Maintenance Manual

Mercury III

Table of Contents :

Chapter 1：Overview

1.1 Introduction

This manual is prepared for distributors to maintain or repair JF240-UV Printer. Briefly,

- Chapter 1 is the introduction of contents, safety and operating enviroment
- Chapter 2, we have diagrams to show the part number for every part in different sections
- Chapter 3 introduction for electrical system
- Chapter 4 introduction to show you how to replace parts
- Chapter 5, deals with the laser system for laser tube、beam & opitcal alignment.
- Chapter 6, an instruction to show you how to upgrade firmware and related software setting
- Chaprter 7, trouble shooting and system diagnostic
- Chapter 8, basic maintenance

Manual contents may be subject to change without notice. Please contact GCC Customer Service by calling at 886-2-2694-6687 or e-mailing to tech.support@gccworld.com for services.

1.2 Safety

1.2.1 The Safety Interlock System

The laser system is equipped with a safety interlock system utilizing magnetic sensors on the top and side access doors, laser-activation and door LED lights on the control panel. The magnetic sensors will deactivate the laser when either door is opened. At this time, the “door” LED light found on the control panel will illuminate, indicating an open or improperly closed door. When the laser is in operation, the “laser” LED will illuminate to inform the operator that the laser is activated. If at any time, any of the access doors are open and the “laser” LED is illuminated, IMMEDIATELY unplug the laser system and contact GCC service team for technical support and maintenance instructions.

⚠ WARNING

- DO NOT operate the laser system if any component of the safety system is malfunctioning.
- DO NOT attempt to remove or modify any component of the safety interlock system.

1.2.2 Product Label

This label is located at the right-back side of machine. All the product information such as Serial Number, Model Numbers, Laser Power and Electric power can be found here. Before requiring any further tech support, always provide the service person with the information on this label.

1.2.3 Safety Measures

- LASER RADIATION WARNING: Exposure to laser radiation may result in physical burns and severe eye damage. Proper use and regular maintenance of this machine is important to the safety of all people in the immediate area.
- Prior to operation, carefully read and familiarize yourself with the warning labels located on both your laser system and in this manual.
- Never leave the machine unattended during the laser cutting and engraving process. The laser may ignite combustible materials. A well-maintained fire extinguisher and operational smoke or fire detector should be kept in the vicinity of the machine.
- Caution—Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Resulting debris from laser cutting are very dangerous and may cause fire hazard.
- DO NOT leave debris and scraps inside laser machine after job finished. Always keep machine clean after job finished.

WARNING

- Resulting debris from laser processing are very dangerous and may cause fire hazard
- DO NOT leave debris and scraps inside laser machine after job finished. Must keep machine clean after job finished.
- Always remove the vector grid to clean any small pieces that have fallen through the grid.

NOTE

SmartGUARD™ is an optional fire detection alarm system developed by GCC. Contact your local GCC authorized distributor for more details to have this safety option installed onto your system.

- Enable the SmartAIR™ nozzle when engraving or cutting materials that may easily ignite, such as acrylic, wood, or paper.
- Always wear safety goggles when the laser system is in operation. Reflective materials such as mirrors, enameled brass and anodized aluminum may partially-reflect some of the invisible laser radiation. Severe eye damage may occur if proper safety goggles are not worn.

> **NOTE**
>
> Each LaserPro laser machine is shipped with a single pair of safety goggles. If additional safety goggles are required, please contact GCC directly or an authorized GCC distributor. If you wish to purchase one on your own, please make sure the safety goggles meet these requirements:
>
> 10600 nm OD5+
>
> Visible Light Transmission: 92.9%

- Connect the machine to a properly grounded power outlet. Ensure the voltage of the power source is identical to the voltage of the machine.
- Do not open the laser access panel when the machine is plugged in.
- Do not attempt to modify or disassemble the laser module.
- Do not attempt to remove or modify any component of the machine's laser interlock safety system.
- Ensure the immediate work area of the machine is well-ventilated. Odors, vapors, and dust are by products generated during the laser engraving and cutting process. An exhaust system, vacuum cutting box, and honeycomb table are recommended. Please contact GCC or your local GCC distributor for more information.
- Do not laser heat-sensitive surfaces or materials that may generate toxic fumes, such as PVC and Teflon.
- Regularly clean and maintain your machine according to our cleaning and maintenance Instructions in Chapter 8. Doing so will ensure your machine will operate effectively and safely over a long period of time.

1.2.4 Operating Environment

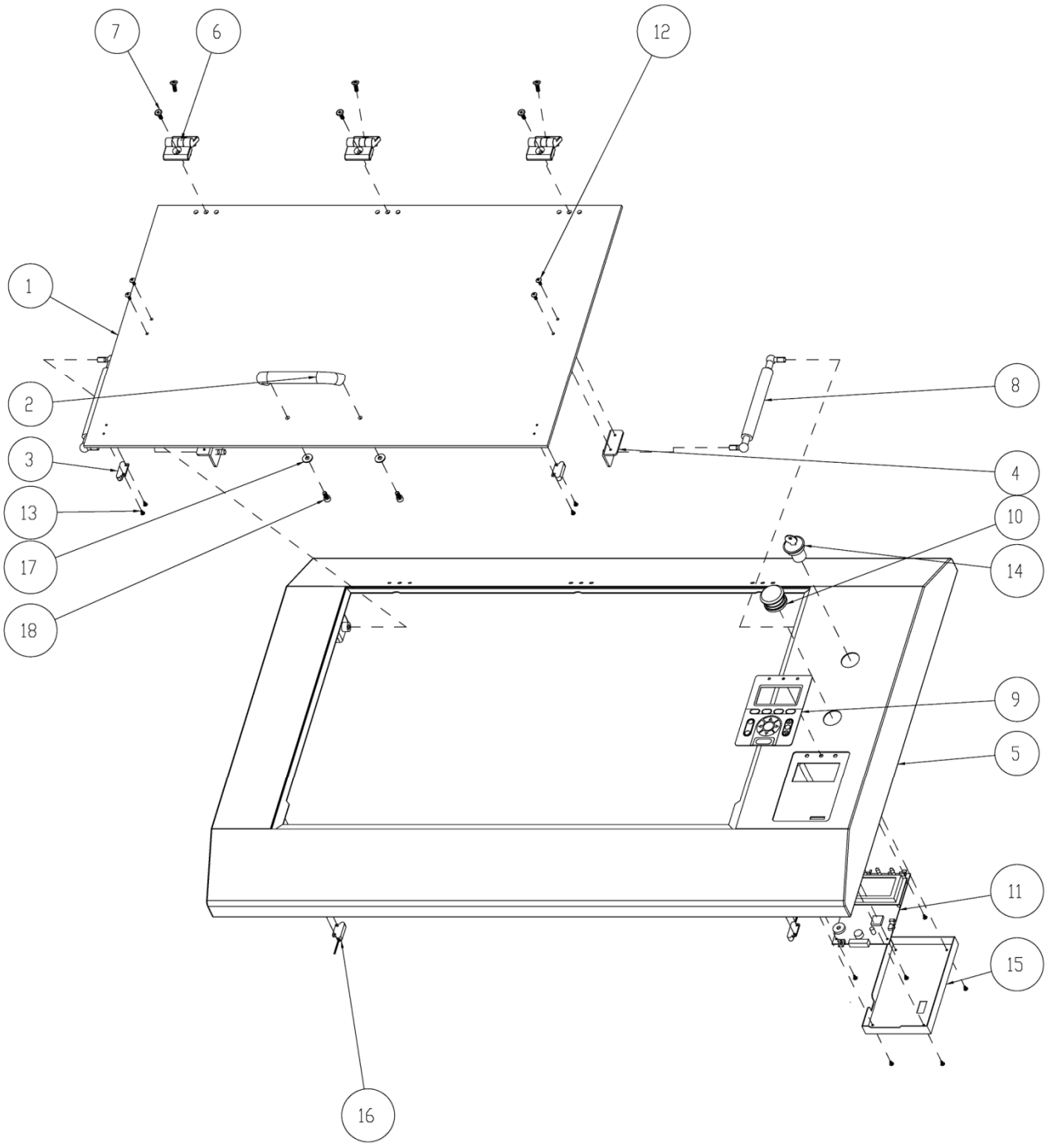
Please follow the guidelines when considering a suitable location to set the LaserPro Mercury Series. Improper work environments may lead to operational malfunction and/or unsafe working conditions. The LaserPro Mercury Series should be placed and operated in a standard office-type environment.

- Avoid environments where the machine is exposed to high levels of dust, temperature
  (temperature exceeding 30°C or 85°F) or humidity (humidity exceeding 70% or where the ambient temperature is near the dew point).
- Avoid small, enclosed areas with poor ventilation.
- Avoid areas with high levels of noise and electrical noise.
- Select a location that is large enough to accommodate the LaserPro Mercury Series, an exhaust system, a computer and a work or storage table.
- Select a location in which the ambient temperature remains between 15°C and 30°C (60°F to 85°F).
- Select a location in which the relative humidity remains between 30% - 40%.

- Select a location in which there is a short, direct path to the fume exhaust system.
- Set the LaserPro Mercury Series on a floor surface that is completely even.
- Make sure your smoke or fire detection system in the immediate area is functioning.
- Setup the machine to be apart from the wall for at least 60 cm (2 feet).

Chapter 2：Mechanical System

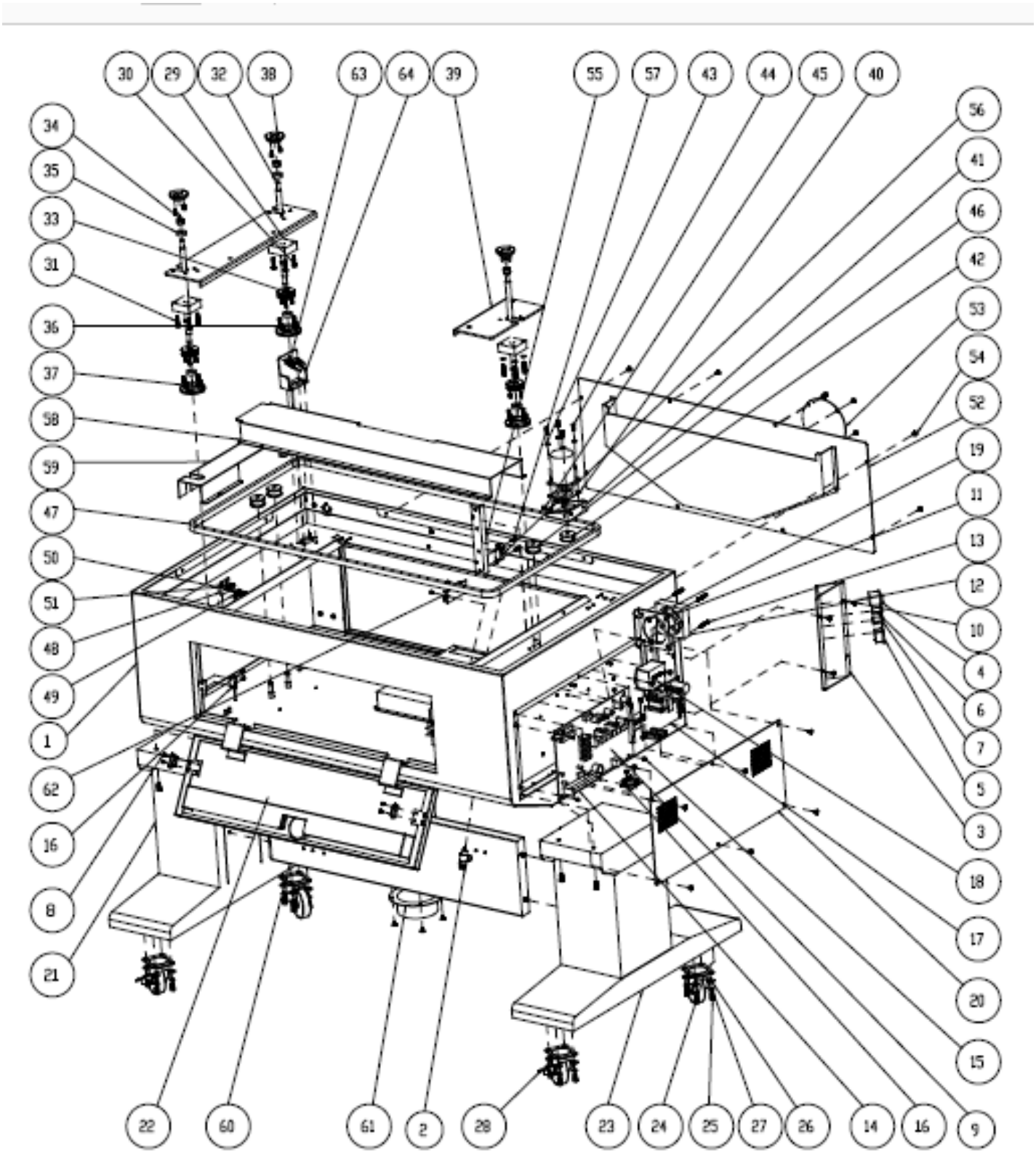
I. Top Cover



Top Cover – Parts List

Item no.	Parts no.	Description	Q'ty
1	228039950G	Glass Windows	1
2	26500165G	Window Handle.	1
3	22000045G	Magnet MC-12	2
4	24400130G	Top Cylinder Bracket	2
5	244054660G	Top Cover	1
6	26500166G	Window Hinge.	3
7	25200308G	90° dish flat head machine screw M6*16	2
8	233016730G	Glass Window Cylinder (8kg)	2
9	23400020G	Control panel sticker.	1
10	25700095G	Emergency Switch (TN3BKR-2B)	1
11	290080120G	Control Panel With RTC Function Set	1
12	25200200G	Truss head machine screw(M4*8L sus).	4
13	25200115G	Truss head machine screw(M3*6L SUS).	12
14	25700094G	Key Switch (E3K2I1A.V)	1
15	24400995G	Key board dust proof cover	1
16	25700015G	Magnetic Switch	2
17	26000039G	Flat washer (d6.4*D16.8*t1.6)	2
18	25200297G	Socket head set screw.(M6*12L white)	2

II. Mid Section

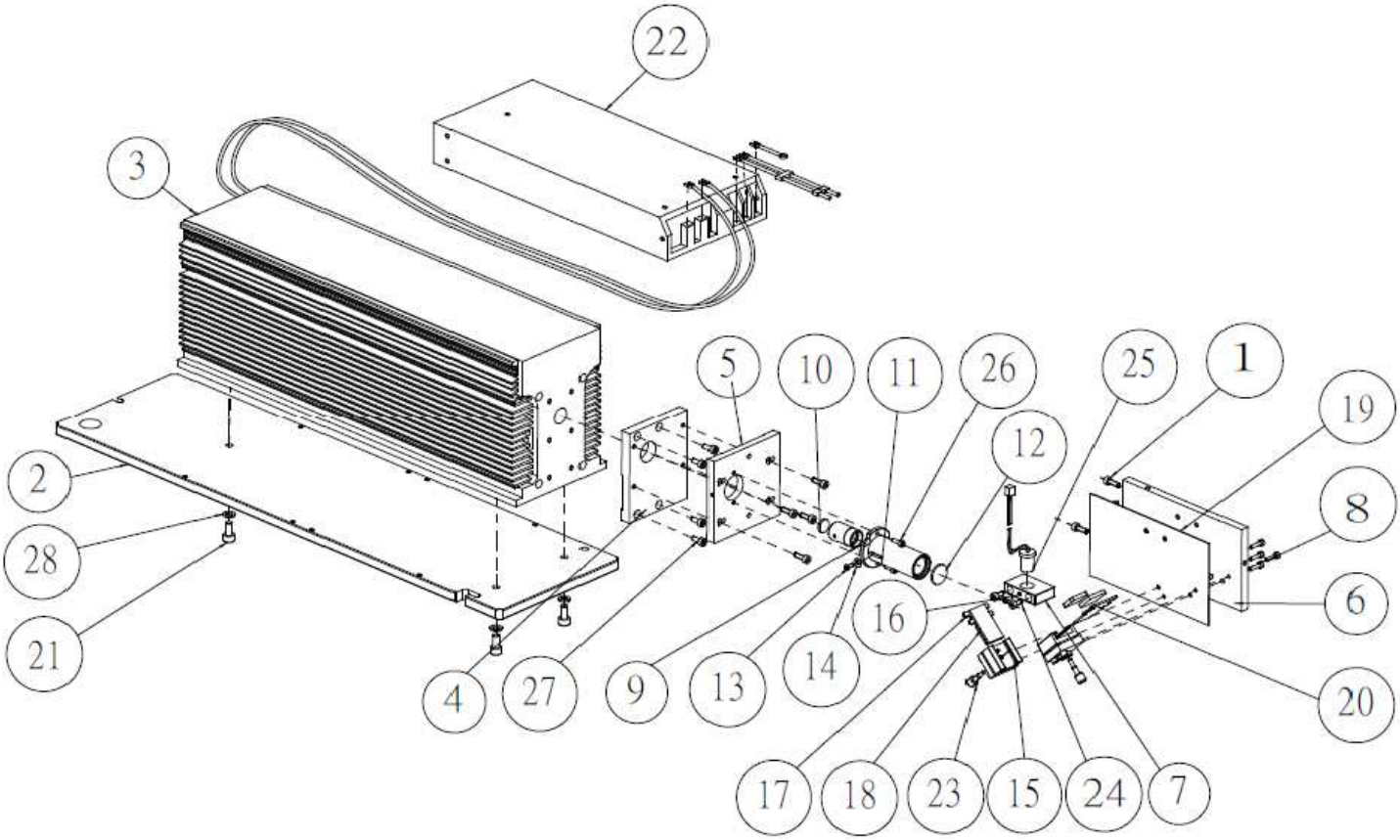


Mid Section – Spare Parts List

Item no.	Parts no.	Description	Q'ty
1	202002680G	Main of Outer Frame Assembly	1
2	26500488G	Air Flow Valve JSC6-02BT(Black)	1
3	244049441G	Connect Bracket	1
4	25700014G	AC power ON/OFF switch (RBW2ABLKBLKFF0)	1
5	21100100G	AC CONNECT (SC-8-1C)	1
6	22300003G	FUSE (15A/250V ZE-800)	1
7	22300004G	Fuse (3A/250V ZE-800)	1
8	25200101G	Socket head set screw.(M3*6L)SUS+CO	8
9	290098980G	M5272 Driver Board in Common Assembly	1
10	25200200G	Truss head machine screw(M4*8L sus).	4
11	24400145G	Little Fan Bracket	1
12	22200006G	Fan (AD0824HB-A70GL(T) LF)/(JF0825B2H-R)	1
13	25200465G	Pan head machine screw M4*35L	4
14	290105920G	Mainboard Assembly with 5272 V2 firmware for Mercury III	1
14	290093770G	Mainboard Assembly with 5272 V1 firmware for Mercury III	1
15	25200115G	Truss head machine screw(M3*6L SUS).	13
16	25700015G	Magnetic Switch	4
17	29002513G	LASER POWER Adapter	1
18	21800007G	EMI Filter YE10T1L2	1
19	25200200G	Truss head machine screw(M4*8L sus).	14
20	24400144G	Cover for Maintance	1
21	24400140G	Left Stand	1
22	25200300G	Socket head set screw.(M6*12L)	10
23	244050740G	Right Stand	1
24	233013930G	2.5" PU Stand Wheel (25PUA-R)	2
25	25200300G	Socket head set screw.(M6*12L)	4
26	26000039G	Flat washer (d6.4*D16.8*t1.6)	4
27	26000012G	Spring Washer.(d6xD11xt1.2)Ni	4
28	233013940G	2.5" PU Stand Wheel with brake (25PUB-R)	2
29	22800130G	Z axis screw thread	2
30	26000016G	Flat washer(d4.5xD9.5xt0.8)	8
31	25200250G	Socket head set screw.(M4*25L) SUS+CO	8

Item no.	Parts no.	Description	Q'ty
32	22801022G	Z-axis table screw	2
33	24100367G	Z axis pulley cover	1
34	22800922G	Z axis top stopper	2
35	20700023G	Bearing 608ZZ	1
36	22800270G	Z axis lower bearing base	1
37	25200214G	Socket head set screw.(M4*12L)	8
38	25200192G	Socket head set screw.(M4*8L sus+coating)	4
39	24400147G	Working table Bracket	1
40	24700013G	Rubber Packing for Z Motor	1
41	24400575G	Z-motor bracket	1
42	22800622G	z axis pulley (P20-5GT-9)	1
43	26000016G	Flat washer(d4.5xD9.5xt0.8)	6
44	25200214G	Socket head set screw.(M4*12L)	4
45	25200192G	Socket head set screw.(M4*8L sus+coating)	2
46	22800084G	idle Pulley	3
47	20600024G	Z-axis belt (5GT-2910-9)	1
48	24400157G	Z axis top Limit Switch seat	1
49	25700008G	Level Limited Switch	1
50	25200074G	Pan head machine screw(M2*12L while)	4
51	25200119G	Socket head set screw.(M3*8L)SUS+CO	2
52	244040560G	Rear Door Panel	1
53	24400167G	Back cover	1
54	25200200G	Truss head machine screw(M4*8L sus).	12
55	24400148G	Limit switch fixed board	1
56	25700002G	Lever Switch(VM5-04N-80S-U10(390))	1
57	25200159G	Socket head set screw.(M3*16L)	2
58	24400135G	Belt Cover for X Axis	1
59	24400136G	Belt Cover for Y Axis	1
60	24400142G	Fixture for Stands	1
61	24400138G	wind pipe stable seat	1
62	29002510G	Y Motor　PCB	1
63	29001144G	0.75" (The 2nd and 3rd mirrors)	1
64	24400576G	Mirror Bracket	1

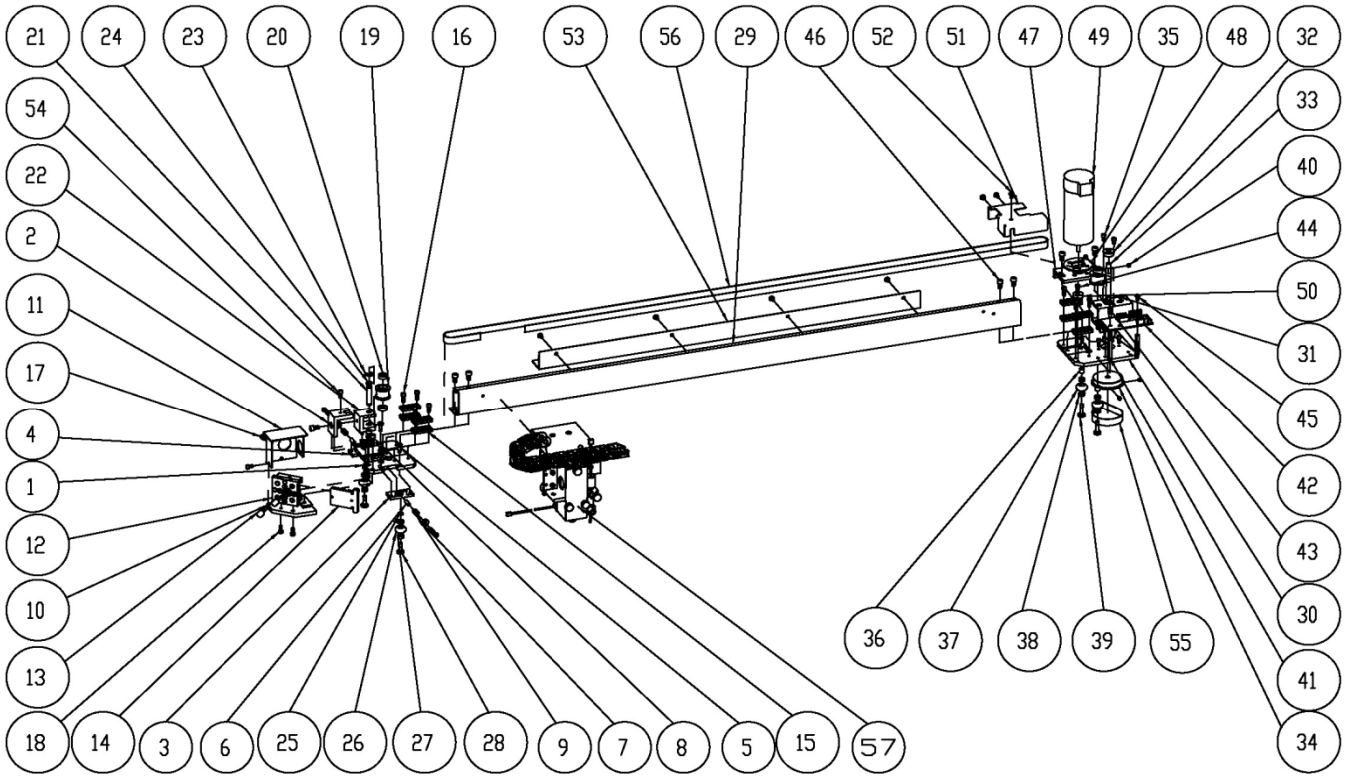
III. Laser tube and power supply



Laser tube and power supply – Parts List

Item no.	Parts no.	Description	Q'ty
1	25200214G	Socket head set screw.(M4*12L)	6
2	22801877G	Laser main base	1
3	29005983G	Synrad 12W Laser Tube	1
3	29005984G	Synrad 25W Laser Tube	1
3	22900048G	Synrad V30 Laser Tube	1
3	22900059G	Coherent C-40 Laser Tube	1
3	22900051G	Synrad V40 Laser Tube	1
3	22900064G	Synrad Ti60 Laser Tube	1
4	22801439G	Laser front board	1
5	22801471G	Laser front bracket	1
6	22801482G	Laser front board	1
7	22800921G	Red beam fixed base	1
8	25200149G	Socket head set screw.(M3*12L)	4
9,10,11,12,13	29002528G	3x beam expander	1
14	26000015G	Flat washer.(d3xD8xt1 SUS)	1
15	20200059G	prism mounts Assembly	2
16	25200127G	Pan head machine screw(M3*8L)	1
17	24400581G	Mirror holder	1
18	29003054G	Red Beam Mirror (19*35*2mm)	1
19	29002609G	front board dip cotton.	1
20	290077670G	1st mirror block(1")	1
20	29001126G	0.75" (The 1st mirror)	1
21	25200300G	Socket head set screw.(M6*12L)	3
22	24500089G	Power Supply for Synrad V30 & V40	1
22	24500042G	Power Supply for Synrad 12W	1
22	24500043G	Power Supply for Synrad 25W	1
22	24500064G	Power Supply for Synrad Ti60	1
23	22800914G	mirror pin	2
24	25200192G	Socket head set screw.(M4*8L sus+coating)	2
25	23600028G	Laser Diode module	1
26	25200138G	Socket head set screw.(M3*10L sus+coating)	2
27	25200410G	Socket head set screw.(#8-32 UNC*1/2"L)	4
28	26000036G	Spring Washer (d6xD11xt1.4)sus	3

IV. X Axis Assembly

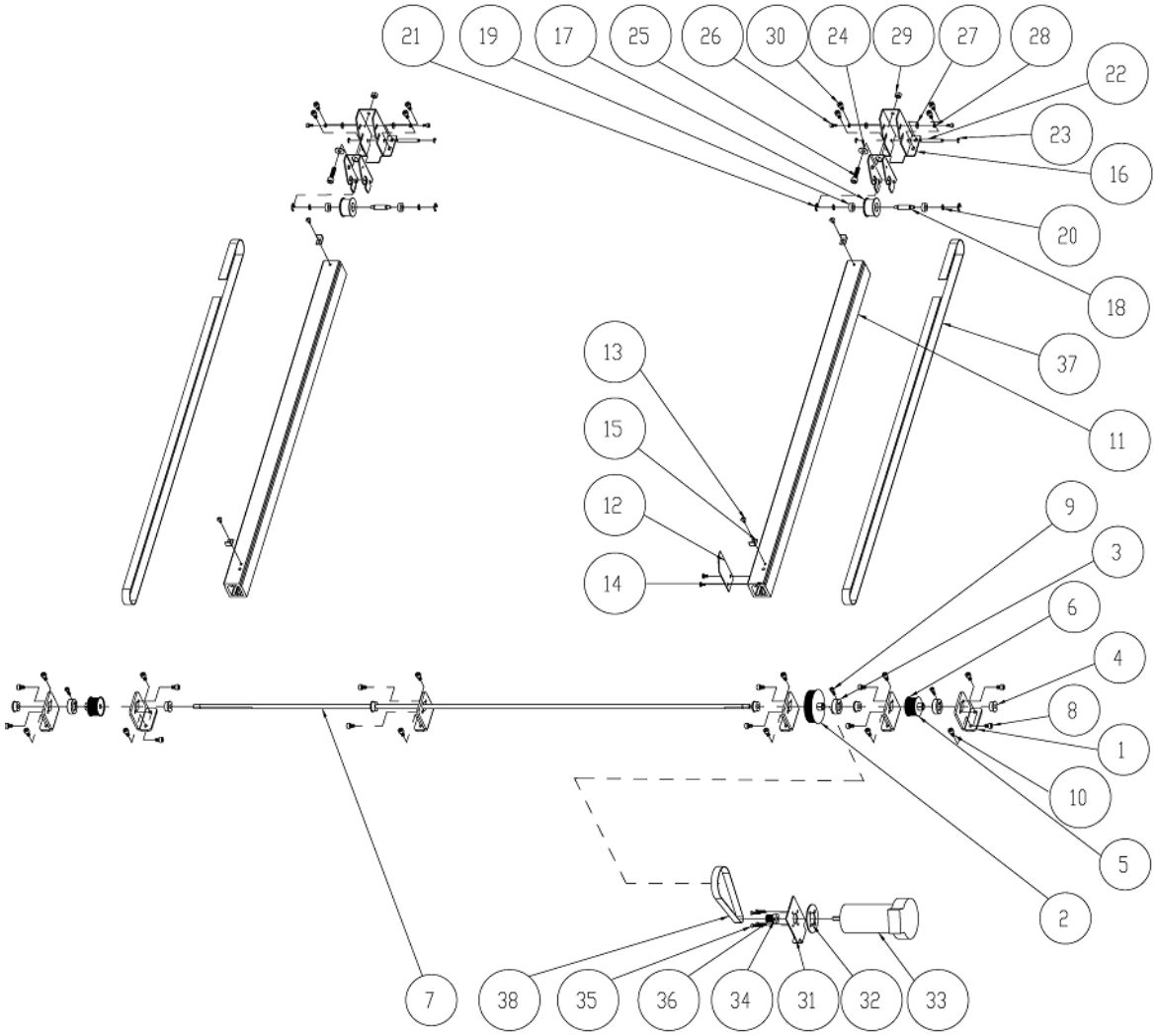


X Axis Assembly – Parts List

Item no.	Parts no.	Description	Q'ty
1	22800614G	X axis left Base	1
2	22800652G	X-Axis idle Pulley Bracket.	1
3	22800616G	Awheel Bracket(Front)	1
4	22800617G	Awheel Bracket (Rear)	1
5	22800632G	Screw 4*5	2
6	22800151G	Bracket	2
7	26000016G	Flat washer(d4.5xD9.5xt0.8)	2
8	25200138G	Socket head set screw.(M3*10L sus+coating)	2
9	25500023G	Spring	2
10	24400576G	Mirror Bracket	1
11	24400245G	Mirror Bracket dust cover	1
12	20200059G	Prism mounts Assembly.	1
13	22800914G	mirror pin	2
14	29001144G	0.75" (The 2nd and 3rd mirrors)	1
15	24100277G	Belt Retainer	4
16	25200138G	Socket head set screw.(M3*10L sus+coating)	6
17	25200101G	Socket head set screw.(M3*6L)SUS+CO	2
18	25200119G	Socket head set screw.(M3*8L)SUS+CO	2
19	22800618G	X axis idle Pulley	1
20	20700002G	Bearing L-1260ZZ/MR126ZZ/WML6012ZZ	2
21	22800156G	X-Axis Pulley shaft	1
22	22800653G	Carriage Belt Tension Tuning Bracket.	1
23	24900002G	E-shape retaining ring.D11*d5*t0.6	2
24	25500022G	Washer	2
25	22800137G	Washer	2
26	22800065G	A roller	1
27	20700029G	Bearing L-840ZZ/MR84ZZ	2
28	22800631G	screw bolt for 4*5 smaller roller	2

Item no.	Parts no.	Description	Q'ty
29	22800641G	X Rail	1
30	22800615G	X axis Right Base	1
31	22800141G	X shaft Bracket	1
32	20700027G	Bearing. LF-1360ZZ/F686ZZ (SUS)	2
33	22800619G	X middle shaft	1
34	22802697G	NEW X Axis Pulley (P54-2GT)	1
35	25200101G	Socket head set screw.(M3*6L)SUS+CO	2
36	22800066G	Space.	2
37	22800065G	A roller	1
38	20700029G	Bearing L-840ZZ/MR84ZZ	2
39	22800063G	Small roller screw.	2
40	25200170G	Socket headness set screw.(M4*4L)	4
41	26500246G	Screw (M3*30)	2
42	290101090G	X Motor PCB with AAS I/O Assembly-5A	1
43	22000039G	Hex Screw M3X8L	1
44	25200138G	Socket head set screw.(M3*10L sus+coating)	4
45	25200115G	Truss head machine screw(M3*6L SUS).	1
46	25200192G	Socket head set screw.(M4*8L sus+coating)	7
47	22800140G	X Motor Bracket	1
48	24700012G	Rubber Packing for Hanson Motor	1
49	23100013G	MOTOR 500COUNT(116-33224-8)	1
50	21700009G	Motor pulley 2GT-P18	1
51	24400583G	Cover	1
52	25200115G	Truss head machine screw(M3*6L SUS).	7
53	24400137G	Cable Chain Bracket	1
54	25200119G	Socket head set screw.(M3*8L)SUS+CO	1
55	20600126G	X Motor Belt(2GT-L148-W6)	1
56	20600026G	X-axis belt.(2GT-1764-10)	1
57	29001090G	Lens carriage assembly	1

V. Y Axis Assembly

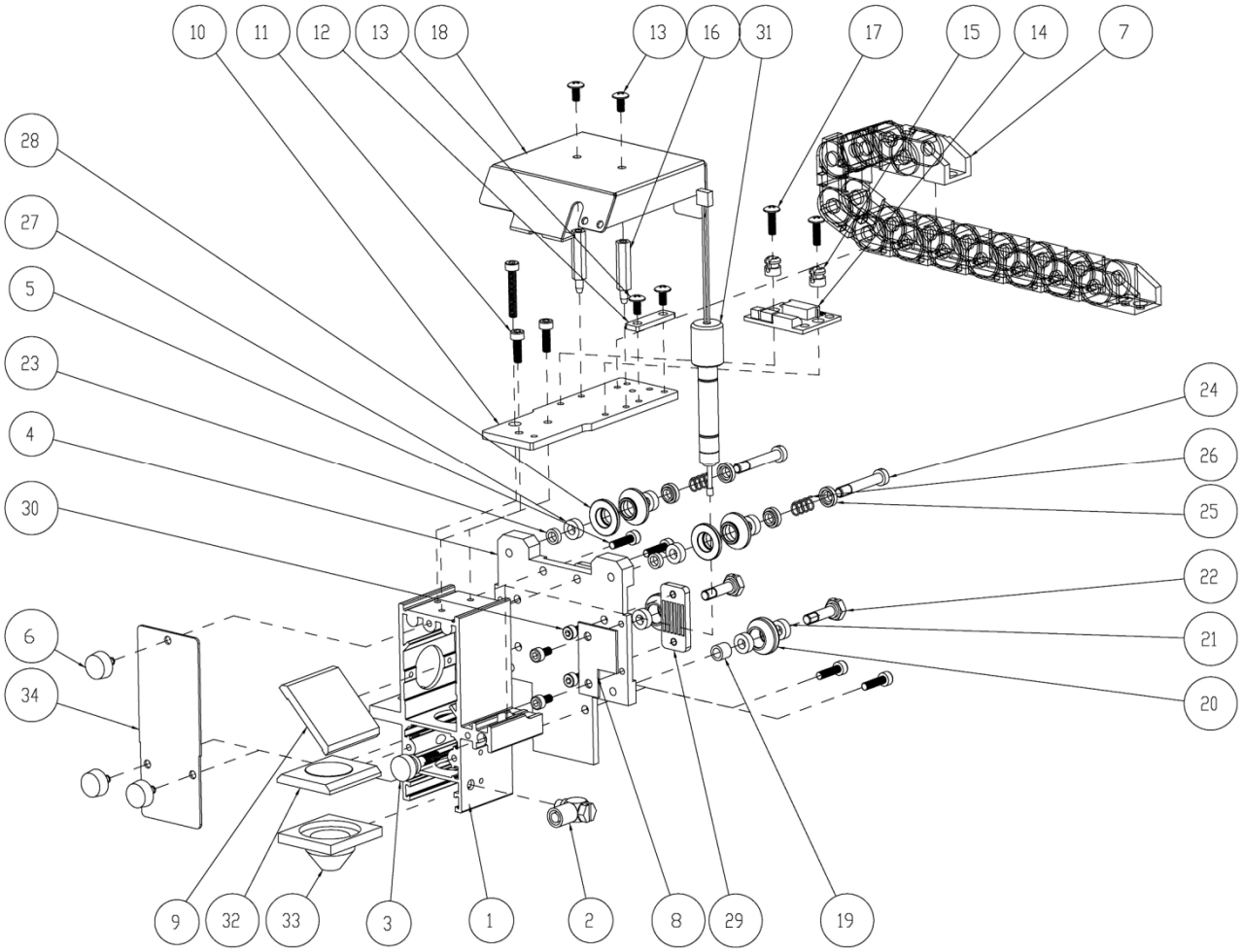


Y Axis Assembly spare parts

Item no.	Parts no.	Description	Q'ty
1	24400134G	Y transmission bearing holder	6
2	24100079G	Pulley (big)	1
3	22800157G	gear fasten ring	3
4	20700027G	Bearing. LF-1360ZZ/F686ZZ (SUS)	6
5	24100078G	Pulley (small)	2
6	24400522G	X pulley cover	2
7	22800145G	Y-Axis Transmission shaft	1
8	25200177G	Socket head set screw.(M4*6L)	12

Item no.	Parts no.	Description	Q'ty
9	25200138G	Socket head set screw.(M3*10L sus+coating)	3
10	25200192G	Socket head set screw.(M4*8L sus+coating)	12
11	22800144G	Y Rail	2
12	29000255G	Y-axis detector	1
13	25200115G	Truss head machine screw(M3*6L SUS).	6
14	25200192G	Socket head set screw.(M4*8L sus+coating)	6
15	24400013G	Carriage Stopper	4
16	20200008G	Y-Axis idle Pulley Holder	1
17	22800624G	Y-axis Idle Pulley	1
18	22800126G	Pulley shaft	1
19	20700002G	Bearing L-1260ZZ/MR126ZZ/WML6012ZZ	2
20	25500022G	Washer	2
21	24900002G	E-shape retaining ring.D11*d5*t0.6	2
22	22800028G	Pinch roller active arm shaft.	1
23	24900006G	E-shape retaining ring.(D7*d3*t 0.6)	2
24	26000017G	Flat washer.(d5.3xD13xt0.8) SUS	1
25	25200282G	Socket head set screw.(M5*20L)	1
26	25200101G	Socket head set screw.(M3*6L)SUS+CO	2
27	26000015G	Flat washer.(d3xD8xt1 SUS)	2
28	26000002G	Spring washer.(d3xD5.5xt0.8)sus	2
29	23500012G	Nut(M5xt4.0xS8)	1
30	25200192G	Socket head set screw.(M4*8L sus+coating)	4
31	24400591G	Y motor bracket	1
32	24700012G	Rubber Packing for Hanson Motor	1
33	23100014G	Motor 1000 COUNT Hansen (116-33224-7)	1
34	21700009G	Motor pulley 2GT-P18	1
35	25200051G	U.S pan head machine screw(White)6#*8	4
36	25200170G	Socket headness set screw.(M4*4L)	1
37	20600025G	Y-axis belt.(2GT-1294-12)	2
38	20600016G	Y motor Belt (2GT-236-10)	1

VI. Pen Carriage

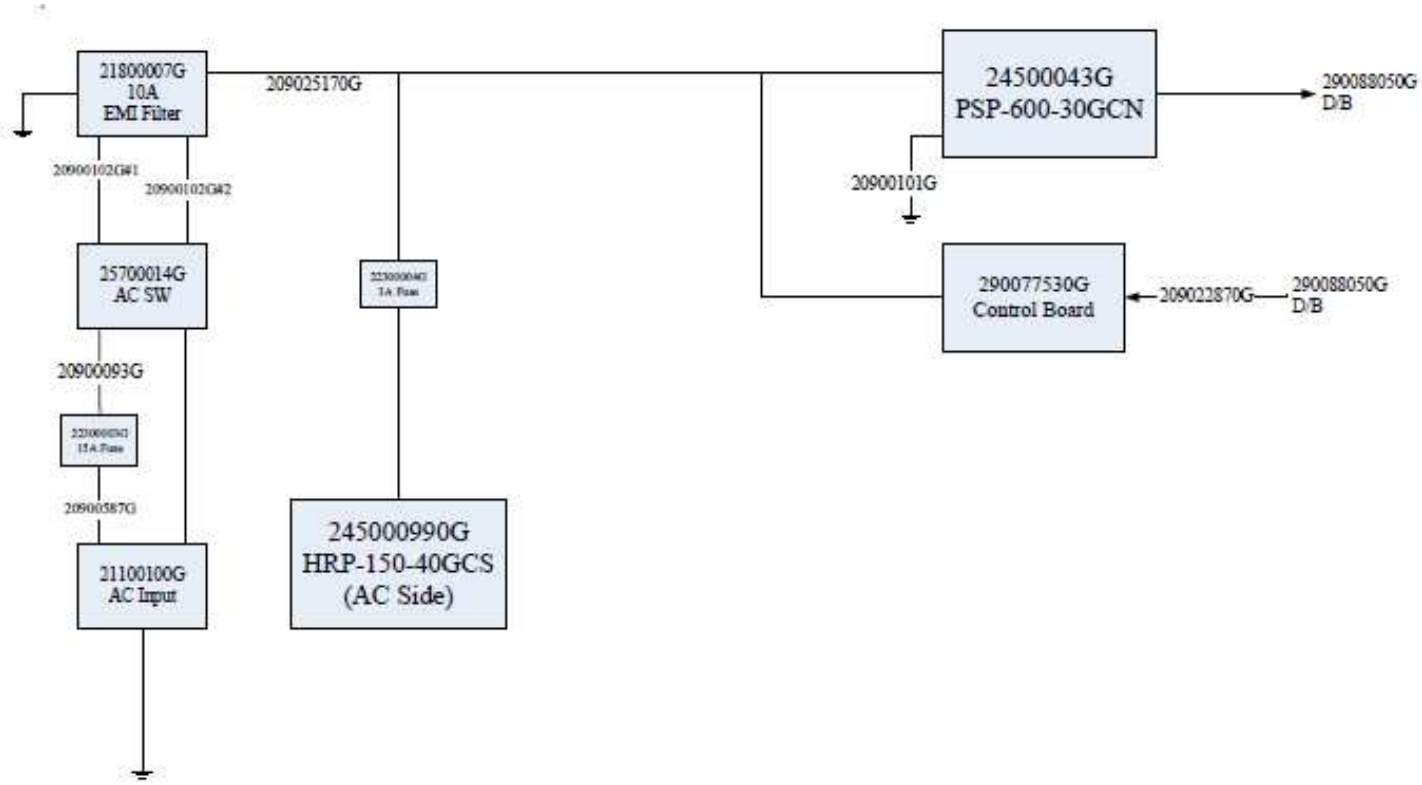


Pen Carriage – Parts List

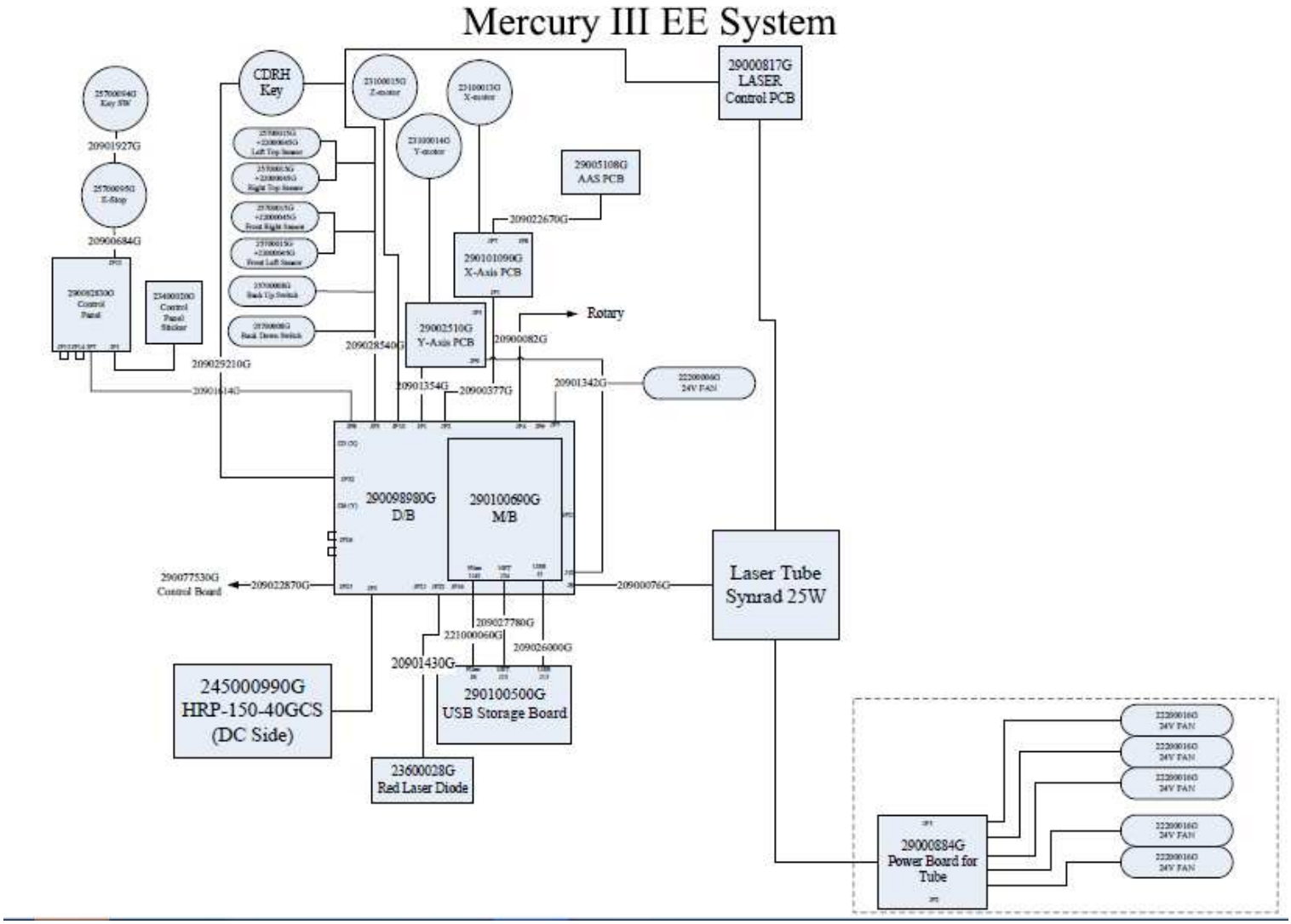
Item no.	Parts no.	Description	Q'ty
1	22800273G	Lens carriage chassis	1
2	26500240G	pipe connector (M-5HLH-6)	1
3	26500252G	plastic screw	1
4	22800645G	Carriage PCB.	1
5	25200149G	Socket head set screw.(M3*12L)	4
6	23300298G	Hand Knobs(CRKB.M3-6L)	3
7	23300385G	X tube chain. (07.10.018-23L-060.10.12)	1
8	244054230G	X-axis detector	1
9	29001107G	1" Carrage Mirror	1
10	228032530G	Carriage Assist Base	1
11	25200138G	Socket head set screw.(M3*10L sus+coating)	2
12	29005770G	Plate	1
13	25200115G	Truss head machine screw(M3*6L SUS).	4
14	29005108G	AAS I terminal board Module	1
15	22000363G	PC SPACER SUPPORT(SS-3)	2
16	23300620G	Hex Screw M3.0*20mm	2
17	25200144G	Truss head machine screw(M3*10L).	2
18	244041260G	Lens carriage top shingle	1
19	22800066G	Space.	2
20	22800065G	A roller	1
21	20700029G	Bearing L-840ZZ/MR84ZZ	2
22	22800063G	Small roller screw.	2
23	22800137G	Washer	2
24	22800708G	DU Roller shaft	1
25	24100054G	Spring bracket for carrier guide roller	2
26	25500041G	Spring for carrier guide roller.	1
27	20700029G	Bearing L-840ZZ/MR84ZZ	2
28	22800651G	DU roller	2
29	24100277G	Belt Retainer	2
30	25200101G	Socket head set screw.(M3*6L)SUS+CO	4
31	29001108G	Auto focus pin Assembly.	1
32	290069590G	2.0" Focal Lens Assembly	1
33	22800630G	SmartAIR Ultra Nozzle	1
34	24400577G	Front cover	1

Chapter 3 – Electrical System

3.1 Mercry III Power system



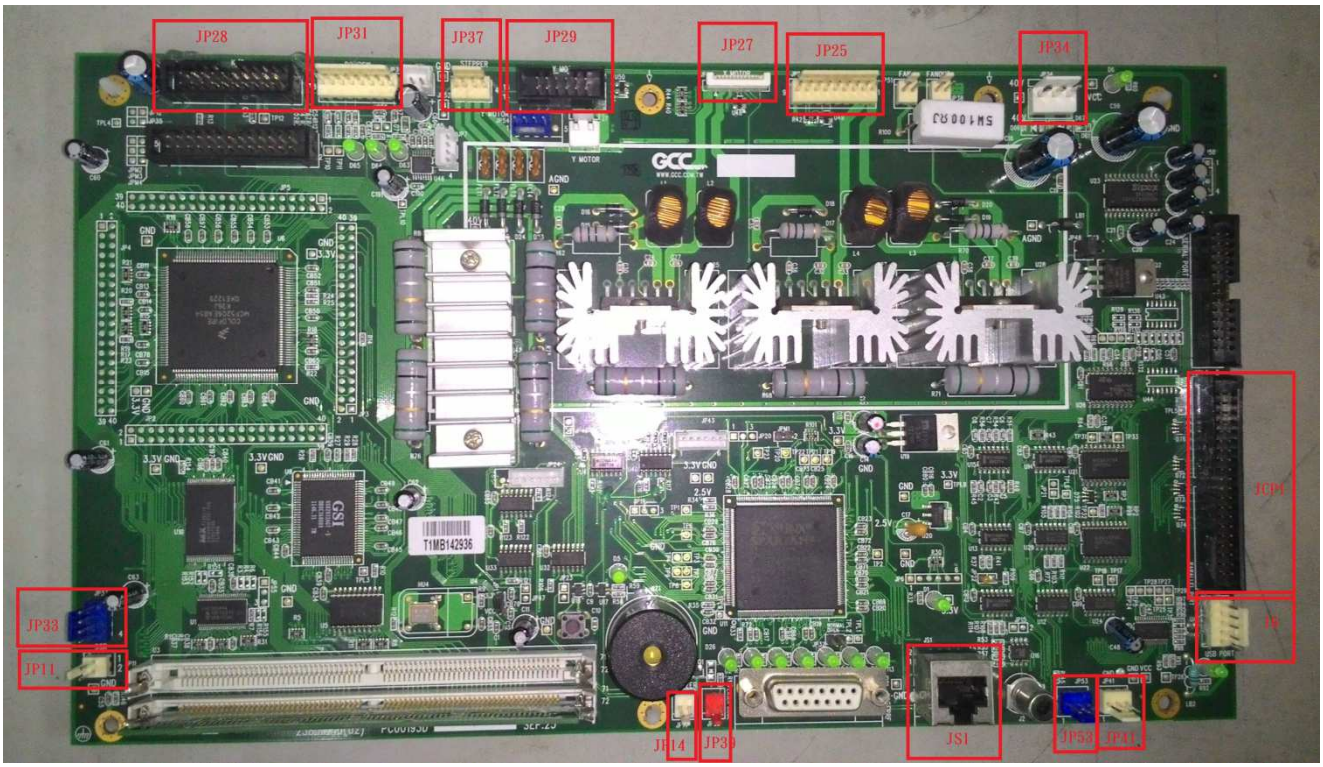
3.2 Mercury III Electrial Diagram



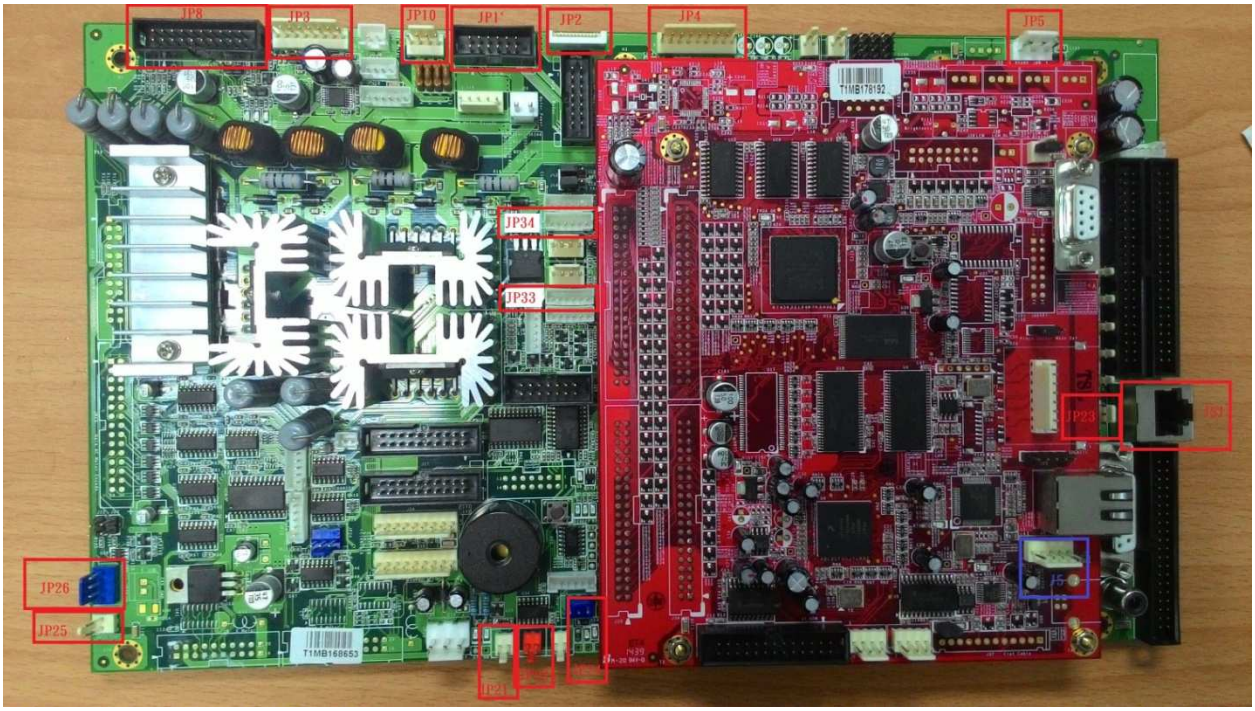
3.3 Definition of Pin (Mainboard)

5206e M/B	5272 M/B	The definition of pin
JCP1	Driver Board JCP1 (N/A)	Paralle port (Black)
JP34	Driver Board JP5	3 pin (White)
JS1	Driver Board JS1	RJ45
JP25	Driver Board JP4	Rotary Motor
JP27	Driver Board JP2	X-motor flat cable (White)
JP29	Driver Board JP1	Y-motor (Black)
JP37	Driver Board JP10	Stepper motor 4 pin (White)
JP31	Driver Board JP3	Doors 6 pin (White)
JP6	MainBoard J5	USB Port 5pin (White)
JP41	Driver Board JP23	3 pin (White)
JP53 (N/A)	Driver Board JP24 (N/A)	3 pin (Blue)
JP39	Driver Board (Under U34) JP22	Laser Diode 2 pin (Red)
JP14	Driver Board (Under U34) JP21	Buzzer 2 pin (White)
JP33	Driver Board JP26	4 pin (Blue)
JP11	Driver Board JP25	SSR 2 pin (White)
JP28	Driver Board JP8	Control Panel Cable
JP24	Driver Board JP33	External control (Output)
JP43	Driver Board JP34	External Control (Input)

5206e Mainboard

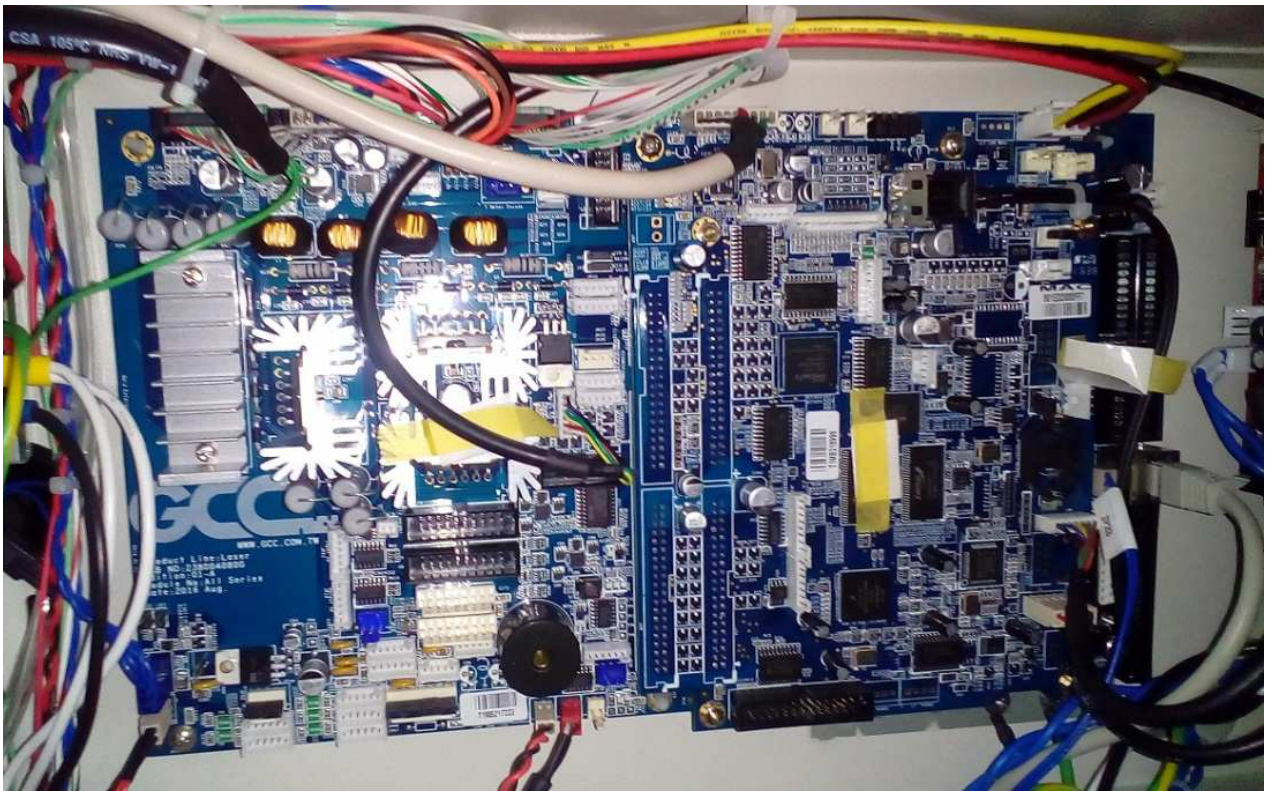


5272 V1 Mainboard (Red is mainboard, Green is Driver Board)



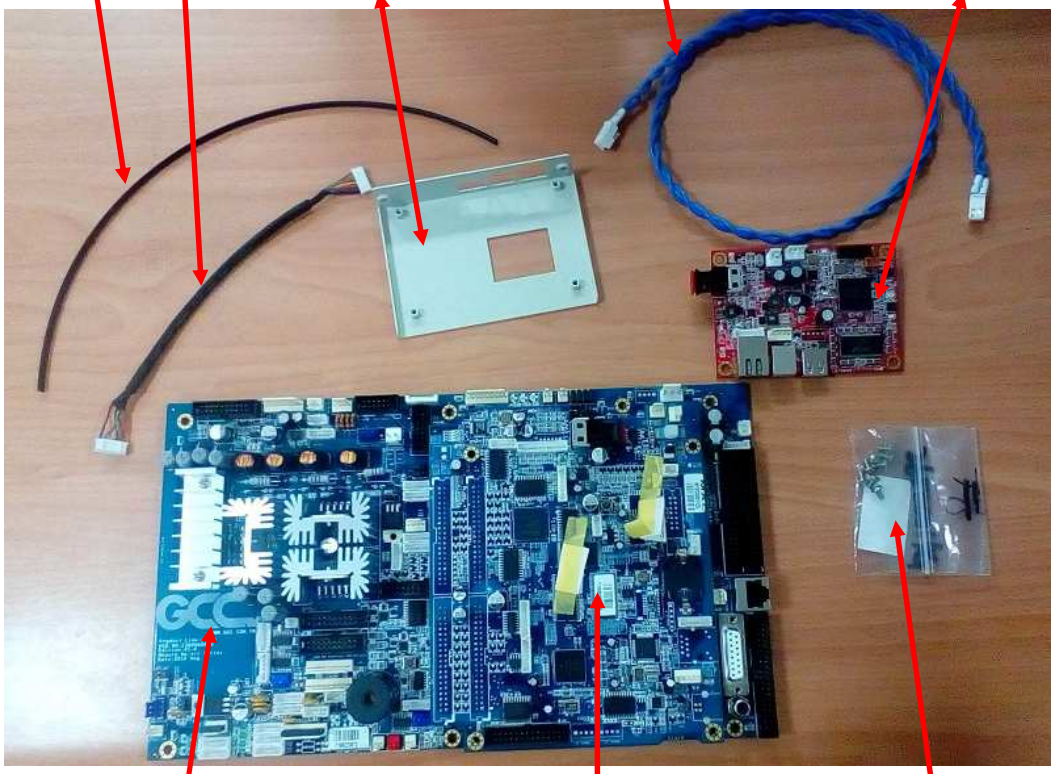
5272 Mainboard V2

The difference of outlook between 5272 main board and 5272 V2 main board are below. Most of the cables connect to 5272 and 5272 V2 main boards are the same (same position). The upgrade process below shows only the difference cable connections. All other cables connect to where is originally connected. The screw positions for mounting 5272 and 5272 V2 main board are same.



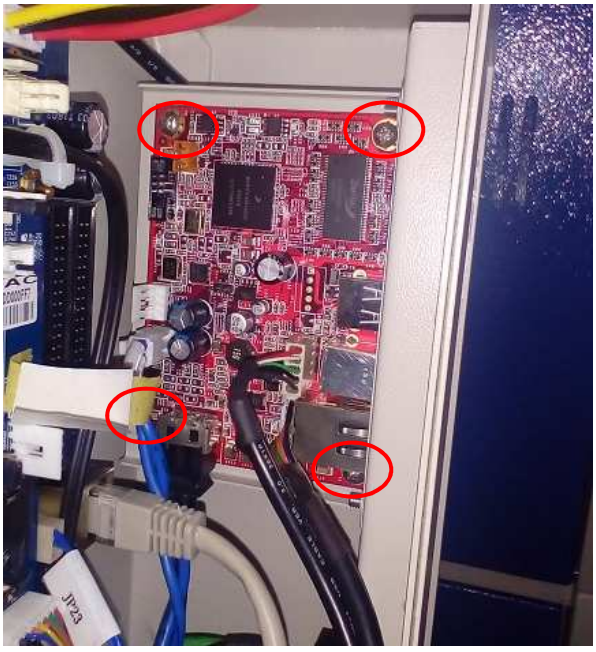
3.4 Upgrade process from 5272 main board to 5272 V2 main board

The parts for upgrading to 5272 V2 main board are below:

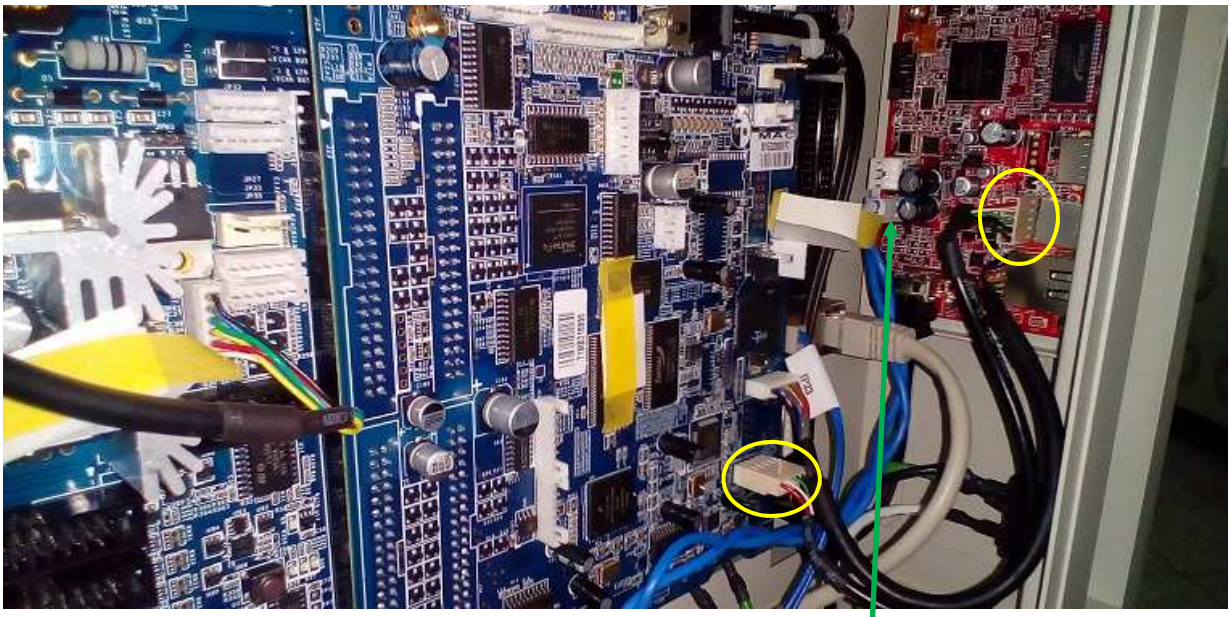


- Remove the original USB adaptor and change to USB disk board adaptor. The mounting screw (red circles) use original two screws.

- Use Truss head screws (25200115G_GCC send) to mount the USB disk board (see 4 red circles below) on USB disk board adaptor.

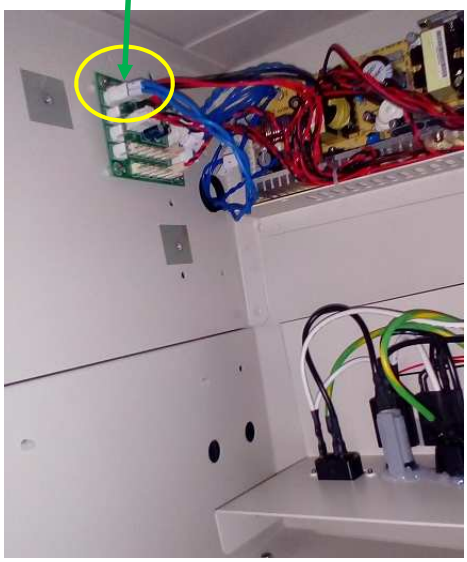


- M5272 V2 main board to USB disk board cable (209027890G) is connected on below position. (see two yellow circles below)The Wafer cable (209027890G) is connected to below position (see the green arrow pointed)

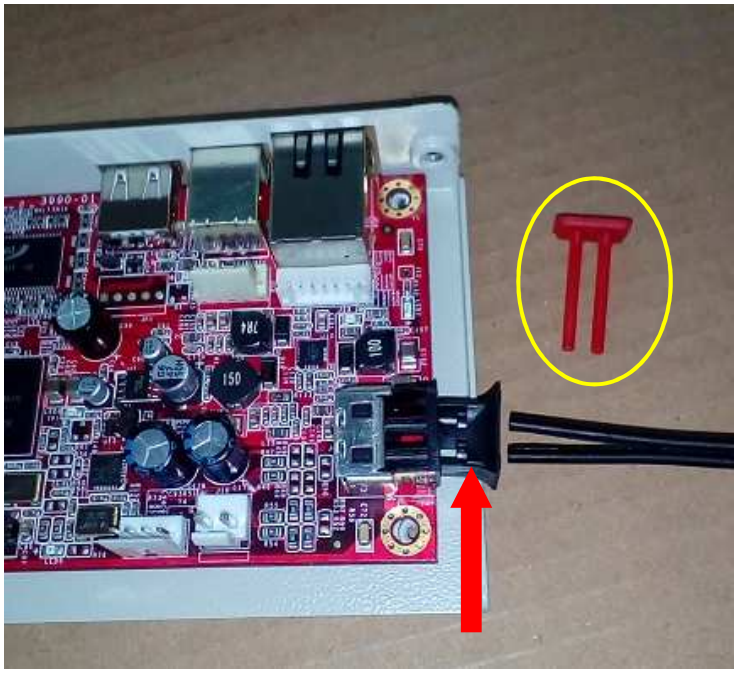


- It needs to remove the cover of extension power set first.

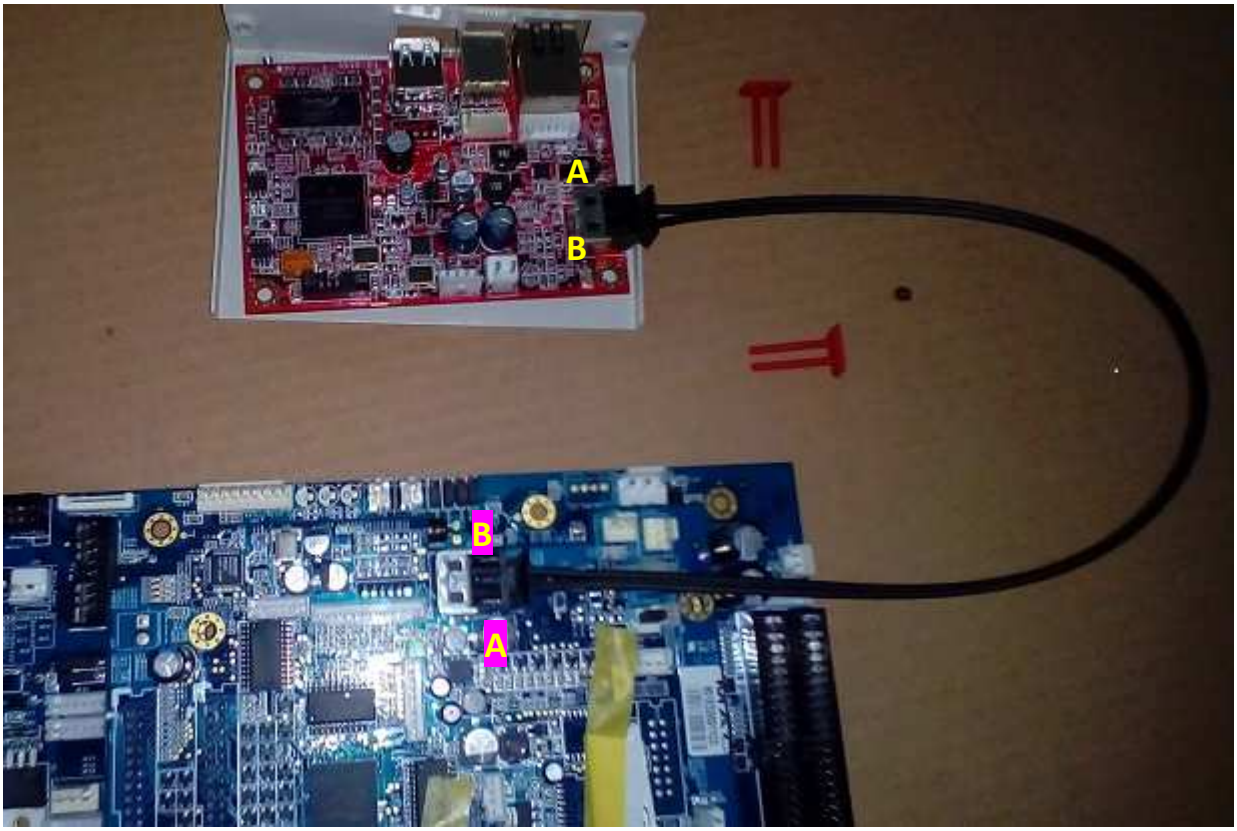
- Then connect the Wafer cable (209027890G) to this position (see yellow circle).



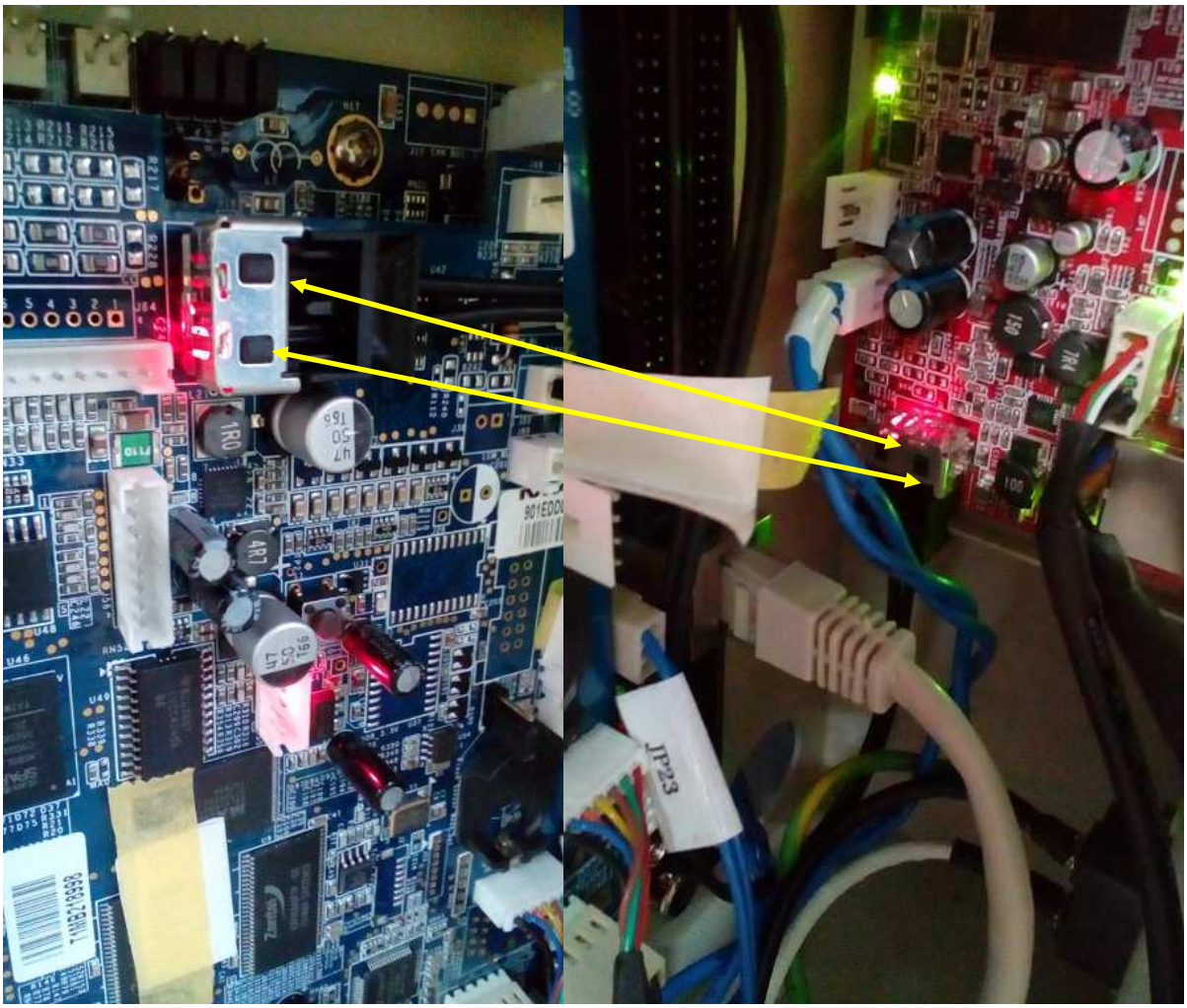
- Before plug in Fiber cable (221000060G) into USB disk board and 5272 V2 main board, the red cap (see the yellow circle below) should be removed. The end of Fiber cable should be separated for 6cm, so the fiber cable can plug all the way down into fiber connector. And then push the black lid (red arrow pointed) inside so the fiber cable can connect to fiber connector tightly.



- The important step for connecting fiber cable is to reverse its position. When connect to A position on USB disk board have to connect to 5272 V2 main board A position (see below).



➢ To make sure the fiber cable is connected correctly. Turn on machine and see if the fiber connector LED **On** connects to **Off** and **Off** connects to **On**.



3.4 A comparison table for GCC laser power supplies

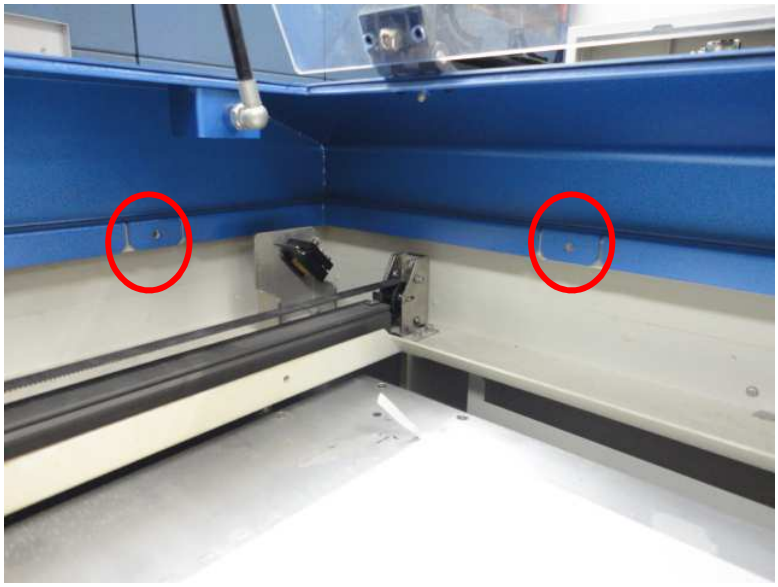
For machines need to change the power supply, in order to avoid the compatibility issue (we changed the supplier of power supply, and the new power supply is not compatible with old power supply in mechanics and connections), we've generated a series of part numbers for service, please check the S/N of machine and refer to below chat to order corresponding power supply assembly (The S/N parenthesized means the point we start to use the new version power supply) .

Series/Wattage	V30	V40	T60	Ti60	Ti80	T100
Spirit	290086090G (K50983)	290086090G (K50983)	290082950G (J50682)	290086140G (K51416)	290086120G (K51416)	290076960G (J50682)
Spirit LS						
Spirit GE						
Spirit GX						
Spirit GLS						
Mercury	290086130G (K50983)	290086130G (K50983)				

Chapter 4 – Components Replacement

4.1 Control Panel Changing Process

1. Open the top window, and loosen eight screws inside, then you can remove the whole top cover. (please refer to below pictures)



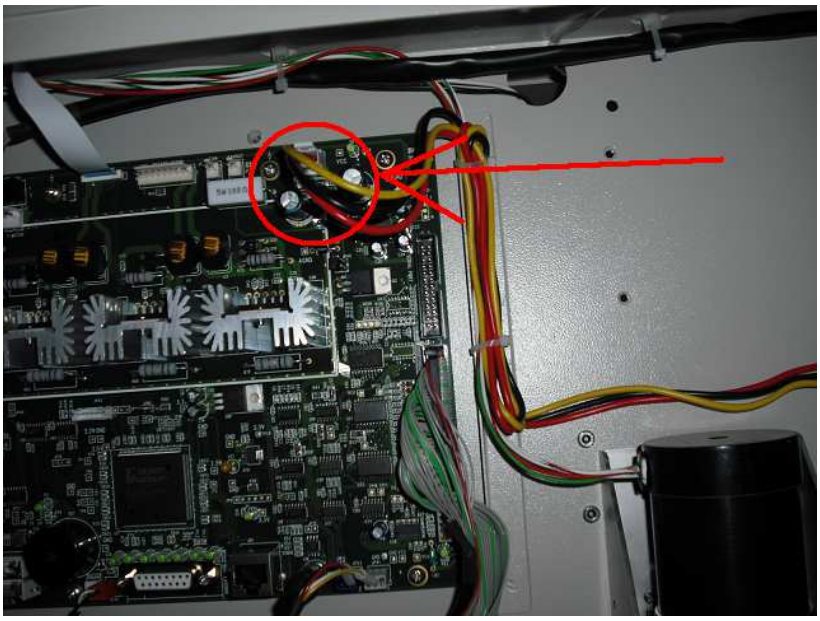
2. Disconnect circles cables show in below picture(blue circles) and loosen four screws (red circles) for the fixing of Control Panel and you can replace the Control panel

4.2 Power Power Changing Process

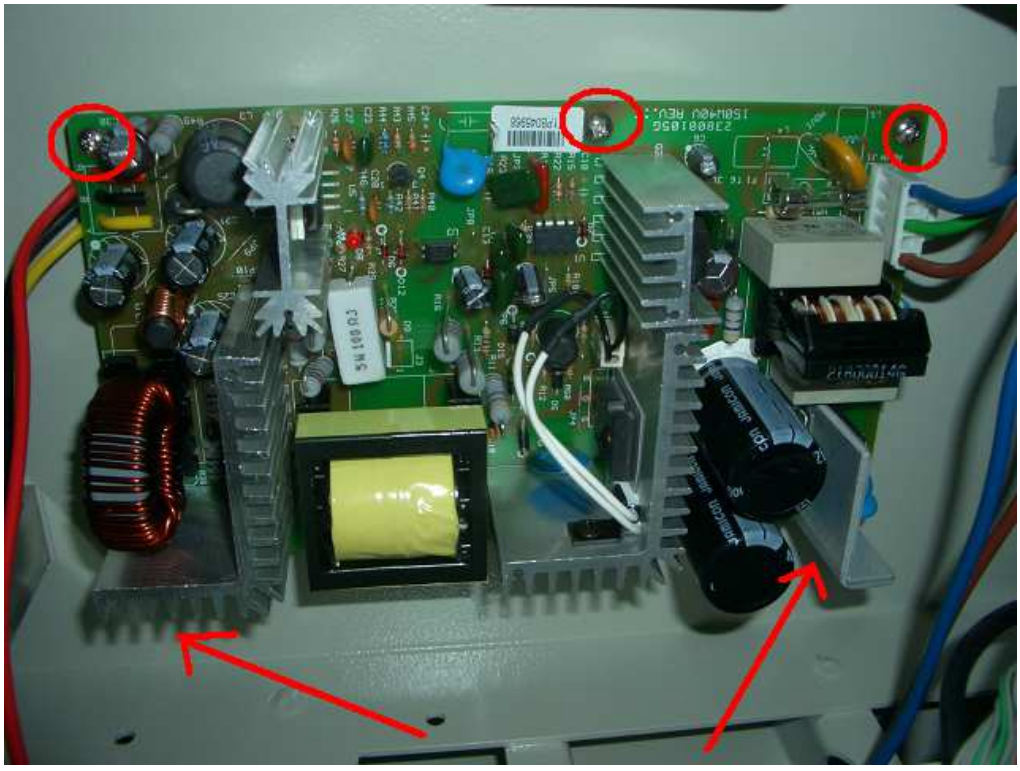
1. Dismount six screws on the side panel (see red arrows below)

2. Disconnect the AC cable (see picture below)

3. Disconnect the DC cable (see picture below)



4. Loosen five screws to remove the power board (see picture below)

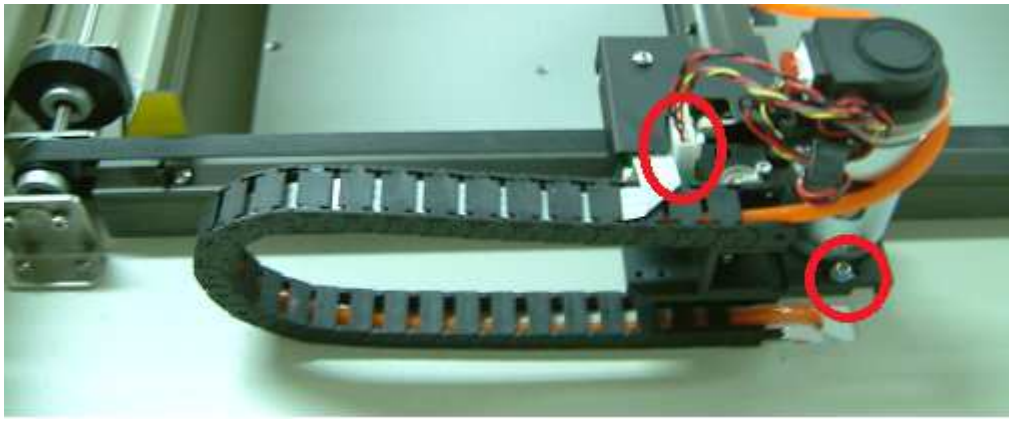


4.3 X motor & X motor pcb Changing process

1. Open the top window, and loosen eight screws inside, then you can remove the whole top cover. (please refer to below pictures)

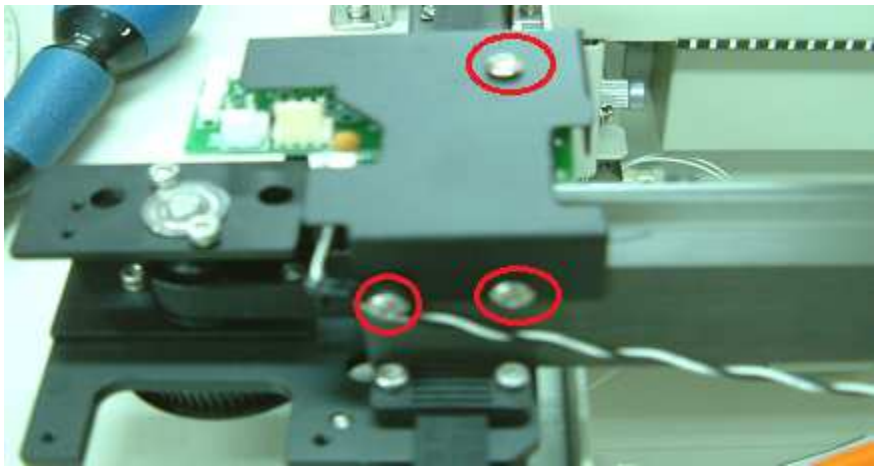
2. Move the top cover away and it will be easier to replace x motor

3. Remove x motor power cable and signal cable and loosen the x motor belt tension cable.

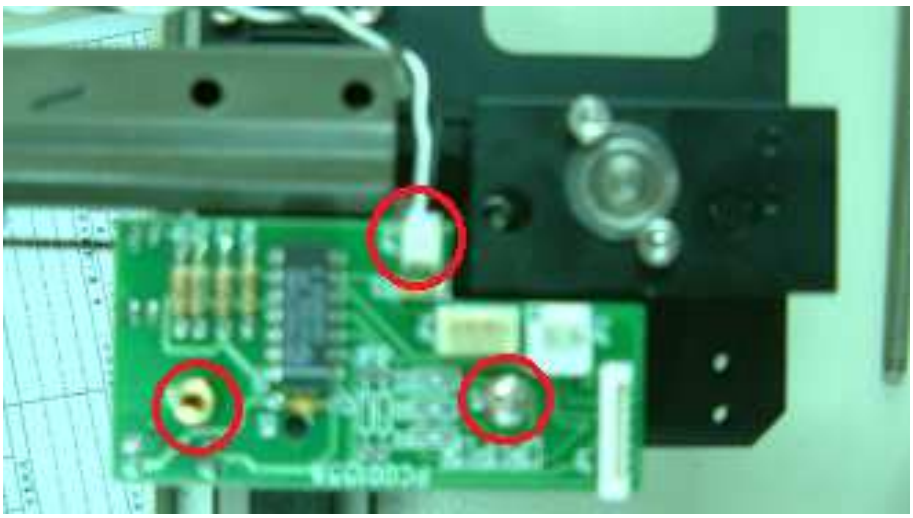


4. There are four screws on the bottom of x motor. Remove these four screws and the x motor can be removed and changed new one.

5. Remove three screws on x motor pcb cover.

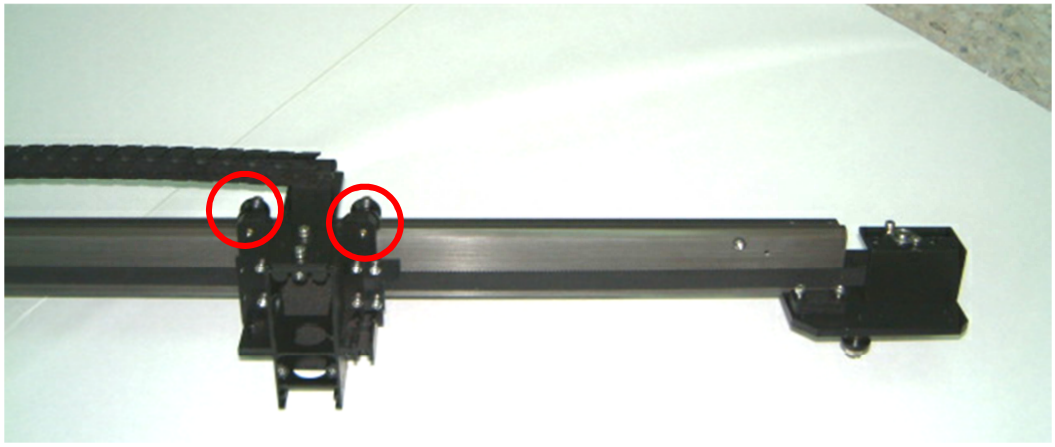


6. Then loosen two screws and unplug the x motor flat cable and auto focus cable. The x motor pcb can be removed.

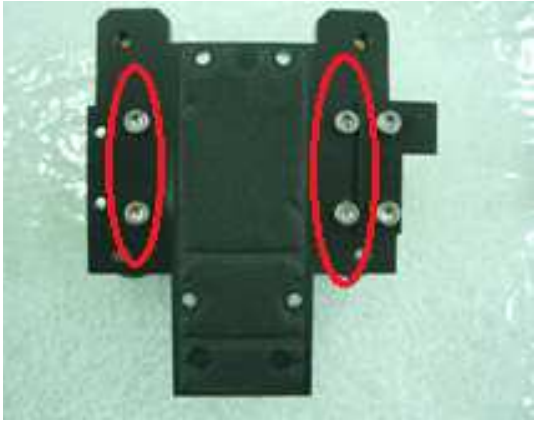


4.4 Lens carriage roller changing process

1. Dismount two screws on the top of lens carriage (see red circles below) and the lens carriage can loosen from X axis rail.



2. On the front of lens carriage, there are four screws for x axis belt retainer (see red circles below. Two screws on the right and two screws on the left). On the back of lens carriage, the location of the belt retainer can be seen. Loosen the belt retainer, the lens carriage can remove from x axis belt.



3. When mounting back the top rollers, the rollers and springs have to be correct sequence. After tighten the top rollers to the end, it needs to be loosen one circle back, otherwise the roller tension is too tight.

Chapter 5 - Laser System

5.1 How to measure the power output of a laser tube?

In order to measure the power output of a laser tube, we need to use a power meter (12170001G) that will measure the heat generated and convert it to a power reading. The best place to measure the laser output power is at the immediate output of the laser tube (before to mirror 1).

5.2 How does the laser beam travel to the working area ?

The laser beam generated by the laser source is reflected and guided by 4 optical lenses on to the working area. Therefore the proper adjustment and maintenance of them are crucial.

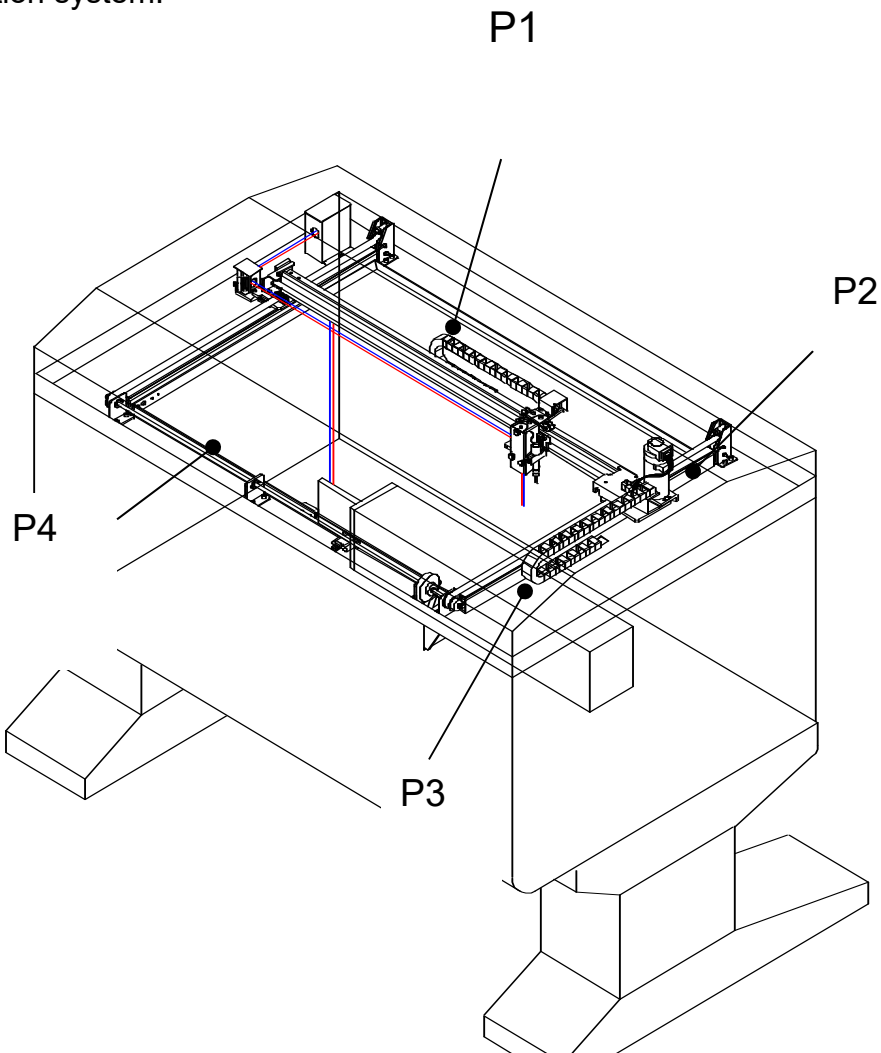
5.2.1 Optical Alignment

In order to keeping the well cutting or engraving quality, if you find the following situation please check laser beam path:

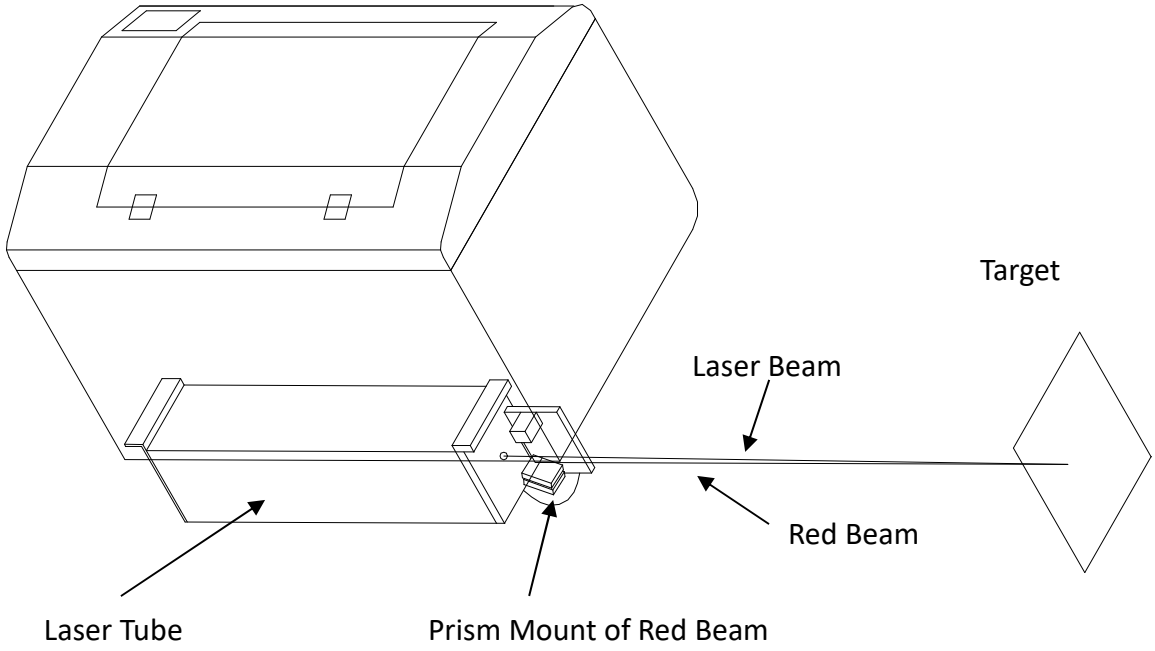
1. Is the cutting edge not vertical?
2. Is the power (Cutting Effect) not even at each corner from P1 to P4?
3. Does the laser tube need to be disassemble for serving?
4. Does the Red Beam need to be replace?
5. The Red Beam still exists but does not on the working table, which means that red beam is not parallel with laser beam.

If you find one of the above condition, please refer to the following instruction to Re-Alignment Beam Path.

PS. P1 stands for moving the Lens Carriage to the most upper and left position on the X,Y motion system.



5.2.2 Laser Beam and Red Beam Alignment



5.2.3 How to Re-alignment Laser Beam and Red Beam Parallel

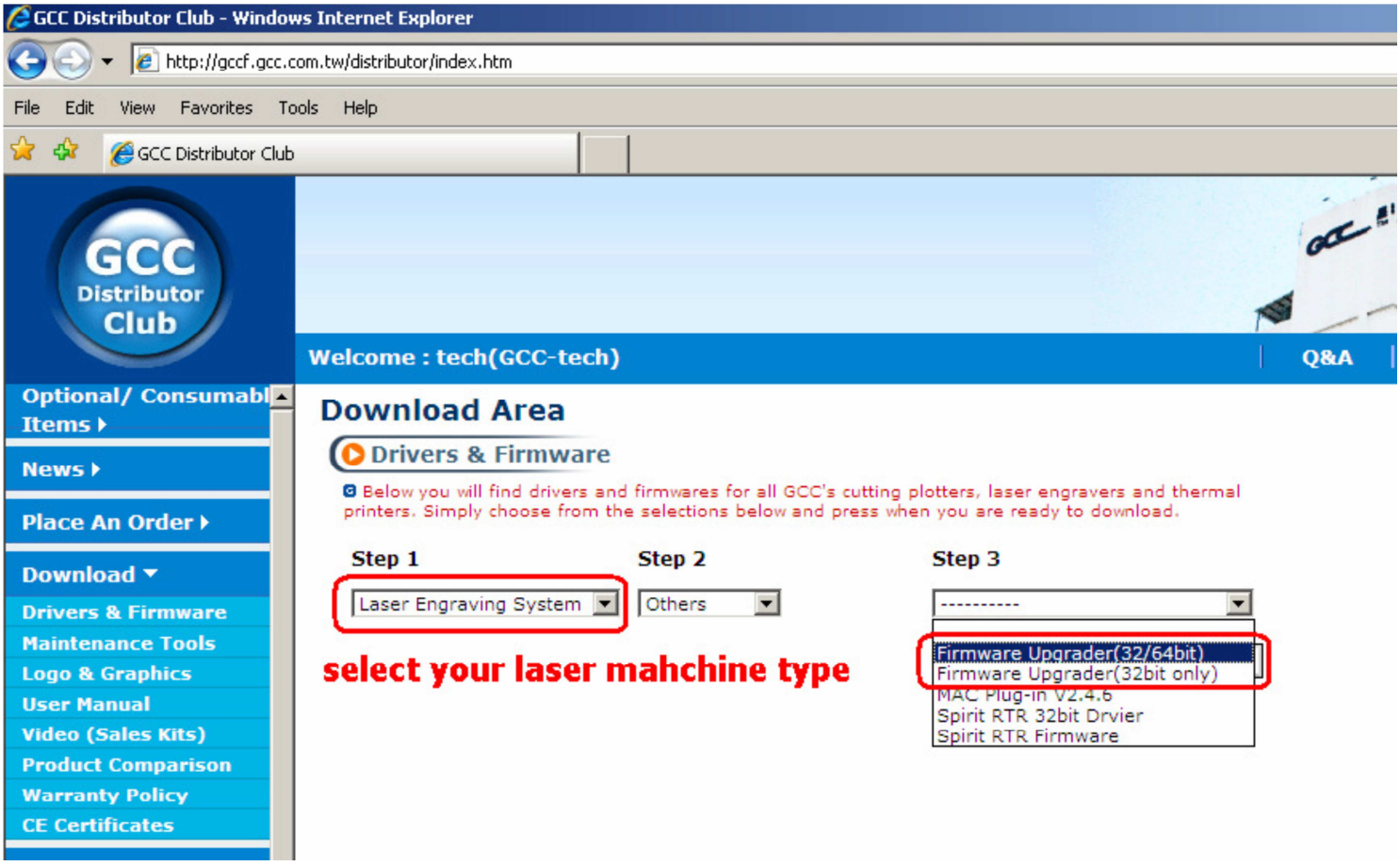
- To remove the side covers and prism mount for mirror 1.
- To put a target paper away from the machine about 3 M.
- Switch on the machine and select “check laser source” in the Diagnostic Process, besides setting the power to 5% on 25W machine, for 100W or 12W please reduce or enlarge the power percentage.
- To Press Enter till the target burning the tiny point.
- To adjust Prism Mount for Red Beam mirror to joint the red beam and tiny point together.
- While the process is done please re-assembly the Prism Mount for mirror 1 back. to previous position.

Chapter 6 - Software

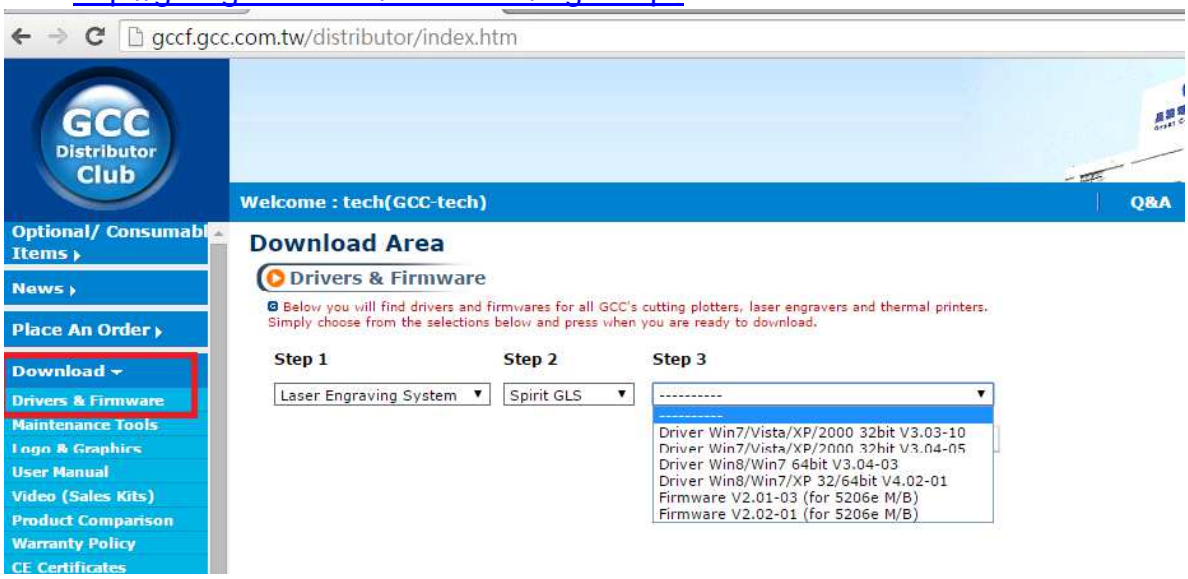
6.1 How to upgrade firmware

GCC machines requires a firmware upgrader program to upload the firmware of machine through USB/Parallel port.

6.1.1 The Firmware Upgrader can be downloaded from GCC Distributor Club website : http://gccf.gcc.com.tw/distributor/login.aspx



6.1.2. Firmware can be downloaded from GCC Distributor Club
http://gccf.gcc.com.tw/distributor/login.aspx



6.1.3. By the firmware upgrader, you can upgrade the firmware to the latest version or the version you want according to below steps :

Step1. Refer to below data sheet, turn on the machine with pressing and holding the corresponding button, the machine will be boot in transfer mode and the communication port is decided by the button you press when turning on the machine.

Model	Parallel port	Common USB	GCC USB
LaserPro,Mercury I, Mercury II, Venus series	Resume key + Power ON	N/A	N/A
Explorer, ExplorerII, Spirit, Spirit GE, Spirit_GX, Spirit LS, Spirit GLS, GAIA, GAIAII, MercuryIII, S290, S290LS, X252RX, X380RX/LS, X500RX/LS, X500III, C180II, FMC280, T500	F2 key + power on	F1 key + power on	F3 key + power on
C180	A/F key + power on	UP key + power on	Down key + power on

Step 2. Run “Uploader.exe” (The name of firmware upgrader program is “Uploader.exe”)
Step 3. Open the dropdown list under “Select a port”, select the port you want to use to transfer the firmware (the port is decided by what you did on Step 1)
Step 4. Browse and select the firmware file.
Step 5. Press the “Start” button, the upgrading process will start, wait until the process is done, the machine will reboot automatically.
Step 6. Locate the firmware file on your computer.

6.2. How to set the proper USB mode on GCC Laser Machine and printer port setting of windows system ?

Step 1 Check loader version installed on the machine

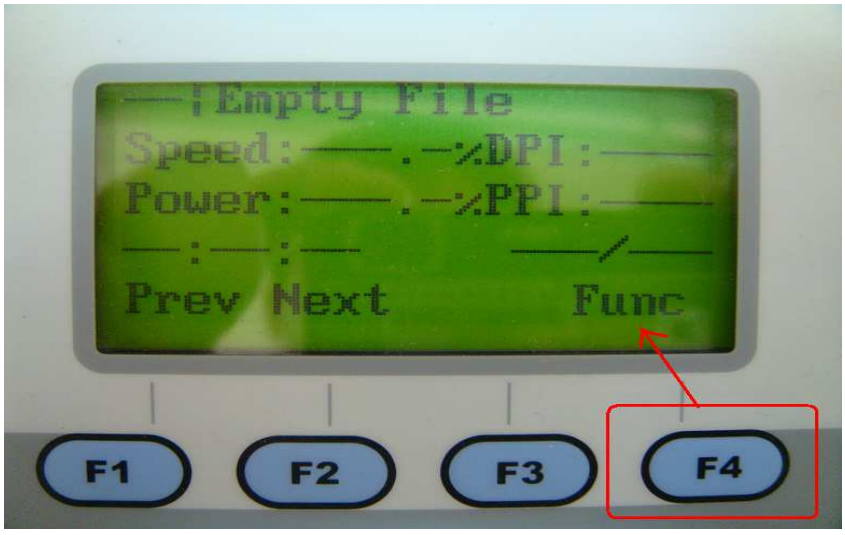
Press and hold “F4” on Control Panel then turn on the machine, if below page appears, the loader installed on the machine is the new loader, if the control panel shows nothing, the loader is an old loader.

Step 2 Set the proper USB mode on both the machine and printer port setting of windows system according to following table :

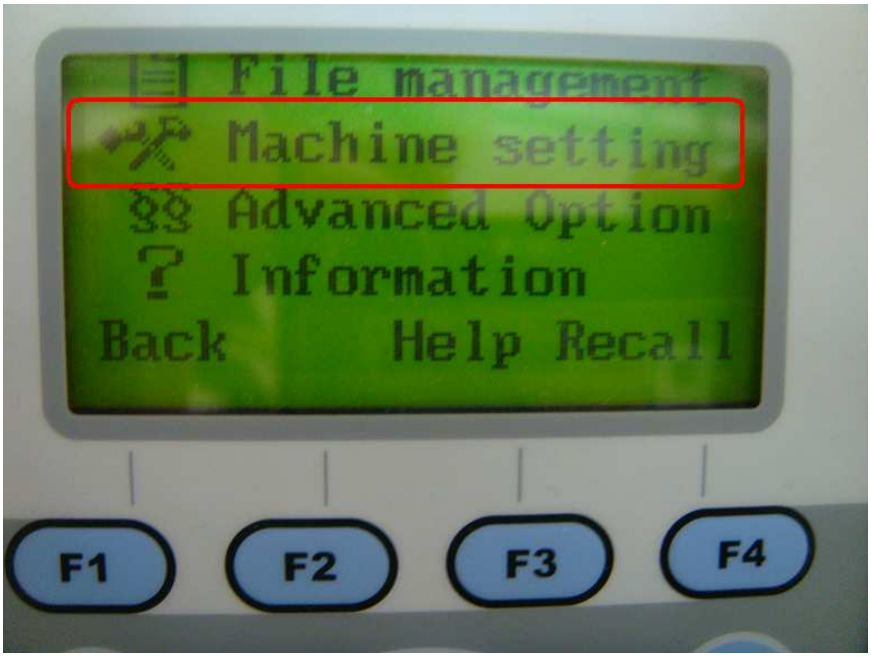
Laser series	Loader version	Windows XP/Windows Vista/Windows 7	
		32 bit	64 bit
Spirit/LS/C180	New	GCC USB or Common USB mode	Common USB mode
	Old	GCC USB mode	X
SGX/GLS	New	GCC USB or Common USB mode	Common USB mode
	Old	GCC USB mode	X
Mercury		Parallel	X
Mercury II/III	New	GCC USB or Common USB mode	Common USB mode
	Old		
S290/S290LS	New	GCC USB or Common USB mode	Common USB mode
	Old		
X252/X380/X500	New	GCC USB or Common USB mode	Common USB mode
	Old		
Gaia/Gaia II	New	GCC USB or Common USB mode	Common USB mode
	Old		

- Machine setting

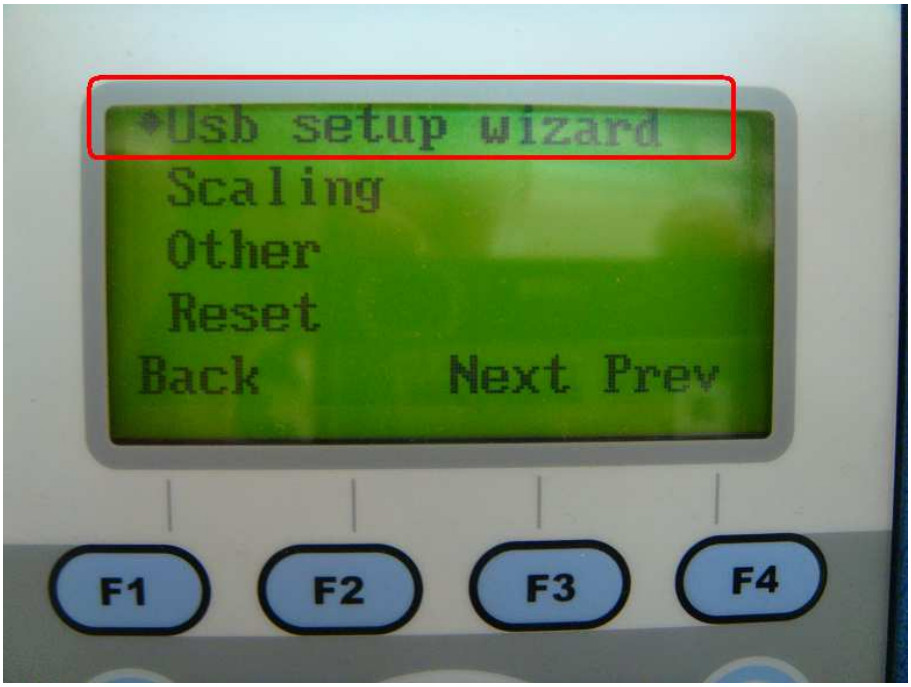
I. Press F4 button on control panel home page to enter Function page



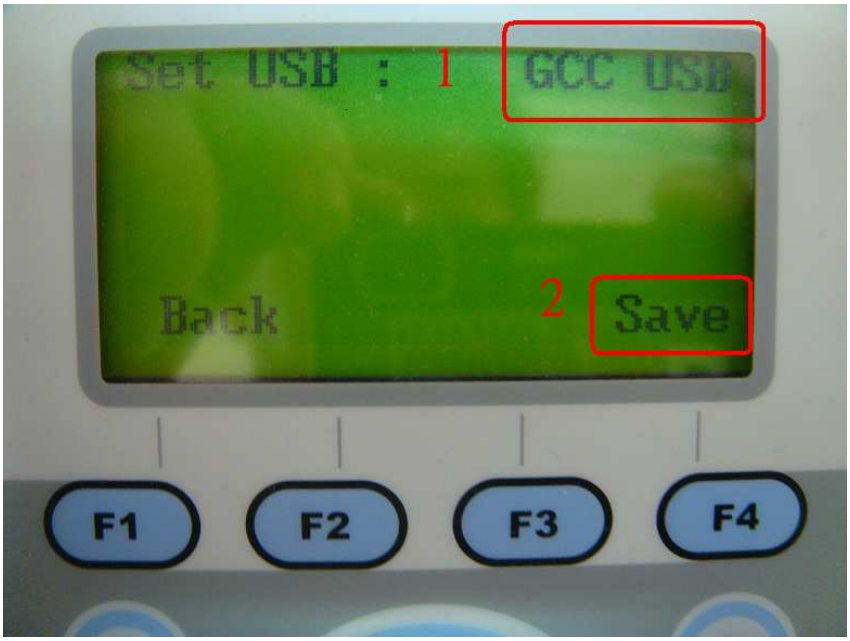
II. Select “Machine setting”



III. Select “Usb setup wizard”

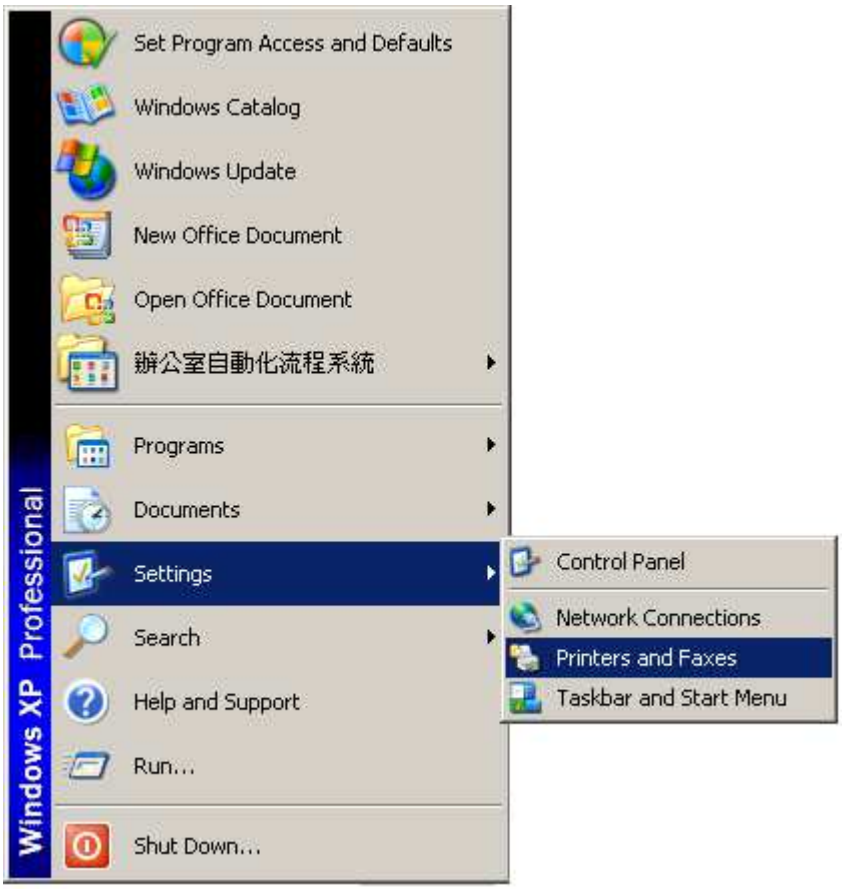


IV. Choice the USB mode you want to use and save it.

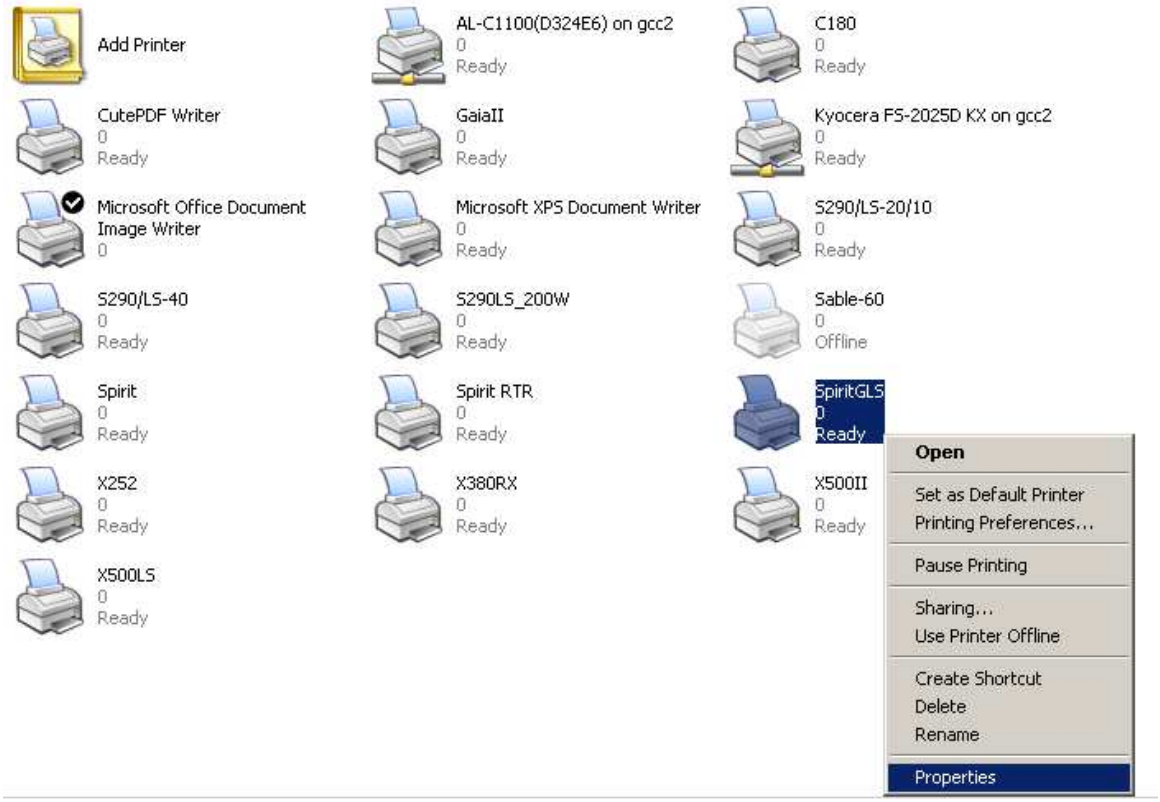


- **Printer port setting**

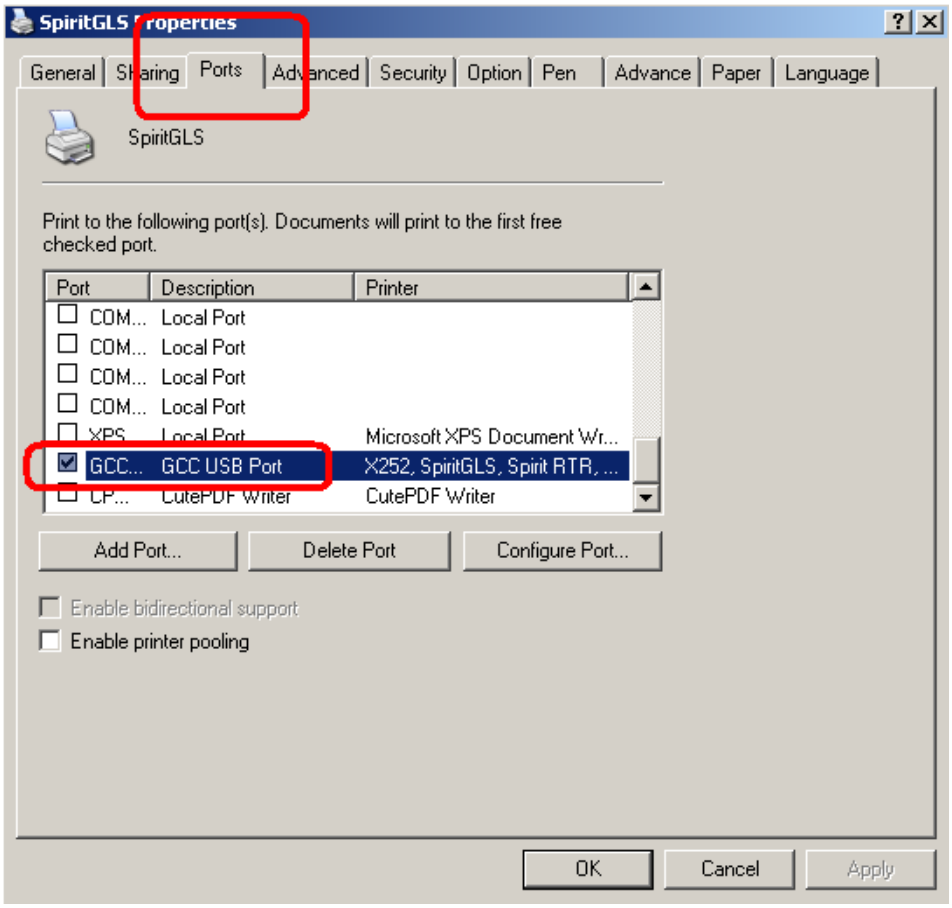
I. Start→Settings→Printers and Faxes to enter “printers page”



II. Right click on the printer you want to set the port and select “Properties”



III. Turn to “Port” tab, select the proper port you want to set (in this case, it’s GCC USB)



Chapter 7 - Trouble Shooting & Diagnostic

7.1 Firmware Error Message

Message	Laser Tube Error Laser tube is overheat press any key to stop
Cause	V30 laser tube responses the over-temp signal for a period of time, and firmware recognizes the laser tube is over temperature.
Solution	Check the temperature is down to normal level , turn off the machine,wait for the laser tube be cooled.

Message	Invalid file, check output file or reset command mode. press any key to stop
Cause	PCL command error
Solution	Check the output file command

Message	WARNING! SmartGUARD fire alarm system is activated,please reboot machine
Cause	Flame detected by SmartGUARD
Solution	Reboot the machine

Message	WARNING! Emergency stop is activated, please free the emergency stop to continue next job
Cause	Emergency stop is activated
Solution	Release the emergency stop button

Message	Please install the Auto Focus pin first before performing the auto focusing or focus tuning
Cause	Auto Focus pin is not installed
Solution	Check if the autofocus pin is installed

Message	HPGL Command Error Command: Address: Please press any key to stop
Cause	HPGL command of printing file is not defined.
Solution	Check the HPGL command

Message	Working table has reached the limit, please lower the table.
Cause	1. Platform reach the top limit 2. Platform reach the bottom limit 3. Certain object touches the limit switch 4. Limit switch malfunction
Solution	1. UP/Down platform to avoid the limit level 2. Remove the objects which touch the limit switch 3. Replace the limit switch

Message	PCL Command Error Command: Address: Please press any key to stop
cause	PCL command of printing file is not defined.
Solution	Check the PCL command

Message	Error! Please make sure the work piece or carriage within work area
Cause	The design object is out of working area
Solution	Verification: 1. Check if the size of design exceed the working area defined. 2. Check if the design is in the default working page. 3. Check the position mode Solution:: 1. Place the object in the default page of driver 2. Select proper position mode.

Message	Language Error Please upload properlanguage pack.
Cause	While using multi-language, precise language file is not imported.
Solution	Import correct language pack file.

Message	No Language Data Please upload proper language data first
Cause	While using multi-language, precise language file is not imported.
Solution	Import correct language pack file.

Message	SmartMEMORY is full.Please remove some file
Cause	SmartMEMORY buffer is full
Solution	Delete files in SmartMEMORY

Message	SmartMEMORY is not dectected. Please check the device
Cause	SmartMEMORY is not installed
Solution	Install the SmartMemory

Message	X motor malfunction For service please contact your local distributor
Cause	X motor is abnormal
Solution	Verification: 1. Check if the cable connections of X motor are correct 2. Check if there were any abnormal sounds from X motor Solution: Re-install the motor cable.

Message	Y motor malfunction For service please contact your local distributor
Cause	Y motor is abnormal
Solution	Verification: 1. Check if the cable connections of Y motor are correct 2. Check if there were any abnormal sounds from Y motor Solution: Re-install the motor cable.

Message	Z motor malfunction For service please contact your local distributor
Cause	Z motor is abnormal
Solution	Verification: 1. Check if the cable connections of Z motor are correct 2. Check if there were any abnormal sounds from Z motor Solution: 1. Re-install the motor cable 2. Adjust the speed of table moving

Message	Laser Warming Up Please Wait
Cause	Laser tube is warming up
Solution	Wait for the laser tube warm up

Message	Please install the Auto Focus pin first before performing Please press any key to stop
Cause	Auto Focus pin is abnormal
Solution	Check Auto Focus pin

Message	CCD Error! Move carriage to first mark or reset CCD Thank you
Cause	CCD didn’t recognize the object successfully
Solution	Do the recognition again.

Message	CCD Offset Error Please change your media or confirm CCD focus distance
Cause	The pattern is too close to the boundary and the carriage goes out of the boundary after the recognition is finished.
Solution	Move the pattern to the center of the table

Message	WARNING!The CCD unitis not detected. Press Back to leave CCD offset mode.
Cause	CCD is not installed
Solution	Install the CCD

Message	WARNING! No CCD Please remove include CCD command file
Cause	CCD is not installed
Solution	Install the CCD

Message	Door is Open; Please Close Door and press BACK to operate
Cause	Top cover is opened while a job is running
Solution	Verification: 1. Check if the top cover is opened 2. Check if the Door sensor worked fine Solution: 1. Close the top cover 2. Replace Door sensor

Message	WARNING! Laser Head Temp. over ; please close machine and check Laser Head
Cause	Fibre laser tube over temperature
Solution	Check if the temperature of tube is really too high

Message	Error Code : please wait
Cause	Error code responsed by Fiber laser
Solution	Check the definition of the Code.

Message	Fail to locate registration mark. Align red beam to the first mark
Cause	The first registration mark can't be recognized
Solution	Move the red beam to the first mark and do the recognition again.

Message	Object is out of bound. Please place object within the valid working area.
Cause	The pattern is too close to the boundary
Solution	Place the pattern to the proper position

Message	Auto Focus disabled Please use the and keys to move the working table
Cause	Auto focus function is disable，please up/down the table manually
Solution	Check Auto focus function

Message	WARNING! Machine ; Initialization error Please free the emergency stop then restart the machine
Cause	Emergency stop button is pressed while the machine is booting
Solution	Release the Emergency stop button

Message	Permit Expired!!
Cause	Time locker date is expired
Solution	Check the expiration of time locker.

Message	Invalid Timer
Cause	Time locker's effective time is different from firmware internal time.
Solution	Confirm the effective time in Time Locker.

Message	Drive Not Found!!
Cause	USB storage dose not plug.
Solution	Confirm if USB storage is plugged or try to replug again.

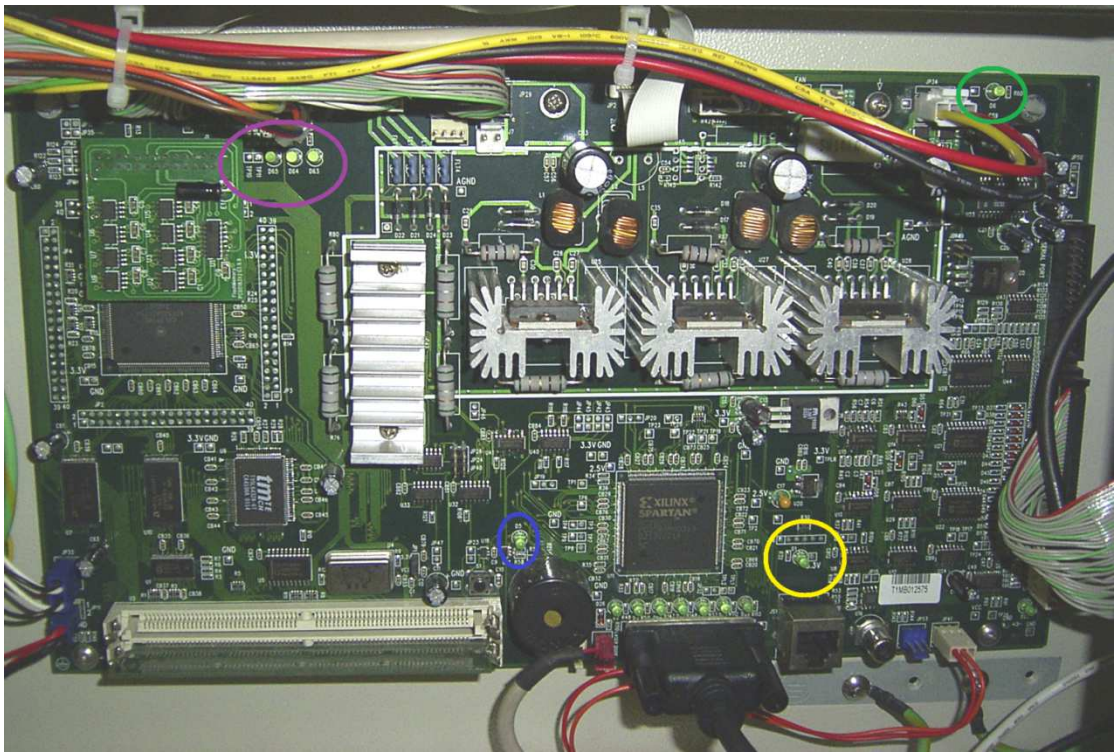
Message	No Valid File!!
Cause	File name is Chinese version or there is no prn and/or plt file mode under the folder.
Solution	Change file name to be English or check if there is prn and/or plt file mode under the folder.

Message	USB drive error. GCCcertified USB drive models w/FAT 16/32 format is required
Cause	Format is not FAT16 or FAT32
Solution	Confirm the format of USB storage.

7.2 Error lights

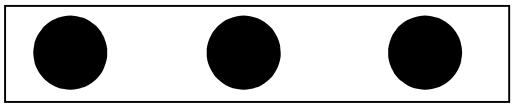
Identifying problems by looking at the lights on the mainboard.

7.2.1 5206e mainboard

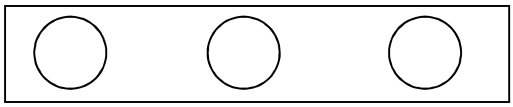


The LED circled in green is the 5V light. This light should always be “ON“ showing that there is a 5V supplied to the mainboard. Check that the power supply next to the mainboard that provides the 5V power is working properly if it is not “on”.
The LED circled in blue is the reset light. This light should only turn on when the reset button is hit. If it stays “on” all the time then the mainboard needs to be changed.
The LED circled in yellow is the initialization light. This light turns on when the machine is turned on. It will turn off after the initialization process. If it stays on, then mainboard is damaged.

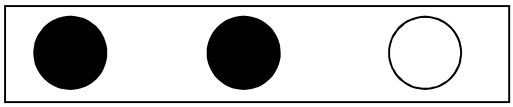
The LEDs circled in purple are the door sensor lights. When all doors are closed, all three LEDs will stay “on”.



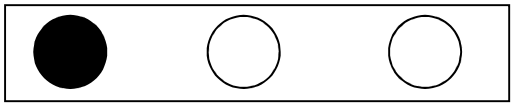
When the front door is open or front door sensors malfunctioning, all the LED will turn off.



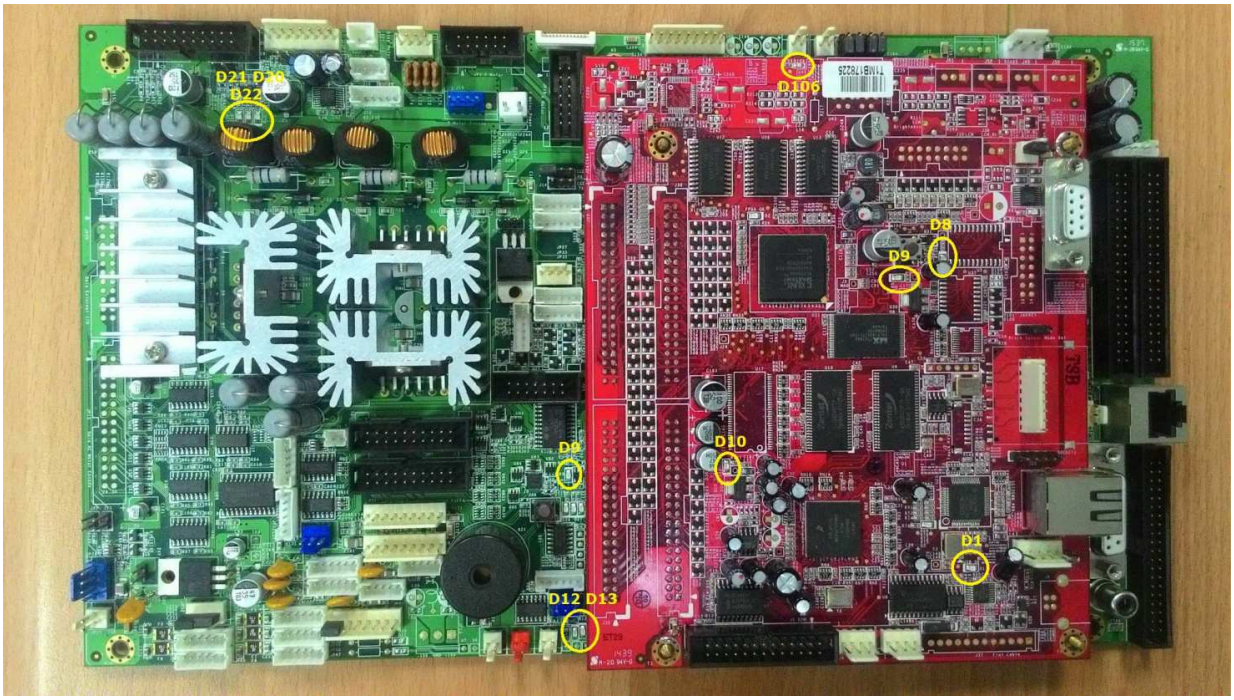
When the backdoor is open or the backdoor sensors are malfunctioning, the two leftmost LEDs will turn “on”.



When the top cover is open or the top cover sensors are malfunctioning, the left most LED turns to “on”.

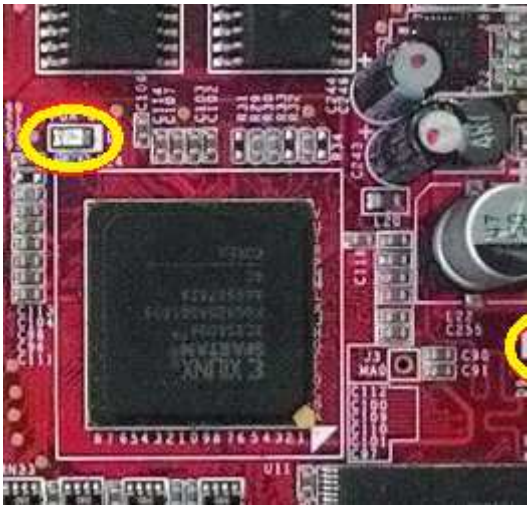


7.2.2 5272 V1 mainboard



A D1 : LED for USB Connection Indicator
LED on : USB Connection
LED off : USB Disconnection

B D2 : FPGA Download Done Indicator
LED on : FPGA Download Done
LED off : FPGA Download not ready

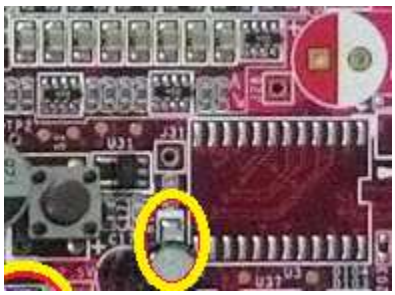


C RESET Indicator

LED on : M/B RESET

LED off : normal mode

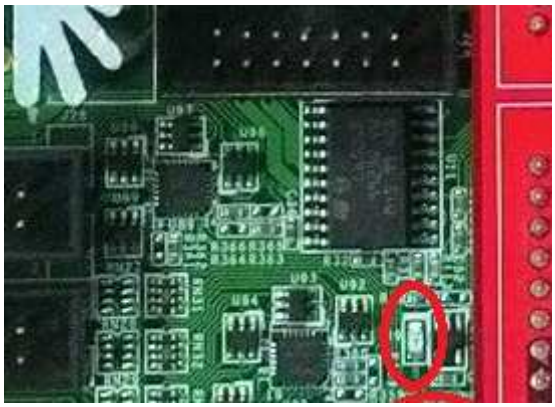
C.1 D8 : M/B RESET Indicator



C.2 D9 : D/B RESET Indicator

Light : M/B RESET

Dark : normal mode



D Power Ready Indicator

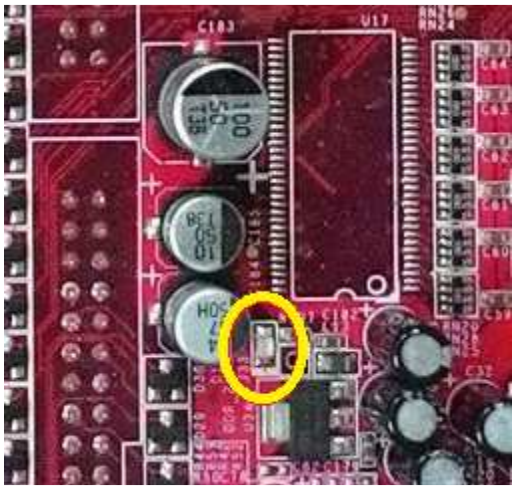
LED on : Power Ready

LED off : Power not Ready

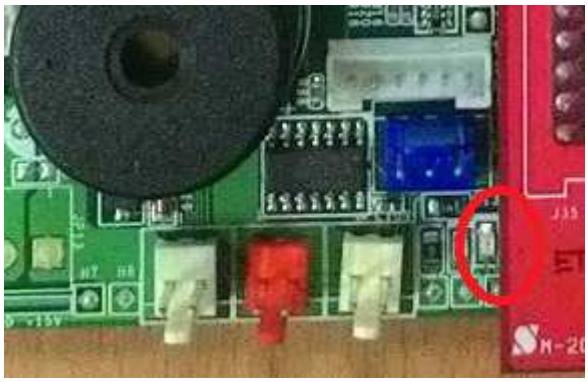
D.1 D106 : M/B 3.3V Power Indicator

D.2 D9 : M/B 2.5V Power Indicator

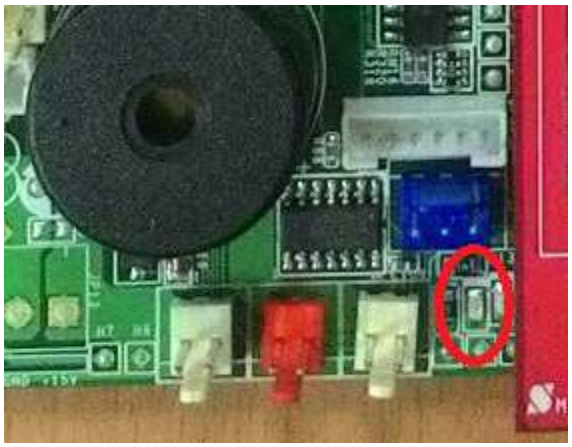
D.3 D10 : M/B DDR 2.5V Power Indicator



D.4 D13 : D/B 5V Power Indicator



D.5 D12 : D/B 3.3V Power Indicator



E Door Open Indicator

LED on : Door Close

LED off : Door Open

E.1 D20 : Door Open Indicator 1

E.2 D21 : Door Open Indicator 2

E.3 D22 : Door Open Indicator 3

7.2.3 Setting tickle pulse on Mercury Series machines equipped with Synrad laser sources.

By nature, Synrad laser sources require a tickle pulse to keep the laser ready for firing. The tickle pulse signal required depends on the individual laser tube. The usual setting is at 5k, however, it may be required to adjust the tickle pulse rate. If the laser is too weak, we can set it to 7k and if the laser is bleeding, then we can set it to 3k.
Hold the “down arrow key” when turning on the machine until “Laser Tube Model Number” shows on the display. Wait till the lens carriage comes to a stop. Press the Enter key to get to the Model Number selection page. Select the corresponding laser tube model from this page. Press F4 and then the Start/Stop key to save and restart the machine.

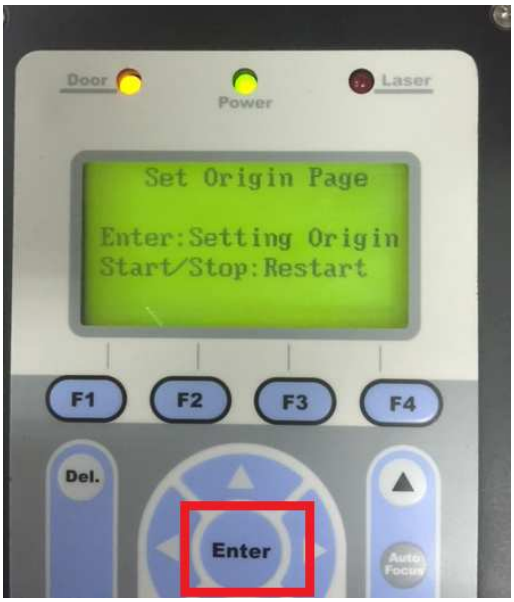
7.3 Hidden Diagnostics

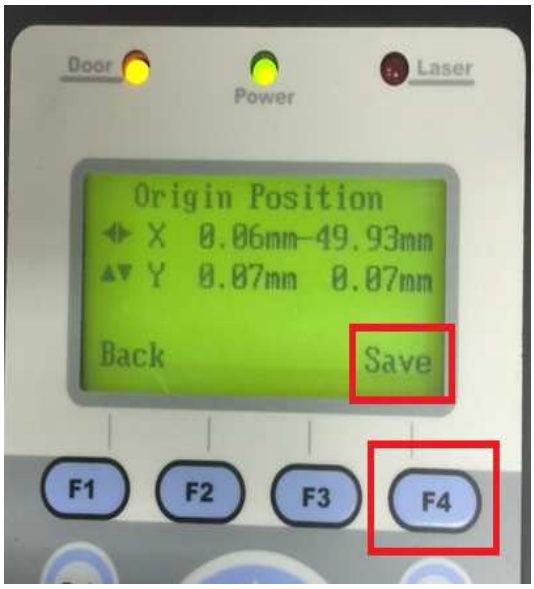
7.3.1. Hidden Function

To enter the Hidden Function , **hold down the ▽ button and turn on the machine.**

7.3.2 Setting Origin

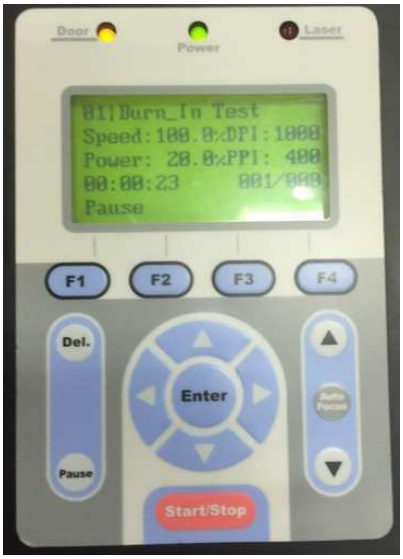
Pressing and holding “Enter” key and turn on the machine → Adjust X、Y position by pressing arrow key → Pressing 「F4」 to Save





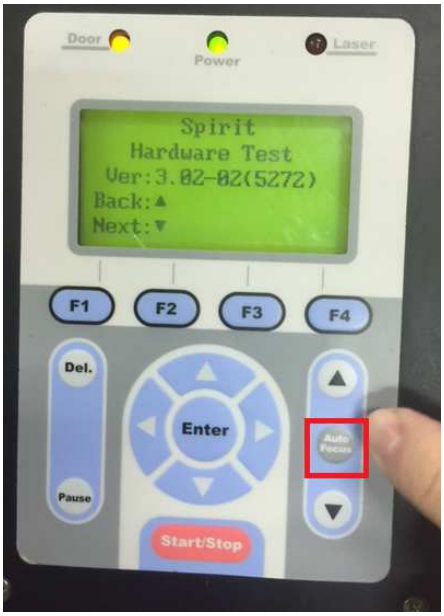
7.3.3 Burn In Test

Pressing and holding “Start/Stop” key and turn on machine; after the machine is boot, a file with name “Burn_In_Test” will be generated and output automatically, this file will permanently run unless user stop it .

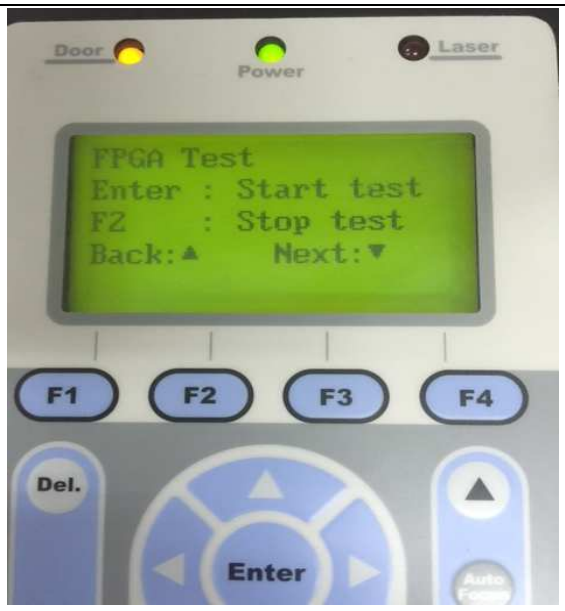
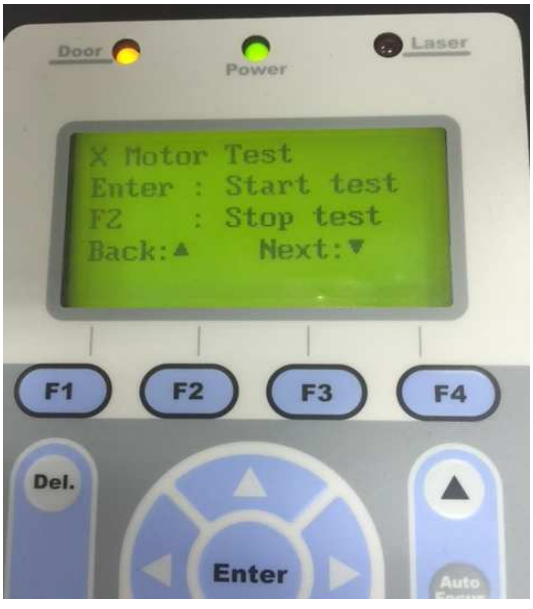


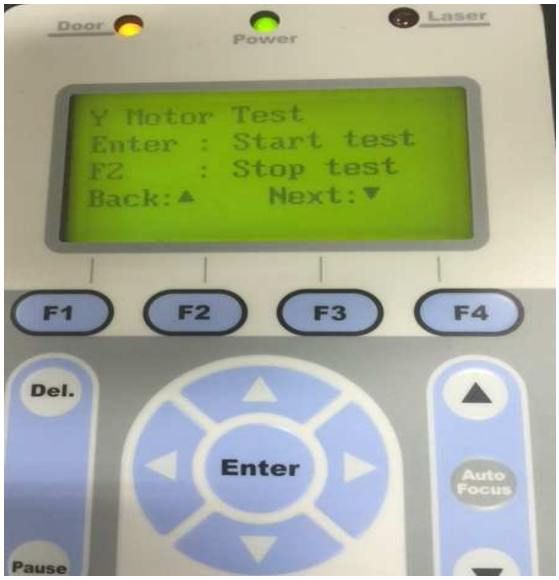
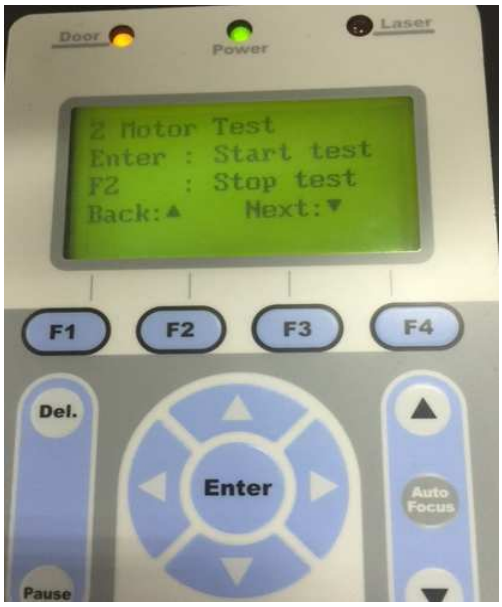
7.3.4 Hardware Test

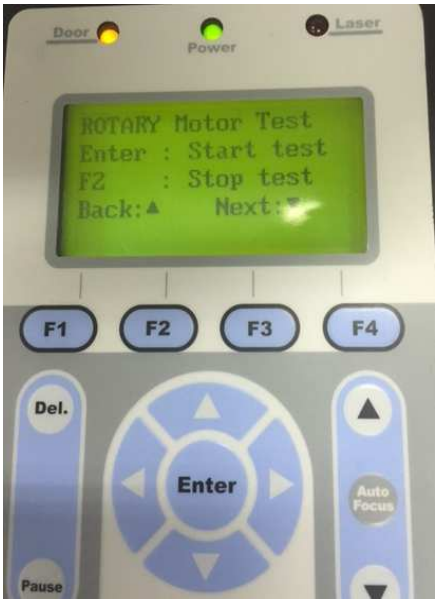
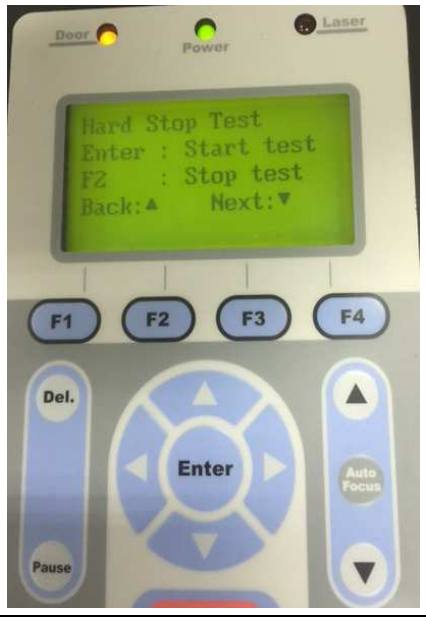
To enter the Hardware Test , **hold down the 「Auto Focus」 button and turn on the machine.** Following the instruction, pressing ▼、▲ to go to previous or next page.

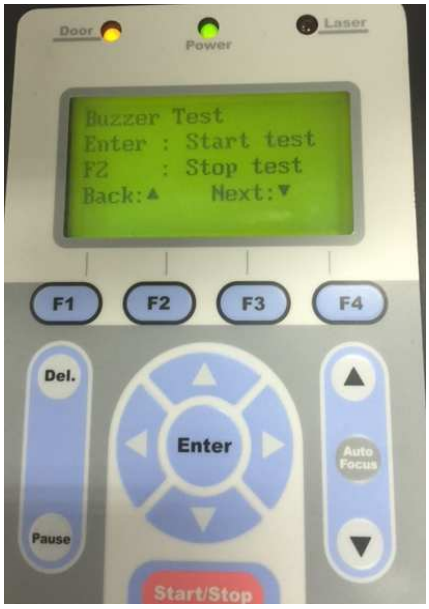
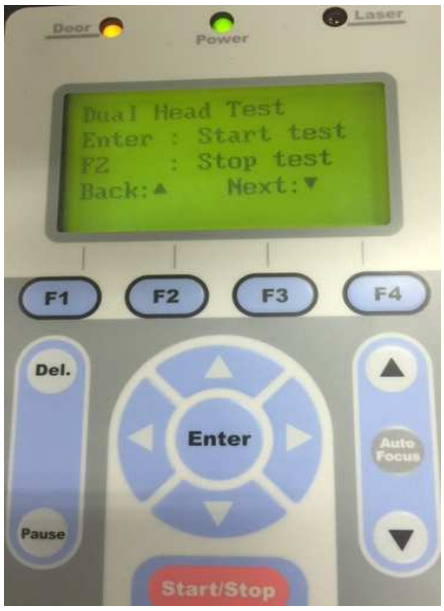
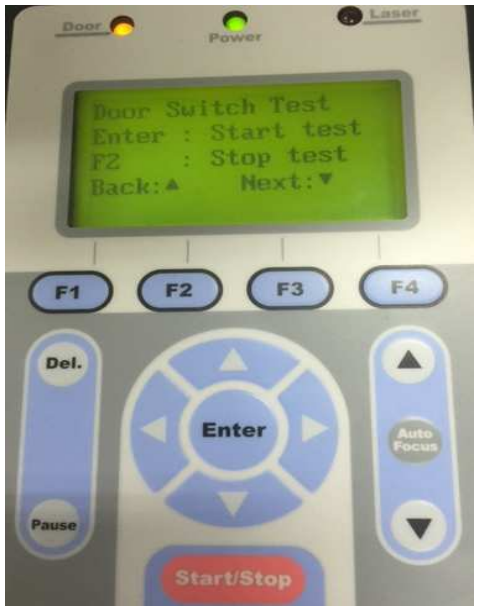


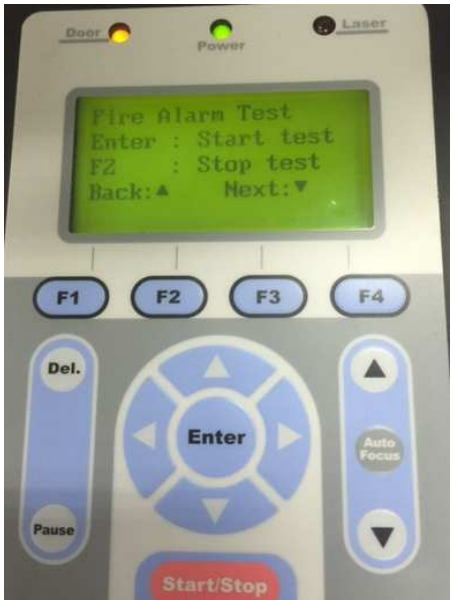
Contents of Hardware Test (Pressing 「Enter」 to start test):

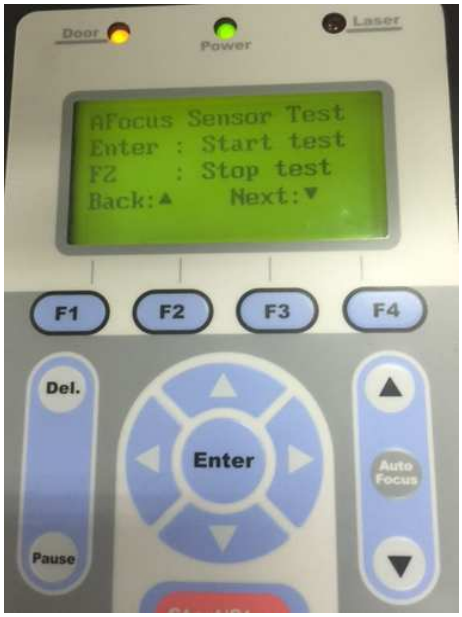
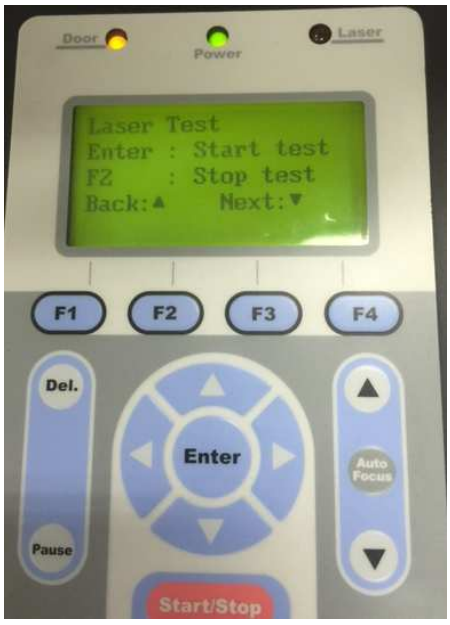
FPGA Test	X Motor Test
FPGA test checks if FPGA chipset is working correctly, test will be started by pressing the “Enter” key, test result will be shown on the screen (Test ok or Test fail)	X motor test checks that the X motor is functional by asking user to use the keys on the control panel to move the pen carriage along the X axle.
	

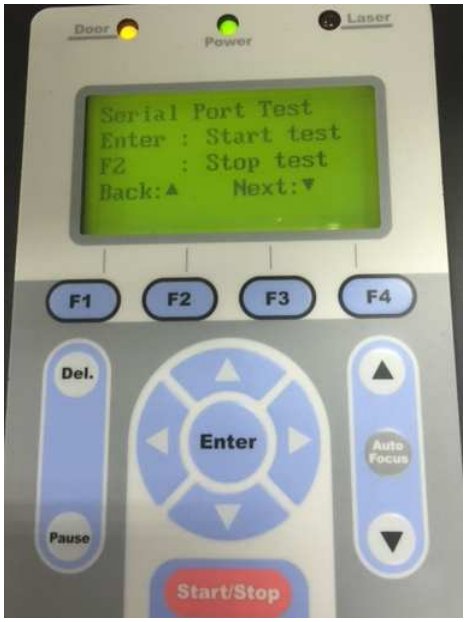
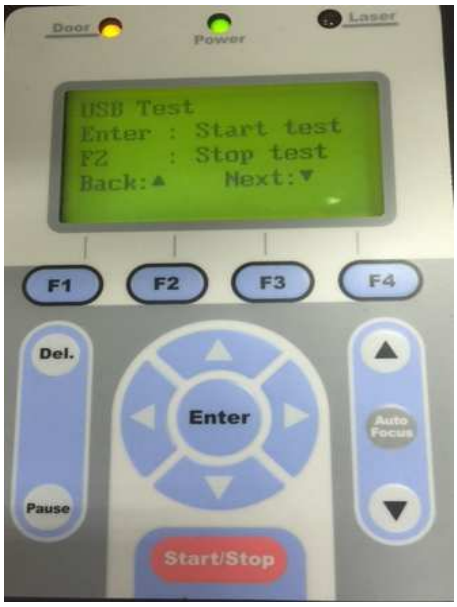
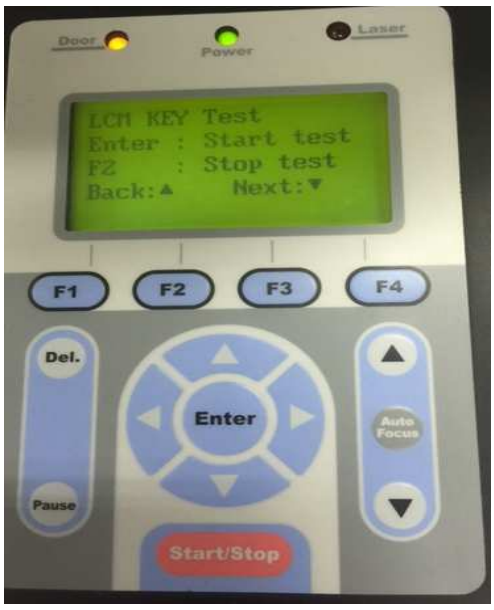
Y Motor Test	Z Motor Test
Y motor test checks that the Y motor is functional by asking user to use the keys on the control panel to move the pen carriage along the Y axle.	Z motor test checks that the Z motor is functional by asking user to use the keys on the control panel to move the platform up and down the Z axle.
	

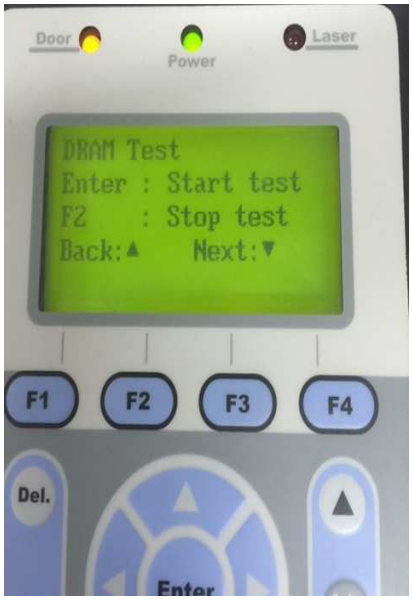
Rotary Motor Test	Hard Stop Test
Rotary Motor Test checks if the motor of the optional Rotary attachment is functional. Press Up or Down arrow key and see if the Rotary attachment will roll or not.	Hard Stop test checks that the X and Y sensors are functional by asking the user to manually move the pen carriage towards the X and Y sensor flags
	

Buzzer Test	Dual Head Test
Buzzer test checks if the following items are functional :Buzzer / Laser Diode / Air / Fans Those functions will run at the same time while users press the “Start/Stop” button.	Dual head test checks if the optional Dual Head module is functional. System buzzer will beep while user is pressing the switch of Dual head module is it’s functional.
	
AutoFocus Test	Door Switch Test
AutoFocus Test checks if the AutoFocus Pin probe is functional. The system buzzer will beep once user press the AutoFocus pin if it’s functional.	Door Switch Test checks if the door switches are all functional.The system buzzer will beep and the yellow door led on control panel will turn to on once any door of the machine (includes top cover、front door、back door) is opened if it’s functional.
	

Fire Alarm Test	Stop Switch Test
File Alarm Test checks if the optional SmartGuard is functional. System buzzer will beep once fire is detected.	Stop Switch Test checks if the Emergency Stop switch is functional. System buzzer will beep once user press the Emergency Stop switch.
	

AFocus Sensor Test	Laser Test
AFocus Sensor Test checks if the sensor of AutoFocus pin is functional, the sensor will detect if the AutoFocus pin is well installed on the AF seat. System buzzer will beep once you remove the AF pin from AF seat if the sensor is functional.	Laser test allow you to fire the laser tube at a selected laser power. (This is also the utility that you use to perform beam alignment.)
	

Serial Port Test	USB Test
Serial port test checks that the serial port is functional by asking the user to send a file through the serial port. (The serial port is for diagnostic purposes only. Please do not use.)	USB port test checks that the USB port is functional by asking the user to send a file through the USB port.
	
LCM Key Test	LCM Interface Test
LCM Key test will test the functionality of the keys on the keypad	LCM Interface test will display a series of different shapes on the LCM to allow user to detect any malfunction on the display unit.
	

DRAM Test
DRAM test checks the functionality of the DRAM.


Charper 8 Basic Maintenance

8.1 Suggested Cleaning and Maintenance Supplies

Cleaning / Maintenance Tool	Special notes
Soap Solution or All-Purpose Cleaner	
Paper Towels	
Cotton Cloth	
Denatured Alcohol	DO NOT use alcohol on any painted surface, plastic, or the laser system.
Acetone	ONLY to be used on the work table
Vacuum Cleaner with a Flexible Nozzle	Only to be used in and around the work table and motion system
Lubrication syringe	Supplied
Cotton Swabs	Supplied
Lens Cleaner	Supplied 1pc. Local supply is suggested.*
Lint Free Lens Tissue	Supplied
#2 Phillips Screwdriver	
Allen Wrench .050”	

*The recommended lens cleaner is Eclipse Cleaning System Solution from Photographic Solutions or HPLC grade Methanol. Search “Eclipse Cleaning System Solution” on Amazon or eBay to get the solution locally.

http://www.amazon.com/Photographic-Solutions-ECDCS-Cleaning-Solution/dp/B0000AUR1I

Eclipse Cleaning System Solution

***The recommended grease is AFA grease**

AFA Grease is a high-grade, long-life grease developed with a urea-based consistency enhancer using a high-grade synthetic oil as the base oil.

Features

(1) Long service life

Unlike ordinary soap based grease for metal lubrication, AFA Grease excels in antioxidation stability and therefore can be used for a long period of time.

(2) Wide temperature range

The lubricating performance remains high over a wide range of temperatures from -45 ℃ to +160 ℃

Even at low temperatures, AFA Grease requires only a low starting torque.

(3) High water resistance

AFA Grease is less vulnerable to moisture penetration than other types of grease because of its high water resistance.

(4) High mechanical stability

AFA Grease is not easily softened and demonstrates excellent mechanical stability even when used for a long period of time.

8.2 Cleaning the Optics System

8.2.1 Removing the Mirrors

We recommend that you check the mirrors once or twice a week to see if they require cleaning.

If any debris or smoke residue is present, use the following steps to clean them.

NOTE

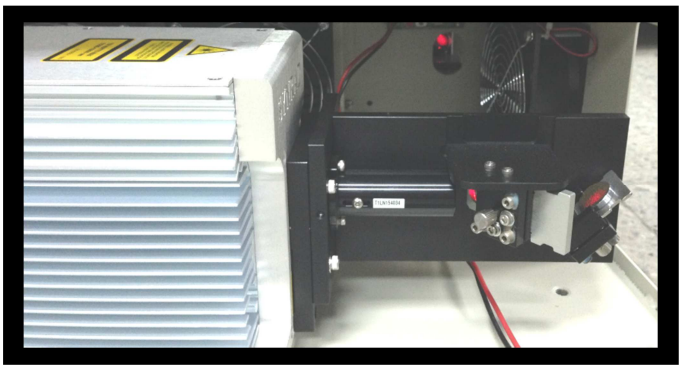
- Mirrors should be removed for cleaning one at a time to avoid beam misalignment after placing them back to the lens holders.
- Refer to section 8.3.2 on how to clean the mirrors.•

The following section will illustrate the location of the four mirrors found on the LaserPro Mercury Series for cleaning.

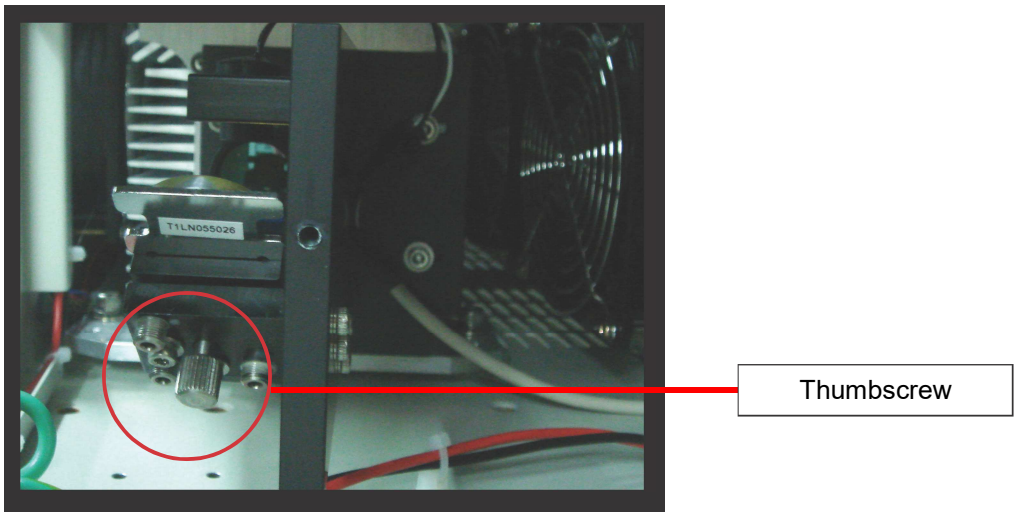
Mirror 1

Mirror #1 is located inside the bottom left access door panel of the LaserPro Mercury Series.

1) Use a #2 Phillips Screwdriver to open the access panel located on the bottom left side of the LaserPro Mercury Series.
2) Open the slot cover on the bottom left side of Mercury Series machine
3) Loosen the thumbscrew and remove the black dust cover in front of laser tube.



4) Loosen the thumbscrew securing mirror #1.



4) Clean the mirror in the proper manner.
5) Place the mirror back to the optics holder after cleaning.
6) Tighten the thumbscrew.
7) Close and secure all the covers.

Mirror 2, 3, 4

These mirrors are located in the work table area of the LaserPro Mercury Series.

Mirror 2

1) Unscrew and remove the black dust cover covering mirror 2.
2) Unscrew the thumbscrew holding mirror 2 in place.
3) Clean the lens in the proper manner.
4) Place the mirror back to the optics holder after cleaning.
5) Tighten the thumbscrew.
6) Close and secure the black dust cover.

Mirror 3

1) Unscrew the thumbscrew holding mirror 3 in place.
2) Clean the lens in the proper manner.
3) Place the mirror back to the optics holder after cleaning.
4) Tighten the thumbscrew.

Mirror 4

1) Unscrew the three thumbscrews securing the lens carriage panel and remove the lens carriage panel to reveal mirror 4 and the focal lens.
2) Loosen the top thumbscrew to remove mirror 4 (as shown in the picture below).
3) Clean the lens in the proper manner.
4) Place the mirror back to the optics holder after cleaning.
5) Tighten the top thumbscrew.
6) Reinstall the lens carriage panel and tighten the three thumbscrews.

8.2.2 Cleaning the Mirrors

After you have removed each mirror, you will want to inspect each mirror for scratches, smoke residue, or debris. If any residue or debris is present, use the following steps to clean the mirrors.

1) Hold the mirror with the reflective side up, without touching the reflective side of the mirror (DO NOT apply any finger pressure or any other cleaning solutions to the mirror surface).
2) Drape a new sheet of lens tissue over the mirror.
3) Apply a few drops of lens cleaner on the tissue covered mirror (apply enough so that the tissue absorbs just enough solution to cover the mirror surface).
4) Pull the tissue across the mirror in only one direction.
5) Repeat the cleaning processes if the mirror is not completely clean after the first attempt.

6) Make sure that the mirror is completely dry before reinstalling it.

CAUTION

- If the center of the mirror is scratched, contact your GCC LaserPro representatives for replacement.
- DO NOT apply any finger pressure or any other cleaning solutions to the mirror or focal lens surface.
- The optics components are very fragile, handle carefully and follow the cleaning procedure well.