateRange**

Type	Bool
Unit	None
Range	0(false):Don't check the range. 1(true): Check the range.
Default	0(false)
When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify whether check the coordinate range.

**RevAxisProgUnit**

Type	Bool
Unit	None
Range	0:Angle(unit: degree), 1:Rotative work piece surface distance(unit: mm)
Default	0
When to became valid	Available swiftly. Needn't to restart.
Instruction	Be valid only when making use of rotative axles. If customer makes use of degree as unit in procedure file, please select 0.Or else select 1,then need to input rotative radius of work piece.

**RotativeWork pieceDiameter**

Type	Double
Unit	mm. (millimeter)
Range	1. 0~3000
Default	10. 000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	Be valid only when making use of rotative axles. The Diameter of rotative work piece at present.

**MoveToReferencePointBeforeMachining**

Type	Bool
Unit	None
Range	0(false):Don't move to reference point. 1(true): Move to reference point.
Default	1(true)
When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify whether the main axle move to reference point before machining.

**FixedCalibratorBlockPosition**

Type	Double
Unit	mm. (millimeter)
Range	Workbench displacement lower limit ~ Workbench displacement upper limit
Default	X:0.000000 Y:0.000000 Z:-1.000000
When to became valid	Available swiftly. Needn't to restart.

Instruction	coordinate of the fixed calibrator block position
-------------	--

**FixCalibrationBug**

Type	Bool
------	------

Unit	None
------	------

Range	0(false):Don't fix the calibration bug.
-------	--

	1(true): Fix the calibration bug.
--	-----------------------------------

Default	0(false)
---------	----------

When to became valid	Available swiftly. Needn't to restart.
-------------------------	---

Instruction	To fix the calibration sign which is not correct. If want to fix the fault of calibration sign please input "1(true)".
-------------	---

**MovetoFixedPointValid**

Type	Bool
------	------

Unit	None
------	------

Range	0(false):Don't move to fixed point.
-------	--

	1(true): Move to fixed point.
--	-------------------------------

Default	0(false)
---------	----------

When to become valid	Available swiftly. Needn't to restart.
Instruction	Move to this position after finished to execute program each time

**FixedPointPosition**

Type	Double
Unit	mm. (millimeter)
Range	Workbench displacement lower limit ~ Workbench displacement upper limit
Default	X:0.000000 Y:0.000000 Z:0.000000
When to become valid	Available swiftly. Needn't to restart.
Instruction	Coordinate of the fixed point position

**G73\_G83SafeHeight**

Type	Double
Unit	mm. (millimeter)
Range	0.0~99999
Default	2.000000

When to become valid	Available swiftly. Needn't to restart.
Instruction	In fixed circulation, the moving back distance when use rapid depth circulation drill

### DirectionWhileFixedDrillStop

Type	Int
Unit	None
Range	0: +X , 1: -X 2: +Y , 3: -Y
Default	0
When to become valid	Available swiftly. Needn't to restart.
Instruction	0/1:(G17:+X/-X) 2/3:(G17:+Y/-Y)
	The direction is valid only when the processing is in the X-Y panel.

### CheckDoubleAxisSynchronError

Type	Bool
Unit	None
Range	0(false):Don't check the error. 1(true): Check the error.

Default	0(false)
When to became valid	Available after reboot the system.
Instruction	In order to check the double axis synchron error The parameter is valid only when double axis synchron is specified.

### DoubleAxisSynchronErrorRange

Type	Double
Unit	mm. (millimeter)
Range	0~1000
Default	10.000000
When to became valid	Available after reboot the system.
Instruction	The biggest difference of the two axles which the system permitted, when the double axis move synchronly, one axle stops, the other continue move on.

### NormalJogFeedrate

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001~ RapidJogFeedrate
Default	1000.000000



When to became valid	Available swiftly. Needn't to restart.
Instruction	NormalJogFeedrate is the motion speed when hit the manual direction key. The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.

**RapidJogFeedrate**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	NormalJogFeedrate ~ Max speed
Default	2400.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	RapidJogFeedrate is the motion speed when hit the manual direction key and "High speed" key co chronously. The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.

**PauseDownSpeed**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	60 ~ Max speed
Default	600.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify the speed of Z axle downwards when the "pause" button was hit.  The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.

**PauseUpSpeed**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	60 ~ Max speed
Default	600.000000
When to became valid	Available swiftly. Needn't to restart.

Instruction	Specify the speed of Z axle upwards when the "pause" button was knocked down.  The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.
-------------	---

**JiggleFeedrate**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	10.0~1000.0
Default	60.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	The speed when jiggling.

**JiggleStepLength**

Type	Double
Unit	mm. (millimeter)
Range	0.01~10
Default	0.100000
When to became valid	Available swiftly. Needn't to restart.

Instruction	The jiggling length corresponding to the button knocked down.
-------------	---

### RapidTravelFeedrate

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001 ~ Max Speed
Default	3000.000000
When to became valid	Available swiftly. Needn't to restart.

Instruction	The motion speed of G00 order. The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.
-------------	---

### DefaultFeedrate

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001 ~ RapidTravelFeedrate
Default	1500.000000
When to became valid	Available swiftly. Needn't to restart.

Instruction	The interpolation speed of G00, G01, G02 order.
-------------	---

**UseDefaultFeedrate**

Type	Bool
Unit	None
Range	0(false):Don't use the feed rate. 1(true): Use the feed rate.

Default	0(false)
---------	----------

When to became valid	Available swiftly. Needn't to restart.
----------------------	--

Instruction	Specify whether abandon the speed setting in the procedure file, or use the default speed parameter the system appointed above.
-------------	---

**UseDefaultSpindleRev**

Type	Bool
Unit	None
Range	0(false):Don't use the default spindle rev. 1(true): Use the default spindle rev.

Default	0(false)
---------	----------

When to become valid	Available swiftly. Needn't to restart.
Instruction	Specify whether abandon the spindle rev appointed in the procedure file, or use the system default spindle rev set by customer instead.

### EnableZDownFeedrate

Type	Bool
Unit	None
Range	0(false):Don't use the feed rate. 1(true): Use the feed rate.
Default	0(false)
When to become valid	Available swiftly. Needn't to restart.
Instruction	Whether use the specified speed to descent the Z axle, when the Z axle move down perpendicularly. The parameter is valid only when Z axle move down perpendicularly and other axles don't move under the G01 order state.

### Z\_DownFeedrate

Type	Double
Unit	mm/min. (millimeter/minute)

Range	0.001 ~ Max Speed
Default	500.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	The parameter is valid only when the parameter "EnableZDownFeedrate" is selected "1(true)". The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.
Z_DownMaximalWorkFeedrate	
Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001 ~ Max Speed
Default	1500.000000
When to became valid	Available swiftly. Needn't to restart.

Instruction	The parameter is invalid to G00 order. It is in order to limit the max processing speed of Z axle when process downwards.
-------------	---

The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.

### OptimizeToolRaisingFeedrate

Type	Bool
Unit	None
Range	0(false):Don't optimize tool raising feed rate. 1(true): Optimize tool raising feed rate.
Default	0(false)
When to became valid	Available swiftly. Needn't to restart.
Instruction	In order to optimize tool rising feed rate.  Only work while use G01 to raising tool vertically

### ToolRasingHeightOnPause

Type	Double
------	--------



Unit	mm. (millimeter)
Range	0.0 ~ 500.0
Default	10.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	When stop or pause each time, the main axle will lift a distance, to protect the work piece, the parameter specifies this distance.

**SafeHeight**

Type	Double
Unit	mm. (millimeter)
Range	0.001 ~ 1000.0
Default	10.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	Relative to work piece origin, valid on moving to work piece origin and resume operations. When move to reference, the Z axle will move to this work piece coordinate point.

**ArcSpeedLimit**

Type	Bool
Unit	None
Range	0(false):Don't perform arc speed limit. 1(true): Perform arc speed limit.
Default	0(false)
When to became valid	Available swiftly. Needn't to restart.
Instruction	When process arc, the parameter perform whether limit the speed.  Specify whether perform arc speed limit when process arc trace.

**IJKIncrementModeValid**

Type	Bool
Unit	None
Range	0(false): invalid 1(true): valid
Default	1(true)
When to became valid	Available swiftly. Needn't to restart.

Instruction	In program file of processing arc, IJK values are incremental values from the center of the circle. Concerning this, please refer to the instruction of lag processing program corresponding.
-------------	---

### RadiusTolerance

Type	Double
Unit	mm. (millimeter)
Range	0.000 ~ 9999.0
Default	1.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	The biggest radius tolerance between the start point and the finish point in IJK programming state.

### FileTranslateParam

#### SafeHeightAtG00Feedrate

Type	Double
Unit	mm. (millimeter)
Range	0.000 ~ 9999.0
Default	1.000000

When to become valid	Reload the procedure file. Needn't to restart.
Instruction	When the main axle move within G00 order, the vertical height from the origin point.

**PLTUnit**

Type	Double
Unit	Mm/plu. (millimeter/plu)
Range	0.001 ~ 9999.0
Default	40.195
When to become valid	Reload the procedure file. Needn't to restart.
Instruction	The unit of PLT.

**PLTToolsDistanceWhileProcessArea**

Type	Double
Unit	mm. (millimeter)
Range	0.0001 ~ 99999.0
Default	0.025000
When to become valid	Reload the procedure file. Needn't to restart.

Instruction	The distance of tools when process area whit PLT.
-------------	---

### TwoDimensionalFileDepth

Type	Double
------	--------

Unit	mm. (millimeter)
------	------------------

Range	-99999 ~ 0.0
-------	--------------

Default	-1.000000
---------	-----------

When to became valid	Reload the procedure file. Needn't to restart.
----------------------	---

Instruction	Specify the processing depth of two dimensional file.
-------------	---

### UseFirstPointAsOriginInDXFFiles

Type	Bool
------	------

Unit	None
------	------

Range	0(false):Don't use first point as origin.
-------	---

	1(true): Use the first point as origin.
--	---

Default	1(true)
---------	---------

When to became valid	Reload the procedure file. Needn't to restart.
----------------------	---

Instruction	Specify whether use the first point as origin in the DXF file.
-------------	--

### PauseAndPromptWhileChangeTools

Type	Bool
Unit	None
Range	0(false):Don't pause and prompt while change tools. 1(true): Pause and prompt while change tools.
Default	1(true)
When to became valid	Reload the procedure file. Needn't to restart.
Instruction	Specify whether pause and prompt while change tools.

## 6.4 Manufacturer Parameters

Generally, Customer need not to know "manufacturer parameter", so you can omit this chapter. For the common user without the authorization, the system will require to input the password before enter "manufacturer parameter". It is shown below. It's in order to prevent from the customer occasionally modifying these important parameters resulting in breakdown.

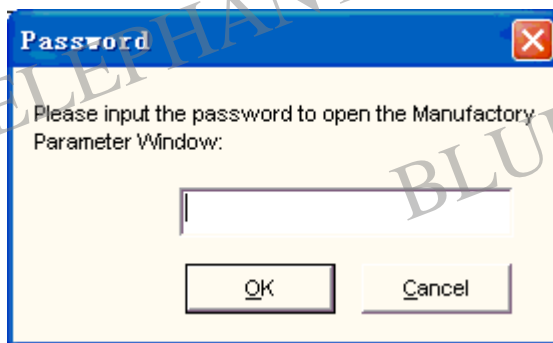


Figure 6- 2: Password Dialogue

Manufacturer parameter window is shown below:

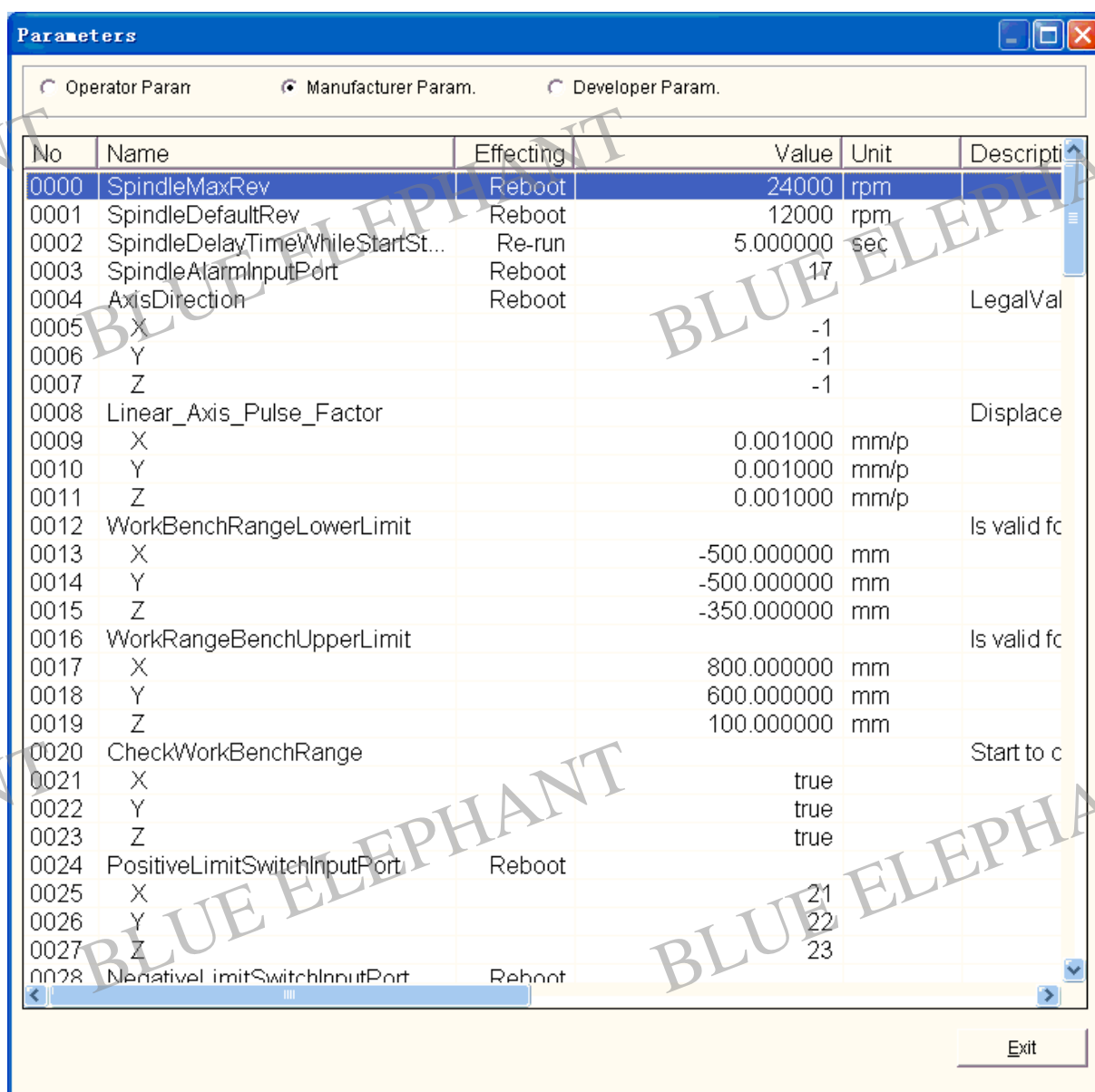


Figure 6- 3: Manufacturer Parameters Dialogue

**SpindleMaxRev**

Type	Int
Unit	rpm. (revolutions per minute)
Range	0 ~ 1000000
Default	24000
When to became valid	Need to restart the system.
Instruction	The rev speed corresponding to max analog output, when the continue rev controlling mode was triggered.

**SpindleDefaultRev**

Type	Int
Unit	rpm. (revolutions per minute)
Range	0 ~ SpindleRevMax
Default	12000
When to became valid	Need to restart the system.



Instruction	The default spindle rev of the system specified by customer. The parameter is valid only when the parameter "UseDefaultSpindleRev" is "true". The system will abandon the spindle rev appointed in the procedure file, use this spindle rev instead.
-------------	--

### SpindleDelayTimeWhileStartStop

Type	Double
Unit	sec. (second)
Range	0.0 ~ 60.0
Default	5.000000
When to became valid	Available swiftly. Needn't to restart.
Instruction	When the system starts and stops, if the customer uses the function of "the spindle starts and stops automatically", system needs to insert a number of delays, because spindle needs several minutes to start or stop.  This parameter specifies the time of delay.

**SpindleAlarmInputPort**

Type	Int
Unit	None
Range	0 ~ 64
Default	22
When to became valid	Available swiftly. Needn't to restart.
Instruction	If the spindle has alarm information, such as high temperatures, customer can input this alarm information into the control system through the port.

**AxisDirection(X, Y, Z)**

Type	Int
Unit	None
Range	1: Positive Direction, -1: Negative Direction
Default	-1(Negative Direction)
When to became valid	Available swiftly. Needn't to restart.

Instruction	Specify the machine coordinate value's increasing direction of spindle.  "1" means that the value will increase in positive direction, "-1" means in negative direction.
-------------	--

### **Linear\_Axis\_Pulse\_Factor(X, Y, Z)**

Type	Double
Unit	mm/p. (millimeter/pulse)
Range	0.0000009 ~ 999.0
Default	0.001000
When to became valid	Available swiftly. Needn't to restart.
Instruction	The displacement or angle produced by every control pulse in corresponded feed spindle. Say in detail, it means the least displacement the motion control card can process, in stepping system: it is corresponding to a stepping pulse, then change the angle displacement in stepping pulse into linear value according to transmission connection.

### **WorkBenchRangeLowerLimit (Machine Coordinate) (X, Y, Z)**

Type	Double
------	--------

Unit	mm. (millimeter)
Range	-99999 ~ 99999
Default	X:0.000000 Y:0.000000 Z:-350.000000
When to became valid	Need to restart the system.
Instruction	Specify the lower limit of workbench.

**WorkBenchRangeUpperLimit (X, Y, Z)**

Type	Double
Unit	mm. (millimeter)
Range	WorkBenchRangeLowerLimit (Machine Coordinate) ~ 99999
Default	X:799.000000 Y:599.000000 Z:0.000000
When to became valid	Need to restart the system.
Instruction	Specify the upper limit of workbench.

**SpindleDelayTimeWhileStartStop (X, Y, Z)**

Type	Double
Unit	sec. (second)
Range	0.0 ~ 60.0
Default	5.000000
When to become valid	Avail swiftly. Needn't to restart.
Instruction	<p>When the system starts and stops, if the customer uses the function of "the spindle starts and stops automatically", system needs to insert a number of delays, because spindle needs several minutes to start or stop.</p> <p>This parameter specifies the time of delay.</p>

**CheckWorkBenchRange (X, Y, Z)**

Type	Bool
Unit	None
Range	<p>0(false):Don't check the workbench range.</p> <p>1(true): Check the workbench range.</p>
Default	1(true)

When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify whether check the range of workbench.

### PositiveLimitSwitchInputPort (X, Y, Z)

Type	Int
Unit	None
Range	0 ~ 64
Default	X:17 Y:19 Z:21
When to became valid	Available swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the positive limit switch information from this port.

### NegativeLimitSwitchInputPort (X, Y, Z)

Type	Int
Unit	None
Range	0 ~ 64
Default	X:16 Y:18 Z:20

When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the Negative limit switch information from this port.

**DriverAlarmInputPort (X, Y, Z)**

Type	Int
Unit	None
Range	0 ~ 64
Default	X:11 Y:12 Z:13
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the drive alarm information from this port.

**DriverAlarmResetPort (X, Y, Z)**

Type	Int
Unit	None
Range	0 ~ 64

Default	X:2 Y:4 Z:6
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the drive alarm reset information from this port.

**DriverAlarmOutputPort**

Type	Int
Unit	None
Range	0 ~ 64
Default	20
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the output port of the motion control card. The system can send the drive alarm reset information to this port.

**WhenLimitedForbidMoveToLimitedDirection**

Type	Bool
Unit	None



Range	0(false): Don't forbid to move to limited direction. 1(true): Forbid to move to limited direction.
Default	1(true)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether forbid to move the limited direction when the limit is triggered.

**OutterAxisEncoderDataValid**

Type	Bool
Unit	None
Range	0(false): The external axis encoder is invalid. 1(true): The external axis encoder is valid.
Default	1(true)
When to became valid	Need to restart the system.
Instruction	Specify whether the external axis encoder is valid.

**EncoderDirection (X, Y, Z)**

Type	Int
Unit	None
Range	1:positive -1:negative
Default	1
When to became valid	Need to restart the system.
Instruction	Specify the counter increasing direction of the encoder.

**EncoderPulseFactor (X, Y, Z)**

Type	Double
Unit	mm/p. (millimeter/pulse)
Range	0.0000009 ~ 999.0
Default	X:0.0000762939000000 Y:0.0000762939000000 Z:0.0000762939000000
When to became valid	Need to restart the system.
Instruction	The replacement or angle produced by each encoder pulse in corresponded feed spindle.

**EncoderMaxStillAllowedError (X, Y, Z)**

Type	Double
Unit	mm. (millimeter)
Range	0.0000009 ~ 999.0
Default	X:0. 010000 Y:0. 010000 Z:0. 010000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	When certain spindle is on idle state the system will give an alarm if the difference between the feedback value and the output value is larger than the parameter.

**EncoderMaxDynamicAllowedError (X, Y, Z)**

Type	Double
Unit	mm. (millimeter)
Range	0.0000009 ~ 999.0
Default	X:0.100000 Y:0.100000 Z:0.100000
When to became valid	Avail swiftly. Needn't to restart.

Instruction	When certain spindle is on moving state the system will give an alarm if the difference between the feedback value and the output value is larger than the parameter.
-------------	---

### CheckOutterEncoderError

Type	Bool
Unit	None
Range	0(false): Don't check external encoder error 1(true): Check external encoder error.
Default	0(false)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether check external encoder error.

### EstopCancelMovetoReferencePointState

Type	Bool
Unit	None

Range	0(false): Don't cancel moving to reference point state.  1(true): Cancel moving to reference point state.
Default	0(false)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Once occur exigent stop, if the parameter is selected "true", the icon "Move to Reference Point" is cleared.

### ReferencePointPosition (X, Y, Z)

Type	Double
Unit	mm. (millimeter)
Range	WorkBenchRangeLowerLimit~WorkBenchRangeUpperLimit
Default	0.000000
When to became valid	Need to restart the system.
Instruction	The machine coordinate of the machine origin point placed, its range is specified according to parameter "WorkBenchRangeLowerLimit" and parameter "WorkBenchRangeUpperLimit".

**RawPositionDirection (X, Y, Z)**

Type	Int
Unit	None
Range	1:positive -1:negative
Default	X: -1 Y: -1 z: 1
When to became valid	Avail swiftly. Needn't to restart.
Instruction	When move to machine origin point, the motion direction of raw position.

**RawPositionFeedrate (X, Y, Z)**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001~10000.0
Default	X:1800.000000 Y:1800.000000 Z:800.000000
When to became valid	Avail swiftly. Needn't to restart.

Instruction	When move to machine origin point, the motion speed of raw position.
-------------	--

### RawPositionSwitchInputPortIndex (X, Y, Z)

Type	Int
Unit	None
Range	0 ~ 64
Default	X:50 Y:51 Z:52
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the raw switch information of each spindle from this port.

### PrecisePositionDirection (X, Y, Z)

Type	Int
Unit	None
Range	1:positive -1:negative

Default	X: 1 Y: 1 Z: -1
When to became valid	Avail swiftly. Needn't to restart.
Instruction	When move to machine origin point, the motion direction of precise position.

**PrecisePositionFeedrate (X, Y, Z)**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001~10000.0
Default	X:60.000000 Y:60.000000 Z:60.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	When move to machine origin point, the motion speed of precise position.

**PrecisePositionSwitchInputPortIndex (X, Y, Z)**

Type	Int
Unit	None



Range	0 ~ 64
Default	X:50 Y:51 Z:52
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the precise switch information of each spindle from this port.

**BackDistance (X, Y, Z)**

Type	Double
Unit	mm. (millimeter)
Range	-1000.0 ~ 1000.0
Default	X:2. 000000 Y:2. 000000 Z:-2. 000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The spindle will move an additional replacement, after the function of precise position of moving to machine origin point was performed.

**AxisErrorCompensationValid**

Type	Bool
Unit	None
Range	0(false): The axis error compensation is invalid 1(true): The axis error compensation is valid
Default	1(true)
When to became valid	Need to restart the system.
Instruction	Specify whether the axis error compensation is valid.

**OnlyReverseSpaceCompensationValid**

Type	Bool
Unit	None
Range	0(false): The only reverse space compensation is invalid. 1(true): The only reverse space compensation is valid.
Default	1(true)
When to became valid	Need to restart the system.

Instruction	Specify whether the axis error compensation is valid.
-------------	---

**ReverseSpace (X, Y, Z)**

Type	Double
------	--------

Unit	mm. (millimeter)
------	------------------

Range	0.0 ~ 1.0
-------	-----------

Default	0.000000
---------	----------

When to became valid	Need to restart the system.
----------------------	-----------------------------

Instruction	Specify the reverse space of each spindle.
-------------	--

**Quadrant\_Errors\_compensate\_valid**

Type	Bool
------	------

Unit	None
------	------

Range	0(false): The quadrant errors compensation is invalid.
-------	--

	1(true): The quadrant errors compensation is valid.
--	---

Default	0(false)
---------	----------

When to became valid	Avail swiftly. Needn't to restart.
----------------------	------------------------------------

Instruction	Specify whether the quadrant errors compensation is valid.
-------------	--

### Quadrant\_Errors\_compensate\_parameters

Positive direction of X axle:

#### compensateTime

Type	Double
Unit	sec. (second)
Range	0 ~ 0.1
Default	0.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The bigger the value is, the more obverse the compensating effect is. Suggest setting this parameter to 0.02 second.

#### CompensateQuantity

Type	Double
Unit	mm. (millimeter)
Range	0 ~ 999.0
Default	0.000000
When to became valid	Avail swiftly. Needn't to restart.

Instruction	The bigger the value is, the more obverse the compensating effect is. Please pay attention to set this parameter. If the value is too small, the system will not decrease the height of circle; if too large, the system will cause the circle concave entad. Suggest measuring the sharp-angle height in practice through making use of laser interferometer and etc when debug the system. The parameter is specified to 0.3~3 times of the sharp-angle height in general (the compensation effect and compensation time are relative to compensation intension).
-------------	---

## CompensateDelayTime

Type	Double
Unit	sec. (second)
Range	0.0 ~ 0.1
Default	0.000000
When to became valid	Avail swiftly. Needn't to restart.

Instruction	Owing to different capacity of each machine, appearance of the sharp-angle is uncertain, it does not locate on the quadrant flat, but locate apart from the quadrant point with some distance. So the parameter means the time corresponding to this distance, please convert the distance into the value of parameter.
-------------	---

## CompensateIntension

Type	Double
Unit	None
Range	0.01 ~ 0.99
Default	0.250000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The value of parameter has influence to compensating affection. The bigger the value is, the more obverse the compensating effect is.

Negative direction of X axle: please consult the setting of "Positive direction of X axle". It omits here.

Manual

Positive direction of Y axle: please consult the setting of "Positive direction of X axle".  
It omits here.

Negative direction of Y axle: please consult the setting of "Positive direction of X axle".  
It omits here.

Positive direction of Z axle: please consult the setting of "Positive direction of X axle".  
It omits here.

Negative direction of Z axle: please consult the setting of "Positive direction of X axle".  
It omits here.

**EstopStateOutputMap**

Type	Hex number of Int
Unit	None
Range	0X0000000000000000~ 0XFFFFFFFFFFFFFFFF
Default	0X0000000000200000
When to became valid	Need to restart the system.
Instruction	The parameter specified the state of output port about exigent stop.

**ResetStateOutputMap**

Type	Hex number of Int
------	-------------------

Unit	None
Range	0X0000000000000000~ 0XFFFFFFFFFFFFFFFF
Default	0X000000000008000A8
When to became valid	Need to restart the system.
Instruction	The parameter specified the state of output port about reset.

**MobileCalibratorBlockThickness**

Type	Double
Unit	mm (millimeter)
Range	0 ~ 1000
Default	0.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The parameter specified the thickness of mobile calibrator block. Please measure the height of the block as the value of parameter.  Notice: the parameter has been modified before leaving factory, so please not make bold to modify without authorization.



## Manual

**ManuDir (X, Y, Z)**

Type	Int
Unit	None
Range	1: Positive Direction, -1: Negative Direction
Default	X: 1 Y: 1 Z: 1
When to became valid	Need to restart the system.
Instruction	Specify the direct of manual operation.

**ManualPositiveButtonInportIndex (X, Y, Z)**

Type	Int
Unit	None
Range	0 ~ 64
Default	X: 64 Y: 64 Z: 64
When to became valid	Avail swiftly. Needn't to restart.

## Manual

Instruction	Specify the input port of the motion control card. The system can receive the manual positive button information from this port.
-------------	--

**ManualNegativeButtonInportIndex (X, Y, Z)**

Type	Int
Unit	None
Range	0 ~ 64
Default	X: 64 Y: 64 Z: 64
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the manual negative button information from this port.

**EStopButtonInportIndex**

Type	Int
Unit	None
Range	0 ~ 64
Default	55

When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the exigent stop button information from this port.

### ReleaseLimitButtonInportIndex

Type	Int
Unit	None
Range	0 ~ 64
Default	64
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the input port of the motion control card. The system can receive the release limit button information from this port.

### OtherEStopButtonInportIndex

Type	Hex number of Int
Unit	None
Range	0X0000000000000000~ 0XFFFFFFFFFFFFFFFF
Default	0X0000000000000000

When to became valid	Need to restart the system.
Instruction	If need to make the system exigent stop when certain input port has signal, then the customer can change the corresponding bit into "1".

### FeedrateModifySwitchValid

Type	Bool
Unit	None
Range	0(false): Feed rate modify switch is invalid. 1(true): Feed rate modify switch is valid.
Default	0(false)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether permit to modify feed rate through external devices.

### SpindleRevModifySwitchValid

Type	Bool
Unit	None

Range	0(false): Spindle rev modify switch is invalid. 1(true): Spindle rev modify switch is valid.
Default	0(false)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether permit to modify spindle rev through external devices.

**KeyboardEStopKeyValid**

Type	Bool
Unit	None
Range	0(false): The keyboard exigent stop key is invalid.  1(true): The keyboard exigent stop key is valid.
Default	0(false)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether perform exigent stop through keyboard. If the parameter is 1(true), when knock the key "pause" down twice, the system will stop exigently.

**SupportMouse**

Type	Bool
Unit	None
Range	0(false): The system does not support mouse method.  1(true): The system supports mouse method.
Default	1(true)
When to became valid	Need to restart the system.
Instruction	Specify whether support mouse method.

**SpindleOutportIndex**

Type	Int
Unit	None
Range	0 ~ 64
Default	16
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the out port of the motion control card. The system can output main spindle start and stop signal from this port.

**CoolantPumpOutportIndex**

Type	Int
Unit	None
Range	0 ~ 64
Default	18
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the out port of the motion control card. The system can output the start and stop control signal of coolant pump from this port.

**LubricationPumpOutportIndex**

Type	Int
Unit	None
Range	0 ~ 64
Default	17
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the out port of the motion control card. The system can output the start and stop control signal of lubrication pump from this port.

**AutoStartLubricationPeriodically**

Type	Bool
Unit	None
Range	0(false): The system does not support auto start lubrication periodically.  1(true): The system supports auto start lubrication periodically.
Default	0(false)
When to became valid	Need to restart the system.
Instruction	Specify whether auto start lubrication periodically.

**PermitLubricateOnlyWhileMachineMoving**

Type	Bool
Unit	None
Range	0(false): The system starts lubrication at ant time.  1(true): The system starts lubrication only when machine moving.
Default	0(false)
When to became valid	Need to restart the system.



Instruction	Specify whether start lubrication only when machine moving. If the parameter was set 1(true), then the system will not start lubrication when machine doesn't move.
-------------	---

### IntervalBetweenStartLubricate

Type	Double
Unit	sec. (second)
Range	3.0 ~ 3600000.0
Default	18000.000000
When to became valid	Need to restart the system.
Instruction	Specify the interval between two lubricating. It is in order to set the cycle time of lubricating.

### LubricateOpenTime

Type	Double
Unit	sec. (second)
Range	1.0 ~ 100.0
Default	5.000000
When to became valid	Need to restart the system.

Instruction	Specify the persistence time when start lubrication.
-------------	--

**DoubleAxisNumber (X, Y, Z)**

Type	Int
Unit	None
Range	0: X axle 1: Y axle 2: Z axle

Default	1
When to became valid	Need to restart the system.

Instruction	Specify axle number of double axis, selected from feed spindle, the parameter is valid only in double axis settings.
-------------	--

**DoubleAxisReferencePointTolerance**

Type	Double
Unit	mm (millimeter)
Range	-1000 ~ 1000
Default	0.000000

When to became valid	Need to restart the system.
----------------------	-----------------------------

Instruction	The parameter is valid only in double axis settings. When Y axle crossbeam of the machine has been debugged, the parameter means the distance tolerance between two axles when they were in the origin point.
-------------	---

### HandWheelValid

Type	Bool
Unit	None
Range	0(false): Hand wheel is invalid. 1(true): Hand wheel is valid.
Default	1(true)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether valid when making use of hand wheel. When using hand operated pulse generator, must set the parameter 1(true), then the output and input of motion control card defined according to the method of hand operated pulse generator.

**CountTheHandwheelPulseStrictly**

Type	Bool
Unit	None
Range	0(false): The count is invalid. 1(true): The count is valid.
Default	0(false)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Under the circumstance of using hand wheel, the moving of machine is according to counting the hand wheel pulse strictly. But when hand wheel run too fast, the machine will move a period of time even if the hand wheel stopped. If the value of parameter is 0, the system quickly respond to the running of hand wheel, if the value is 1, and the running of hand wheel is too fast, the moving distance of machine will not identify to the hand wheel.

**HandWheelPulseDirction**

Type	Int
Unit	None

Range	1: the direction of count decrease. -1: the direction of count increase.
Default	-1
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether the count of pulse increase (decrease) when the hand wheel runs clockwise.

**HandWheelMultipleX1**

Type	Int
Unit	None
Range	1 ~ 1000
Default	1
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify how many pulse the system will translate to receive when the hand wheel sent a pulse under the circumstance of selecting X1 level.

**HandWheelMultipleX10**

Type	Int
------	-----

Unit	None
Range	HandWheelMultipleX1 ~ 1000
Default	10
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify how many pulse the system will translate to receive when the hand wheel sent a pulse under the circumstance of selecting X10 level.

**HandWheelMultipleX100**

Type	Int
Unit	None
Range	HandWheelMultipleX10 ~ 1000
Default	100
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify how many pulse the system will translate to receive when the hand wheel sent a pulse under the circumstance of selecting X100 level.

**HandWheelGuideFactor**

Type	Int
------	-----

Unit	None
Range	1 ~ 1000
Default	1
When to became valid	Avail swiftly. Needn't to restart.
Instruction	When use hand wheel steer the machine, the parameter specify the magnification relationship of rev and spindle feed rate correspondingly. It is shown through using one integer divide another integer. The integer on the former means numerator of guide factor, anther means denominator.

### HandWheelAcceleration

Type	Double
Unit	mm/s <sup>2</sup> . (millimeter/second <sup>2</sup> )
Range	1.0 ~ 1000.0
Default	200.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the capacity of deceleration and acceleration when using hand wheel.

**AxisMaxFeedrate (X, Y, Z)**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0 ~ 1000000
Default	60000.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the max permitted speed of each spindle.

**StartupFeedrate**

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.0 ~ The Max Speed
Default	300.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The parameter is corresponding to stepping electrical machinery.  The Max speed is the smaller one between that inputted by customer (namely is the biggest speed of every axle) and hardware speed.



**DecelerationDisplacementWhileG00**

Type	Double
Unit	mm. (millimeter)
Range	0.0 ~ 999.0
Default	5.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the displacement of moving when deceleration within G00 order. The parameter is in order to make the moving softly.

**SpeedWhileApproachingToWork piece**

Type	Double
Unit	mm/s. (millimeter/minute)
Range	0.001 ~ 99999.0
Default	300.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify feed rate while using G00 order and tool approach to work piece.

**LinearAcceleration**

Type	Double
------	--------

Unit	mm/s <sup>2</sup> . (millimeter/second <sup>2</sup> )
Range	0.001 ~ 100000.0
Default	1200.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the deceleration and acceleration capacity of single spindle.

**ConnectionAcceleration**

Type	Double
Unit	mm/s <sup>2</sup> . (millimeter/second <sup>2</sup> )
Range	0.001 ~ 100000.0
Default	2999.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the maximal acceleration owed by the spindle drawing near when the spindle on feed moving. Suggest setting the value of parameter 1 ~ 2 times of "LinearAcceleration"

**RateOfAcceleration**

Type	Double
------	--------

Unit	mm/s <sup>3</sup> . (millimeter/second <sup>3</sup> )
Range	0.001 ~ 99999999999.0
Default	9999.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify the increasing amplitude of acceleration.

Method of modifying parameter relative to reference cycle:

When processing circular work piece, the radius of work piece will decrease along with the increasing processing speed.

Please make a standard cycle with radius "R". Process the cycle with different speed "V", measure the radius tolerance "dr" between standard and processed cycles, if you are pleased with the tolerance "dr", please input the radius "R" into parameter "ReferenceCircleRadius" and parameter "ReferenceCircleMaxSpeed".

### ReferenceCircleRadius

Type	Double
Unit	mm. (millimeter)
Range	0.001 ~ 9999.0
Default	5.000000
When to became valid	Avail swiftly. Needn't to restart.

Instruction	The parameter means the radius of reference cycle when measuring, please input the actual value.
-------------	--

### ReferenceCircleMaxSpeed

Type	Double
Unit	mm/min. (millimeter/minute)
Range	MinSpeedInACircularMotion ~ 99999.0
Default	600.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Means maximal permitted speed of corresponding reference cycle. The bigger the value is, the bigger the error of tracing is, the less the dimension of cycle is. Please set the speed acceptable as the value of parameter.

### MinSpeedInACircularMotion

Type	Double
Unit	mm/min. (millimeter/minute)
Range	0.001 ~ 99999.0
Default	180.000000

When to become valid Avail swiftly. Needn't to restart.

Instruction

Specify the minimal speed when the processing arc. If the radius of cycle is very little, the two parameters above will make the processing speed very small in practice, this parameter limit the minimal speed of processing, when the parameter "ArcSpeedLimit" was set 1(true), the speed of machine will be equal to the value of the parameter at least.

### ExactStopTime

Type Double

Unit s. (second)

Range 0 ~ 999.0

Default 0.000000

When to become valid Avail swiftly. Needn't to restart.

Instruction

The parameter is in order to conquer the delay effect caused by servo system.

### CutterCompensationValid

Type Bool

**Manual**

Unit	None
Range	0(false): The cutter compensation is invalid.  1(true): The cutter compensation is valid.
Default	1(true)
When to became valid	Avail swiftly. Needn't to restart.
Instruction	Specify whether make use of cutter compensation function.

**PreventShakeLevel**

Type	Int
Unit	None
Range	1 ~ 10
Default	1
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The higher the prevent shaking level is, the flatter the acceleration is, and the longer the processing time is.

**FlatTime**

Type	Double
------	--------

Unit	s. (second)
Range	0 ~ 0.2
Default	0.000000
When to became valid	Avail swiftly. Needn't to restart.
Instruction	The bigger the value of parameter is, the slicker the surface of work piece is.  But if the value is too large, it will cause alteration of work piece size. Suggest set the parameter 0.05 in general.

**TrackTolerance**

Type	Double
Unit	mm. (millimeter)
Range	0 ~ 10
Default	0.000000
When to became valid	Avail swiftly. Needn't to restart.

Instruction	The bigger the value of parameter is, the slicker the surface of work piece is.  But if the value is too large, it will cause outline of work piece faintness .Suggest set the parameter 0.02 in general.
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### CoordinateBenchmark

Type	Int
Unit	None
Range	0: based on the value of programming  1: based on the value of adding up.  2: based on the value of feedback
Default	0
When to became valid	Avail swiftly. Needn't to restart.
Instruction	When processing, the adding up method of coordinate.

### ShowUSBKeyboardMsgInLog

Type	Bool
Unit	None



Range 0(false): Don't show USB keyboard messages in log window.  
1(true): Show USB keyboard messages in log window.

Default 0(false)

When to became valid Avail swiftly. Needn't to restart.

Instruction Specify whether show the USB keyboard messages in log window.

## **7** Instruction to operate the customized small keyboard

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NcStudio™ version 5.4.53 and above support customized small keyboard.

For the user using NcStudio™ software conveniently, a customized small keyboard lays out 5×4 as below is provided:

Start Pause	Stop	Resume	Jog
Spindle switch	Set as origin	Return to origin	× 1
X+	Y+	Z+	× 10
X-	Y-	Z-	× 100
Shift	Calibrator	F-	F+

Each key has its certain function in the software, listed as below:

- I Start/Pause: After press this key, the system begin to run the processing file if a NC file is loaded and the system is in idle; if the system is in running mode, press this key will make the system pause.
- I Stop: Stop the current operation. The processing will be stopped after this key is pressed if the system is in processing status; the mobile calibrator will be stopped after this key is pressed if the system is in mobile calibrator status.
- I Resume: The system will resume to machining after this key is pressed if the system is in processing pause status.
- I Jog: Switch the manual data input (MDI) mode to jog.
- I Spindle switch: Turn on the spindle after this key is pressed if the spindle is shut off; Otherwise, turn on the spindle.

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**Manual**

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- I Return to origin: The system will execute the command of move to workpiece origin.
- I ×1: After this key is pressed, the jog steplength will set to be 0.01mm.
- I ×10: After this key is pressed, the jog steplength will set to be 0.1mm.
- I ×100: After this key is pressed, the jog steplength will set to be 1mm.
- I X+: Move the cutter one step to the X axis' positive direction. If the machine tool is in continually jog state, the cutter will be moved to the X axis' positive direction continually. Pay attention: if it is in continually jog state, press this key only, the cutter will jog continually at manual low speed; while press the shift key and this key at the same time( press the shift key, do not loosen it, then press this key),the cutter will jog continually at manual high speed.
- I X-: Move the cutter to the X axis' negative direction. The speed, the steplength and the group keys are the same as X+ key.
- I Y+: Move the cutter to the Y axis' positive direction. The speed, the steplength and the group keys are the same as X+ key.
- I Y-: Move the cutter to the Y axis' negative direction. The speed, the steplength and the group keys are the same as X+ key.
- I Z+: Move the cutter to the Z axis' positive direction. The speed, the steplength and the group keys are the same as X+ key.
- I Z-: Move the cutter to the Z axis' negative direction. The speed, the steplength and the group keys are the same as X+ key.
- I Shift: Nothing will happen if you press this key singly. Only when you press this key and other key at the same time some function will be triggered. The group keys are described in other keys' instruction.
- I Calibrator: That is the second key at row five. The system will mobile calibrator after this key is pressed.
- I F-: The feed rate will be decreased if this key is pressed.
- I F+: The feed rate will be increased if this key is pressed.

## 8 Operation steps

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## Manual

1	negative direction of X-axis
5	positive direction of — Y-axis
2	negative direction of — Y-axis
6	positive direction of — Z-axis
3	negative direction of — Z-axis

These keys with CTRL can realize super-speed ambulation of the machine tool.

## 8.5 Set the work piece origin

The work piece origin is also the origin of X, Y, Z, axis in processing. Before processing, we should connect the position of coordinate origin with actual position of the work piece origin. The detail steps are below:

Move the X, Y axis to the expected origin position of work piece and then choose the menu of "Set work piece origin", or reset the coordinate value of the current position in the coordinate window and then the system will set the current position as the start point in carrying out the processing.

The above steps will help you setting the work piece origin of X, Y axis, but set the work piece origin of Z-axis needs more accurate operating manual. This system works with the hardware of the machine tool will provide the function of adjusting cutter.

Choose the menu of "operate |mobile calibrator ... "that will help you complete mobile calibrator. After these operations, the work piece origin is ensured.

## 8.6 Process automatically

It means that the processing procedure of machine tool chosen will process automatically.

### Start to process automatically

Choose the item of "operate| start", machine tool will process the procedure automatically by itself from the first sentence. Customer can use short cut key "F9" to complete the function.

### Stop the machine tool

In automatically processing, if you want to stop the movement of processing procedure, you can choose the menu "operate| stop" or corresponding button in the toolbar, also can use short cut key "F11", machine tool will stop after completing processing of the current line and enter into "idle" state. This recommended method is the accurate and ordinal way of system stopping.

**Note:**

When the connection characteristic of super-speed smooth speed is valid, system will stop while connection speed is zero.

### Pause the Machine tool

In automatically processing, if need pausing processing, choose the item of "operate| pause" or corresponding button in the toolbar, also can use short cut key "F10", machine tool will stop after carrying out the current sentence of processing, at this time if you want keep on carrying out processing, you can choose the item of "operate| Start".

### Jump the segment and carry out the procedure

Choose the menu of "Advanced Start", the system will flip out a dialog box and ask you which sentence will start to carry out the procedure and which sentence will end. If you fill in the number of the segment and click "start", the machine tool will carry out the appointed segment according to your requirements. But you must give a number in front of the procedure sentence.



# 9 Attentions while operating

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## 9.1 Attentions execute multi-Task

Because the Windows is a time sharing operates system, generally when carrying out the auto processing in the computer, you can execute other tasks (for example, edit the processing procedure), but please pay attention to the following two problems:

The procedure of Windows takes up large memory, so please do not open too much windows, according to generally the size of computer memory.

The movement of some applications themselves may be not too stable, for example the some game procedure, VCD player etc., they may take the system resources without limit in circulate process, for example: The memory, CPU time an etc., end cause the computer crack down. So, in processing time, please do not start these procedures, so as not to result in accidental processing interruption.

## 9.2 Attentions move to mechanical origin

At the process of returning mechanical origin, there will be different process according to different system requirement. The calibration process will be slower in high accuracy requiring system. When process returning mechanical origin function you must pay attention to the NC state window, and close the dialog of returning mechanical origin only after the system enter idle state.

When the process of returning mechanical origin is interrupt manually, it will cause some aftereffect as following: 1.it will usually appear the port warnings, because of this time limitation signal does not disappear; 2. un-accurate position because of interruption of returning mechanical origin; 3. the soft limitation function has no effect, because moving to reference point process does not complete, so system consider the soft limitation function to be invalid, and the soft limitation function will function until the process of returning reference point completed.

# 10 User software permission agreement

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Permitted:

The Shanghai Naiky Technology Co. Ltd. (Abridge for Naiky Company here) awards you this software procedure right. But you must guarantee toward the Naiky Company: Does not use, copy, revise, rent, transfer either this system or no matter what a part outside this agreement stipulation provision.

You guaranteed that:

1. Only uses this system on one machine;
2. Only when use on this machine, in order to backup or manage the records, permit to copy this system by the readonly mode;
3. Only when the third party accepts the provision and condition of this agreement, permit to authorize to use this system and permission agreement for the third party.
4. When transferring, the original documents, supplementary documents and all copies must be transmitted to the other party together; or destroyed the surplus products completely;
5. Only under the circumstance of accepting one provision of itmes below, permit to use this system on the multiuser environment or the networks:

This agreement definites provision permitted to use in the multiuser environment or the network system;

Usage of each pitch point and terminal of the system have all purchased the use permission.

You guaranteed not do those below:

1. Transfers the permission once more;
2. Reverse project, disassemble or disintegrate this system;
3. Copy or transmit this system completely or partially, but if the clear statement provision of the agreement permitted doing so is an exception.

When you completely or partial hand over this system or the copy for another use side, your permission power terminated voluntarily.

The copyright and property rights:

This system and the documents enjoy the copyright, and are procted by international agreement provision. You can not remove the copyright from the copyright statement of the software.You guarantee to copy duplicates of the copyright statement for this system (completely or are partial).You agreed to stop copying the system and documents by any illegal forms.

Post-sale guarantee:

The Naiky company guarantees, in the normal use situation, from sells the date in 90 days, the software carrier has the material or the craft flaw, when really has the flaw after confirmation, the Naiky Company's complete responsibility is to exchanges a software carrier; also it is the only compensates. When the accidents, abuses or error usage resulted in paralysis of software, the post-sale guarantee is invalid. The carrier which exchanges from Naiky Co. enjoy surplus time of original guarantee time, or 30 day-long guarantee; Takes its elder first.

Except the post-sale guarantee above, this system does not enjoy the post-sale guarantee of any other forms.

Responsibility limited:

The guarantee declared above, regardless of simile or metaphor, is complete content of guarantee, including commercial character and compatible guarantee for special application goal. No matter either follows this agreement and other provisions or not, produced by using this system: The loss of profit, the usability lose, the commercial severance, or indirect, special, accidental and inevitable destruction of any forms, or the other party's any suing for damages, the Naicy Company, its agent and its seller are not responsible generally, even if the Naicy Company is informed the possibility occurrence of this kind of matter.

Permission termination:

If you disobey no matter what a provision and the condition of this agreement, the

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Naicy Company can possibly terminate as necessary, when the permission terminated, you must destroy this system, documents and all copies immediately, or return them to Naiky Company.

Apply the law of:

"Intellectual property rights Protection Rule", "Copyright Law" and so on.

Now, you affirm you already read in detail and had understood this agreement, and strictly obey various provisions and conditions of the agreement.

The Shanghai Naiky Technology Co. Ltd

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The short key map in common use is shown below:

Move to Reference Point	Ctrl + Home
Move to Origin	F7
Calibrate	Ctrl + F7
Move to Position Change Tool	Ctrl + D
Set Work piece Coordinate	F6
Set Work piece Origin	Shift + F6
Start	F9
Pause	Pause or F10
Stop	F11
Enter Simulation Mode then Start Simulating	F8
Direct Go	F5
Show Trace Window	Alt +1
Full Screen	Ctrl + Enter
Clear View	Ctrl + Del
Advanced Start	Ctrl + F9
Resume	Shift + F9
Advanced MDI	Ctrl + Shift + F9
Show Log Window	Alt + 2
Show File Manager Window	Alt + 3
Show Parameter Window	Alt + 4
Show Editor Window	Alt + 5
New	Ctrl + N
File Information	Ctrl + I



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Open and Load	Ctrl + O
Unload	Ctrl + U
Open and Edit	Ctrl + E
Edit Loaded File	Ctrl + P
Save	Ctrl + S
Cut	Ctrl + X
Copy	Ctrl + C
Paste	Ctrl + V
Find	Ctrl + F
Repeat	Ctrl + H
Find the Next	F3
Select All	Ctrl + A
Undo	Ctrl + Z
Show IO State Window	Alt + 6
Show Auto Window	Ctrl + 1
Show Manu Window	Ctrl + 2 or Scroll Lock

The shortcut button below is available when Manual Window was activated only, and is available in either continuous point-motion mode or increasing stepping mode.

1	Direction of X -
4	Direction of X +
2	Direction of Y -
5	Direction of Y +
3	Direction of Z -

The shortcut button below is available when Trace window was evoked and focused only.

Zoom Out	Num +
Zoom In	Num -
Center View	Home
Fit to Window	Num *
Show Current Point	End
Front View	5
Top View	8
Bottom View	2
Left View	4
Right View	6
Southwest View	1
Northwest View	7
Southeast View	3
Northeast View	9
Alt + → or Alt + ←	Cycle with Z axle
Alt + ↑ or Alt + ↓	Cycle with Y axle
Alt + PgUp or Alt + PgDn	Cycle with X axle