ww.3wcad.com Before using this product, we recommend that you

Read the hardware manual of the product carefully!

more small ,more Strong ,more stable set ,more can by ,more ⋮

M2Nano

the Lord board hard Pieces hand book

Lee Brigh Yu

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Nano Is a very popular word in recent years and is often used by various products, such as iPod Nano Just an example.Nano What exactly is it? In fact, it means very small, you can also understand it as Nano Is better than Mini Even smaller.M Series motherboards are actually Mini Series motherboards. Now we have developed a smaller and inheritedM2 The motherboard, what other words can be used to describe it is more compact?

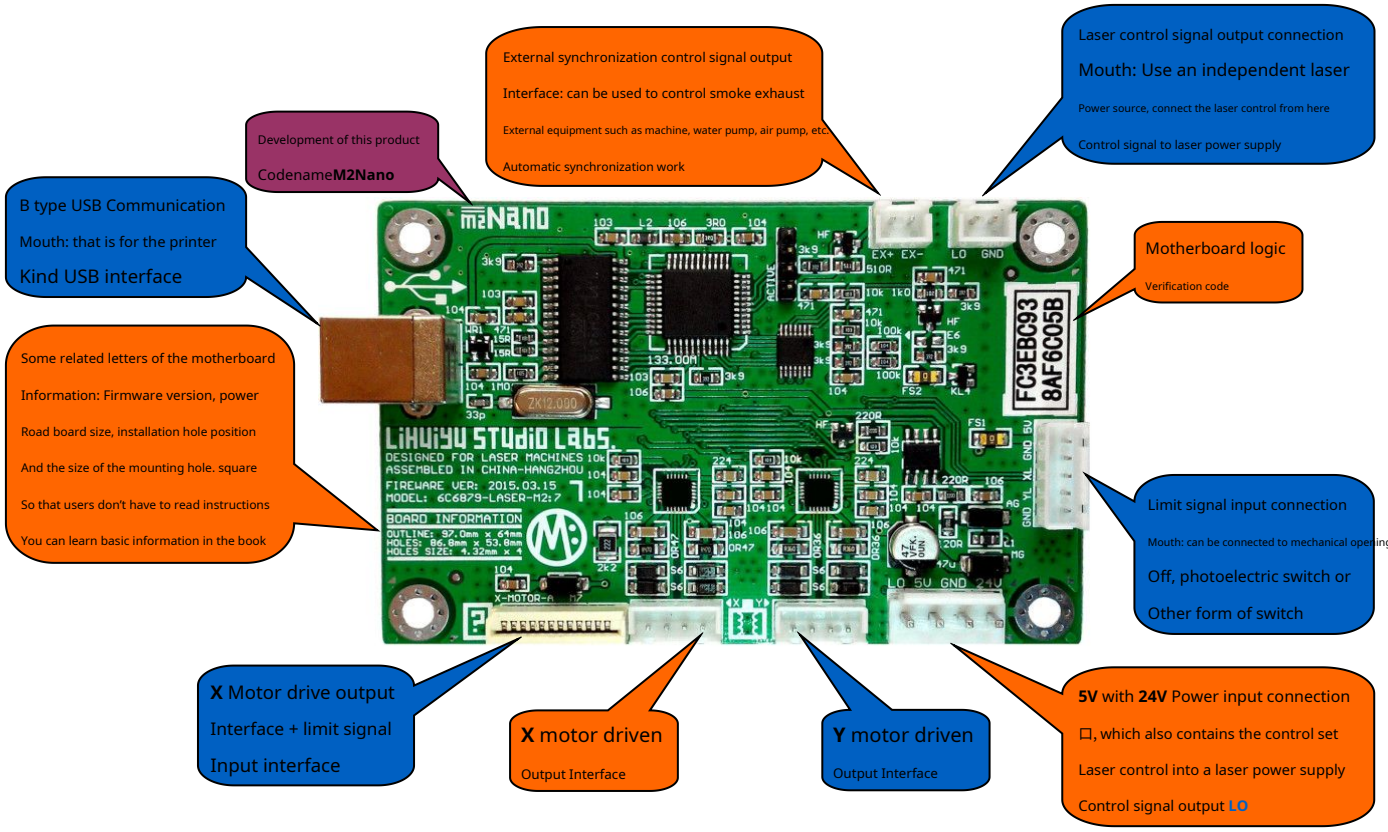
Nano,M2Nano...

Note: Nano There is also a well-known Chinese name——Nano!

2015 year 03 month 01 day

Writer: Li Huiyu

Chapter One:M2Nano Features and physical photos of the motherboard



Abbreviation

You can call this motherboard M2Nano Motherboard, You can also call this motherboardM2 Nano Motherboard. We useNano(Nano) as the development code of this product is just to describe its smallness.

feature(Manufactured in lead-free process, suitable for export)

The lightest motherboard in the industry, only 30 Grams or so

The main advantage of being light is that the circuit board is definitely not heavy. Large electronic components and accessories (such as radiators), so the earthquake resistance is very strong, no special anti-seismic protection measures are required.

The smallest motherboard in the industry, the size is only 97mm x 64mm;

There are many advantages of small size, not only the electrical performance is very good, but also the installation method Poop——It does not take up too much space, it can be installed in only a small corner, which is convenient for planning the internal layout of the machine, and because the circuit board spans The degree is very small, and the shockproof ability is very strong after fixing.

The motherboard with the smallest heat generation in the industry, with a total heat loss less than 2W;

It is well known that low heat generation is an advantage. But we have to One advantage: the motherboard with small heat generation can be completely sealed Installation method to avoid the erosion of dust, smoke and water vapor. The motherboard with large heat generation needs air convection to dissipate heat, which is not convenient for sealing installation.We recommend fully enclosed installation M2Nano The motherboard fundamentally eliminates the erosion of dust, smoke, and water vapor on the motherboard.

Integrated external synchronization control interface (EX+ EX-)

Accessories such as fume extractors, water pumps, and air pumps are collectively referred to as the outer parts of the laser machine. 部设备。 Equipment. The external equipment of the laser machine, only when the laser machine is working If necessary, it is best to turn it off automatically after the work is over.M2Nano Integrated external synchronization control interface, which can automatically control external equipment and laser The machine works synchronously.

X axis,Y Shaft drive, suitable for driving two-phase hybrid stepping motors

X Shaft drive capacity: average 0.25A/Phase, peak 0.36A/phase

Y Shaft drive capacity: average 0.33A/Phase, peak 0.47A/phase

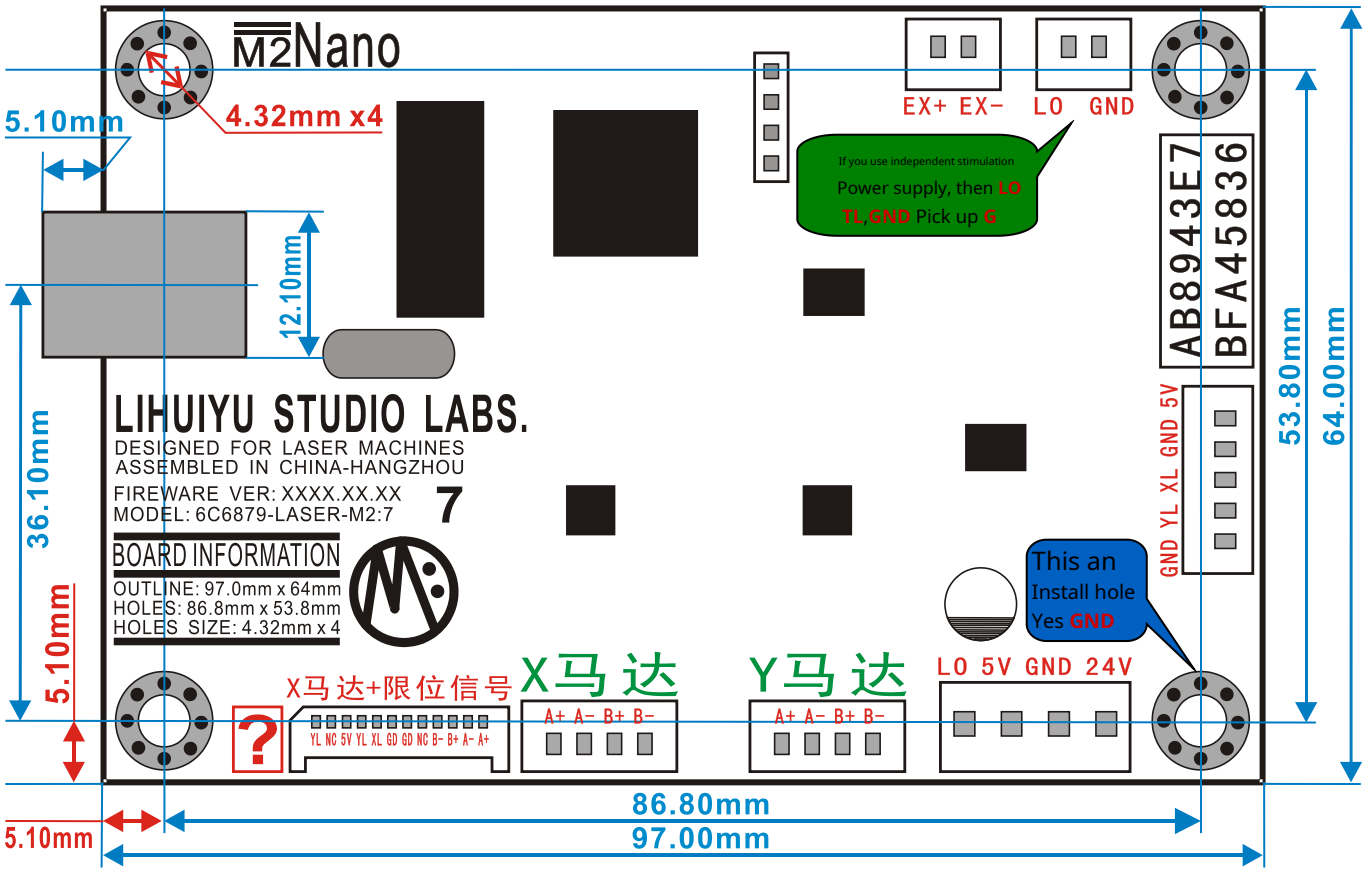
Power requirements (5V Actual measurement<40mA,the following 100mA Is the spare margin)

1. 5V (4.75V-5.25V):more than the 0.10A = 100mA
2. 24V (23.5V-28.0V):The smallest 1.2A, Preferably greater than 1.8A
3. 5V,24V, Laser power supply, the three must share the same ground

Working speed (only refers to the theoretical design speed)

Sculpture 10-600mm/s; Cutting: 0.5 – 100mm/s

Chapter two:M2Nano Motherboard size, wiring and installation



wiring

Regarding the wiring, the above picture is clearly marked. Here are some brief explanations for some parts that may not be easy to understand:

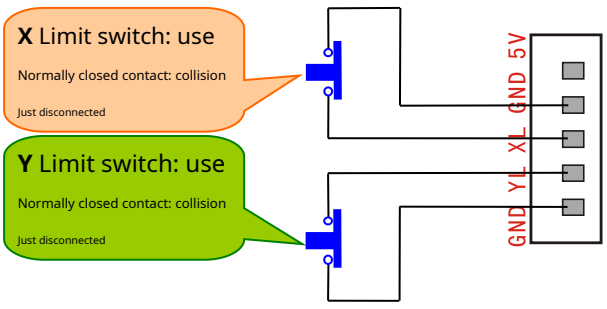
NC: Not used, that is, no wiring is required;

GND,GD: Power ground,GD for GND Abbreviation for only;

LO: Laser control signal output, low level turns on the laser, high level turns off the laser;

XL,YL:X axis,Y The limit signal input of the axis can also be called X axis,Y The axis zero point (or origin) signal input, high level is effective;

The wiring method of mechanical limit switch is shown in the figure below:



EX+ EX-: External synchronization control signal output. If the laser machine needs to use To use the external synchronization control function, you need to purchase an external synchronization control circuit board from our office, which also has **EX+ EX-**, The corresponding connection can realize the external synchronization control, which will be explained in detail later in this document.

M2Nano The connection line with the integrated laser power supply is made as shown below:

M2Nano Changed the power input socket and used a fool-proof (anti-wrong plug) function **4** needle **VH3.96** Socket, and make it correspond to the output interface of the integrated laser power supply one-to-one without crossing. After such an improvement, the power input line of the motherboard is very intuitive, and it is generally not a mistake.

It is recommended to wire as shown in the color:**LO[**green Line],**5V[**Red line],**GND[**black line], **24V[**Yellow line]. Copper core is not less than0.75mm2

What should I do if the motor goes backwards?

If the motor goes in the opposite direction, first check if it is X Motor got Y Motor position. If the inspection is correct, then the**A+,A-** Just swap the two wires.Never pry off the socket and install the socket backwards!

installation(Important content)

M2Nano Use on the motherboard New technologies developed in recent years Motor driver chip, the chip is very small: long x width x Thick = 4mm x 4mm x 0.75mm. Such a tiny chip has some characteristics that require our attention, which are embodied in the following aspects:

1,The pins are very thin (only 0.2mm Left and right), so the pins are soldered to the circuit board There is only a small spot of solder stuck to the place. If the circuit board warps and deforms, it may be Lead to pin desoldering;

2,The pins are very dense (the pin-to-pad gap is only 0.2mm Left and right), so extremely The small metal dust falling between the pins may also cause the chip Short circuit fault

3,If the pin is corroded, it may be corroded soon. Just imagine 0.2mm How long can thin and thick pins be corroded?

4, [important]After this tiny chip is damaged, the motherboard can only be scrapped. because Manual repairs and desoldering such delicate chips are too difficult.

Note:M2Nano The motor driver chip is actually a flip-chip vertical heat dissipation chip with a leadless package. For the convenience of description above, we assume that The solder ends on the bottom of the chip are the pins.

Why use such a troublesome chip?We must believe that technology is always moving forward: near 5 Over the years, each IC The output current designed by the design company is 2.5A Most of the following new motor driver chips are so tiny, why do we have to reject the new technology?

M2Nano The reason why the motherboard chooses this tiny motor driver chip is that it may help us solve some historical problems that have been unable to be properly solved in small and medium-sized laser machines, and there is a little trouble that can be easily overcome.——It's not even troublesome. Furthermore, from the perspective of technological development, we can only accept such tiny chips. We must follow the development trend of modern technology, but can we still be afraid that the chips are too small?

In fact, chips that are too tiny are also produced and tested for us M2Nano The motherboard brings a very serious challenge!

M2Nano The installation hole position of the machine should be as accurate as possible;

If the mounting holes are not accurate, forcibly tighten the screws.M2Nano The circuit board will be pushed by the screws and warped, which may cause M2Nano The solder joints of the motor-driven chip are desoldered, even if they are not immediately desoldered, the Long-term fatigue occurs under the action of deformation stress, and it may gradually crack Desoldering,Don't think that it's all right at the time, and it must be insurance and reliable.

Our suggestion: when manufacturing the case, the case manufacturer should precisely press riveting it is goodM2Nano Of mounting studs.

Tip: Do not pry violently M2Nano Any socket on the motherboard, unless you can ensure that the motherboard does not have any warping during the prying process.2014 Our repair statistics for the year, there are 53 A motherboard was violently pried on the socket and the circuit under the socket was broken and repaired!

Fully enclosed installation is recommendedM2Nano Motherboard, which can completely eliminate the erosion of dust, smoke, water vapor, etc.;

becauseM2NanoThe pins of the motherboard's motor drive chip are too thin and dense, so they are afraid of dust and corrosion. But because of its total calorific value Small, basically don't need to consider air convection heat dissipation, so it's very Suitable for closed installation. How to achieve a closed installation? Can be in the design When housing, design a tiny isolated airtight room; it can also be used as a A simple metal cover covers the motherboard.M2Nano It is so small that it can settle down in a small corner.

Very important: Cover M2Nano The metal cover must be well connected with the frame ground (grounding screw). To ensure safety and reliability, it is best to weld a wire to this cover and pull it directly to the connection of the chassis. On the ground screw!

The erosion of dust, smoke, water vapor, etc. is also due to the instability of the motherboard. To one of the culprits of damage. In fact, no matter what the motherboard is, it's fully sealed It's best to install it (such as the control boards used in some large machines, which have already been fully enclosed), but because the motherboards of small and medium-sized machines integrate two motor drive circuits, the heat generation is usually large, and a relatively large space is required. Air convection dissipates heat, which is not convenient for airtight installation.

It is enough to do the above two installation points. Actually, this Not M2Nano The trouble is caused by the fact that people have neglected or failed to implement (such as motherboard heating) standard installation. Does it mean that other motherboards do not require precise mounting holes, and it does not matter if the motherboard warps due to rough installation? Are other motherboards not afraid of dust, smoke, moisture, etc.? In this sense,M2Nano It did not cause us any trouble, it just requires us to do a standardized installation.——You can even say this:M2Nano The problem of heat generation is solved, and we have the opportunity to install the motherboard in a sealed way to make a more reliable laser machine.

Effectively protect the motherboard USB socket

2014 Years, we repaired nearly 100 Block cause USB Motherboard returned for repair due to socket problem.USB There are two main types of socket problems, one is USB The socket is corroded beyond recognition, the other is USB The socket was violently damaged and fell apart. Nearly a year100 Block cause USB The motherboard returned for repair due to socket problems is an amazing data, which has brought additional trouble and loss to users, manufacturers and us, and we must try to avoid this trouble and loss.

First, avoid USB Corroded socket.USB After the socket is corroded, it will cause poor contact or leakage, and the communication will be unstable. If the motherboard is installed tightly,USB The problem of the socket being corroded has basically been solved.

Secondly, we must take precautions USB Violent damage to the socket. This is also relatively easy to do, as long as you open a andUSB The same hole as the socket, after the motherboard is installed,USB The socket fits into this hole and is locked in position by this hole, which is damaged by external force USB The socket is not easy. We can refer to the printerUSB How the socket is inserted into the case. But pay attention:Open on the case USB The socket hole should be slightly larger to be compatible with manufacturing errors.

Because it's impossible for every motherboard USB The sockets are installed extremely accurately and there will be manufacturing errors, so we opened them on the casing USB For socket holes, the manufacturing tolerances of compatible motherboards need to be considered.

on USB Related matters of the interface:

1,Not recommended for use USB Extension cord leads USB interface. Some have off Machine function board, usually use eared USB Extension cord leads USB Interface and fixed to the chassis. However, the small and medium-sized laser machine motherboards with high cost performance do not have the offline function. Work offline and not offline The difference in work is:The control board that works offline is to engrave after all the data is transmitted, so it will not be affected by the laser power frequency during the data transmission. The interference of the high-voltage circuit of the fan start and stop; the motherboard that does not work offline is the carving At the same time, the data must be continuously transmitted, so when the data is transmitted, it must be Will suffer from the interference of the high-voltage circuit of the laser power supply frequently starting and stopping. use USB The extension cable affects the continuity of the differential impedance, and there is inevitably a shielding fault, so the anti-interference ability of the data path will be affected. It drops a lot, so it is not recommended to use USB Extension cord;

2,It is recommended to use well-shielded USB Data line. Except for low speedUSB Assume Spare, other USB It is recommended to use double-layer shielded cables for the equipment: braided mesh to shield low-frequency interference, and aluminum foil to shield high-frequency interference.USB The main defect of communication is that the anti-interference ability is not very ideal, especially when it is against transients. Ability to interfere with the state pulse group. If the laser machine is used without shielding or Poorly shielded USB The data line is difficult to resist the transient interference of the high-voltage circuit of the laser power supply frequently starting and stopping, and it is also difficult to resist because of other applications. Transient interference caused by the start and stop of electrical appliances (such as high-power motors, microwave ovens, air conditioners, refrigerators, etc.). So, a well-shieldedUSB Data cable, yes USB The laser machine is very important.

3,Only the laser machine motherboard has strong anti-interference ability, but it cannot completely solve the laser Machine USB Communication problem. Usually everyone thinks that the reason for the unstable communication of the laser machine is that the anti-interference ability of the laser machine main board is not good. The point of view is one-sided, because USB Communication is master-slave communication. For the laser machine system: the computer is the master and the laser machine is the slave. It means that all of the laser machine motherboard USB Communication matters are completely ordered by the computer, and it cannot make its own claim. therefore,USB Motherboard developers can't fully handle USB Communication's anti-interference problem, because if the interference interferes with the computer USB Interface related circuits,USB The motherboard developer is helpless, because the master-slave communication mechanism is that the master has full control of the slave, and the slave has no rights. Give orders to the owner.How to enhance the computer USB What is the anti-interference ability of the interface-related circuits? Start from three aspects: a good shielding Ok USB Data cable, a stable and compatible computer motherboard, a high-quality computer power supply [this is very important]. We saw the well-shieldedUSB The importance of data lines.

4,The following conditions will affect USB Stability of communication

Motherboard USB The socket is dirty or severely corroded, on the motherboard USB The wiring around the interface chip is dirty or corroded; dirty and corroded Lead to weak leakage, and communication stability will deteriorate;

The motherboard is subject to strong rigid collisions and shocks. On the motherboardUSB The clock generator of the interface chip is a crystal oscillator (a component with an iron shell on the motherboard), and its internal structure is an extremely thin quartz chip. Rigid collision and impact, the quartz crystal inside will be damaged, from Resulting in USB The clock signal required for communication is unstable, or the crystal oscillator does not oscillate and there is no clock signal. Although the crystal oscillator is made of iron case, it is not Think it is very strong. It is recommended that you handle the motherboard with care,Never put the motherboard"Snapped"Slap to the table top, or fall from a height and hit hard groundThe sequelae that may result from this is that the motherboard communication is unstable and it is difficult to locate the fault point, which will increase your after-sales troubles!

2014 We repaired the motherboard whose crystal oscillator was squashed in 2016 30

More! So here is a special emphasis.

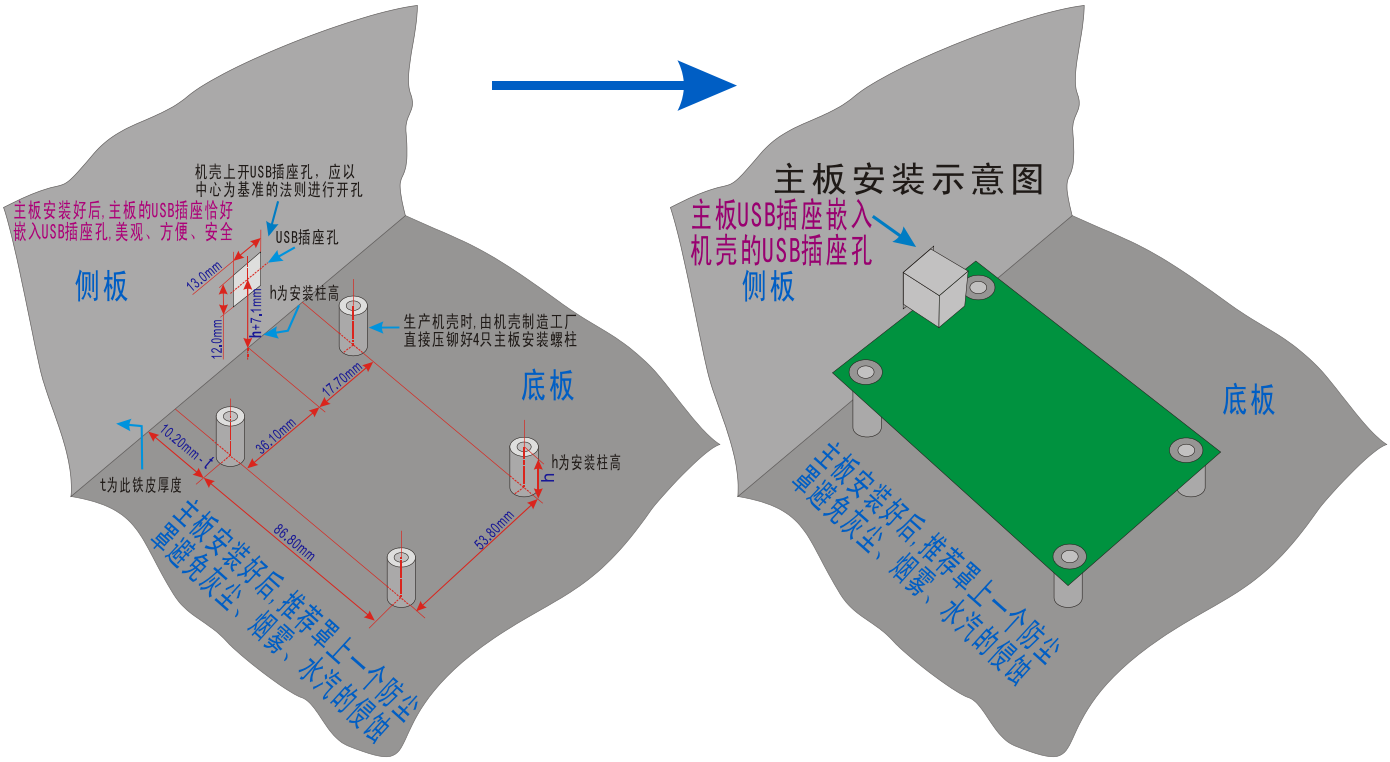
USB The data line has a momentary short circuit. The production inspection link of the data line is called"Swing test": It is to detect whether there is an open circuit or short circuit inside the data line under the condition of constantly swinging the data line, because The detection is unreliable under stationary conditions. in caseUSB There is an instantaneous short circuit inside the data line, and the number of short circuits is too large.USB The interface chip may be damaged, performance will deteriorate, resulting in unstable communication or No communication at all.Saw it again USB The importance of data lines.

prompt: If the motherboard is sometimes unable to connect, but can be connected after unplugging it, then,USB There may be a problem with the data cable, it is recommended to replace it immediately USB Data line.

5V Poor quality of power supply will cause unstable communication.5V The power supply is CPU,USB The working power supply of control circuit such as interface chip, if 5V If the quality of the power supply is not good, the communication may become unstable or even unable to communicate.

Note:5V The quality of power supply 5V Whether the voltage of the power supply is stable, but also related to the ripple size, dynamics, noise suppression capabilities, etc. Wait.prompt: The existing integrated laser power supply, and the power supply board cut out from the integrated laser power supply, because its switching power supply part is only suitable for 24V Output sampling and voltage regulation, its 5V The dynamic performance of the power supply is poor,Don't carry too much load, Otherwise it may cause unstable communication, poor engraving effect, and even frequent resetting of the engraving machine in severe cases. Main reason Because it integrates the laser power supply and the power supply board 24V The power supply cannot digest the regenerative power of the stepper motor when it is working, which seriously affects 5V The dynamic response capability of the power supply.Although the parameters given by the integrated laser power supply manufacturer are 5V/1.5A, Don't believe it, stick to this 5V The principle of not carrying too much load is enough.

M2Nano Installation demonstration diagram



third chapter:M2Nano Control the synchronization of external devices

Accessories such as fume extractors, water pumps, and air pumps are collectively referred to as laser machines. external device. These external devices only need to be turned on when the laser machine is working, and it is best to automatically turn off the laser machine after the work is finished.M2Nano It integrates the external synchronization control interface, which can automatically control the external equipment to work synchronously with the laser machine. This has the following advantages:

Simplify the laser machine panel. On the panels of some machines, there are switches for external equipment such as smoke exhaust fans, water pumps, and air pumps.M2Nano Synchronous control function of external equipment can save this type of switch;

Reduce the user's preliminary operations. If there is no synchronization control, the user must turn on the external equipment such as water pump, air pump, smoke exhaust fan and so on before engraving;

It can prevent the user from forgetting to turn on the related external equipment, especially if the water pump forgets to turn on, which may cause serious consequences such as laser tube burst;

When the work is completed, the external equipment is automatically turned off to save electricity and reduce noise. The laser machine is noisy when working: smoke exhauster, water pump, air pump, convection cooling fan of the cabinet, cooling fan of the laser power supply, front air fan..., The noise is very loud, and the power consumption cannot be underestimated.

Precautions for the use of external synchronization control module:

1,The maximum output of this module is 5A/220V, Which is 1100W. Usually water

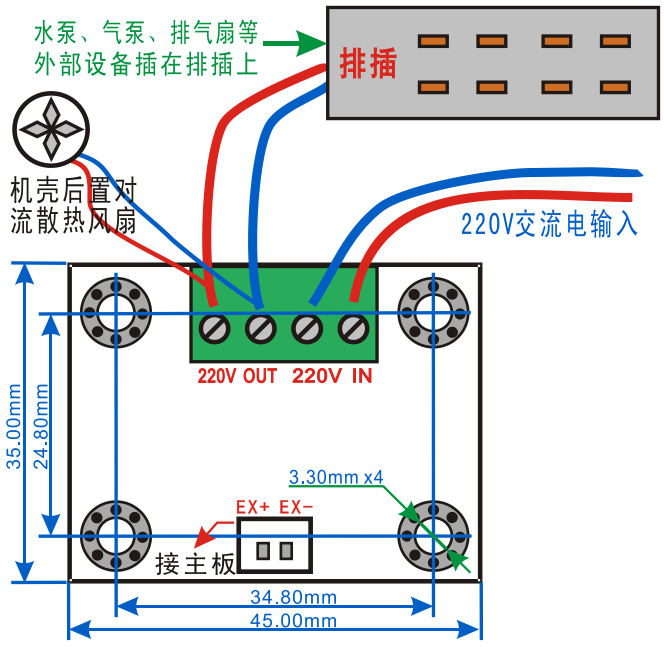
The total power of the pump, air pump, exhaust fan, and convection cooling fan at the rear of the cabinet

Rate will not exceed 500W, Generally enough to use;

2,This module is used to control AC equipment, and there will be a little interference, so

Be sure to stay away from sensitive circuits such as the motherboard, and away from 20cm That's all.

The size and wiring of the external synchronization control module are shown in the figure below:



Appendix I:M2Nano Design ideas

We have been in the laser machine industry for more than three years. In the past three years, we ourselves are very dissatisfied: because the motherboard repair rate is still higher than our expectations.2014 In 2009, we analyzed and summarized the main reasons for motherboard repairs in detail, and concluded that: repairs caused by man-made reasons and repairs caused by force majeure occupy an absolute dominant position.

Man-made repairs mainly include: wrong power cord connection, hot plugging and burning of the motor drive chip, circuit board line is cut by a sharp object,USB The socket was damaged by external force, the components on the main board were missing, the crystal oscillator was smashed, the main board assembly stress was too large, and the electronic components were unsoldered or broken. Below, we will analyze several key points.

Rework caused by wrong power cord connection is particularly serious. Some manufacturers can have a very low repair rate, but the repairs caused by the wrong power cord accounted for more than half of their total repairs. Why do some manufacturers always connect the wrong power cord? There are two main reasons: First, some manufacturers always refuse to separate the wiring. Several wires in a plug always use wires of the same color. If the color separation wiring, for example, the red wire is5V Wire, which hole should be in the plug, the yellow wire is 24V Line, which hole should be in the socket, the green line...,black line..., So it can be clear at a glance. If4 The threads are all the same color, which one is 5V, Which one is 24V.....? It has to be sorted out in the plugs at both ends, which is easy to make a mistake. Secondly, the inherited6

The core power socket has no foolproof (anti-wrong plug) function, and it is easy to make mistakes when you are careless. For example, the six-pin socket isGND LO 5V 5V 24V GND Arranged, if the jack of the power cord is not aligned with the pins of the socket on the motherboard when the power cord is plugged in, the motherboard is likely to suffer.

The circuit on the circuit board was cut by a sharp object, The main reason is that some manufacturers used a sharp tool (estimated to be a flat-blade screwdriver) to forcibly pry the socket on the motherboard, and the sharp tool cut the line under the socket. For example, some manufacturers, if the wiring of the motor cable plug is wrong, and the motor goes backwards, they forcibly pry off the motor socket on the main board and install the motor socket backwards. If a batch of hundreds of motor wiring is wrong, then you have to pry hundreds of motherboard sockets! Let's explain here again, ifIf the motor goes in the opposite direction, just take out the leftmost (or rightmost) two wires in the motor plug and change the position.

Excessive motherboard assembly stress causes electronic components to be desoldered or chippedThe main reason is that the mounting holes are inaccurate and the motherboard is forced to be screwed down. The motherboard is pushed and bent by the screws, but can the electronic components on the motherboard bend along with the motherboard? If the motherboard is bent excessively, but the electronic components on the motherboard cannot bend along with the motherboard, then the electronic components will either be desoldered or broken. Another situation is that the mounting holes are inaccurate, and the assembler forcibly screwed the motherboard and tested it without any problems. However, although the electronic components were not soldered or chipped on the spot, it does not mean that there will be no problems. , Maybe the problem occurred just after the machine was sent to the user, and the problem may continue to be entangled afterwards. Because the manufacturer sends a new motherboard to the user, the user can only force the screw to fix the motherboard!

Repairs caused by man-made reasons, approximately accounted for the total repairs 50%. Before discussing the repair of the cause of force majeure, let us first talk about the meaning of the cause of force majeure. The cause of force majeure we are talking about here is relative, that is to say, if we change the method, it may be solved. For example, if the motherboard installation does not consider the erosion of dust, smoke, and water vapor, then for this machine, the erosion of dust, smoke, and water vapor is an irresistible factor. And if the manufacturer installed the motherboard in a sealed manner, the erosion of dust, smoke, and water vapor would have been solved for this machine.

There are mainly the following types of repairs caused by force majeure: burned X The motor drive chip, the motherboard is severely corroded, and the motherboard is damaged due to the failure of other accessories.

burn X Motor driver chipRepairs caused by this reason are more common. burnX Motor drive chips are also classified as a cause of force majeure? We takeM2 Main board to analyze. first of all,X Motor driver chip and Y The motor drive chip is exactly the same drive chip and the same circuit design; secondly, Y The output current ratio of the motor drive chip X The motor driver chip is much larger; third,Y The calorific value of the motor drive chip is approximately X Motor driver chip 1.8 Times; fourth,X Comparison of the heat dissipation conditions of the motor drive chip Y The motor drive chip is much superior. These four points should be able to prove: if it is easy to burn the motor driver chip, it should beY The motor driver chip is easier to burn! But the fact is just the opposite,90%Burning the motherboard of the motor drive chip is burned X Motor driver chip. Under what circumstances is easy to burnX Motor driver chip?When high-pressure ignition or laser tube ignition is difficult,The specific theory will not be analyzed in detail. M2Nano Next to the flat wire socket, we marked a big?: We suggest that the flat wire and flat wire socket should be abolished gradually, because thisTwo kindsThings are very unsuitable for laser machines,M2Nano The flat socket is temporarily retained just for transition.

The motherboard is severely corrodedFor repairs caused by this reason, let's just say one thing: only airtight installation can solve this problem properly.

The motherboard is damaged due to the failure of other accessories, We cite two typical examples, one is high-voltage discharge sparking; the other is the internal short circuit of the motor caused

The motor drive chip burned out. The internal short circuit of the motor, what we know is:Generally, a faulty motor will burn continuously 5 More than one motherboard!This is what several customers who have encountered a short circuit inside the motor said themselves, but not our prediction. Tip: There are generally only three reasons to burn the motherboard as soon as you turn it on:Motor internal short circuit, wrong wiring, power failure; Don't burn a motherboard. If you don't find the reason, replace it with a new motherboard and continue burning....

Repairs caused by force majeure also account for approximately the total repairs 50%.Of course, there are also some manufacturing defects and inspection omissions, such as electronic component failures, false soldering, false soldering, etc., but very few are found.Less than total repaired 1%, Basically negligible.

We analyzed the two main reasons for motherboard repair, so we can say M2Nano The design idea of the motherboard, becauseM2Nano The design idea of the motherboard is aimed at the two main reasons for motherboard repair.

1,For human reasons,M2Nano Basically solved these two: wrong power cord connection, hot plugging and burning of the motor drive chip.Lines on the circuit board The road was cut by a sharp object,USB Sockets are broken apart by external forces, components on the motherboard are missing, crystal oscillators are smashed, and electronic components are desoldered or broken due to excessive assembly stress. As for these human factors, we have no solution for the time being. . but,Although it is plugged and unplugged M2Nano Any connection to the motherboard will generally not cause M2Nano Damage does not mean that we encourage live plugging and unplugging, we encourage the development of standardized and professional habits.Some manufacturers told us: We rarely break motherboards ourselves, but agents always break motherboards, and we really have nothing to do. Therefore, we had no choice but to find a way, not to encourage everyone to develop irregular and unprofessional habits.

2,For irresistible reasons,M2Nano Basically solved these three: burned X Motor drive chip, internal short circuit of stepper motor, or other reasons The resulting short circuit, such as damage to the motor wire sheath.As for the motherboard is severely corroded, we have nothing to do. The above two points are enough to explainM2Nano Design ideas. However, there is still nothing left. There is no way, which means that there is a way. In fact, the way is very simple: if we make a hermetic box to encapsulate the motherboard into a small box, and paste "Tearing the seal will not be guaranteed"Label, so the above can be basically eliminated if there is no solution. However, due to the conditions being immature, there can only be no solution for the time being.

Appendix 2: Use M2Nano Possible situations

Happening 1: After the laser engraving machine is turned on, the track clicks or does not move at all.

Reason: The click is because of the two coils of the two-phase stepper motor, one of the coils does not work (ie lack of phase); it does not move at all, it is the two wires of the stepper motor None of the circles work.M2Nano Integrated short-circuit protection function, this will happen if the internal short-circuit of the stepper motor or other reasons cause the motor drive chip to be in a short-circuit state. Solution: Install the motherboard on a normal machine. If it is normal, it can basically indicate that the problem lies in the stepper motor;

Happening 2: When the laser engraving machine is engraving halfway, suddenly the track rattles or does not move at all.

Reason: There is a short circuit inside the stepper motor, or there is a fire phenomenon in the high voltage,M2Nano In order to protect itself from being damaged, stop working completely or shut down The work of a certain phase of the motor. There is a hidden internal short circuit fault of a stepper motor that is difficult to judge: the motor is completely normal when it is cold, and when the motor has been working for a period of time, it starts to heat up (some parts expand), and the short circuit points touch together.

Happening 3: In the middle of carving,Windows The operating system is hibernated, and the engraving is out of place after exiting the hibernation.

Reason: When the system suddenly hibernates (or sleeps), the motherboard may still have important events waiting for the engraving software to respond, but the computer has hibernated, so There may be a response, so an error may be caused.We suggest that to perform long-term engraving tasks, it is best to disable system sleep, system sleep, screen saver and other functions.

Happening 4：Engraving software when engravingoccasionally"Laser engraving machine detected" pops up...", and then this window is automatically closed again.

Reason: When interference causes USB When communication cannot be carried out normally, ourThe engraving software can detect,M2Nano Can also detect.M2Nano Will wait first The engraving software automatically reconnects, if the engraving software fails to reconnect automatically, it will pop up"Detected..."Window at this time M2Nano Will simulate unplugging USB For the operation of the data line, perform the hardware reconnection operation. If the hardware reconnection is successful, the pop-up window will be automatically closed.Software reconnection is a seamless reconnection, while hardware reconnection is an analog plug/unplug USB Data cable (more convenient than manual pulling), so software reconnection is preferred.In other words,M2Nano When the motherboard is disconnected, there are two measures: software reconnection and hardware reconnection to combat accidental interference. USB Communication problem.

Happening 5: Engraving softwarecontinuously"Laser engraving machine detected" pops up..."'S window

Reason: This situation indicates that the laser machine can be connected but cannot communicate at all. This situation is more complicated, and you can only find the reason with the replacement and elimination method: the suspect is a number According to the cable problem, then change a reliable data cable; if it is suspected to be a motherboard problem, then change to a normal motherboard....

Appendix 3: Other varieties M2Nano Motherboard

Product development is a very interesting and creative work, and to a higher level, you must also have the ability to construct systems. To give a simple example, our products have always been able to guarantee perfect compatibility: regardless of the old motherboard or the new motherboard, just use the latest version of the software. In fact, the reason is very simple: because we first developed the so-calledLHYMICRO-GL Instruction set, all our motherboards are using LHYMICRO-GL Instruction set, and our engraving software also uses this instruction set, one-to-one correspondence, incompatibility is weird. In other words, in the developmentLHYMICRO-GL In the instruction set, we have already constructed a system. Then, the design of the motherboard and the development of engraving software are all centered on LHYMICRO-GL The development of the instruction set is the development idea of the so-called system structure. The development of system construction ideas is exactly the same as thinking. It is a completely different level of development from the development of a hammer in the east and a hammer in the west. Because the development of the system construction idea is based on Everything has been thought out and sorted out. The work to be done afterwards is to develop and improve related applications based on this system.

What varieties do we have M2Nano What about the motherboard? We have developed fourM2Nano The firmware of the motherboard: general firmware, dedicated firmware for vertical machines, high-speed firmware, and firmware for external drives. And each firmware program is divided into: use1.8 The firmware program and use of the degree motor 0.9 The firmware program of the degree motor. In other words,M2Nano Share 8 Kind of firmware program.

No matter what kind of firmware program is usedM2Nano The main board, in our engraving software, the control board models are all selected:**6C6879-LASER-M2**. The engraving software will automatically identify which firmware isM2Nano Motherboard.

genericM2Nano Firmware program (if needed 1.8 The version of the degree motor, please specify when ordering)

Our public sale M2Nano Motherboard, the firmware used is universal 0.9 The firmware program of the degree motor is compatible with the mechanical structure of most small and medium-sized laser machines. M2Nano.1.8 The price of a degree motor is not only better than 0.9 High-speed motors are cheaper, and the varieties are more abundant, and the selection range is larger, which is conducive to product development and improvement. We suggest that small and medium-sized laser machines should be gradually abolished.0.9 The history of the degree motor. genericM2Nano Firmware program, provided 1.8 The version of the degree motor, its engraving accuracy and use 0.9 The degree motor is exactly the same. This is not only the cost of the province, but also beneficial.

For vertical machineM2Nano Firmware program

Vertical and horizontal machinesAlwaysAll use the same control panel; the industryAlwaysThere is a saying that "the engraving effect of a vertical machine is difficult to do well". Is it because the vertical machine and the horizontal machine use the same control panel, which makes the engraving effect of the vertical machine difficult to do well? Therefore, according to our ideas, we tried to develop a dedicated vertical machineM2Nano The firmware program, but because we don't have a suitable test platform (vertical machine) for testing, we can't guess how effective it is, so we can only introduce a little bit here;

high speedM2Nano Firmware program

Is faster M2Nano Firmware program, estimated to use 42 The motor pulls the light linear guide, the speed can be 600mm/s the above. all M2Nano Wouldn't it be better if all motherboards use this high-speed firmware program? Of course it's good, but because of the high speedM2Nano The main board has completely different requirements for motors, power supplies, and tracks. For example, if the existing motor is used, not only the speed increase is extremely limited, but also the motor generates severe heat and noise. For example, the existing integrated laser power supply and ordinary power supply board, the current output capacity is not enough, and it is impossible to use high-speedM2Nano Firmware program.high speed M2Nano Motherboard, better than genericM2Nano The motherboard is much more expensive, the structure is also completely different, it is a single power supply (28V/4A)Yes, it comes with terminal blocks and can be packaged into a module (packaged into a module, the manufacturer needs to make a module box).high speed M2Nano Single power supply (integrated on board 5V with 3.6V) The reason is because the motherboard's power supply system is more complicated and requires 28V,5V,3.6V Three-way power supply.

External stepper motor driverM2Nano Firmware program

External drives have many advantages, but there are also some inconveniences, which are embodied in the fact that the control board cannot control the drive very deeply (for example, it cannot dynamically adjust the current of the motor), and the wiring tasks are more tedious, requiring wiring one by one. There are two significant differences between the external drive and the integrated drive chip: First, the external drive requires a wider control signal pulse width (usually in5us Above, some cheap drives even require 20us The pulse width of the left and right), and the integrated driver chip, the pulse width requirement generally does not exceed 2us. Second, the external drive is current control, and the control signal must have at least10mA The current drive capability of the left and right sides, and the integrated drive chip is controlled by the voltage signal, and the current drive capability of the signal is basically negligible. and so,It is very unreliable to simply draw the control signal from the motherboard integrated with the motor drive and connect it to the external stepper motor driver.. External driveM2Nano The firmware program, the current drive capability, pulse width and timing of the control signal, meets the requirements of most stepper motor drivers. and,Later we may also develop suitable drive products

Products for matching. Of course, even if we have matching drives, they will not be sold in a bundle. For our customers, it is completely free to choose which drive.. However, choosing our drive may have the following benefits:

The vast majority of drives have carefully stated:It is strictly forbidden to unplug and plug the strong current terminals of the drive when the power is on. When the charged motor is stopped, there is still a large current flowing through the coil. Pulling and plugging the terminals will cause a huge momentary induced electromotive force and burn the drive. In fact, this is also the main reason why motherboards with integrated drives cannot be plugged or unplugged under power. However, the laser machine industry is relatively complicated, and it is difficult to control the live plugging and unplugging: installers, agents, repairers, and end users may all be plugged and plugged under power.The driver designed by us can be plugged and unplugged in any terminal, even when the motor is running happily, it will not burn out if plugged in. In other words, our drivers will be designed according to the status quo of the laser machine industry;

Our drive will have a considerable price advantage. The price advantage is not to say that it is shoddy, but because we only design for the laser machine industry, or even only for our own control panel. For example, the subdivisions of the drivers used in most laser machines are basically fixed, such as4000(20 Subdivision),5000(25 Subdivision),6400(32 Subdivision), and some of the drivers purchased by laser machine manufacturers have 10 Are several subdivision settings available? Excluding the parts that are not needed by the laser machine industry, there will naturally be a price advantage;

For our driver, the current adjustment step will be smaller, so that the motor can get the best working current as much as possible. As mentioned earlier, one of the disadvantages of using the driver is that the control board cannot dynamically adjust the current of the motor, because most of the current of the driver is set by the DIP switch. After the DIP switch is set to a certain current position, the current of the motor is fixed. The control panel cannot participate in the adjustment. However, the current setting of some drives has larger steps, such as0.5A,1A, 1.5A,2A,2.5A,3A,3.5A,4A, Each step is 0.5A, So if 1A Feel too small,1.5A What should I do if I feel too big? There is no way. So we will eliminate too many subdivision settings that are not needed, and refine the current adjustment step length, which will be more suitable for laser machine use.In fact, some drive manufacturers have realized this point, so the so-called digital drive has appeared, and the digital drive has passed PC The software sets the subdivision and current, because with the traditional DIP switch setting, how many DIP switches can be installed in the drive shell? However, although the digital driver can set the current very carefully, the price has no advantage, and it is difficult for non-professional users to understand, because the design of these so-called subdivision drivers has improved, but the use is not in line with the trend: all The serial port is connected to the computer, but most computers nowadays have eliminated the serial port.

Our driver will do some protection against high voltage. In the laser machine, the laser power supply is a plague-like thing, it can even be said,10 The second fault has 9 Secondly, it was caused by messing up. Most drive manufacturers generally do not consider this particularity. Four kindsM2Nano This is the end of the motherboard firmware program. However, what we sell publicly, mass-produced, and stocked all the year round, are universal M2Nano(0.9 Degree motor,1.8 Motors will have the same circuit board, only the firmware program is different), which is the one introduced in this document.M2Nano Motherboard.Of the other three firmware programsM2Nano The control panel, because we don't know the size of the demand for the time being, we don't have the stock for the time being, we need to make a reservation, but the number of reservations cannot be too small, and there is no manufacturer willing to process it for us.. As mentioned earlier, the current motherboards are more difficult to process.

At last,Answer another question that may be puzzled:M2Nano Do I have to wait until the engraving software is upgraded before I can use it? No need because2 I have done all this in the software years ago. It's just because everyone was busy at the beginning. It's bigger than the motherboard, who's bigger than the motherboard's radiator, and attacked tirelesslyM2 It's young, and, at the time, I was just entering the industry, and my right to speak was limited. Now that the conditions are ripe,M2Nano It's time to be released.

If you are more attentive, you will find that there are still some motherboard models that have not been shown in our engraving software. It's not that we don't want to show up, and we really don't have time to do it.2 More than a year ago, we did a lot of things in the engraving software, just waiting for time to develop related hardware., For example, the offline function that everyone cares about is actually already done in our engraving software. There is an option of "export to file" on the left side of the engraving manager. This file is saved to U Disk, just plug it into the panel with offline, but there has been no time to develop an offline panel.I always prefer to develop software, so the software is always a lot ahead.

I think everyone has already understood the development of system construction ideas. What does it look like? It is the same development as you think, and it is a completely different level of development from the development of one hammer and one hammer on the west.

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(Finish)