

Quantum-FL20B Laser Marking Machine Operation Manual



Wuhan Questt Asia Technology CO., Ltd

§1.Caution for the operation safety

Please completely read and clearly understand the information contained in this manual before any attempt is made to operate this system. There is very important operation and safety information in this operator's manual.

Notice:

- Every attempt has been made to ensure that all information in this manual is accurate. The information included in this manual is correct and subject to be changed without notice. Questt Asia makes no representations or warranties of any kind regarding this information, including but not limited to, implied warranties of merchantability and fitness for a particular purpose. Questt Asia shall not be held responsible for errors contained herein or any omissions from this information.
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- The Quantum-FL20B Fiber Laser marking system is Class IV laser product.
- The laser output power is 30W with the wavelength of 1060nm.
- Avoid touching the laser beam or the laser radiation directly. The human body is vulnerable to the output of certain lasers, and under certain circumstances, exposure can result in damage to the eye and skin.
- The system can be only opened for the maintenance in Questt Asia.

§2.Laser Safety information

2.1.Safety Standards

Throughout this manual, special warnings and cautions are given as needed. Important information and special hazards are also identified with symbols (icons) as shown below:

a. Warning

Whenever this “Warning” symbol appears, a hazard may exist that could result in death or serious injury. A description of the potential hazard is supplied for the users’ information. It is the users’ responsibility to take all necessary steps to prevent injury to themselves or other personnel.

b. Caution

Whenever this “caution” symbol appears, a description of potential damage to the Laser is supplied. It is the user’s responsibility to understand this information and use it to prevent any damage to the machinery. If a user does not understand the information or is not sure how to proceed, immediately call the Questt Asia for further instruction.

2.2.General safety instruction

Users should follow the information included in this manual to ensure the safety and performance of the system.

Warning: The power supply must be attached with the ground wire.

Caution: The maintenance should be proceed by the qualified professional person form Questt Asia. Don’t open the laser enclosure or destroy the label on the machine. Otherwise, the machine will not be warranted.

Caution: The laser head of the Quamtum-FL20B Z-axis motorized Fiber Laser marking system is connected to the fiber-optic. It should be handled carefully during the operating to prevent from the dust and contamination. The lens should be cleaned by the special lens paper

Caution: The system should be operated under the required environment. Otherwise the safety function will be loss.

§3. Laser Class

This laser is manufactured according to the standard of 21 CFR 1040.10(or IEC60825), belongs to the class IV laser product. It can emit 30 Watts of laser at the wavelength of 1060nm. It is harmful to the human eyes and skin. Although the laser beam is invisible, it will cause the injury to the retinal and the corneal. It is necessary to wear a protect glass when the user operates the system. It is the user's responsibility to prepare all the safety glass.

Caution: Don't install the output collimator when the laser is running.

Caution: At the Back of the Quantum-FL20B Fiber Laser marking system, there are Two fans for the cooling purpose, in order to have sufficient air flow.

Warning: Don't watch the laser output head directly. Wear the protect glass when you operate the laser.

Caution: Don't operate the laser at the frequency less than 20 KHz, the high energy density is harmful to the laser.

Caution: Don't process the metal with high reflectivity, in case the laser will be damaged.

Caution: Use the uninterruptable Power Supply to operate the laser, the break off of the laser power supply will be seriously damage the laser.

Warning: The improper operation of the controller or the regulator may cause the harmful radiation.

§4. The symbol (icon) and the location of the warning and caution



Label of warning

Location: at the cover or the front panel of the laser

Information for the operation.



This symbol means the laser radiation and is marked on the product.

§4. System Description

Quantum-FL20B Fiber Laser marking system is one of the advanced products developed by Questt Asia Technology Co., Ltd. It uses the laser's high energy advantage working on the surface of the work piece, enables the work piece surface to achieve the instantaneous gasification, and according to the predetermined path, it can engrave and mark certain depth characters and designs.

Quantum-FL20B Fiber Laser marking system is widely used in electronic component, the communication, the spare parts of automobiles and motorcycles, instrument and meter, aerospace, war products, hardware and machinery, measuring and cutting tools, sanitary equipment, medication, food and beverage, cosmetics, drugs packing, medical appliance, solar energy, handicraft and so on. It is suitable to mark on all kinds of metal and partial non metallic material.

Comparing with the traditional diode pumped laser (include Nd:YAG laser), the Quantum-FL20B Fiber Laser marking system has the high gain of 50~60dB power amplifier technique (MOPA) and the Q modulating resonator. The efficiency of the pump source transferring is more than 10 times of the traditional laser.

§5. System Description

Equipment Performance

The machine adopts originally fiber laser 20W Raycuse fiber laser and high speedy galvo scanning system and big marking area F-theta lens. High quality of light beam, long using time, stable equipment performance exempts maintenance. It is speedy, and precious. Marking has non-touched process, permanent effect, humanized operation, and stable running. The proprietary control software may compatible software output of AutoCAD, CorelDRAW, Photoshop, etc. It can realize automatic edition and correction of characters, signs, graphs, images, bar codes, two dimensional codes, and automatically increased serial numbers. It can support various file formats like PLT, PCX, DXF, BMP, JPG, and so on. It may use TIF fonts directly. 24-hour non-stop running makes it meet the demand of massive on-line and off-line industrialized production.

Applicable fields

The machine is widely applied in electronic component, the communication, the spare parts of automobiles and motorcycles, instrument and meter, aerospace, war products, hand-ware and machinery, measuring and cutting tools, sanitary equipment, medication, food and beverage, cosmetics, drugs packing, medical appliance, solar energy, handicraft and so on. It is suitable to

mark on all kinds of metal and partial nonmetallic material.

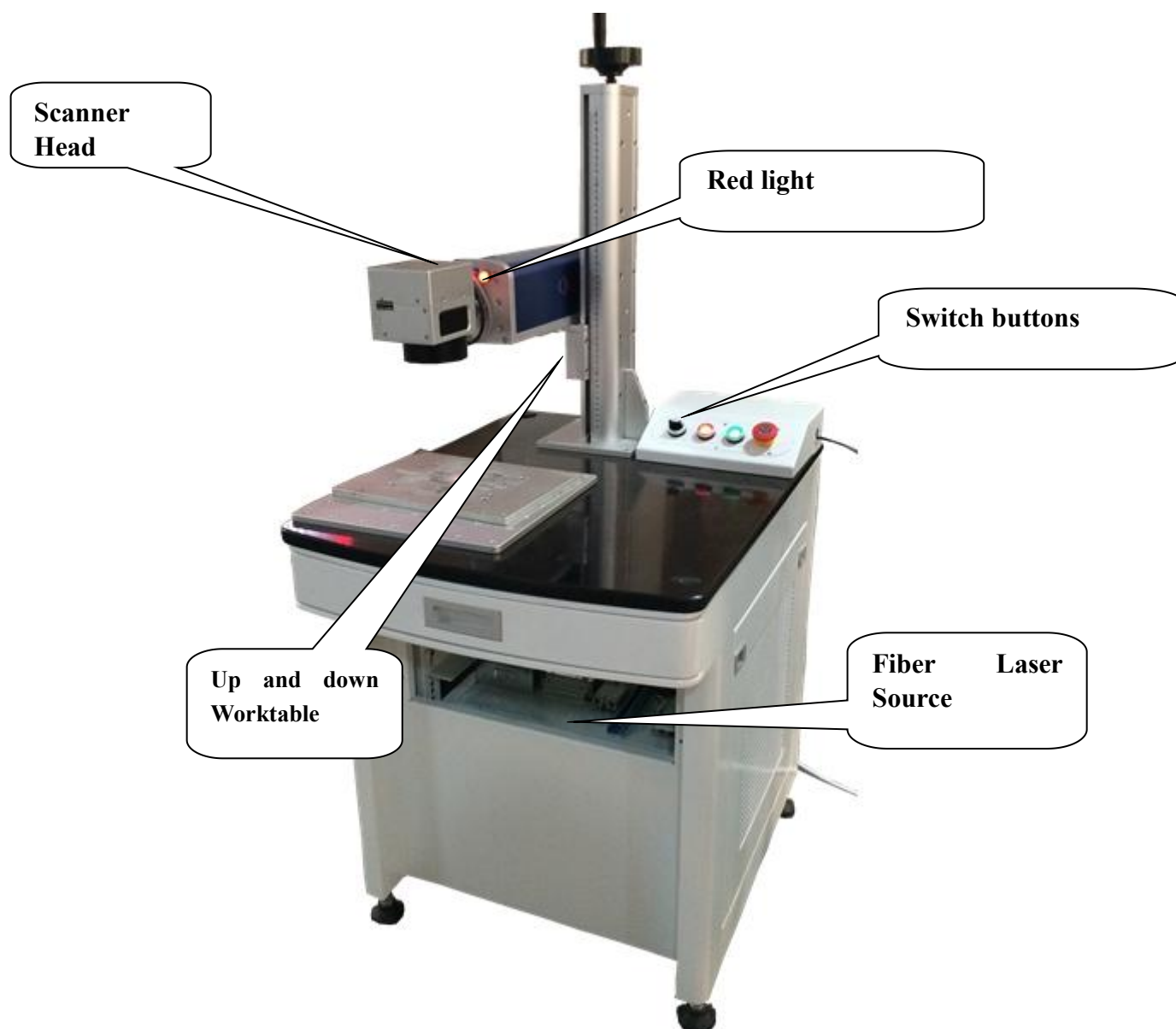
Optional configuration

Online flying marking, Rotary marking, USB port offline working.

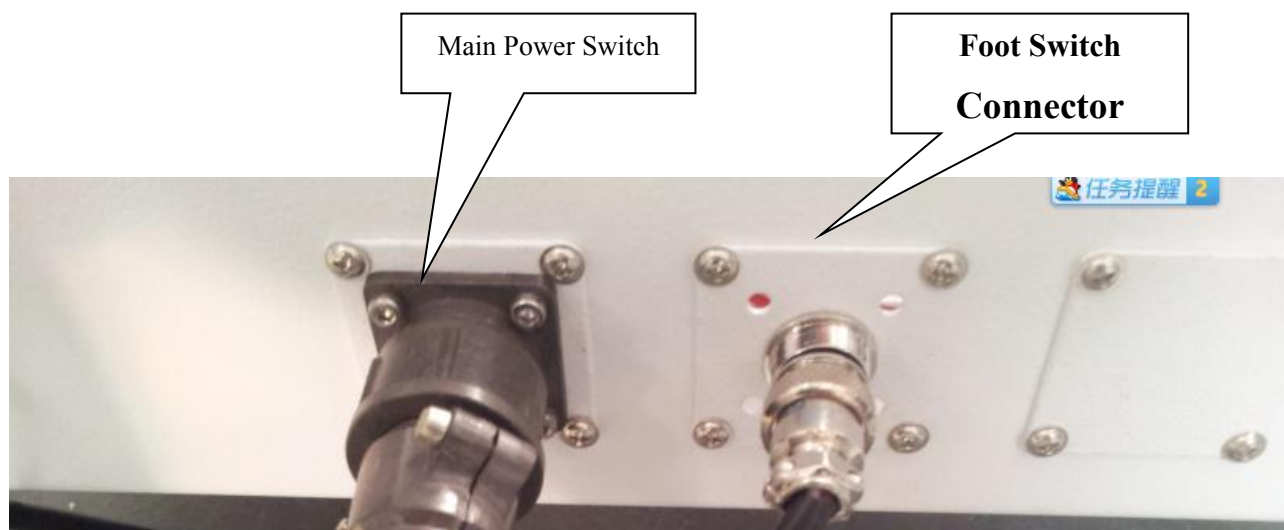
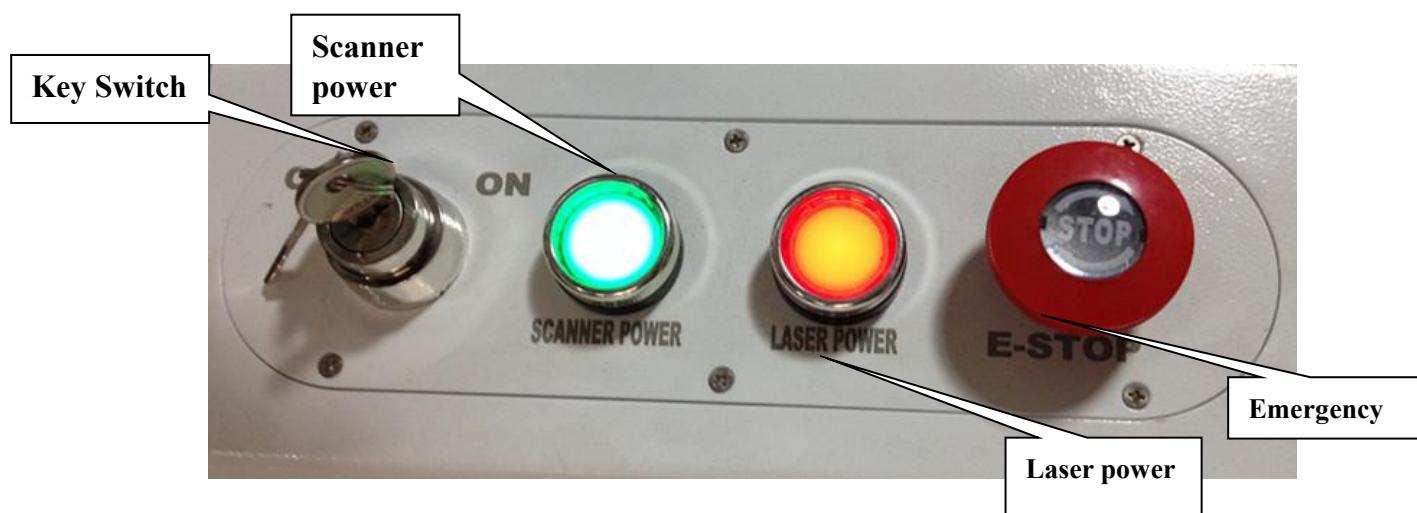
The main of technical parameters

Type specification	Quantum-FL20B Fiber Laser marking system
Laser mode	Base mode
Wave length of laser	1064nm
Laser power	20W
Laser repetition frequency	20KHz~100KHz
Marking speed	≤7000mm/s
Repetition precision	0.01mm
The minimum focus facula diameter	10μm
Minimal character	0.1mm
Marking scope	310*310mm
Power supply	110V/50Hz/600VA
Cooling way	Forced-air cooling

§5. Installation and Operation



Part introduction



Total power Switch

Foot Switch

5.1 Equipment installation and position requirement

Quantum-FL20B Z-axis motorized Fiber Laser marking system should be located at room with good ventilation and clean. The machine should keep at least 600mm from the wall or other goods.

5.2 Un-pack the wooden box

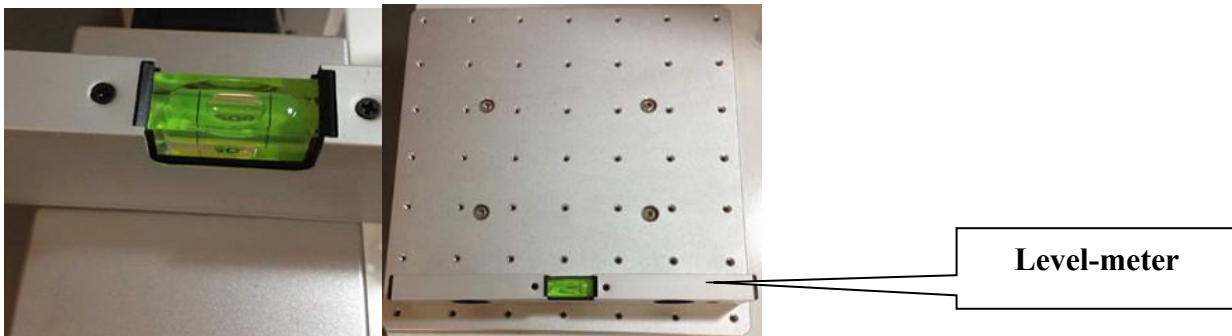
Please be carefully to un-pack the machine to prevent the damage the system and parts. If there is some broken parts, please inform Questt Asia Technology Co.,Ltd as soon as you can.

In order to protect the machine during transport,we have take off the Z axis devices. After you open the wooden box, please assemble them first. The operation is easy,just fix the 4 screws on the table.

5.3 Installation

5.3.1 Placement

Be sure the fiber laser will put on the flat floor which has enough weight capacity and stability.
You need to use a level-meter to test is the table and marking head is flat. See attached photo.

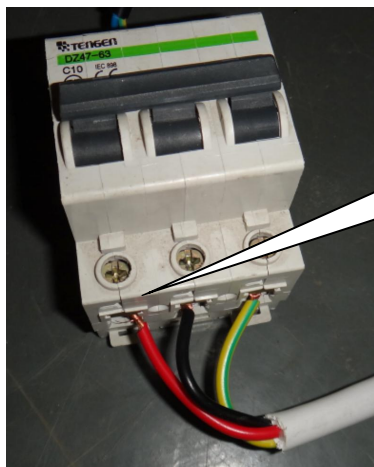


5.3.2 Install cabinet and the PC, Keyboard, and Monitor

5.3.3 Connect the Main Power and Foot-Switch Connector



5.3.4 Power connection in your factory or room.



Red: L
Black: N
Yellow: Earth

5.4 Operation

1. Loose the Emergency, start the “Key Switch”.
2. Start the PC
3. Click the marking software QUESTT
4. Press the “Laser Power”



5. Press “Scanner Power”.



6. Take off the cover of the lens.



7. By the software to make the drawing and marking by press F1
Detail operation for the software, please check the “Questt Mark Software Manual”
8. After you put the ready template with workpieces on the table, before marking, you need the find the right **Focal Distance**, you can turn around the Z axis handle to move the marking head up and down to find it. When the spark is the largest. It means this is the right Focal Distance.(when testing, we have made a mark on about 41.5mm.When you adjust the Focal distance, you can turn to this place first, then make micro adjustment to find the right Focal Distance).



8. **If stop the machine, the sequence should be opposite.**

6. Attentions

6.1 Forbin in the refrigeration ventilator anomaly condition, start laser power source and oscillating mirror power source.

6.2 Do not allow the equipment work in the situation that the power and the voltage are not stably, when necessity needs the Monistat to keep constant voltage.

6.3 Présents the abnormal phenomenon, first closes the total power switch and then to inspect .

6.4 The equipment works, all circuit protection device (for example: Laser power and oscillation mirror power) and Optical devices (for example: The Fiber Optic Laser, oscillating mirror and the f - Theta focusing lens) needs the good abstraction of heat, therefore should insure that the working conditions ventilation.

6.5 The use environment should the clean and no dust, otherwise will pollute the optical device and affect the laser power's output, seriously ever damage the optical device!!!

6.6 Environment relative humidity $\leq 80\%$, temperature $5^{\circ}\text{C} \sim 30^{\circ}\text{C}$.

6.7 The complete machine earths reliably, if not observe this stipulation possibly to cause electric shock or the equipment work is not normal!

6. 8 It must after cut-off power source at least 10 minutes later, only then can carry the machine, earthling and inspect the machine .

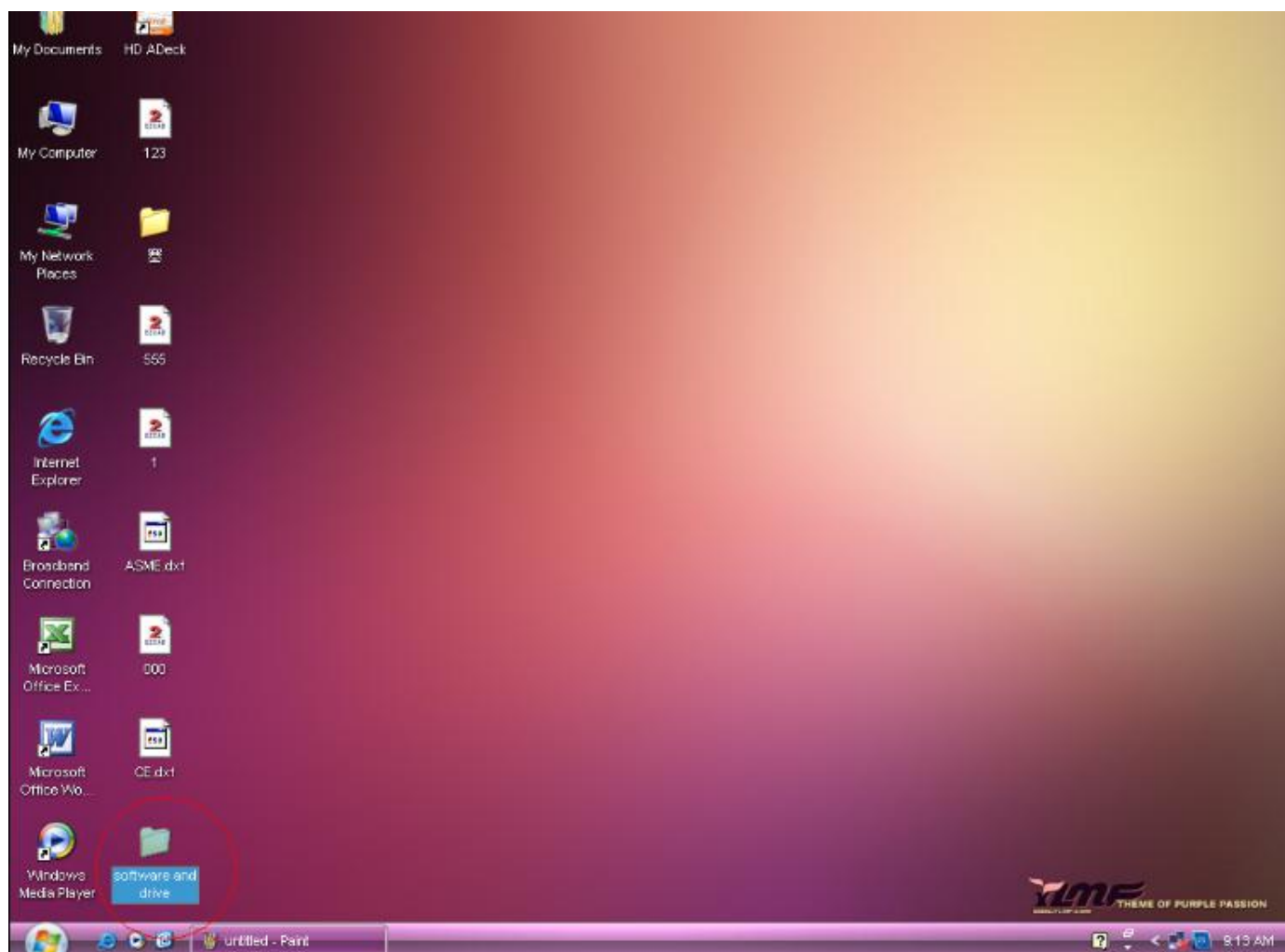
§7. Software operation explanation(for the system without PC)

1. Software Installation:

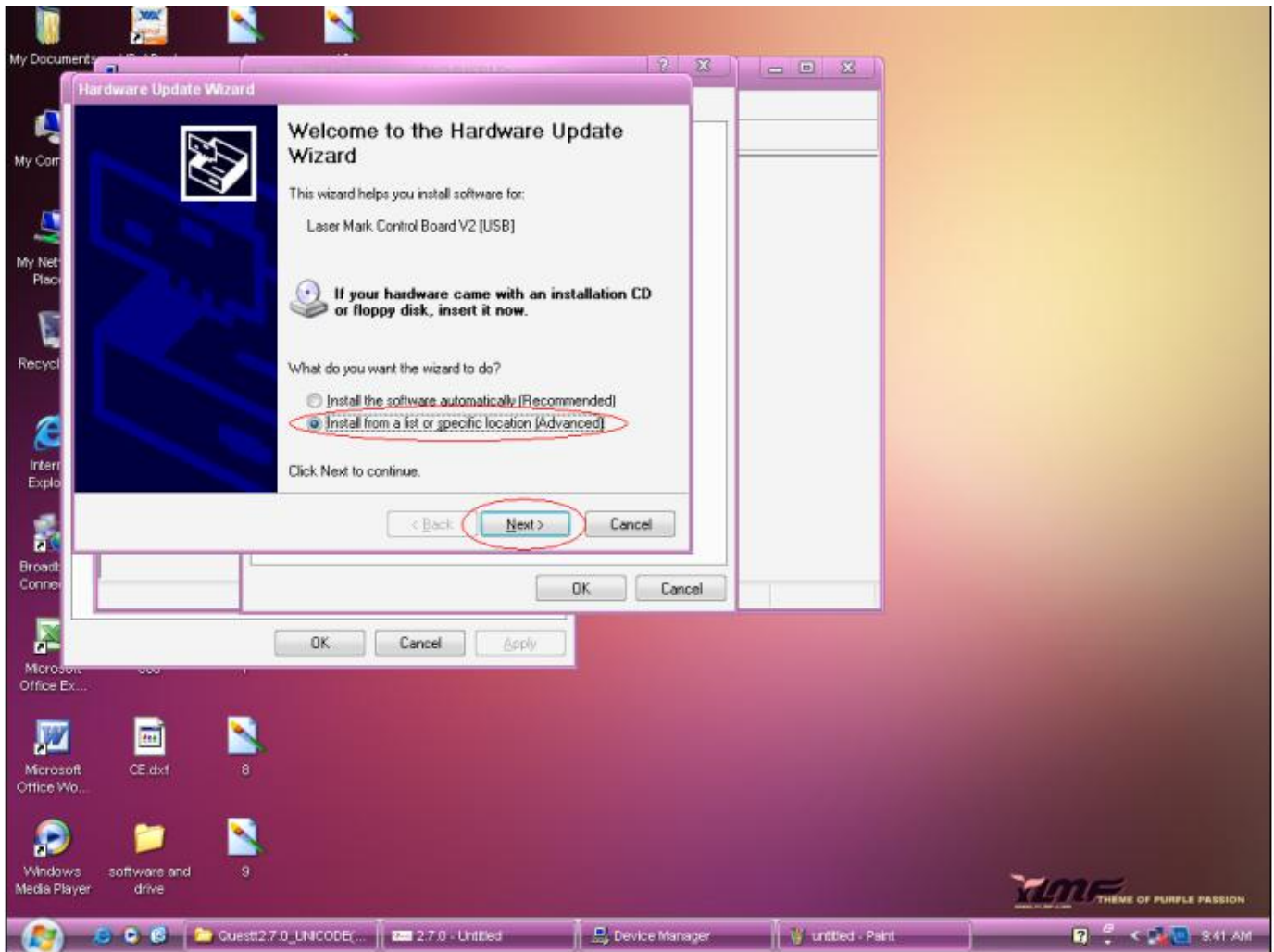
The software is not need installed. Just copy the folder

“Questt2.7.0_UNICODE(20111229)new” to your computer.

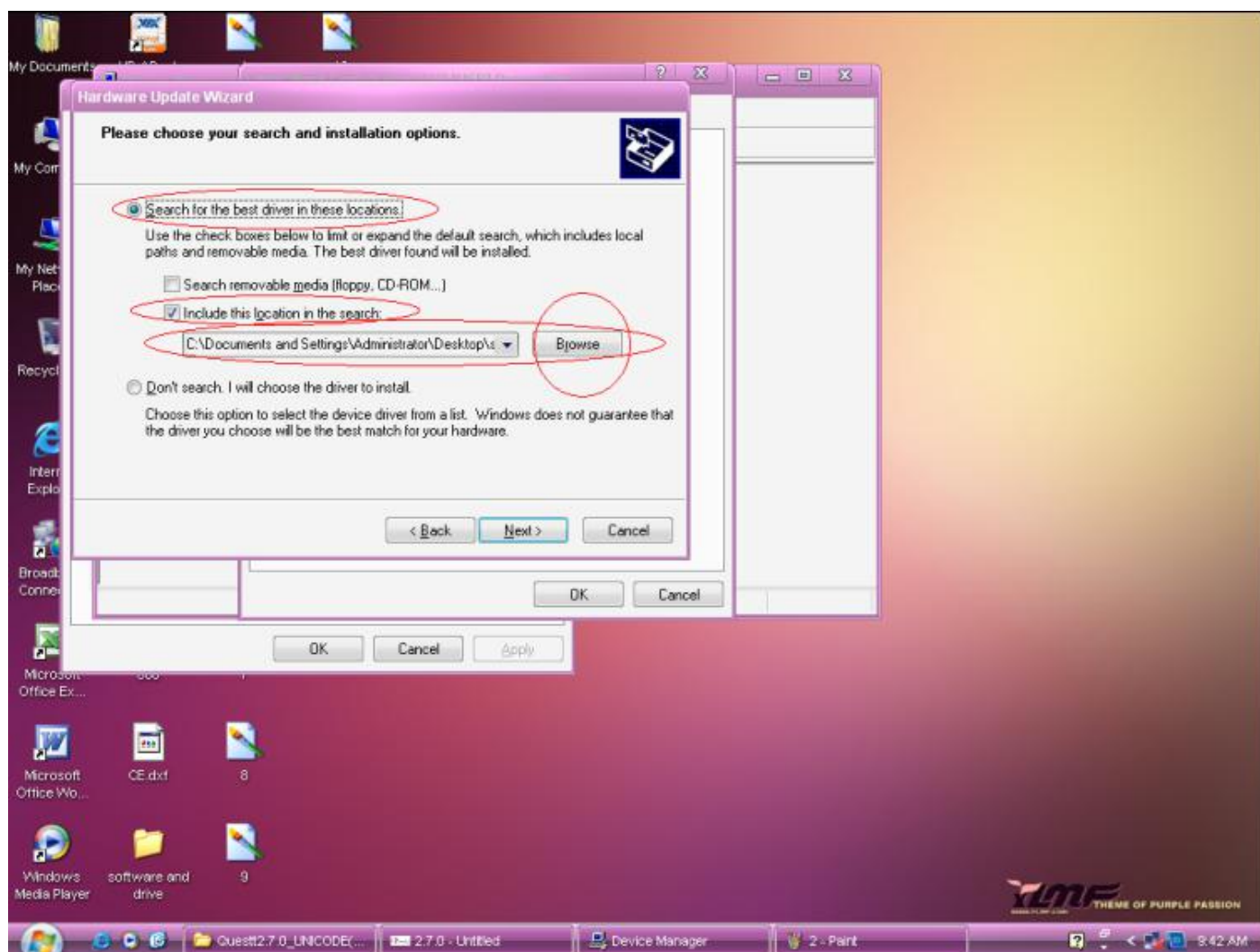
Then install the driver for the control card. The driver file is in the folder with red circle.



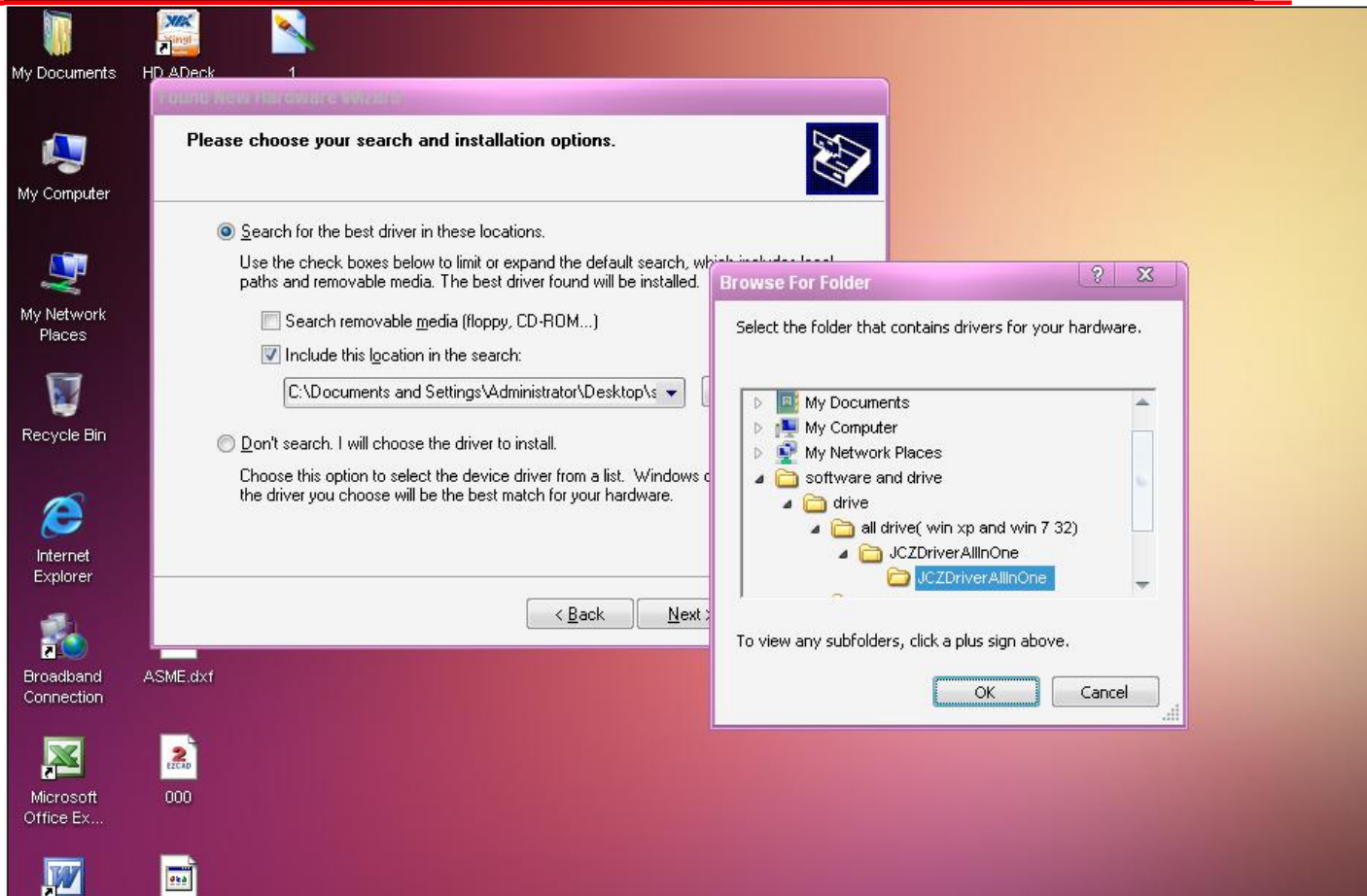
2. Use the USB cable to connect with the Laser machine and your computer.



3. Choose the red circle one and click “Next”

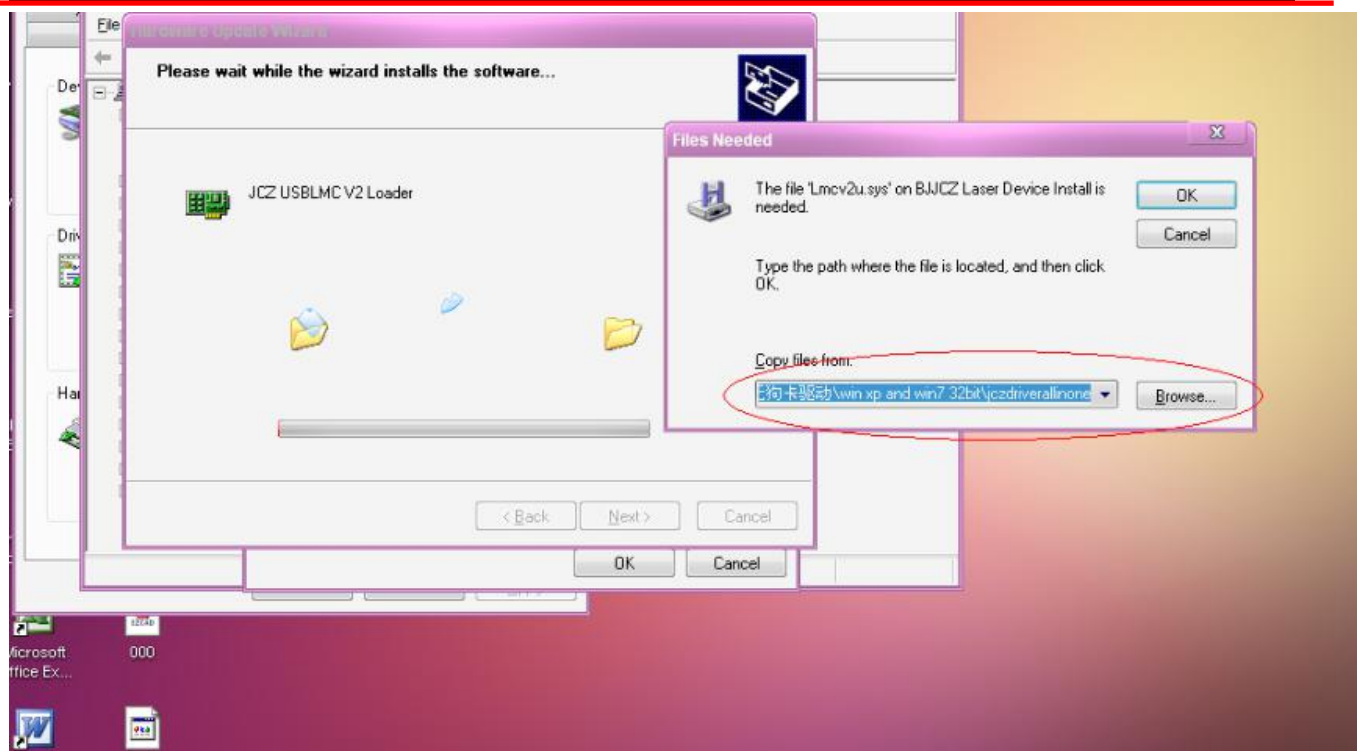


Choose the red circle ones and click “Browse”



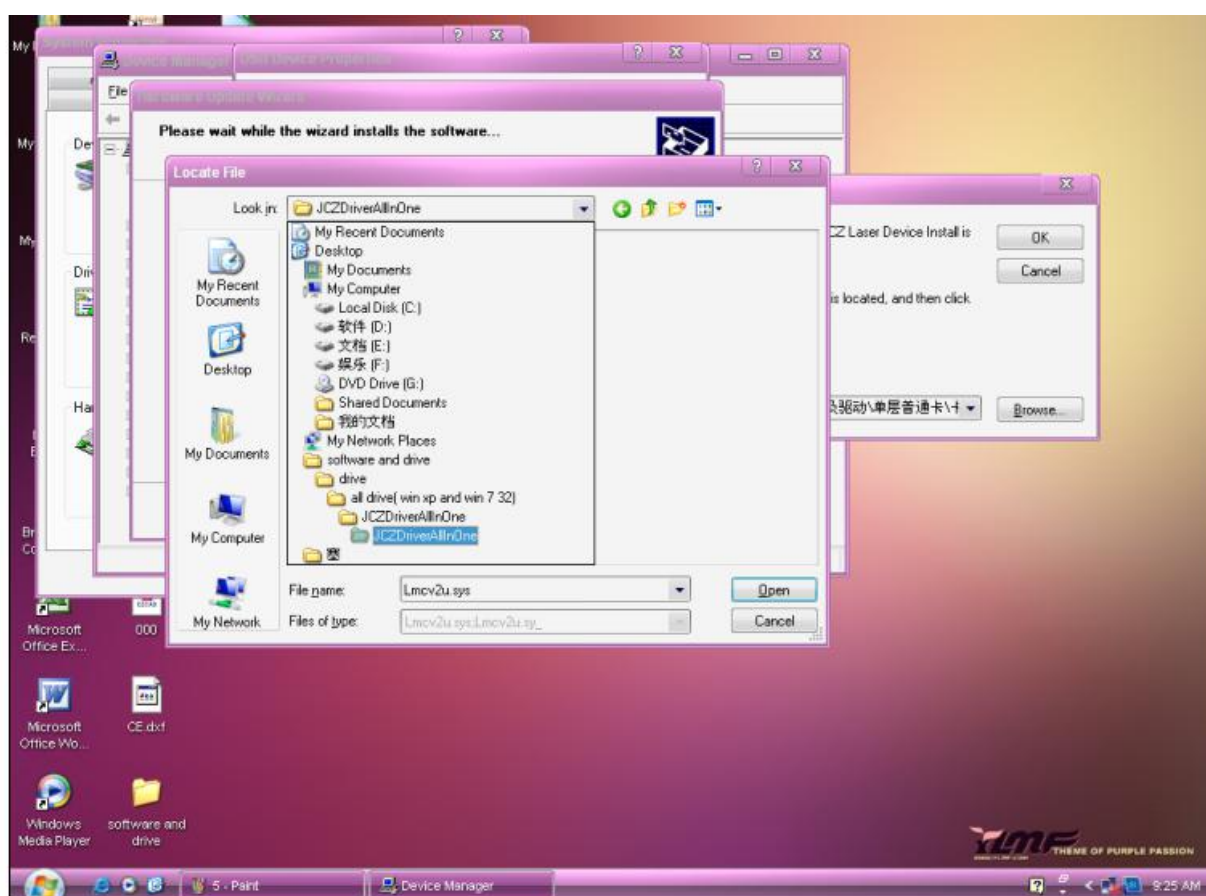
4. Find the driver file folder from the “software and driver”

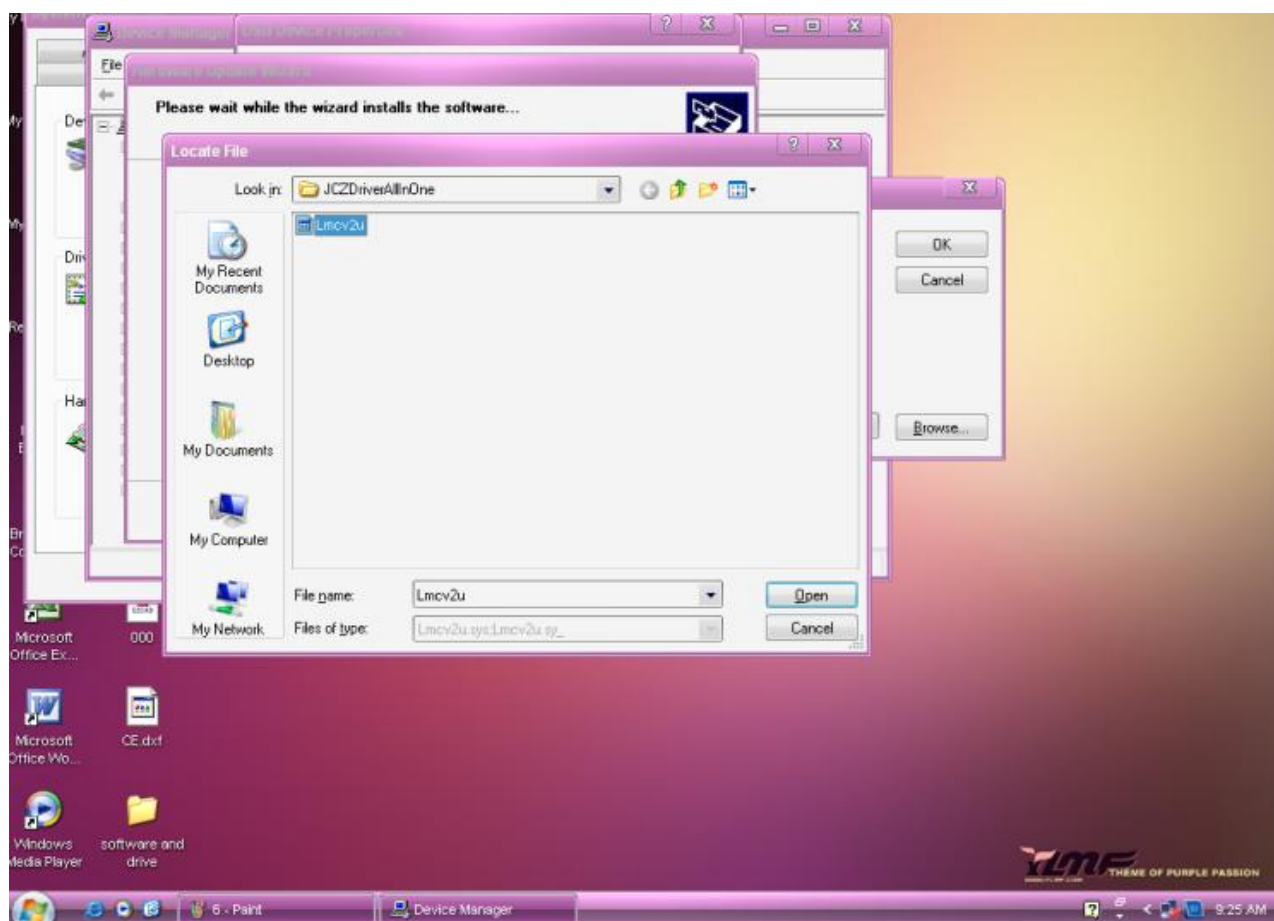
5. Click “OK”



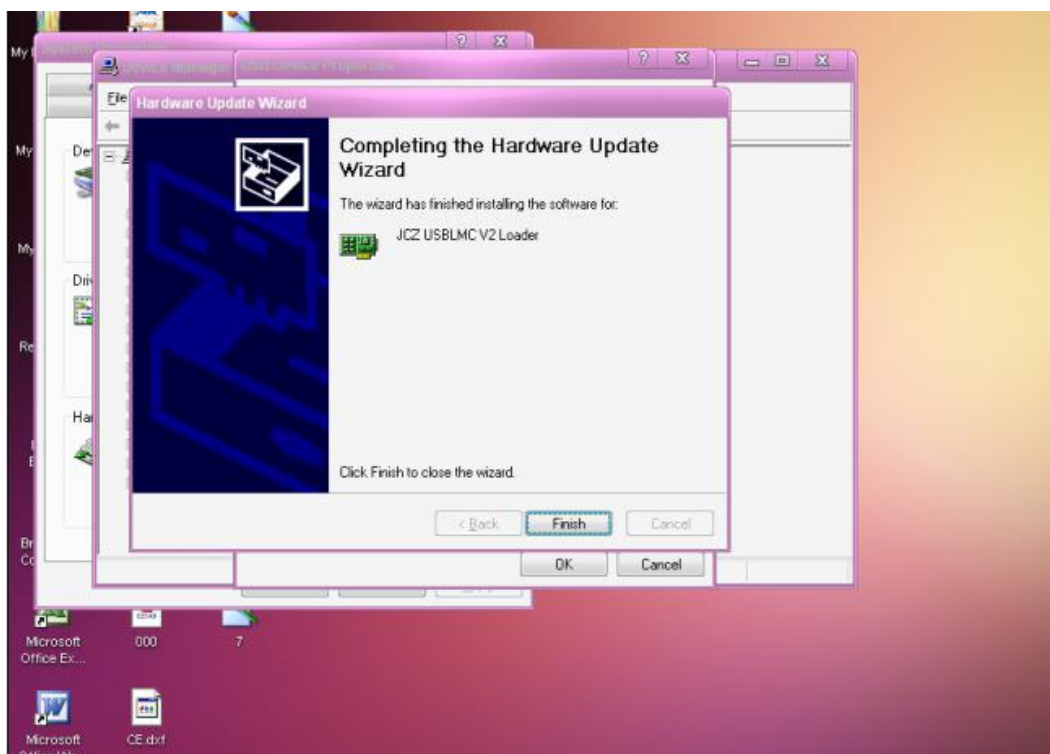
6. Click "Browse"

o



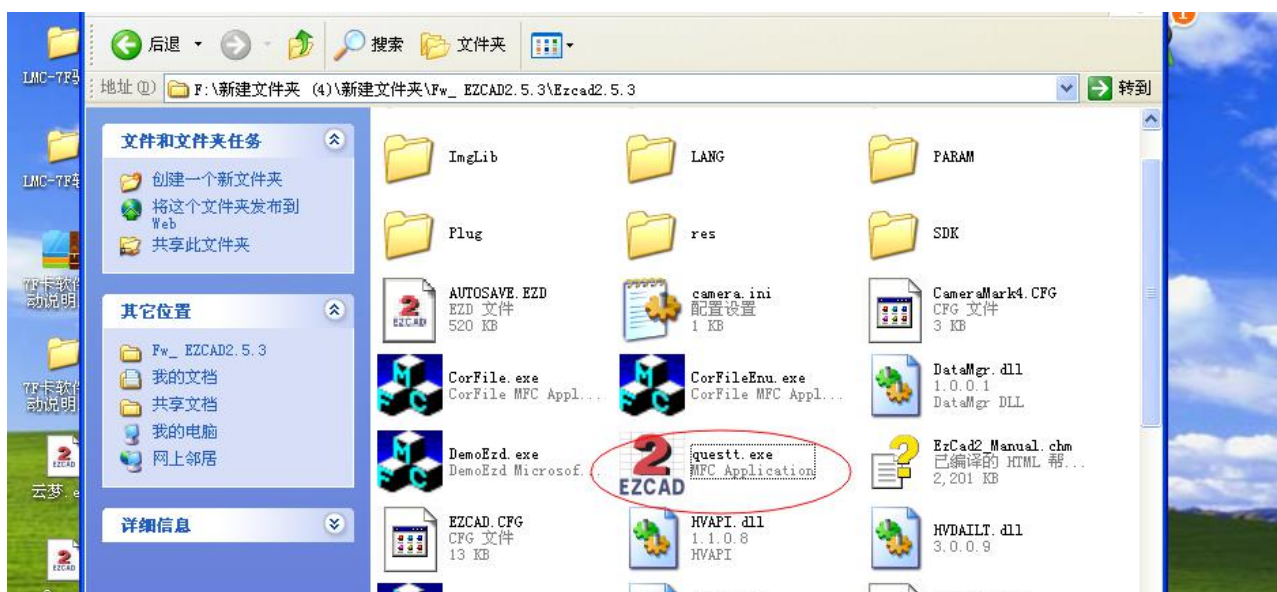
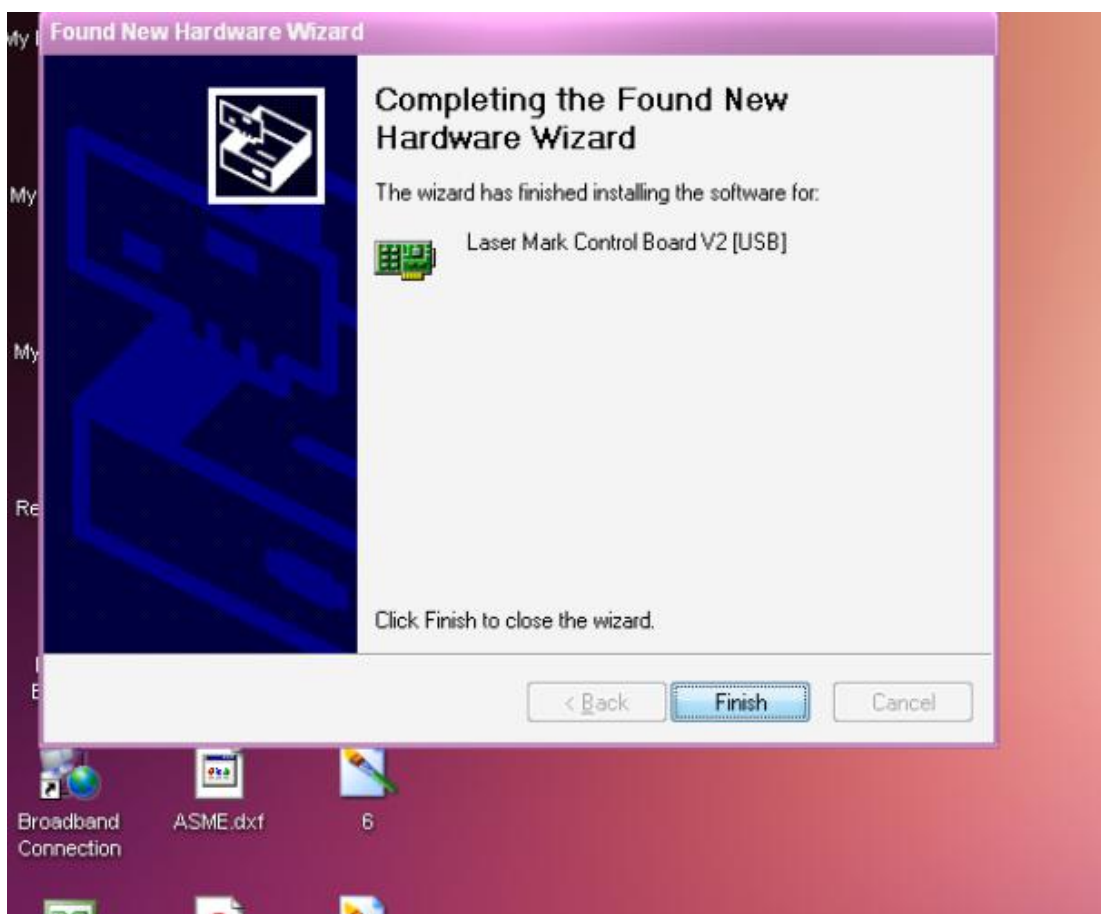


7. Click “Open”

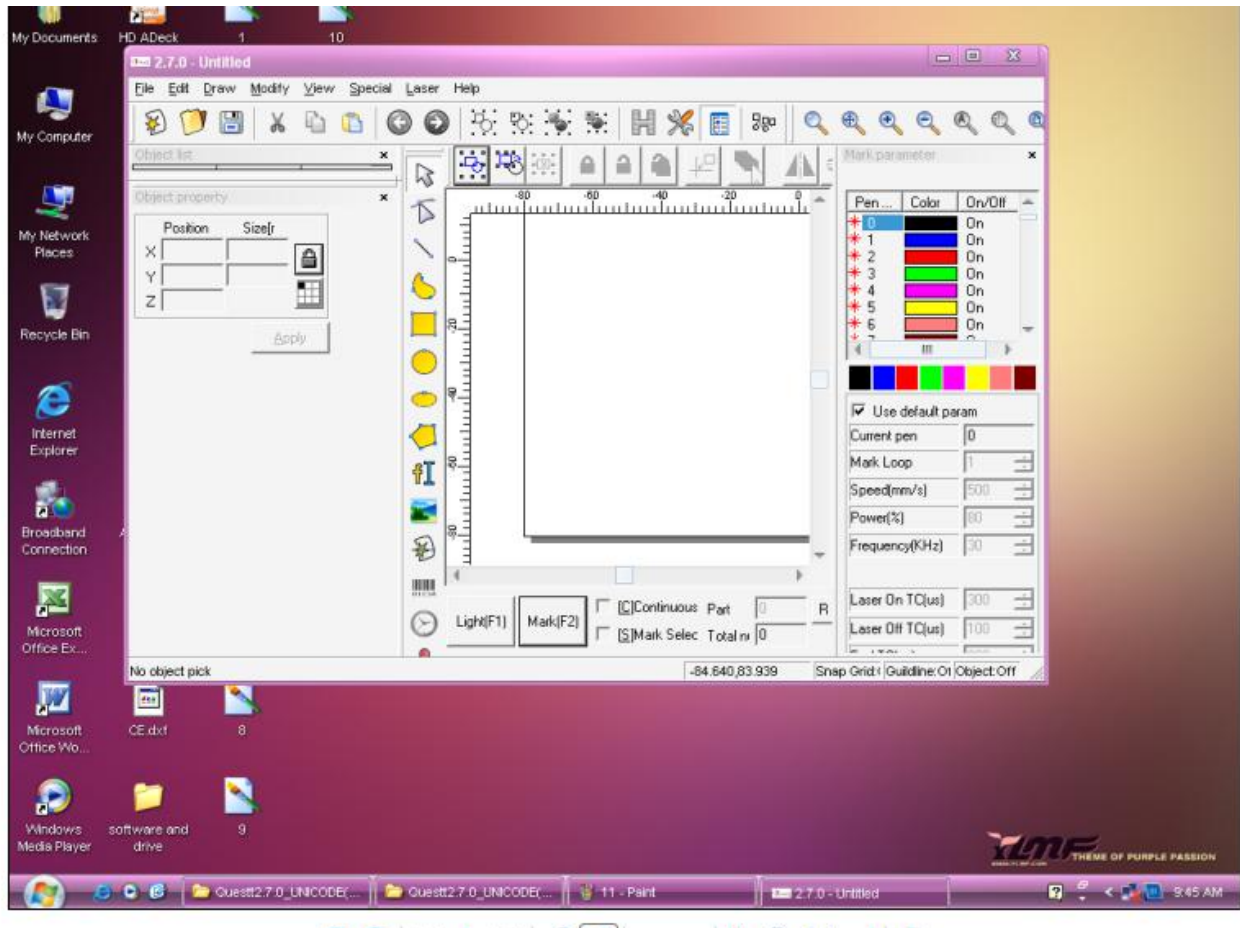


8.Click Finish.

If it reminder to install the USB again, please repeat the sequence.



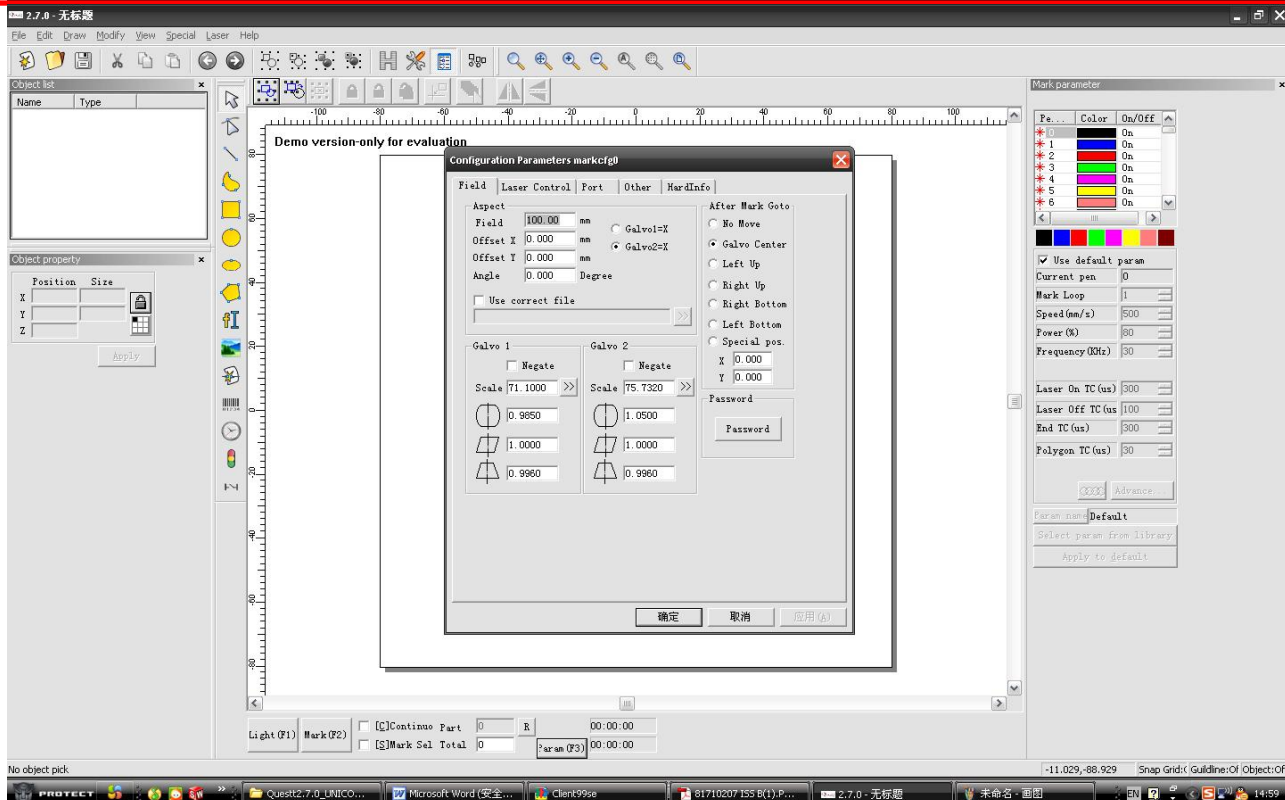
9. Open the software folder and double click “Questt”



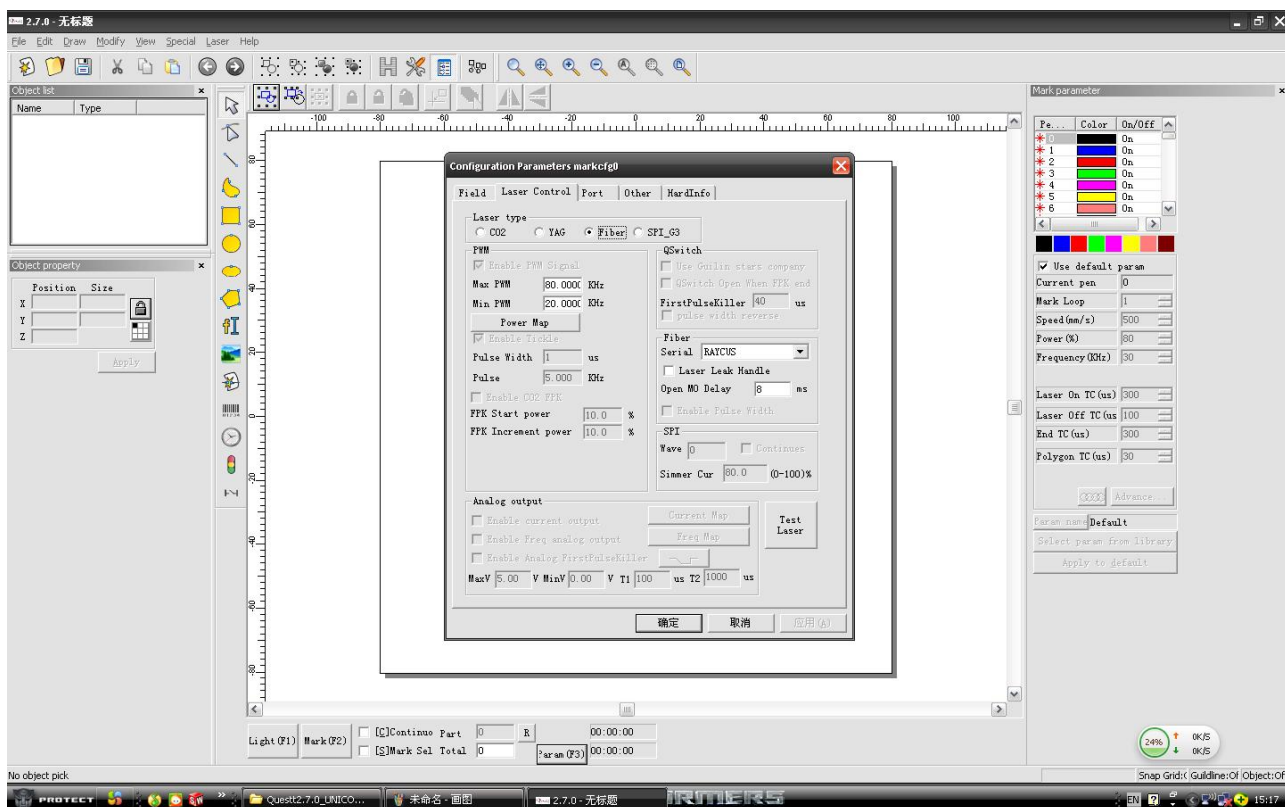
8 Parameter Setting:

According to the following images set the parameter. (Equipment before leaving the factory have already be set, if it did not have modification, did not need setting)

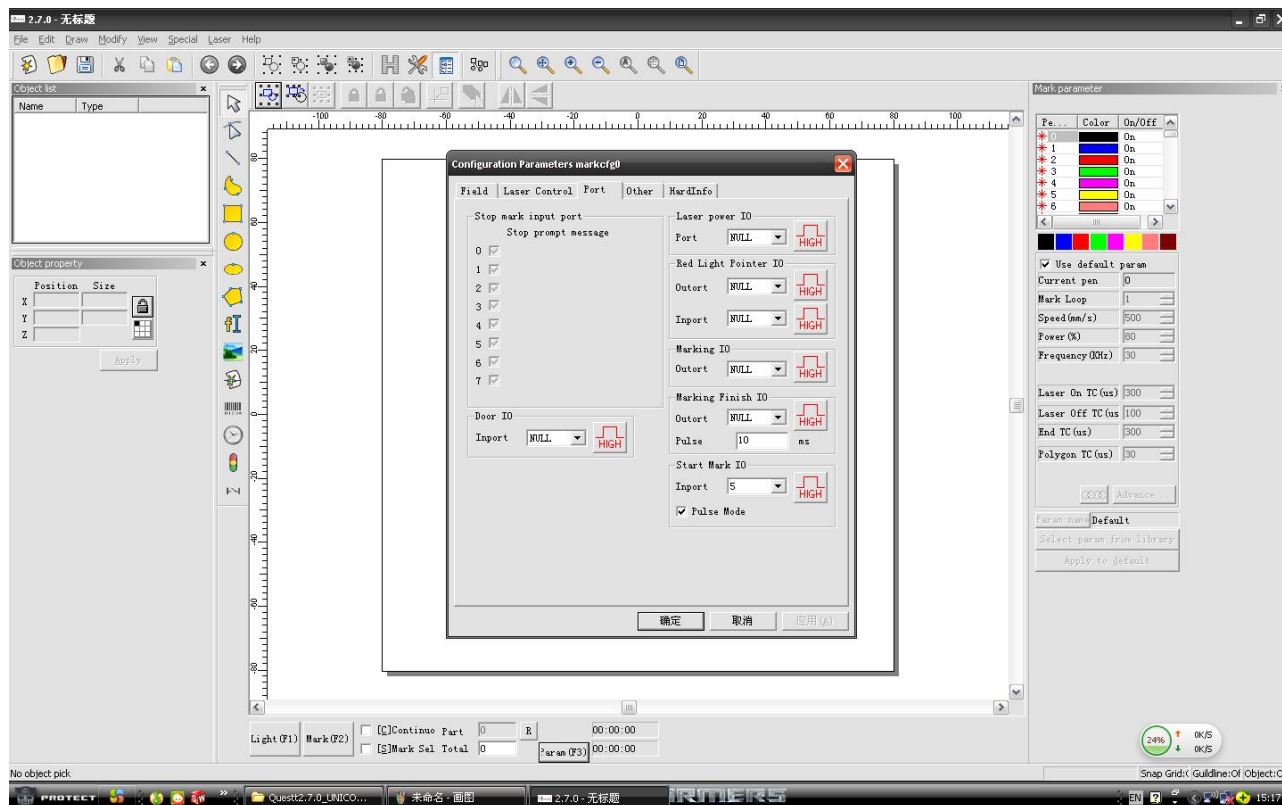
8.1 Working space and adjustment parameter intercalate:



8.2 Laser Type Setting:



8.3 Control Port Setting:



Record: All above parameter is default setting. No need setting if it did not have modification. In working space and adjustment parameter intercalate, different equipment have different parameter, Please use the parameters which is saved in control computer, it is the standard parameters.

Function:

Z-axis motorised marking for different height parts

Color Marking: OPTIONAL

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Rotary: OPTIONAL

9. USB marking card control fiber optical laser

1) characteristic

1) This interface board is special design for Raycuse Corporation's YLP series pulse laser. And, the CON2--DB25 needle plug and laser's 25 needle plug butt joint directly.

2) Digital IO signal. Provides a group general output, three group general input signals.

Explanation

IN0/IN1 fixes for the fiber optical laser condition input; IN6 fixes for the fiber optical laser sudden stop signal input; IN7 uses in examining the fiber laser marking machine's power switch whether to press down; IN2/IN3/IN5 can not use. IN4, IN8, IN9 are the general input signals. The concrete

OUT0 is the general output, OUT2 fixes for the fiber optical laser's red enables;
OUT3 fixes for the laser enables; OUT1, OUT4--OUT6 can not use.

3) X axis stepper motor control signal. Y/ Z axis does not output.

4) Can connect the revolving encoder to realize the high-speed fly marking.

connection form as well as the recommendation connection mode invites reference [number IO connection showing](#).

5) Oscillating mirror output signal for the digital output. Can setting as the non-code digital signal output, also can setting for the with expands the code the digital signal output.

2) Output socket definition

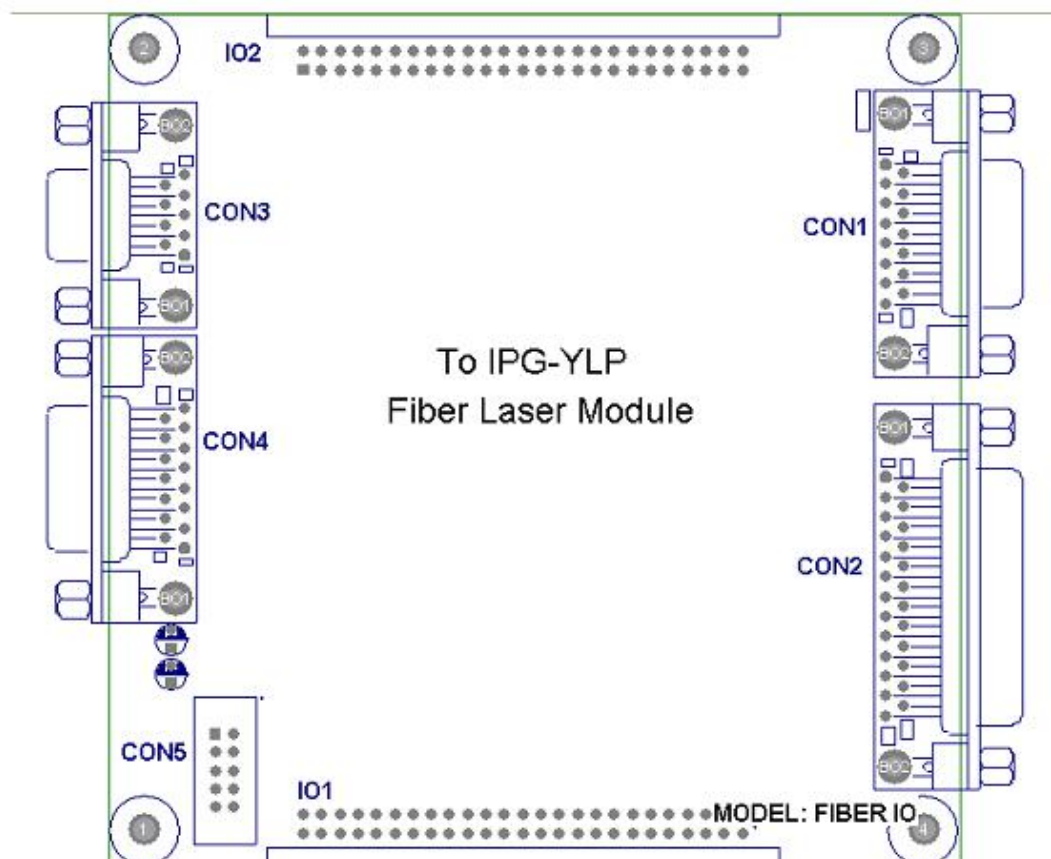


Image 2-1 The fiber interface board - - plug sketch map

3) Output socket base pin definition

1CON1: DB15 oscillating mirror output

Oscillating mirror signal is the digital signal, can direct connection to the digit oscillating mirror. Because the digit oscillating mirror the digital signal transport protocols to be not completely the same, therefore, it needs to confirm that the digit oscillating mirror to use what kind of transport protocols. Our company also provided the keysets for digit to transfer the simulation, also can through the keysets transfer the simulated signal output and connect to the simulation oscillating mirror.

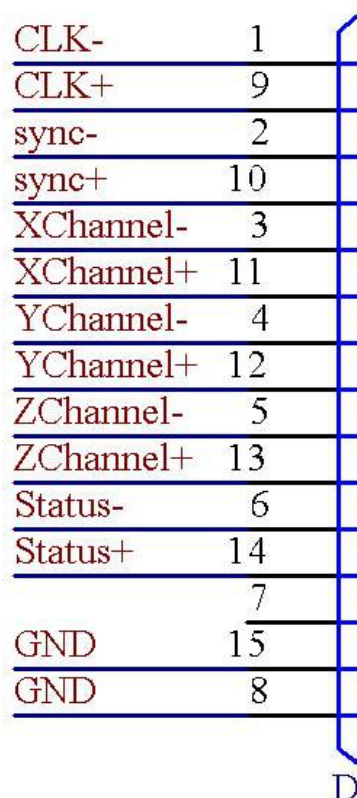


Image 2-2 The fiber interface board CON1 Plug base pin definition sketch map

Base pin number	Signal name	explain
1, 9	CLK-/CLK+	Clock signal. Difference output.
2, 10	SYNC-/ SYNC+	Synchronized signal. Difference output.
3, 11	XChannel-/ XChannel+	X axis oscillating mirror data signal. Difference output.
4, 12	YChannel-/ YChannel+	Y axis oscillating mirror data signal.Difference output.
5, 13	ZChannel-/ ZChannel+	Z axis oscillating mirror data signal.Difference output.
6, 14	Status-/ Status+	Oscillating mirror 's state feedback signal. Difference output.
8, 15	Gnd	Control card's reference place.

For common two-dimensional oscillating mirror ,only needs to connect the CLK clock, the SYNC synchronization, XChannel, the Ychannel four group of signal eight holding wires altogether . The digital signal suggested that uses the twisted pair line (in common use net wire) to connect.

2CON2: DB25 Laser output CON2 plug and the fiber optical laser's 25 needle plug docks directly through 25 needle row of line.

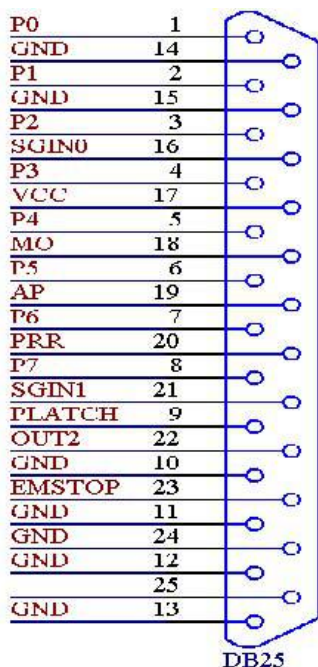


Image 2-3 The fiber interface board CON2 Plug base pin definition sketch map

Base pin number	Signal name	explain
1——8	P0——P7	Laser power. TTL output.
9	PLATCH	The power lock saves signal. TTL output.
10, 11, 12, 13, 14, 15, 24	Gnd	Control card's reference place.
16, 21	SGIN0, SGIN1	Laser's condition input.
17	Vcc	Control card's outputs power is 5V.
18	MO	Main oscillator switching signal. TTL output.
19	AP	Power amplifier switching signal. TTL output.
20	PRR	Repetitive pulse frequency signal. TTL output.
22	Out2	Laser's red signal. TTL output.
23	EMSTOP	Sudden stop switching signal . TTL output.
25		This foot is hanging, not connect.

3CON3: DB9 fly marking

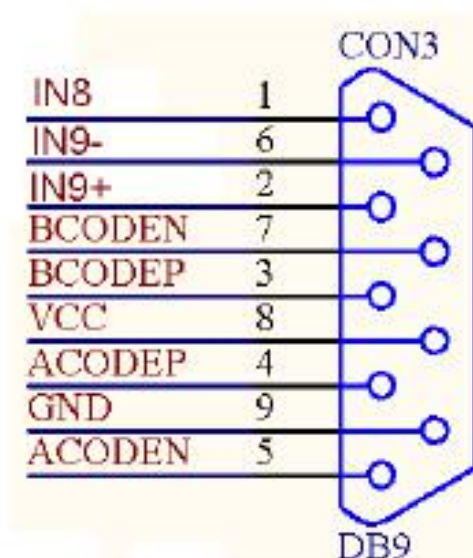


Image 2-4 The fiber interface board CON3 Plug base pin definition sketch map

Base pin number	Signal name	explain
1	IN8	General input signal 8 and GND.(9) When uses this signal, separately and GND to switch's both sides .
2, 6	IN 9+ / IN 9	TTL input signal. The interior resistor. If the voltage is higher t

4CON4: DB15 Power supply and extension axis control

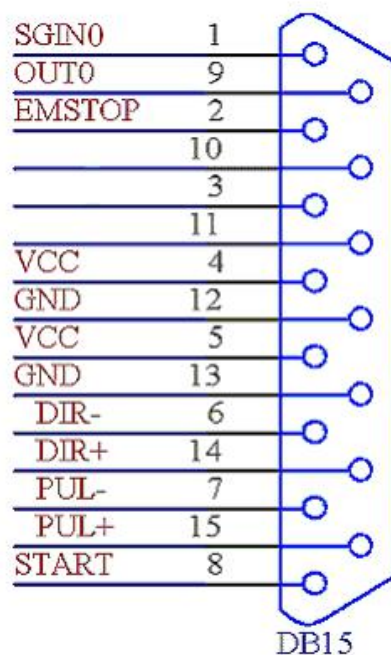
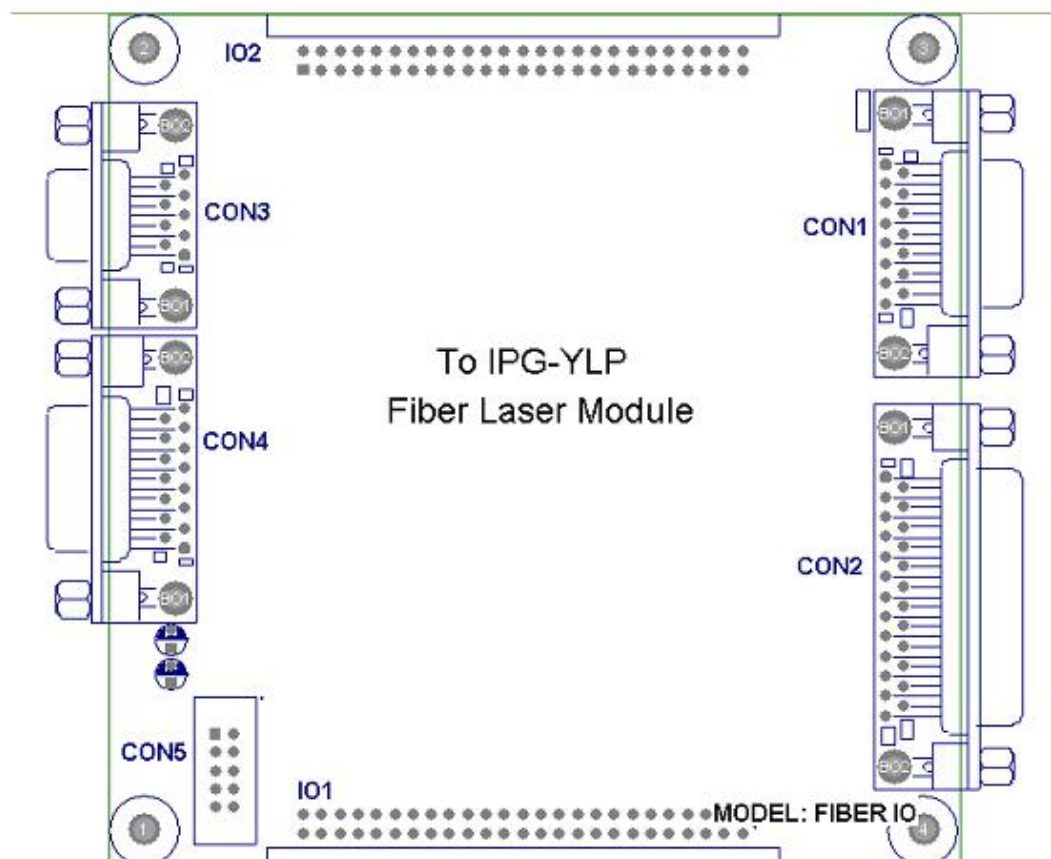
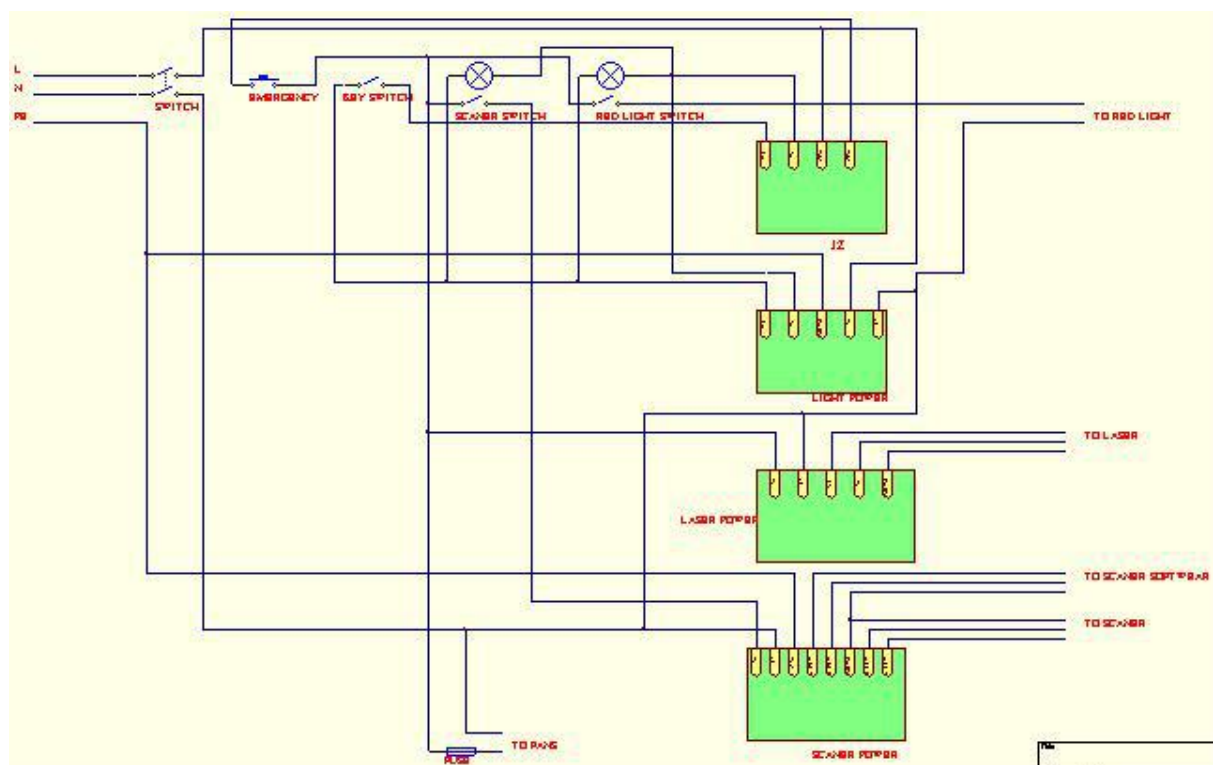


Image 2-5 The fiber interface board CON4 Plug base pin definition sketch map

Pin	NAME	Function
1	SGINO	Plus input of general input 0,make up return circuit with INRTNO
3	POW_BTN	
4, 5	VCC	Input pin for 5v power supply
12, 13	Gnd	Reference pin for 5v power supply
8	REMARK	Repeat marking signal.Use GND as a reference ground,to use this signal just connect a switch between this pin and GND.When it is activated the control control will mark the content in the cache.
9	OUT0	General Output Out0,using GND as reference ground.They are TTLoutput by default.
10, 11	POW_CON, POW_CON1	
6, 14	DIR-/DIR+	Direction signal of extension axis .It can be either a differential output or a TTL output.Forcommon anode,use VCC and DIR+ SIGNALS,AND VCC IS ANODE SIGNAL.
7, 15	PUL-/PUL+	Direction signal of extension axis .It can be either a differential output or a TTL output.Forcommon anode,use VCC and PUL+ SIGNALS,AND VCC IS ANODE SIGNAL.



10. Drawing for the principle



Drawing of connection

