

the IO test, and the program will display “Auto check on”.

10.2.1 General Input Signal

Definitions of the connectors between the input signal and external buttons are:

Signal	1	2	3
Input	IN1	IN2	IN3
Function	Foot switch	Uncapping protection	Water protection

Press one external button to check the corresponding signal react or not. means there are input of signals.

10.2.2 General Output Signal

Check one signal and click it to see whether the external equipment reacts or not. means there are output of signals. Definitions of connectors between the output signal and external buttons are:

Signal	1	2	3	4
Output	OUT1	OUT2	OUT3	OUT4
Function	Blow ctrlol	Work finished denote	U-Disk denote	Reserved

10.2.3 Limit Datum Signal

Datum Signal: means there are input signals. If the laser head is away from the datum switch, and there are input signal, there may be damage to the datum switch or error of the lines.

Limit Signal: means there are input signals. If there is such signal input, the laser head can not move (toward one direction). If the laser head is away from the limit switch, and there is signal input, there may be damage to the limit switch or error of the lines.

10.2.4 Movement Test

It can check whether each movement axis works well or not. Off-line laser movement test is determined by the download configuration of the software.

11 Appendix

11.1 Create AI Format File

Cutting with the AI Format is smoother, and generate less strike. It is suggested to use AI Format File as much as possible, especially, in cutting of the constant speed. If you find some obvious strike in cutting of varied speed, and the figure distorted, change the file to PLT.



11.2 Multiple Controller Operation

This introduction is suitable for MPC6515 and MPC6535.

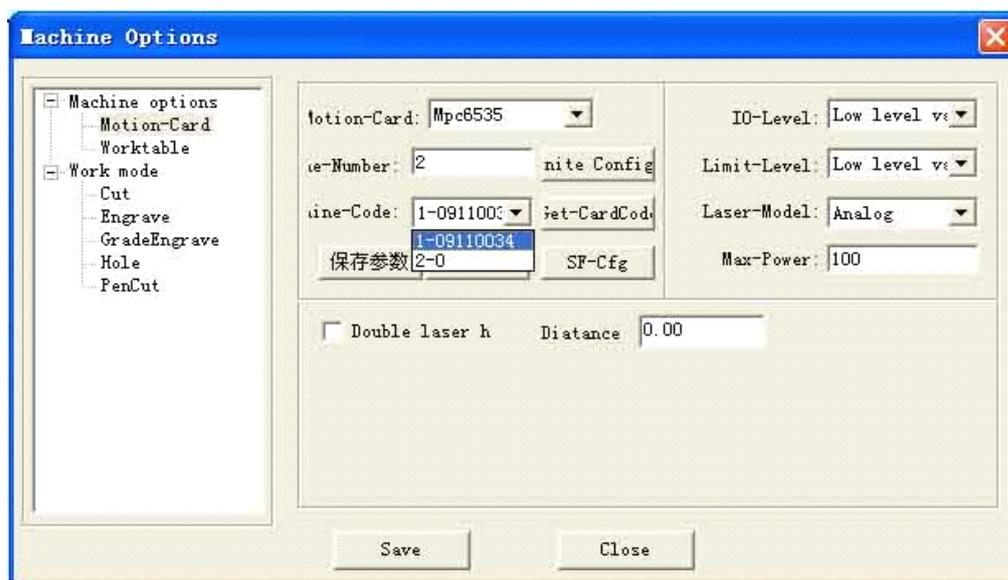
A PC can control a maximum of 8 equipments without unplugging USB cable (all the controller cards are linked to the USB interfaces at the same time).

11.2.1 Suitable Controller Card

Suitable controller card are MPC6535 or any version over the MPC6515 V4.1.1.0 (MPC6515 V4.1.0.0 excluded).

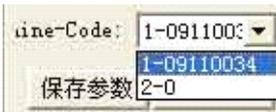
11.2.2 Introduction of Install Set

No set is needed before the install of the software. You can operate as the normal install steps goes. Interface appears as below after the installment:



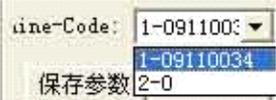
1. The default number of the machine is 1, and you can input the number as it shows: 2 mean the number of the machine. Input a number, click **Set-CardCode**, and then click “Save” to close the software.

2. Link the USB cable of the No.1 machine to the USB interface of the PC, power on, open the

control software, check 1 in the following interface . Then click

Set-CardCode to get the serial number of the controller card. Stick the serial number on the back of the 6516 card to match the controller card number of the software. Go back to the “Worktable” interface to set the parameters such as the range of the worktable and other related movement parameters and then click “Save” to close the software. Unplug the USB cable.

3. Link the USB cable of the No.2 machine to the USB interface of the PC. It should be another USB interface due to the multiple card control. Power on, open the control software, check 2

in , and then click **Set-CardCode** will do.

4. Link No.1 and No. 2 machine to the USB interface one by one, open the control software, select the serial number of the machine in the interface shown as below:

11.2.3 Other notes

1. If there are more machines to control, you can input the corresponding number of the machine and set according to the steps listed above.

2. Due to the limit of the number of the USB interface, the USB cable of the 6515 controller card should not be longer than 5m. At present one PC can link to a maximum of 8 equipments at a time.

3. the most advanced function of the Multiple Control is that each can control several worktables at a time. That is to say, each can control two equipments, one with one laser head and one with two laser heads.

4. To ensure the stability of the control, machines which are in processing can not be linked by the software in Multiple Control. You can only link the machine after the processing stops.

11.3 MPC6535 Power Down Auto Recovery Function

This function is the customized version. It is not added to the released version. You can contact the provider to update the board and DLL if you want this version.

MPC6535	firmware	DSP version No.: V4.2.1.10
	hardware	FPGA version No.: V4.2.1.0
Dll	Dll	version No.: V4.2.1.10
PadFmw	PAD Firmware	version No.: V4.2.1

Usage: modify all the parameters in syscfg.ini.

1. CanContinueForEngrave=1

Introduction of parameter set:

When it is 1, power down memory is valid.

When it is 0, power down memory is invalid.

Note: users should not easily change this parameter.

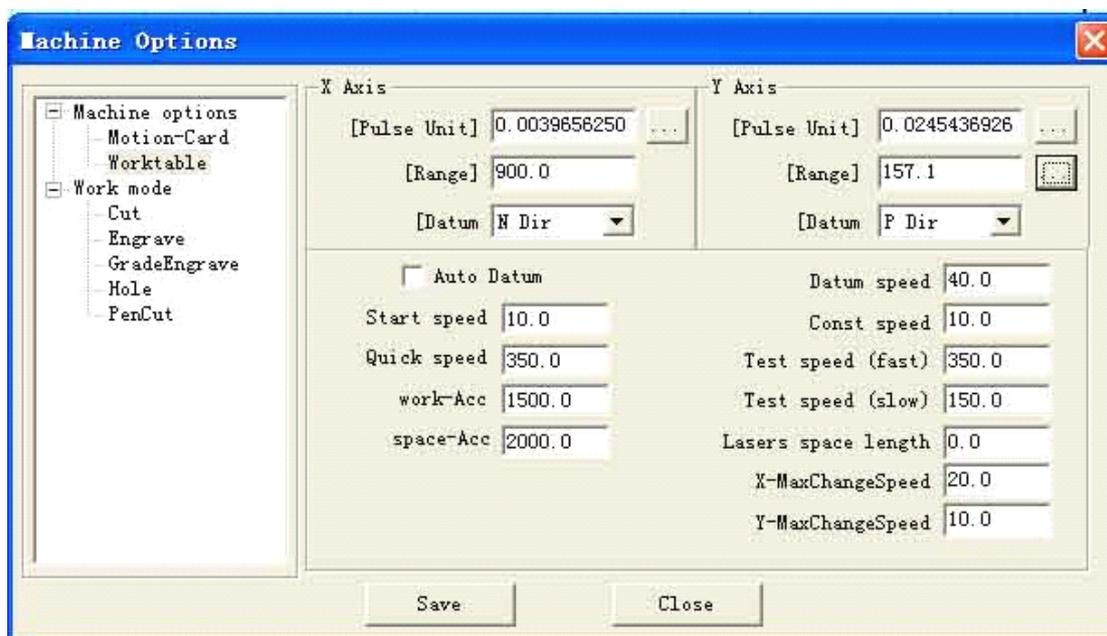
2. SaveBreakTime=0.002 It means: the number multiplied by 1000 is the actual compensating distance.

Introduction of the parameter set:

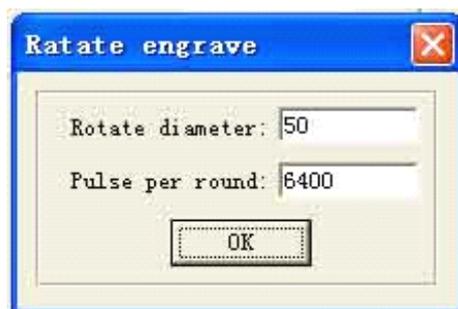
0.002 means: the number multiplied by 1000 is the actual compensating distance.

Note: user can modify this number according to the actual situation (download new configuration files after modification).

11.4 MPC6515/35 Spindle Function



In Advanced Configuration, you can see ... after the range of the worktable on the Y-axis. Click it and dialog box appears as below:



Pulse number in one spine: the pulse number needed for the spine axis spine once. Eg: driver is subdivided by 25 subdivisions, that is, 5000 pulse are needed in one spine. Reduction ratio of the spine table is 1:2, that is, input $5000 * 2 = 10000$ in this dialog box.

No need for the users' modification.

Diameter: directly input the diameter of the rotor. The range of the Y-axis will accordingly change to the perimeter of it.

11.5 MPC6515 Two Laser head Function

11.5.1 Set the laser card type in the machine set MPC6515, laser machine mode two laser heads control, and download configuration.

11.5.2 Unplug the JP2 jump line, and link the JP6 jump line to 2, 3 foot.

11.5.3 Confirm the U15 chip is TL5618 or not. If not, change it to TL5618.

11.5.4 Simulate output on the Y2 terminal and laser power lead feet (2, 3 lead foot) are respectively linked to two laser heads. The link of the other lead feet are the same with those linked to one laser head.

11.5.5 When you use two laser heads to process, the power of the two laser heads will not be the same due to the influence of the laser tube. So, you need to set the power respectively in order to make them work normally.

11.6 MPC6535 Two Laser head Function

11.6.1 Set the laser card type in the machine set MPC6535, laser machine mode two laser heads control, and download configuration.

11.6.2 DA1 and DA2 lead foot on the Y5 terminal are linked with two laser heads. The links of the other laser heads are the same with those with the one laser head.

11.6.3 When you use two laser heads to process, the power of the two laser heads will not be the same due to the influence of the laser tube. So, you need to set the power respectively in order to make them work normally.

11.7 MPC6535 Output Pulse Mode Setting

11.7.1 Set the "Step03Card_0" in the configuration file syscfg.ini. if the raising edge of the driver is valid, set the number in the AxisPulseOutputLogic 0; if the falling edge of the driver is valid, set the number in the AxisPulseOutputLogic 1. Wrong set will lead to the process malposition.

11.7.2 If the driver uses two-pulse operating way, set the AxisPulseOutputLogic 1; if it uses pulse and direction, set the AxisPulseOutputLogic 0.

11.7.3 You need to download new configuration files after setting the parameters.

11.8 MPC6515/35 Water Protection Function

11.8.1 Set the "Step03Card_0" in the configuration file syscfg.ini. If WaterProtected=0, then water protection is invalid. If WaterProtected=1, then water protection is valid.

11.8.2 You need to download new configuration files after setting the parameters.

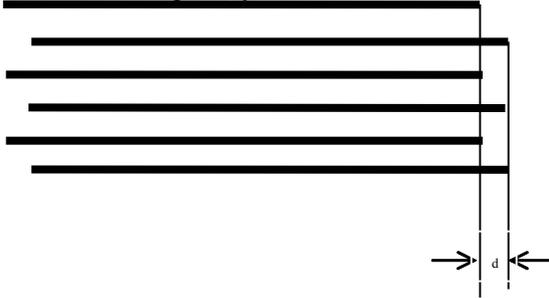
11.8.3 IN3 lead foot on the X4 terminal of the MPC6535 and 3 lead foot on the X2 terminal of the MPC6515 is the input lead foot of the water protection. It is valid in low level.

11.8.4 All the versions over V4.1.2.3 of the MPC6515 and all the versions of the MPC6535 support this function.

11.9 Backlash Compensation

In engraving of high speed, burr may appear in the processing edge due to the tightness of the belt or the influence of the teeth space. It appears as below:

There is Backlash Compensation set in the Engrave Set of the Machine Set. The backlash can be both negative and positive value. Change the engrave step to 2mm, backlash 1mm, and start processing. If d increase, change it to a negative value; if d decreases, increase the number, gradually d will near 0 after several adjustment. The value of the Backlash Compensation differs from different speed; you should to set it according to different speed.



11.10 RF Tube Setting

11.10.1 When use MPC6515, plug the JP2 jump line, plug JP6 to the 1, 2 lead foot, and make sure the U15 chip is the TL5615. No change when use MPC6535.

11.10.2 Y2 terminal of the MPC6515 links the ground wire and PWM lead foot; Y5 terminal of the MPC6535 links both ground wire and PWM lead foot.

11.10.3 Set the "Step03Card_0" in the configuration file syscfg.ini. LaserLowerPulse is pre-burning frequency and LaserLowerPower is duty ratio. These two parameters should set according to the parameters of the RF tube you use.

11.10.4 You should download new configuration file after setting the parameter.

11.11 Laser Power Compensation Setting

When the laser head is processing in a far away place from the laser emitting position, you need to compensate power due to the long distance. It appears as below. Set the "Step03Card_0" in the configuration file syscfg.ini. LaserPowerRepairPower is the compensation value. Several adjustments are needed.



11.12 Grade Adjustment

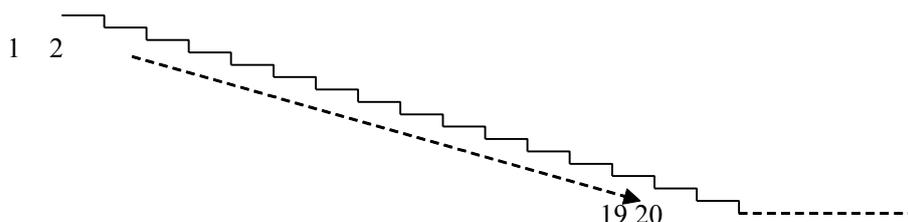


MPC6515/35 output simulate signal can control the average voltage varies from 0~5V. Power supply of the laser will output 0~20mA current to the laser tube to control the laser strength according to the signal. Different laser strength will engrave different depths on the processing materials, thus formation of the engraving grade.

Ideal situation: MPC6515/35 output 0~5V voltage will linearly control the uniform change of the engrave depth.

However, this can not be achieved due to the nonlinear factors existing in the grade engraving system. Therefore, Grade Power function is added in the system software. Grade power is divided into 20 grades, corresponding to 20 depths. Linear relations between the engrave depths and the power grade can be achieved after respectively setting grade power of all the grades. The grade engraving result will be improved.

You can test the relations between the set value and the engrave depth by the experimental method in the grade power set of the software. Eg: after you set the grade power engrave a long bar with 20 different depths.



Users can change the set of the grade power set according to the actual engraving depth, until the changing of the engrave depth is uniform to improve the result of the grade engrave result. Please contact the provider for more details.

11.13 Laser Machine Ground

11.13.1 MPC6535 Case

MPC6535 is the control core of the laser machine system; you must exclude the interruption from MPC6535. MPC6535 should have a fixed ground point beside the 24V input terminal.

11.13.2 Metal Case of Laser Power Supplier

Laser power supplier of the CO₂ glass laser tube will generate tens of the thousands voltage and it will be a great interruption resource. Charges gathered on the metal case of the laser power supplier will even strike a light on the power supplier. At home, GND on the control terminal of the CO₂ glass laser tube is linked to the metal case to allow the interruption signal pass, and then the signal will be turbulent.

11.13.3 Metal Control Cabinet of Laser Machine

MPC6535, driver, switch power supply and even laser power supply are installed on the metal control cabinet of the laser machine. In the case of laser radiation and external interruption, it will be electrified and the people will feel numb when touch it and it may even sparks. Electrostatic charge on the metal case will release to the controller through the cable and make the control turbulent.

11.13.4 Metal Case of PC

Usually PE terminal of the Computer which are the power supply are not connected to the ground. No filtering function of the computer power supply will make the metal case electrified. Computer is linked to the USB cable of the laser controller and then GND of the laser power supply is linked with GND of the Computer.

11.14 FQA

11.14.1 Superposition appears in grade engraving

This always occurs when the figure is very small and the set value in the “Grade width” is too big. Please input a smaller number in “Grade width”.

11.14.2 Figure can only be moved toward one direction. Click “Shift” or “Ctrl” will do.

11.14.3 PLT figure can't be engraved

Reason: the figure is unclosed or overlapped. Please use the “data check” tool to check if there are such occasions.

11.14.4 Size of the output of engrave/cut is not the same with the figure.

Please adjust the “Pulse Unit”.

11.14.5 When engraving, the edge is not in order

This may happen when you use DSP5.3 engrave software. It is mainly caused by the backlash. You can adjust it as follow:

1. Draw a rectangle, set the 0.5mm in “Laser Engrave” and “Engrave Step”. Theoretically, the engrave result will be ok, that is, edges of the odd lines are in order and edges of the even lines are in order. But some odd lines and even lines may also be in order.
2. Open “Set Engrave Options”, you will see different processing parameters for different speed. But set values in the “Backlash” are all 0. You can set the value according to the actual situation, both negative and positive.
3. If you require a better engrave result, choose one direction laser on. Uncheck the “Bi-Dir” will do. But this will decrease the process efficiency.

11.14.6 X-axis or Y-axis doesn't move (MPC6515)

Set direct voltage 5V by a multimeter, test the voltage between 1 and 4 lead feet on the Y4 or Y5 terminal (X Y-axis pulse direction output terminal). Take Y-axis as an example. Click up or down button, the normal value is about 2.8V. If it is not, control car is damaged. Please change controller card. If it is, step on.

Change the output terminals of the two drivers, and click up or down button. If X-axis is right, then Y-axis motor is damaged. Please change Y-axis motor. If X-axis does not move, then Y-axis driver is damaged. Please change Y-axis driver.

11.14.7 X-axis or Y-axis doesn't move (MPC6535)

Set direct voltage 5V by a multimeter, test the voltage between PULX (or PULY) and GND. Take

Y-axis as an example. Click up or down button, the normal value is about 2.8V. If it is not, controller card is damaged. Please change controller card. If it is, step on.

Change the output terminals of the two drivers, and click up or down button. If X-axis is right, then Y-axis motor is damaged. Please change Y-axis motor. If X-axis does not move, then Y-axis driver is damaged. Please change Y-axis driver.

11.14.8 X-axis or Y-axis can only move to one direction (MPC6515)

Set direct voltage 5V by a multimeter, test the voltage between 2 and 4 lead feet on the Y4 or Y5 terminal (X Y-axis pulse direction output terminal). Take X-axis as an example. Click “left” and then “right” button to see if there are changes of the voltage (higher than 2.8V or lower than 0.8V). If not, the controller card is damaged. Please change it. If yes, check if the driver is ok.

Please change Y-axis driver.

11.14.9 X-axis or Y-axis can only move to one direction (MPC6535)

Set direct voltage 5V by a multimeter, test the voltage between DILX (or DILY) and GND. Take X-axis as an example. Click “left” and then “right” button to see if there are changes of the voltage (higher than 2.8V or lower than 0.8V). If not, the controller card is damaged. Please change it. If yes, check if the driver is ok.

Please change Y-axis driver.

11.14.10 Laser always off (MPC6515)

Set direct voltage 5V by a multimeter, test the voltage between 2 and 4 lead feet on the Y2 terminal. Click “Laser” on the control panel to see if there are changes of the voltage (higher than 2.8V or lower than 0.8V). If not, movement controller card is damaged, please change it. Moreover, set 0ms in the “Time” of the laser in the control panel PAD03 (laser time after you stop pressing the laser on button), adjust the power (0%~100%), click “Enter” and press the “Laser” button. Test the voltage change between 2 and 1 lead foot. It should be varied from 0~5V. If there is not, movement controller card is damaged. Please change it. If there are both the above-mentioned points, power supply is damaged.

11.14.11 Laser always off (MPC6535)

Set direct voltage 5V by a multimeter, test the voltage between LAS- and GND. Click “Laser” on the control panel to see if there are changes of the voltage (higher than 2.8V or lower than 0.8V). If not, movement controller card is damaged, please change it. Moreover, set 0ms in the “Time” of the laser in the control panel PAD03 (laser time after you stop pressing the laser on button), adjust the power (0%~100%), click “Enter” and press the “Laser” button. Test the voltage change between DA1 and GND lead foot. It should be varied from 0~5V. If there is not, movement controller card is damaged. Please change it. If there are both the above-mentioned points, power supply is damaged.