LaserPro®

www.laserpro.com

User Manual

Gaia

Dear Madam and Sir,

Thank you for choosing GCC and the LaserPro Gaia. You can be assured that this machine meets all of the highest safety standards while using technological innovations shared by no other laser engraver. The Gaia is backed by GCC, a truly international company that is dedicated to help your business grow.

We at GCC are proud to introduce the LaserPro Gaia, our most technologically advanced laser engraver to date. This easy to operate machine has been designed with quality, productivity, and safety in mind. With innovations like the QSM^{TM}, stellar quality under high speed, SmartFILE file management, and the new Linear Low Maintenance Motion System, the Gaia clearly on the cutting edge of all laser systems.

GCC understands that a creative technical background is the key to successful growth in the ever-changing information economy. We have a strong team of R&D experts who propel our company to new heights. From product development to manufacturing, our engineers are dedicated to innovation and quality.

Guiding our solid technical base is a world-class management team. At GCC, our leaders bring together marketing, technical support, research development and distribution experts to create an international network able to meet your demands. Over the years, this network has been able to span the globe. Our technical support staff is committed to provide you with impeccable service, and when your business is ready to grow, our team will also be there!

Sincerely,

Leonard Shih
President of G.C.C.

![LaserPro logo](www.laserproi.com)

Content

Chapter I – Safety

1.1 Principles of a CO2 Laser

LASER is the acronym for Light Amplification by Stimulated Emission of Radiation. A CO_2 laser works by electrically stimulating the molecules within a carbon dioxide gas mixture. When focused through a lens, this highly-intense, invisible beam will vaporize many materials. Depending on the speed and intensity of the projected beam, a CO_2 laser may be used to engrave or cut through a wide variety of materials.

1.2 Safety Ratings

The LaserPro Gaia is equipped with a sealed carbon-dioxide laser that emits intense and invisible laser radiation with a wavelength of 10.6 microns in the infrared spectrum. The laser system is designated as a Class I laser device, meaning that the system is equipped with key safety features and an enclosed lens carriage to completely contain the laser under standard use. One of the key safety features found on the LaserPro Gaia is a Class IIIR red dot safety guidance pointer (similar to a laser-pointer presentation pen), allowing the operator to see the exact location where the laser beam will fire. Even though the LaserPro Gaia is equipped with our most powerful laser to date, proper usage and hardware safeguards make it an extremely safe machine.

1.3 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 technical support for service 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.

1.4 Safety Labels

According to CDRH standards, all fixed or removable covers that allow access to a laser beam must have the appropriate laser warning labels attached to them. These warning labels must be clearly visible to the operator prior to removing the cover. Additional labels must be applied to the

interior of the machine and be visible in the event when the covers are removed. A label clearly displaying the manufacturer's name, date of manufacture, description of product, model number, serial number, and compliance statement must be attached to the outer surface of the machine.

In compliance with CDRH standards, the required warning labels are affixed at the time of manufacture to the LaserPro Gaia in the appropriate locations. These labels are not to be modified in any way or removed for any reason. Please familiarize yourself with the specific labels and their locations on the machine. Below is a list of all the safety labels and their locations on the machine.

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 tech support, always provide the service person with the information on this label.

CDRH Label

This label indicates the class level of CDRH.
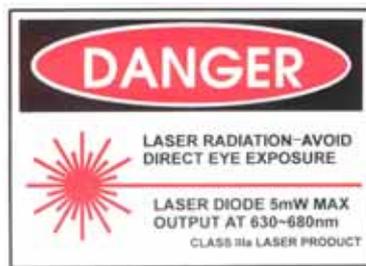
Laser Path Warning Label

LaserPro machines are very safe under normal functioning conditions. However, in case of any accident, Laser Path Warning Label will be affixed on the possible laser path. When operators are near by these paths should be careful of possible injury while machine is working.

Warning Label

Warning Label is written with all the necessary information to be aware of in every operation.

Emergency Stop Label

This label indicates the emergency stop button. You can find this label on the right upper side of the machine.

Maintenance Warning Label

This label can be found on the laser tube cable, to remind you that the laser tube component is of critical parts, should be served by trained personnel only.

1.5 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.

> **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 appropriate 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:
>
> 190 - 398 nm OD5+
> 10,600 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 byproducts 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. Doing so will ensure your machine will operate effectively and safely over a long period of time.

1.6 Operating Environment

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

- Avoid environments where the machine is exposed to high levels of dust, temperature (temperatures 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 Gaia, 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 Gaia 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).

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

Chapter II - Unpacking & Contents

2.1 Unloading and Unpacking

The LaserPro Gaia is shipped in one crate that contains the machine, the software, and all of the necessary accessories. The following section contains detailed step-by-step instructions for unpacking and assembly of the machine.

> ⚠ **WARNING**
> To prevent personal injury or damage to the machine, please obtain assistance when loading and unloading the shipping crate.

> ⓘ **NOTE**
> Please save the original shipping crate. If the machine must be returned for product servicing, it will need to be packed in its original shipping crate.

Perform the following steps to unpack your machine.

Step 1   Use an M12 open end or impact wrench to unscrew and remove the top.

Step 2   Remove the 4 sides of the crate in the order.

Step 3   Take the protective wrap off the machine. For step 1 and 2, please see Figure 2-1.

(Figure 2- 1 Unpacking)

Step 4 Take out the wooden holding stick (see Figure 2-2).

(Figure 2- 2 Unpacking)

Step 5 Loosen the pink packing strips and remove them. Firstly push the lock on the strip down (see Figure 2-3), and then pull it out to the top (see Figure 2-4) before you can loosen the strips.

(Figure 2- 3 Unpacking)

(Figure 2- 4 Unpacking)

Step 6 Unscrew the two settled boards (see Figure 2-6), take them out of the crate, and then turn them up side down.

Settled
Boards

(Figure 2- 5 Unpacking)

Step 7 Put the settled boards at each end of the crate base to form a slope (see Figure 2-7).

(Figure 2- 6 Unpacking)

Step 8 Remove the wooden block from the crate base (see Figure 2-7), and then unscrew the

four holding stands so that they can be moved up (see Figure 2-8).

Holding

(Figure 2- 8 Unpacking)

Step 9   Roll the machine out of the crate base to where you are going to setup.

Step 10 Remove the X-axis restraining strips.

Step 11 Screw 4 holding stand on the ground and adjust the level.

Step 12 Fix front and rear pass-through door on Gaia.

Step 13 Save the crate for shipping in case any return service is needed.

2.2 Contents and Accessories Checklist

Please check to make sure that all of the following items are included within the shipping crate. If any of the following items are missing, immediately contact your local GCC distributor.

Item	Quantity
Power Cable (Std. of - US/EU/AU)	1/Each Std.
AC Input Cable	1
Parallel Print Cable	1
USB Cable	1
CO2#900 Goggle	1
Lens Cleaner	1
Cotton Stick	1
Focusing Tool	1
Lens Cleaning Paper	1
Cutting Table Bar	15
Promise Card	1
User's Guide CD(Driver included)	1
Pencil Sample	1
Engraved Pencil Sample	1
QuickALIGN Switch	1
Gaia Jig Screw Accessory Set	1
Air Nozzle	1
Dual Hose Connector	1
Hose Fixer 5"	4
Hose Fixer 6"	2
Air Compressor 220V	1
Water chiller tube - 7M(Diameter:1/2 inch) Only for water cooled model	1

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Chapter III - Mechanical Overview

Please take some time to familiarize yourself with this section regarding the mechanical overview of the LaserPro Gaia. References will be made back to the different parts of the LaserPro Gaia in later sections.

3.1 Front View

Left Shoulder

Front Door

Lower Front Door

Right Shoulder

SmartEXT™ Pass-Through Door (Front)

Main Power Switch and Front Fan switch

3.2 Top View

Emergency Stop Button

SmartLight™ Switch

Control Panel

3.3 Right (Profile) View

Y Motor Access

Main Board Module

Power Supply Module

3.4 Left (Profile) View

Purged Air

Access Panel Mirror #1

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3.5 Rear View

SmartEXT™ Pass-Through Door (Rear)

Power Control Module

Exhaust Hose Connector

Data Interface

Power/Air/Water Connectors

Laser Tube Module

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Chapter IV - Setup and Installation

4.1 Machine Setup
4.1.1 Powering Up the Machine

> ⚠ **CAUTION**
> Make sure both the LaserPro Gaia and computer are turned off before connecting either to a power source.

1) Connect the male end of the power cord to a quality surge protector and then connect the surge protector into a properly grounded outlet.
2) Do the same for the computer system.
3) Connect the female end of the power cord into the machine's power cable inlet located on the right side of machine.

> ℹ **NOTE**
> • The LaserPro Gaia has been designed to automatically switch from 100~240 VAC.
> • Make sure to supply 220V of electricity to the LaserPro Gaia with laser wattages above 60W.

4.1.2 Power Cable Connection

LaserPro Gaia you purchased need to have a professional electrical technician install the power cable wiring as shown below.

Step 1 Each Gaia machine is equipped with the following power cord which is marked separately with G-Ground, N-Neutral, and L-Live. Notice that the two ends of the power cord has different type of connectors, O-shape and Y-shape.

O Shaped, connect to Laser Machine

Y shaped, connect to Electricity Outlet on the wall

Fig. 4-1   Power Cord for Gaia Machine

Step 2 Unscrew the power control module panel in the rear side of Gaia.

Step 3 Unscrew the black fixing connector in the right rear side of Gaia.

Black Fixing Connector

Fig. 4-3 Location of Black Fixing Connector

Step 4 Insert the O shaped power cord through the black wiring connector.

Assembly C

O ring, B

Fig. 4- 5   Insert the O shaped Cord to the Black Fixing Connector

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Step 5 Install the Assembly C in step 4 to Gaia through an opening and use O ring B to fix it.

Install the assembly C
(located outside of laser
machine) and O ring B
(located inside of laser
machine) to the machine

O ring B to fix the wiring

Fig. 4- 6 Install the Assembly and O ring to Gaia

Step 6 Loose the screws on the terminal connector, affix the O shaped power cord and re-install
the screw to fasten the O shaped power cord.

Install O shaped power
cord in order of L
(white), G (green), and
N (black) from left to

Fig. 4-7 Install the O shaped Cord to Terminal Connector

Step 7 Close the laser cabinet panel to finish the power cord installation.

4.1.3 Hose Connector

LaserPro Gaia default sets a 6" hose connector on the left-rear side of machine. We recommend that your air extraction system to be as powerful as possible. Another option would be to use 4" hose extractor with dual hose connectors.

INSTALLATION

1) Gaia default setup a 6" hose connector on the left-rear side of machine.

2) If you are using 4" hose extractor, you can replace the 6" connector with dual hose connector.

> ### NOTE
> Powerful air extraction system is helpful to cutting quality and reduces the maintenance need. If you are using 4" hose extraction system we recommend you use two units to empower the air flow.

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4.1.4 Air Compressor

Specifically designed for laser engravers, the air compressor utilizes an oil-free safeguard. The air compressor helps eliminate harmful and potentially damaging moisture from the laser optics, maximizing laser optic life. In addition the air compressor provides the optimal air flow to the SmartAIR nozzles to minimize flaming, suppress working temperatures, and blow away dust and particle byproducts generated from the laser process.

¼" Air Inlet Tubing

Power Cord B

Power Cord A

INSTALLATION

1) Remove the plugs on the air compressor to expose the air inlets.

2) Fasten the included air tube fastener valve to the outgoing air inlet (indicated by 2a) and the air filter into the ingoing air inlet (indicated by 2b).

Plugs

2b

2a
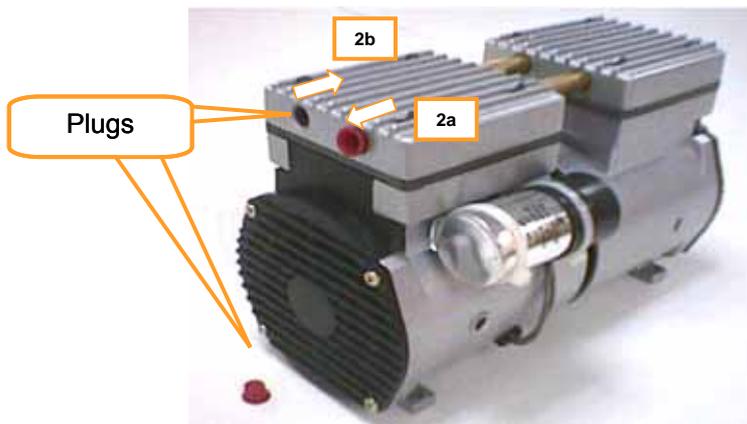
3) Connect a ¼" tubing to the air tube fastener valve on the air compressor.

> ℹ️ **NOTE**
> It is important that the ¼" air tubing has clean, straight cuts on each end. Jagged or slanted cuts will not produce adequate sealing capabilities.

4) On the right-rear side of Gaia to locate both the Air-Assist Valve and Internal Power Sockets, as indicated below:

Power Cord A Socket

Power Cord B Socket

Air Assist Valve

5) Plug the air compressor's power cord A into the AC power socket.

6) Plug the female end of power cord B to the AC power socket and the male end to an external power outlet.

7) Take the unattached end of the ¼" air tubing (other end already connected to air compressor) and connect it to the air tube connector on the air assist valve. Make sure you press down on the air tube fastener when inserting the ¼" air tubing, to form a tight, secure attachment as indicated in the diagram below.

Air Flow Regulator:

Turn Clockwise to increase airflow

Turn Counter-Clockwise to decrease airflow

Air Tube Fastener

Air Tube Connector
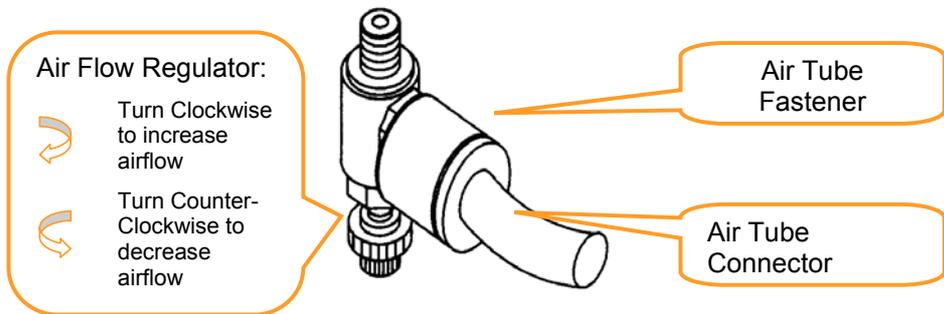
8) Congratulations, you have finished setting up the air compressor.

OPERATION

1) Switch on the air compressor unit and make sure that the airflow regulator on the air assist valve is opened (turn clockwise to increase the airflow, counter-clockwise to decrease the airflow). The air nozzle under the lens carriage should emit a steady flow of air.

With the SmartAIR nozzle and air compressor properly installed and operating, all configurations and settings relating to air-assist functions are controlled through the LaserPro Gaia print driver and hardware control panel. Please refer to the LaserPro Gaia print driver and graphic control panel sections of this manual for details on how to enable and configure air-assist functionalities.

註解: 請問這段是要分點 or 分段落？

4.1.5 Water Chiller (Only for Water-cooled model)

The water cooler that will be connected to the machine consists of a cooling system, and two tubes that allow inflow and outflow of water. When you turn the power on, the cooling system is activated and delivers cool water to the laser module to absorb heat produced there, and then brings it back to the cooling system to cool down.

> **NOTE**
> Make sure to turn on the water chiller before starting to work with Gaia.

Adding Water

The water cooler is an external device that has to be connected to the laser machine for cooling down the laser tube. For water cooler setup and adding water, please refer to the water cooler manual on the device. Here we will show you some basic tubing connection, please follow the steps to connect the water chiller with laser system.

> **NOTE**
> 1. If you need to ship the laser machine after using it, you must remove the water tubes that are connected beneath the laser machine, and then lift these two tubes up as high as possible so that the cooling water will not drain out.
> 2. Do not disconnect the tubes too often, in case the tubes become loose.
> 3. Do not spill any water onto the internal components of the machine while removing it.

Step 1 Please connect the water pipe of the water chiller to the water inlet and outlet connector on the laser engravers.
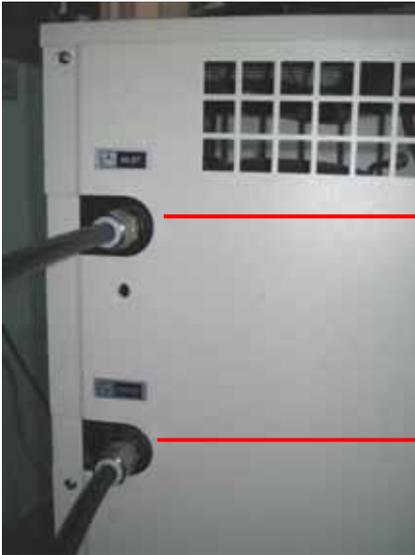
The inlet tubing of chiller should connect to the outlet connector on the engravers.

The outlet tubing of chiller should connect to the inlet connector on the engravers.

Step 2 Arrange the Outlet and Inlet tubing as follows. Insert the Outlet tubing of chiller through the "Water In" slot opening.

Step 3 Connect the outlet tubing from chiller to the "Water In" connector on laser tube.

Water in connector on laser tube

Water out connector on laser tube

4.1.6 SmartPOINT

LaserPro Gaia SmartPOINT is a nice design for users to locate material when working on repeat jobs. With four red beam pointers, everyone can easily place the material right on the same place as they did before.

1) After completing the first job, do not remove your work on the table.

2) Manually adjust SmartPOINT to a specific place that is easy for you to aim on.

4) Remove your first work and load new material.

5) You can easily take the red points as reference and know where your job is going to be processed.

Manually adjust SmartPOINT as reference of next job.

4.1.7 QuickALIGN

QuickALIGN helps you to adjust the beam alignment easily through the user friendly design of remove control. Beam alignment will become easier with this unique design. Save time on adjustment, gain more time on operation.

1) Plug QuickALIGN on the left-rear side of Gaia.

2) Each press of the switch button will cause one laser pulse.

3) Carefully do beam alignment mirror by mirror.

4) Remember to unplug QuickALIGN after beam alignment is finished.

> ⚠️ **WARNING**
> - QuickALIGN controls laser firing direct through electrical signal, it is not controlled by firmware or software.
> - Unplug the QuickALIGN remote control when not in use in order to avoid accidents

4.1.8 Reserved Jig Slot

A laser cutter can be used for various applications and it is hard to meet everyone's needs. In order to satisfy every individual need, customized jig slots provide the flexibility to install customized jigs on Gaia for the expansions of various applications. Now, it seems like anything is possible.

1) Remove jig slot covers

Jig Slot Cover

Jig Slot Cover

a.   Open front door and pull the rod to remove front door

Pull the rod here

b.   Use 5mm hex wrench to loose two Socket Head Set Screw

Socket Head
Set Screw

Socket Head
Set Screw

c.   Take off the jig slot cover

Jig Slot

Jig Slot

2) Fix your jig on the slot

a. Take this jig for example, if we want to fix it on the slot as below.

Sample Jig

b. Assemble the screw and nut on the jig, and mount this assembly on the slot.

Sectional
Drawing

c. Use hex wrench to screw tight, the nut will turn 90 degree to fix the jig.

Sectional
Drawing

4.1.9 Adjustable Air Nozzle

Air Nozzle in the accessory box can create different distances to the working piece for different air blowing effect to meet various application demands and prevent dust accumulated on lens.

Nozzle adjustment

1) **Clockwise**
   Nozzle close material surface to have a direct air blow on material.

2) **Counter-clockwise**
   Nozzle leave away from material surface to have a wider range of air blow.

3) **Remove Nozzle**
   If you do not need strong air blow direct on the material, screw nozzle counter-clockwise to remove it and have an open air blow.

> ℹ️ *NOTE*
> The air blow on the material can cooperate with Gaia right-rear air assist valve to have a best air blow volume.
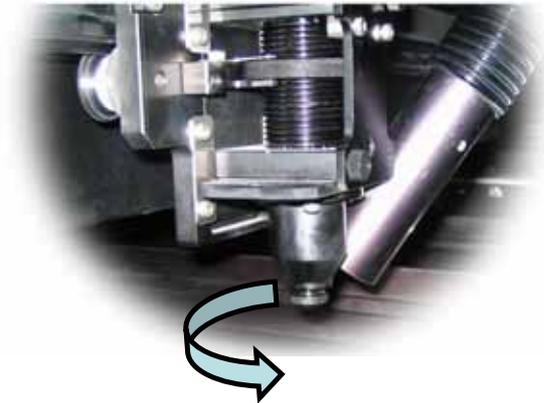
4.1.10 Knife-shaped Cutting Table

Unique cutting table with tipped bars that can be easily adjusted without tools to create different levels of working depths. The cutting table of Gaia reduces laser reflections and delivers clear cutting edge.

![LaserPro logo](www.laserproi.com)

1) 3 levels of supporting slots design on cutting table for cutting bars.

2) 2 edges of knife-shaped cutting bar can be mounted by the thin edge or the thick edge.
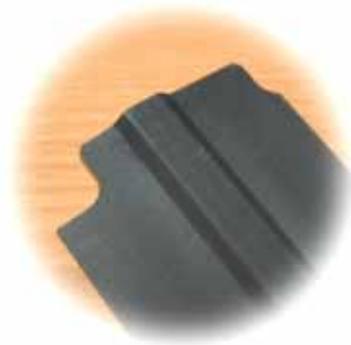
3) 6 different levels of depths created for different applications.

4.1.11 Connecting the Computer

The LaserPro Gaia can communicate with a computer through a USB Port or Parallel Printer Port connection interface. The USB Port connection offers faster file transfer rates and greater flexibility over the Parallel Printer Port connection. Regardless of the connectivity method chosen, you will need to connect the respective connection cable from the LaserPro Gaia to your computer.

USB Connectivity: Connect the included USB Port Cable to the USB Port on the right side of the LaserPro Gaia.

Printer Port Connectivity: Connect the included Printer Port Cable to the Printer Port on the right side of the LaserPro Gaia.

NOTE
If you have purchased additional Optional Accessories for the LaserPro Gaia, please refer to chapter VII for instructions on how to properly setup your optional accessories. These should be setup prior to working with your LaserPro Gaia.

4.2 Graphics Software Setup

The LaserPro Gaia is compatible with graphics software that can output HPGL commands, such as CorelDraw, Adobe Photoshop, AutoCAD, Illustrator etc.

Supported Graphic Software
- Photoshop
- CorelDraw
- Illustrator
- AutoCAD

Other software such as EngraveLab and PhotoGrav may work with the LaserPro Gaia, but these are not supported. Any software that can output to the LaserPro Print Driver should work.

NOTE
- Support will not be offered, if you experience output problems with non-supported graphics software.

4.2.1 Recommended Computer Configuration

The LaserPro Gaia operates under Windows operating systems and is designed to work on a computer that meets the following minimum requirements.

Computer
- CPU   Pentium 90 (or equivalent) or greater
- RAM   32MB or higher
- FDD   One 3.5" 1.44 MB Floppy Disk Drive
- HDD   1.2 GB Hard Drive or greater
- SVGA   15" Super VGA Monitor
- On Board Parallel Mode (Enabled from your motherboard's BIOS):
- SPP – Preferred Mode
- ECP – Cable (Less than 1.8 meters)

Software
- The LaserPro Gaia drivers are designed for Windows 2000, XP, or newly developed operating systems.

4.2.2 Installation of the LaserPro USB Driver

This section is only required for users that use USB connectivity. If you use the Parallel Printer Port connectivity, then you can skip this section.

> **NOTE**
> - Do NOT connect the USB cable to the PC before you have completed both the LaserPro USB driver and LaserPro print driver installation.
> - Install the LaserPro USB driver BEFORE installing the LaserPro Gaia print driver.
> - This set of USB drivers are not the same as the native USB drivers for Microsoft Windows.

1) Turn on your computer and insert the LaserPro CD.

2) From the auto run menu, select Gaia→ USB Driver to start the LaserPro USB Driver installation.

3) The LaserPro USB Driver installation program will update your Windows USB driver. When the notification pops up, select Yes to continue the installation.

4) Click Start to begin the installation.

4.2.3 Installation of the LaserPro Print Driver

1) Insert the LaserPro CD.

2) From the auto run menu, select Gaia→ LaserPro Driver to start the LaserPro Print Driver installation.

3) When the Add Printer Wizard menu comes up, click **Next** to continue.

4) At the Local or Network Printer page, select <Local printer attached to this computer>, then click **Next** to continue.

5) At the Select a Printer Port page, select <Use the following port> and select the port that the LaserPro Gaia will be attached to, then click **Next** to continue.

6) The next screen will prompt you with a list to select the manufacturer and model of your printer. From this menu, click Have Disk. Another menu will now pop up for you to indicate the location of the print driver. With the LaserPro CD still in your drive, click Browse and point to the file located at: E:\Gaia\LaserPro driver\WIN XP\Dv3.45\GL345.inf (where E is the driver letter assigned to your CD-Rom drive) and click OPEN to have Gaia displayed as a valid printer.

7) Now select Gaia from the list of printers (Gaia should be the only printer displayed on the list) and click **Next** to continue.

8) If a screen comes up informing you of the detection of a previous driver and asks to keep the existing driver or use the new one, select Replace Existing Driver and click Next to continue.

9) This screen will prompt you to provide a printer name. Simply type in <Gaia> and select Yes or No if you want to use this printer as the default printer and click **Next** to continue.

> *i* **NOTE**
> When working with the LaserPro Gaia Print Driver within your graphics software, you will need to have the Gaia set as the default printer to get proper output. If you select to not have the Gaia be the default printer, please remember to manually change this on your own from within the graphic software printer selection area or from the Windows Control Panel → Printers and Faxes section.

10) At the Printer Sharing screen, select <Do not share this printer> and click **Next** to continue.

11) Select <No> when asked if you want to print a test page and click **Next** to continue.

12) Now simply click Finish to complete the Add Printer Wizard.

13) Now the installation will proceed, if you get a Hardware Warning about the software you are installing for this hardware has not passed Windows Logo testing… simply click Continue Anyway to ignore this warning.

14) Congratulations, your printer driver has been successfully installed!

15) (This step is required only for USB connections) If you are using the Gaia's USB connection interface, then you will need to go to your Windows → Control Panel → Printer and Faxes. Right-click on the Gaia listing, and select properties. Go to the Ports menu and place a check next to GCC USB0, then click OK.

Chapter V - Operating the LaserPro Gaia

Once you have installed the LaserPro USB Driver (USB connectivity only), LaserPro Print Driver, and have connected the LaserPro Gaia to your computer, you will need to familiarize yourself with the LaserPro Gaia's control panel and LaserPro Print Driver. The print driver will be where you spend most of your time configuring specific laser parameters for your jobs, while the control panel will allow you to set repeat times, manipulate the file order, perform auto / manual focusing, configure the start point, and more.

> ℹ️ **NOTE**
> If you are using the water-cooled model, be sure to power on your water chiller before start operating Gaia. Water chiller temperature is recommend to set around 18~22℃. If you forget to start water chiller first, the laser will not fire. To solve this problem, just power on water chiller then restart Gaia.

5.1 Using the Hardware
5.1.1 Adjusting the LCD Display Screen's Contrast Setting

Depending on the lighting of your immediate work area, you may need to adjust the contrast of LCD display screen. You may increase or decrease the contrast via the contrast adjustment wheel found on the inside of the right shoulder. You can access this area by opening the front door and looking inside to the right shoulder (as shown in the picture below).
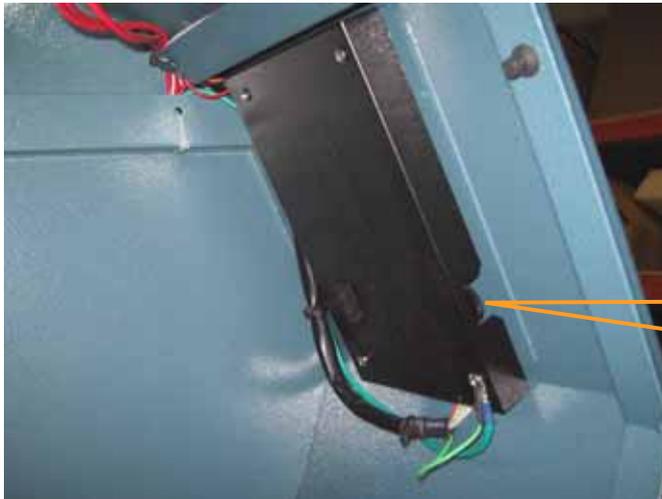
LCD Display Screen's Contrast Adjustment Wheel

![LaserPro logo - www.laserproi.com]

5.1.2 Graphic Control Panel Overview (Description)

The Control Panel

The control panel on the LaserPro Gaia provides an easy access to all the manual controls needed for cutting and engraving. The LCD screen, functional, directional and selection buttons make navigating through the machine's manual controls easy to do.

LED Indicator Lights

LCD Display Screen

Function Buttons

Directional and Selection Buttons
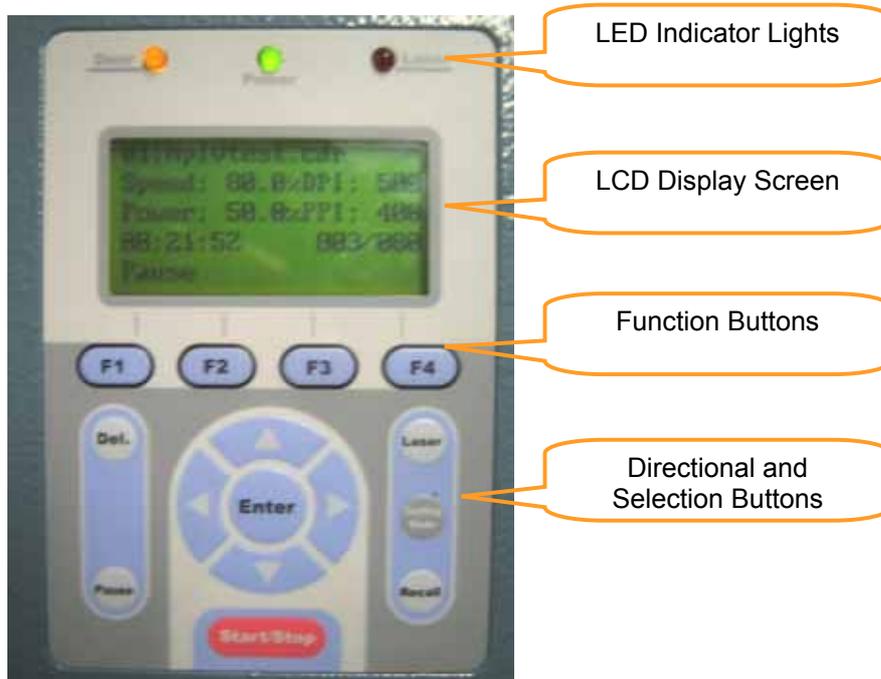
LED INDICATOR LIGHTS

Three indicator lights on the LaserPro Gaia's control panel are part of the system's safety interlock system.

- **DOOR** - The door light will illuminate when either the top lid or external pass through doors on the LaserPro Gaia are open or improperly closed.

- **POWER** - The power light will illuminate when the LaserPro Gaia is powered on.

- **LASER** - The laser light will illuminate when the laser is active and in operation.

DIRECTIONAL AND SELECTION BUTTONS

Function (F1 / F2 / F3 / F4)
Four function buttons allow you to select various functions, which will change depending on what section of the menu you are in. Each function button's corresponding function will be displayed right above its respective button on the LCD display screen. Please note that in certain menus, not every function button will always be mapped to a corresponding action. In these situations, that particular button will not have a function.

Directional ($\triangle$ / $\triangledown$ / $\triangleleft$ /$\triangleright$)
Four directional buttons allow you to navigate the selection cursor through the control panel menu and adjust the value of specific settings. In general, the $\triangle$ **/** $\triangledown$ directional buttons cycle through the various selections, while the $\triangleleft$ **/** $\triangleright$ directional buttons adjust the value of that particular selection.

Enter – Confirms the current selection.

Start / Stop – Allows you to start or stop engraving jobs, once those jobs have been successfully loaded onto the system.

Delete - Provides quick access to delete the current job.

Pause – Pauses the current engraving process. Press again to resume the current process.

Cutting Mode – Cutting mode key would access to the three options of cutting quality and speed combination

LASER
The Laser hot key can easily switch the laser status between on and off . When the laser is off, the laser carriage would start to work without laser firing after pressing START/STOP key to better positioning the laser firing path. Once the position of laser firing is confirmed to be correct, then you can press the LASER key again to enable the laser, and start to laser engraving or cutting on materials.

Recall– The RECALL key makes the lens carriage applies the saved position as origin.

5.1.3 Graphic Control Panel Navigation Chart

```
                    ┌─────────────────────────┐
                    │     Main Work Page      │
                    └─────────────────────────┘
                                 │
                    ┌─────────────────────────┐
                    │     Functions Page      │
                    └─────────────────────────┘
        ┌────────────────────┼────────────────────────┐
┌──────────────────┐ ┌──────────────────────┐ ┌────────────────────────┐
│ File Management  │ │ Machine Setting Page │ │ Machine Information     │
│ Page             │ │                      │ │ Page                    │
└──────────────────┘ └──────────────────────┘ └────────────────────────┘
        │                       │
  ┌──────────────────┐   ┌──────────────────────┐
  │ Link / DLink Page│   │  Carriage Lock Page  │
  └──────────────────┘   └──────────────────────┘
  ┌──────────────────┐   ┌──────────────────────┐
  │ File Information │   │ Set Command Mode Page│
  │ Page             │   └──────────────────────┘
  └──────────────────┘   ┌──────────────────────┐
                         │   Save Position Page │
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │  Flash Memory Page   │
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │ Set File Save Mode   │
                         │ Page                 │
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │  Set Vector Mode Page│
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │  Tune Image Power    │
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │     Set Smooth       │
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │     Other Page       │
                         └──────────────────────┘
                         ┌──────────────────────┐
                         │     Reset Page       │
                         └──────────────────────┘
```
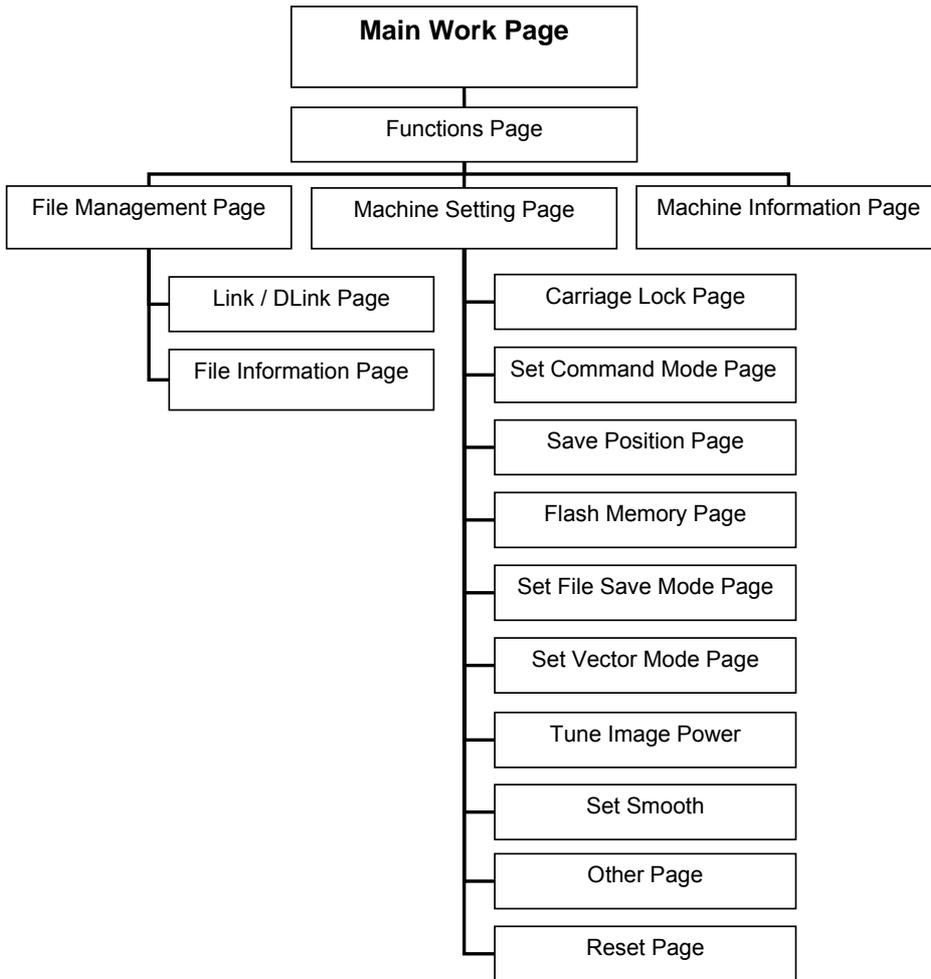
5.1.4 Graphic Control Panel Function Pages

When the LaserPro Gaia is powered on, the machine will perform a series of safety checks and initializing routines. The LCD display screen will display the GCC copyright, LaserPro logo, and machine initialization pages before going to the main work page.

Main Work Page

The main work page is the page that the LaserPro Gaia will default to upon startup and will be the "home base" for when navigating through the various functions of the control panel. This will be the page that is displayed when you are processing your jobs. This page contains specific job information such as the current job's name, Speed, Power, PPI, DPI, processing / remaining times, and jobs loaded.

Main Work Page	
Relevant Buttons	**Function**
F1 (Prev)	Scroll through previous jobs
F2 (Next)	Scroll through next jobs
F3 (Z)	Go to Carriage / Work Table Adjustment Page
F4 (Func)	Go to Functions Page
△ / ▽ / ◁ / ▷ Directional	Go to Carriage / Work Table Adjustment Page
Start / Stop	Start / Stop the current job
Delete	Delete the current selected job
Cutting Mode	Set Acceleration

Carriage / Work Table Adjustment Page

☼ **Navigating to this page:**

```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │
            │  Press △, ▽, ◁, ▷, or F3
            ▼
┌─────────────────────────┐
│   Carriage / Work Table │
│     Adjustment Page     │
└─────────────────────────┘
```
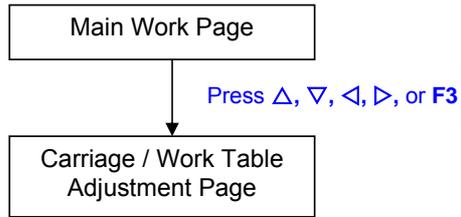
The Carriage / Work Table Adjustment Page allow you to manually increase and decrease the height of the work table (Z-axis). In addition, you can manually adjust the Y-axis and X-axis of the laser carriage.

Carriage / Work Table Adjustment Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Manually adjust the Y-axis position of the laser carriage
◁ / ▷ Directional	Manually adjust the X-axis position of the laser carriage
Start / Stop	Back to Main Work Page

Functions Page

☼ **Navigating to this page:**

Main Work Page

↓ Press **F4**
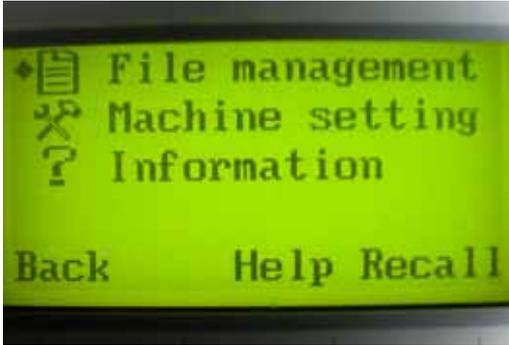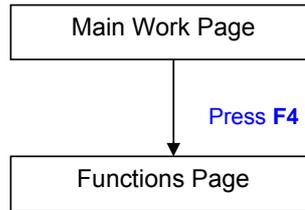
Functions Page

The Functions Page allows you to edit file management and machine settings. From this page, you will be able to access the File Management, Machine Setting, and Machine Information pages.

- **File Management Page** – this page allows you to manage the files that you have loaded onto the LaserPro Gaia.
- **Machine Setting Page** – this page allows you to access and modify various machine settings, including: Set Lens, Tune Auto Focus, Set Table Down, Set Red Beam, Carriage Lock, Set Command Mode, Save Position, Flash Memory, Set File Save Mode, Set Vector Mode, Tune Image Power, Set Laser Wattage, Set Fine Mode, Other, Reset.
- **Machine Information Page** – this page allows you to view information regarding the system such as the GCC logo, machine name, firmware version, and other information.

Functions Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F3 (Help)	Display help
F4 (Recall)	Back to previous page
△ **/** ▽ Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

Gaia User Manual

File Management Page

☼ **Navigating to this page:**

```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │
            │  Press F4
            ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
            │
            │  Select <File Management>
            │  from the menu
            ▼
┌─────────────────────────┐
│   File Management Page  │
└─────────────────────────┘
```
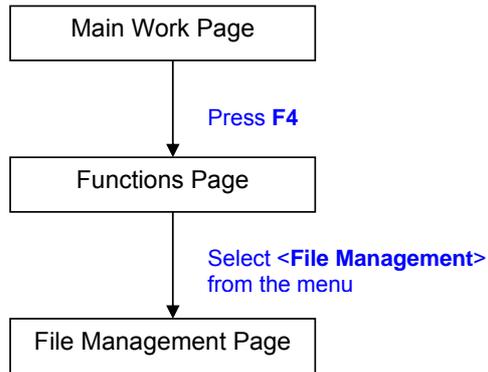
The File Management Page allows you to manage the files that you have loaded onto the LaserPro Gaia. You can scroll through your jobs, delete a selected job, delete all jobs, and go to the Link/DLink Page to set and arrange multiple loaded jobs into a single job queue for processing.

File Management Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Link)	Go to the Link/DLink Page
F3 (D-All)	Delete all loaded jobs
F4 (Del)	Delete the selected job
△ / ▽ Directional	Scroll through your loaded jobs
Enter	Go to the File Information Page for the selected job
Start / Stop	Go to the Main Work Page for the selected job

Link/DLink Page

☼ **Navigating to this page:**

```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │
            │ Press F4
            ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
            │
            │ Select <File Management>
            │ from the menu
            ▼
┌─────────────────────────┐
│  File Management Page   │
└─────────────────────────┘
            │
            │ Press F2
            ▼
┌─────────────────────────┐
│    Link / DLink Page    │
└─────────────────────────┘
```
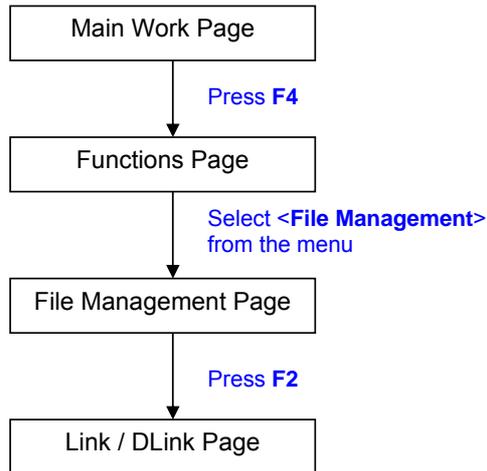
The Link/DLink Page allows you to set, arrange, and remove loaded jobs to and from a job queue for processing. Use the directional keys to cycle through your loaded jobs, then simply press the <F2 (Link)> key to add a file to the job queue. The job queue will be set in a sequential order based on the order you link the files. To remove a job from your job queue, press the <F4 (DLink)> key.

The first column field (before the file name) displays the job number. The sequence for your job queue is displayed in the two columns to the right of your file names. The first column to the right of your job file name displays the job number of the previous file in the job queue sequence. The second column after the file name displays that job's next file in the job queue sequence. First and last jobs in the job sequence you set will have a (---) in the first and second columns respectively. So according to the image above, the job queue sequence has been set to be processed in this order: 03:Marble.cdr → 01:Marble.cdr → 02:Marble.cdr.

Link/DLink Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Link)	Add the currently selected job to the job queue
F4 (DLink)	Remove the currently selected job from the job queue
△ / ▽ Directional	Scroll through your loaded jobs
Start / Stop	Back to Main Work Page

File Information Page

☼ **Navigating to this page:**

Main Work Page

Press **F4**

Functions Page

Select <**File Management**>
from the menu

File Management Page

Select a job file and
press **Enter**

File Information Page
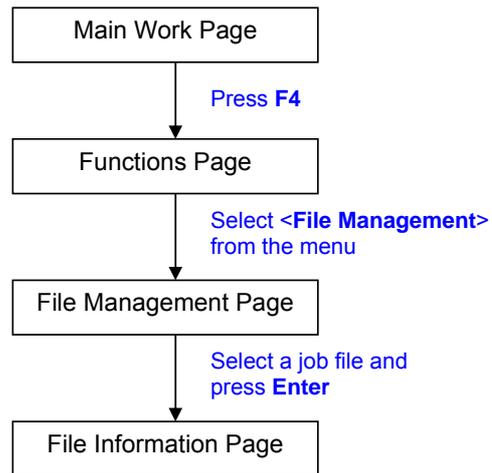
The File Information Page allows you to view the speed, power, DPI, and PPI settings of the selected job. In addition, you will be able to go to the File Management Edit Page from this menu to change raster / vector speed and power settings for the selected job.

File Information Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Edit)	Go to the File Management Edit Page for the selected job
Start / Stop	Back to Main Work Page

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File Management Edit Page

☼ **Navigating to this page:**

```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
              │ Press F4
              ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
              │ Select <File Management>
              │ from the menu
              ▼
┌─────────────────────────┐
│   File Management Page  │
└─────────────────────────┘
              │ Select a job file and
              │ press Enter
              ▼
┌─────────────────────────┐
│   File Information Page │
└─────────────────────────┘
              │ Press F4
              ▼
┌─────────────────────────┐
│ File Management Edit Page│
└─────────────────────────┘
```
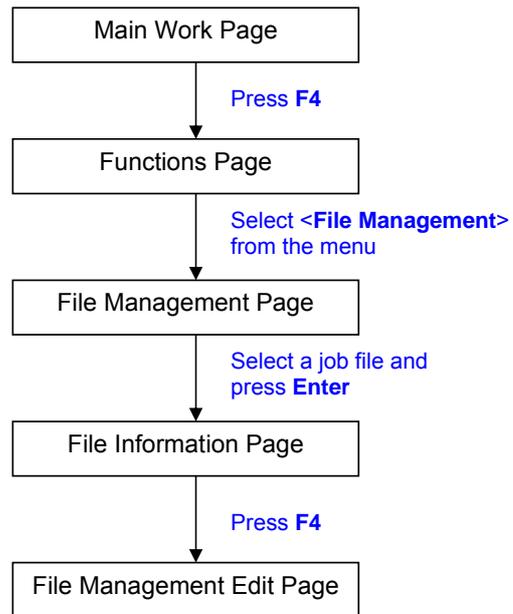
The File Management Edit Page allows you the choice to modify your raster or vector settings for the selected job, as well as setting the number of times to repeated the process of the job selected (Repeat Num).

File Management Edit Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Cycle through the available selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

![LaserPro logo](www.laserpro.com)

File Edit Raster Page

☼ **Navigating to this page:**

```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │ Press F4
            ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
            │ Select <File Management>
            │ from the menu
            ▼
┌─────────────────────────┐
│  File Management Page   │
└─────────────────────────┘
            │ Select a job file and
            │ press Enter
            ▼
┌─────────────────────────┐
│   File Information Page │
└─────────────────────────┘
            │ Press F4
            ▼
┌─────────────────────────┐
│ File Management Edit Page│
└─────────────────────────┘
            │ Select <Raster Setting>
            │ from the menu
            ▼
┌─────────────────────────┐
│   File Edit Raster Page │
└─────────────────────────┘
```
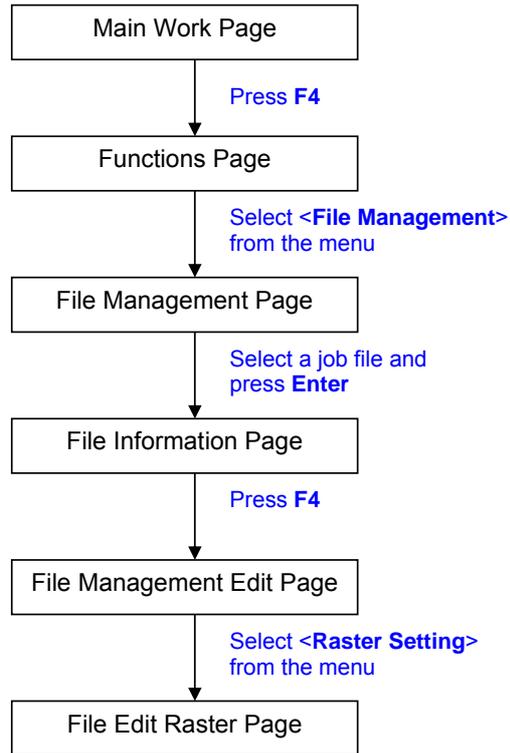
The File Edit Raster Page allows you to edit the raster power and speed settings, as well as enable or disable SmartACT for the selected job. These settings correspond to the same settings found on the LaserPro Gaia print driver. This page allows you to easily adjust these values to make immediate adjustments while processing your loaded jobs, even when you have disconnected your computer from the LaserPro Gaia.
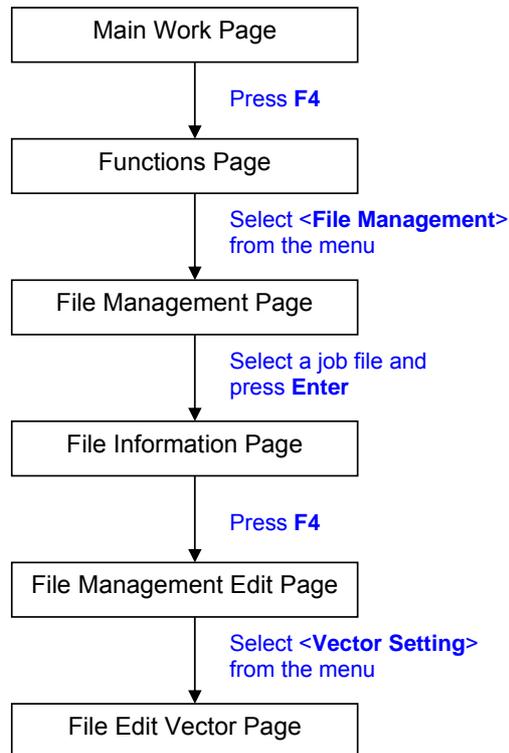
- Raster Power: 0.0% - 100%
- Raster Speed: 0.0% - 100%
- SmartACT: YES / NO

File Edit Raster Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page

File Edit Vector Page

☼ **Navigating to this page:**


```
Main Work Page
```
Press **F4**
```
Functions Page
```
Select <**File Management**>
from the menu
```
File Management Page
```
Select a job file and
press **Enter**
```
File Information Page
```
Press **F4**
```
File Management Edit Page
```
Select <**Vector Setting**>
from the menu
```
File Edit Vector Page
```

The File Edit Vector Page allows you to edit the vector pen, vector power, vector speed, and vector PPI, and power ramp settings for the selected job. These settings correspond to the same settings found on the LaserPro Gaia print driver. This page allows you to easily adjust these values to make immediate adjustments while processing your loaded jobs, even when you have disconnected your computer from the LaserPro Gaia.

- Vector Pen: 1 - 16
- Vector Power: 0.0% - 100%
- Vector Speed: 0.0% 100%
- Vector PPI: 30 - 1524
- Power Ramp: YES / NO

File Edit Vector Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page

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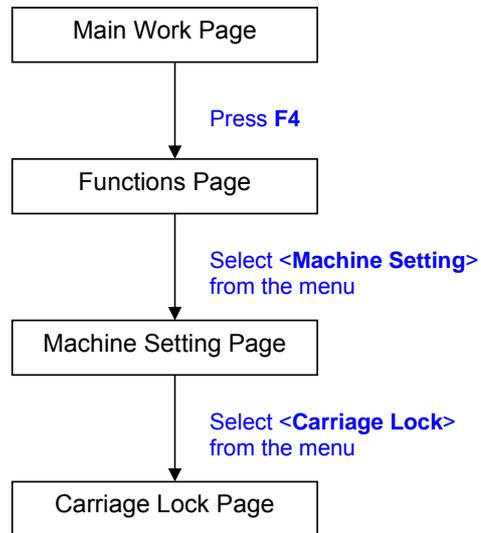www.laserproj.com

Machine Setting Page
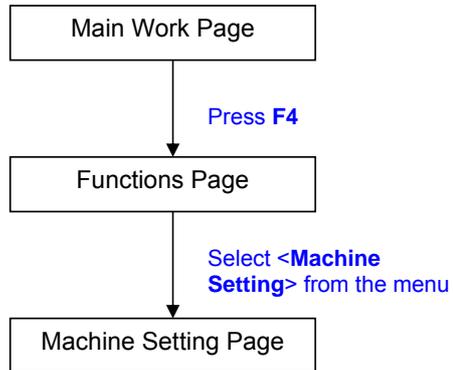
The Machine Setting Page allows you to access and modify a variety of your machine settings, including: Set Lens, Tune Auto Focus, Set Table Down, Set Red Beam, Carriage Lock, Set Command Mode, Save Position, Flash Memory, Set File Save Mode, Set Vector Mode, Tune Image Power, Set Laser Wattage, Set Fine Mode, Other, and Reset.

Machine Setting Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

Carriage Lock Page

☼ **Navigating to this page:**

```
┌─────────────────────┐
│   Main Work Page     │
└─────────────────────┘
          │
          │  Press F4
          ▼
┌─────────────────────┐
│   Functions Page     │
└─────────────────────┘
          │
          │  Select <Machine Setting>
          │  from the menu
          ▼
┌─────────────────────┐
│ Machine Setting Page │
└─────────────────────┘
          │
          │  Select <Carriage Lock>
          │  from the menu
          ▼
┌─────────────────────┐
│  Carriage Lock Page  │
└─────────────────────┘
```

The Carriage Lock Page allows you to set whether the laser carriage is locked or free. If the Carriage Free setting is set to <YES>, then you will be able to manually move the laser carriage along the X and Y axis by hand with the top door open. Whereas setting the Carriage Free to <NO> will lock the laser carriage, and movement or positioning can only be done by the control panel.
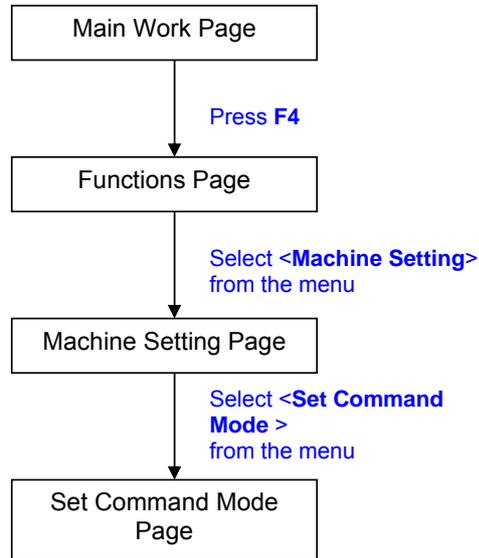
- Carriage Free YES / NO

Carriage Lock Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Carriage Free between YES / NO
Start / Stop	Back to Main Work Page

Set Command Mode Page

☼ **Navigating to this page:**

Main Work Page

Press **F4**

Functions Page

Select <**Machine Setting**> from the menu

Machine Setting Page

Select <**Set Command Mode** > from the menu

Set Command Mode Page

The Set Command Mode Page allows you to configure vector settings when outputting in Default or HPGL mode. Default mode is the standard Windows print driver recognized by the most popular graphic software programs, such as CorelDraw, Photoshop, Illustrator, etc. Whereas, HPGL mode is a less common output format generated from some RIP applications (signage industry). Regardless of which format you will be working with, both output formats are supported.
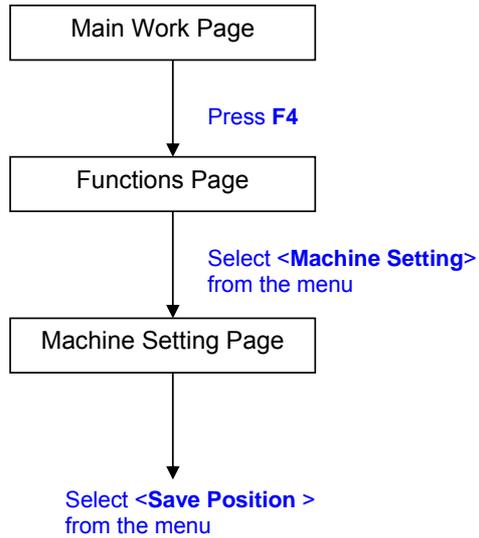
- Mode: Default / HPGL
- Vector Pen: 1 - 16
- Vector Speed: 0.0% - 100%
- Vector PPI: 0.0% - 100%
- Power Ramp: YES / NO

Set Command Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page

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Save Position Function

☼ **Navigating to this page:**

```
Carriage Lock
Set Command Mode
◆Save Position
Flash Memory
Back
```

Main Work Page

Press **F4**

Functions Page

Select <**Machine Setting**> from the menu

Machine Setting Page
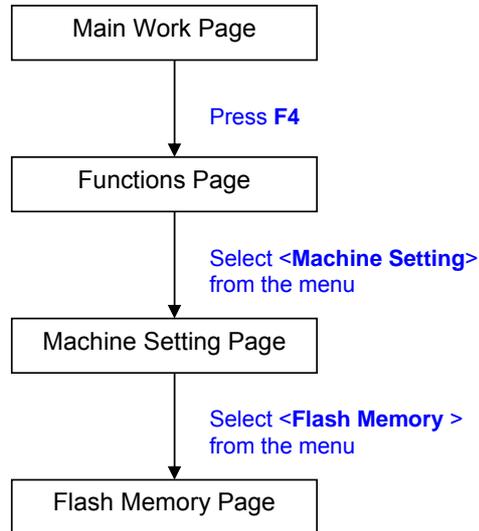
Select <**Save Position** > from the menu

The Save Position Function allows you to save the current X-axis and Y-axis positions of the laser carriage and sets this position to be the origin for subsequent jobs.

TIP

This is an excellent function to use when you are processing identical items or engraving relatively smaller objects positioned away from the default start position (top left) of the work table.

![LaserPro logo](www.laserproj.com)

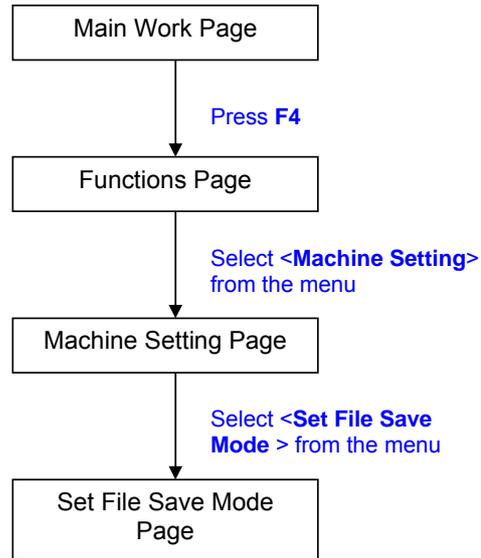**Flash Memory Page**

☼ **Navigating to this page:**


```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │
            │  Press F4
            ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
            │
            │  Select <Machine Setting>
            │  from the menu
            ▼
┌─────────────────────────┐
│   Machine Setting Page  │
└─────────────────────────┘
            │
            │  Select <Flash Memory >
            │  from the menu
            ▼
┌─────────────────────────┐
│    Flash Memory Page    │
└─────────────────────────┘
```

The Flash Memory Page allows you to read and write data with the optional SmartMEMORY module installed. Selecting <Write Flash Memory> will copy all current jobs from the LaserPro Gaia to the SmartMEMORY module. Selecting <Read Flash Memory> will copy all job files from the SmartMEMORY module to the LaserPro Gaia.

Flash Memory Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

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Set File Save Mode Page

☼ **Navigating to this page:**

Main Work Page

↓ Press **F4**

Functions Page

↓ Select <**Machine Setting**> from the menu

Machine Setting Page

↓ Select <**Set File Save Mode** > from the menu

Set File Save Mode Page

The Set File Save Mode Page allows you to set whether or not the LaserPro Gaia automatically deletes each job file after processing. Setting File Save to <NO> will automatically and immediately delete each job file from the LaserPro Gaia after the engraving or cutting process. Setting File Save to <YES> will retain all job files on the LaserPro Gaia, even after each job has been processed.

- File Save: YES / NO

Set File Save Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle File Save between YES / NO
Start / Stop	Back to Main Work Page

Set Vector Mode Page

☼ **Navigating to this page:**

```
┌─────────────────────┐
│   Main Work Page    │
└─────────────────────┘
           │
           │  Press F4
           ▼
┌─────────────────────┐
│   Functions Page    │
└─────────────────────┘
           │
           │  Select <Machine Setting>
           │  from the menu
           ▼
┌─────────────────────┐
│ Machine Setting Page│
└─────────────────────┘
           │
           │  Select <Set Vector Mode>
           │  from the menu
           ▼
┌─────────────────────┐
│  Set Vector Mode Page│
└─────────────────────┘
```
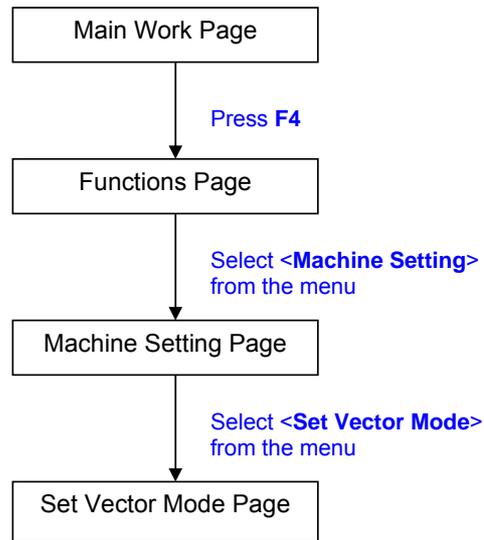
The Set Vector Mode Page allows you to adjust and balance vector mode's quality and speed settings based on your specific job. Speedy Vector Mode offers the highest output speed, sacrificing quality. Whereas Quality Vector Mode offers the highest quality, sacrificing output speed. Keep in mind that speed and quality are usually at a tradeoff. The system's default is Fine Vector mode, sacrificing some speed for higher quality. The LaserPro Gaia's default setting is <Fine Vector>.

- Modes: Quality Vector, Fine Vector, Coarse Vector, Speedy Vector
  (Slower speeds / higher quality -------------------- Faster speeds / lower quality)

Set Vector Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Set Vector Mode between QUALITY VECTOR / FINE VECTOR / COARSE VECTOR / SPEEDY VECTOR
Start / Stop	Back to Main Work Page

Set Smooth Page

☼ **Navigating to this page:**


```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
           │  Press F4
           ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
           │  Select <Machine Setting>
           │  from the menu
           ▼
┌─────────────────────────┐
│  Machine Setting Page   │
└─────────────────────────┘
           │  Select <Set Smooth> from
           │  the menu
           ▼
┌─────────────────────────┐
│     Set Smooth Page     │
└─────────────────────────┘
```
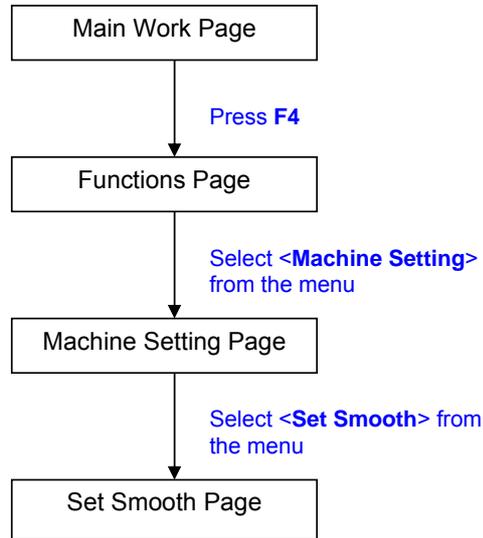
The Set Smooth Page makes you choose whether to move with more precision, or have a clearer cutting edge. With Fine Mode set to <YES> will provide higher quality in cutting edge. With Fine Mode set to <NO> will provide more accuracy to laser path. Default set to <Yes>.

- Smooth : YES / NO

> **TIP**
> If you are cutting materials like thick acrylic, then set smooth function "YES" to have better quality output. When you are cutting materials like textile which need more accuracy, please set smooth function to "NO".

Set Fine Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Fine Mode between YES / NO
Start / Stop	Back to Main Work Page

LaserPro®
www.laserproi.com

Other Page

☼ **Navigating to this page:**

```
┌─────────────────────────┐
│    Main Work Page       │
└─────────────────────────┘
            │
         Press F4
            ↓
┌─────────────────────────┐
│    Functions Page       │
└─────────────────────────┘
            │
    Select <Machine Setting>
    from the menu
            ↓
┌─────────────────────────┐
│  Machine Setting Page   │
└─────────────────────────┘
            │
    Select <Other> from the
    menu
            ↓
┌─────────────────────────┐
│      Other Page         │
└─────────────────────────┘
```
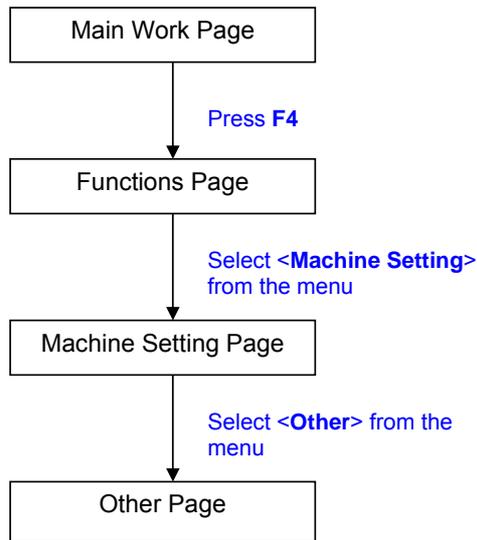
The Other Page allows you to change various settings that correspond to the control panel. The Language setting will allow users to change available languages displayed by the control panel. The Unit setting will allow you to change whether the units displayed by the control panel is in the metric or imperial system. The EOF (end of file) Alarm setting will enable or disable an audible notification when your jobs are complete. The Air Delay setting allows you to specify the delay in seconds of the SmartAIR air-assist after the point of laser firing.

- Language: ENGLISH (others dependent on Firmware)
- Unit: METRIC / ENGLISH
- EOF Alarm: YES / NO
- Air Delay: 1-100 seconds

TIP
Depending on the material you are engraving with, your laser settings, and the desired results, please experiment with the air delay to achieve your desired results.

Other Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page

Reset Page

☼ **Navigating to this page:**

```
┌─────────────────────┐
│  Main Work Page     │
└─────────────────────┘
          │
          │   Press F4
          ▼
┌─────────────────────┐
│  Functions Page     │
└─────────────────────┘
          │
          │   Select <Machine Setting>
          │   from the menu
          ▼
┌─────────────────────┐
│ Machine Setting Page│
└─────────────────────┘
          │
          │   Select <Reset> from the
          │   menu
          ▼
┌─────────────────────┐
│   Reset Page        │
└─────────────────────┘
```
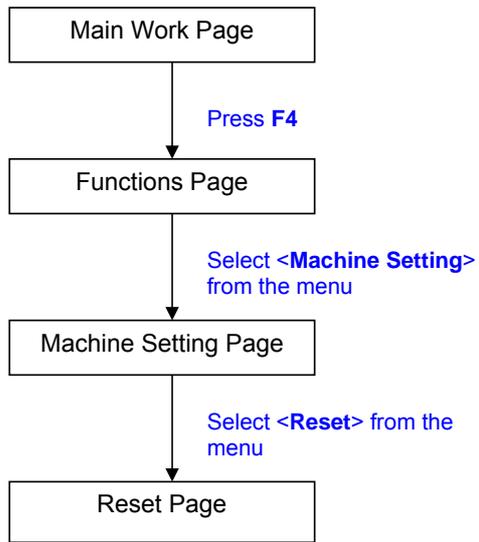
The Reset Page allows you to reset all changes made to the LaserPro Gaia's Machine Settings Page to their default settings. This does not affect the settings saved to an image file on the computer. The User Reset setting will set all settings back to the default. After any firmware updates, you must use the System Reset setting (your previous settings are saved).

- User Reset (will pop up a confirmation, press Enter to confirm and continue)
- System Reset (will pop up a confirmation, press Enter to confirm and continue)

Reset Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

Machine Information Page

☼ **Navigating to this page:**

Main Work Page

Press **F4**

Functions Page

Select <**Machine Information**>
from the menu

Machine Information Page
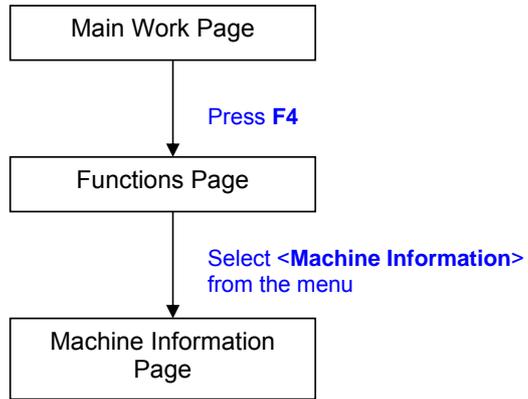
The Machine Information Page allows you to view information regarding the system such as the GCC logo, machine name, firmware version, and other information.

Machine Information Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through pages
Start / Stop	Back to Main Work Page

5.2 The LaserPro Gaia Print Driver

With the LaserPro Gaia print driver successfully installed, you will need to adjust the printer and page size default settings before you can begin editing and completing jobs. By doing so, you will be setting the work area in your graphics software to match the LaserPro Gaia's worktable area.

> ℹ️ **NOTE**
> Please make sure Gaia is set to the default printer before proceeding to the page and layout setup.

Ensure that the LaserPro Gaia has been selected as the DEFAULT PRINTER. You can do so by going into your Windows Control Panel → Printers and Faxes.

If LaserPro Gaia is not selected as DEFAULT PRINTER, you may set it up through the graphics software as well. The following example takes Corel Draw to demonstrate how to set up LaserPro Gaia as the Printer.

1)   From the primary menu, click FILE → PRINT SETUP.

2)   From the navigation bar Name, click Gaia → OK
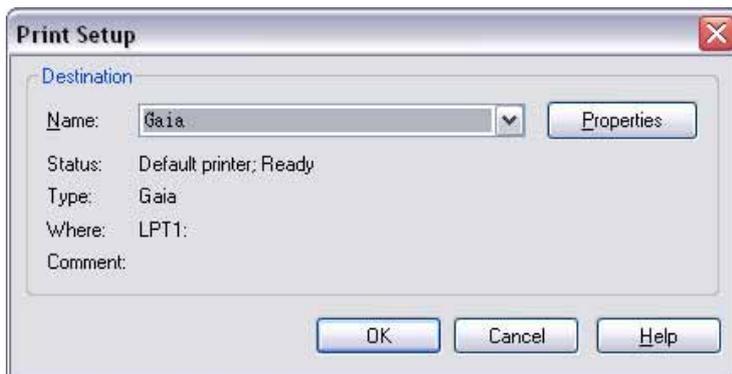
5.2.1 Page Setup and Orientation

The first thing you must do before working with the LaserPro Gaia Print Driver will be to make sure the page and layout settings are properly configured within your graphics software. You will need to access and edit the Page Setup or Layout page of your graphics software to set your graphics software's page layout to match the LaserPro Gaia's work table's dimensions and orientation.

From your graphic software's Page Setup page:
- Set the page orientation in the graphics software to Landscape mode.

- Set page size horizontal length to 1300 mm (51.1 inches) and vertical height to 916 mm (36.1inches).

Corel Draw Example (Page Setup and Orientation)

The following is an example of how to set the Page Setup and Orientation in the graphics software. CorelDraw is the designated graphics software used for this example. For other graphics software, you will need to access the corresponding Page Setup page.

1) From the primary menu, click LAYOUT → PAGE SETUP.

2) From the navigation bar on the left, click DOCUMENT → PAGE → SIZE.

3) Ensure that NORMAL PAPER and LANDSCAPE are selected.

4) Ensure the Paper Width and Height dimensions match the LaserPro Gaia's work table dimensions of 1300 mm (51.1 inches) and 916 mm (36.1 inches).

5) Click OK to complete the paper size adjustment.

> **TIP**
> Instead of manually selecting the Landscape and setting the Paper Width and Height, you can simply click the Set From Printer function and CorelDraw will automatically set the proper orientation and dimensions based on LaserPro Gaia's work table. (You MUST have the Gaia set as the default printer prior to doing this.)
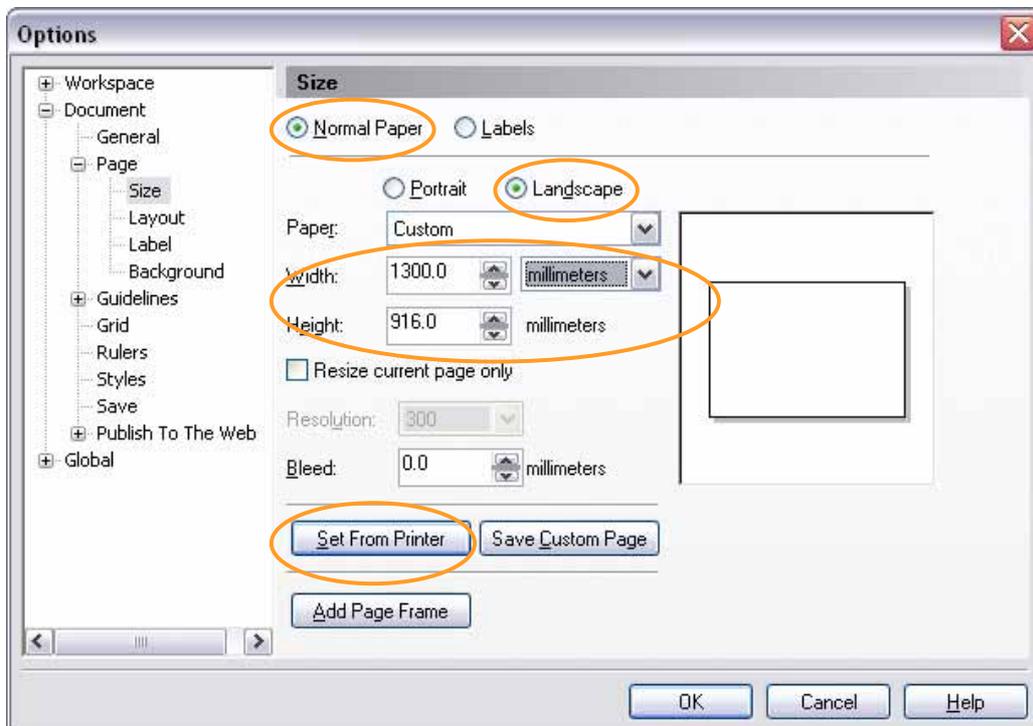
5.2.2 Color Management

LaserPro driver uses pen color settings to control laser engraver's engraving and cutting parameters. In addition to having your Page Setup and Orientation properly set in your graphics software, you will also need to make sure Color Management is DISABLED prior to working with the LaserPro Gaia Print Driver.

From your graphic software's Color Management page:
- Disable Color Management or set Color Management to Off.

Corel Draw Example (Color Management)

The following is an example of how to properly disable Color Management in the graphics software. CorelDraw is the designated graphics software used for this example. For other graphics software, you will need to access the corresponding Color Management page.

1) From the primary menu, click TOOLS → COLOR MANAGEMENT and CorelDraw's Color Management will appear.

2) Under the Style pull down menu, select COLOR MANAGEMENT OFF.

3) Click OK to complete the color management adjustments.
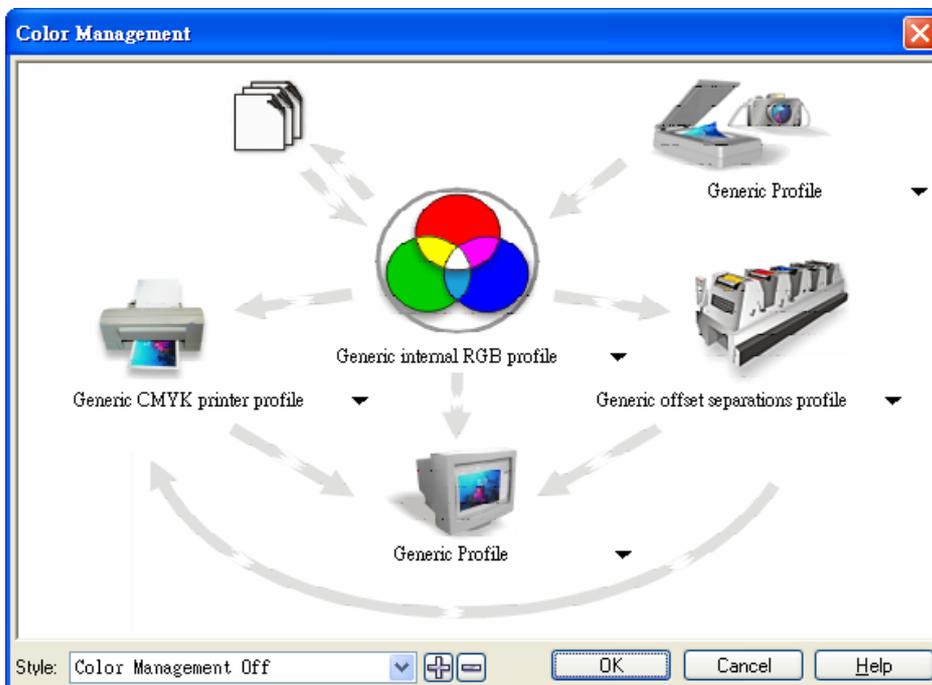
5.2.3 Using the LaserPro Gaia Print Driver

Now after you have properly set the Page and Layout and Color Management of your graphics software, you are ready to configure the details of your actual job through the LaserPro Gaia Print Driver. The LaserPro Gaia print driver allows you to adjust your engraving / cutting options. After you have setup your image, design, or text to be engraved in your software application, you can access the LaserPro Gaia print driver by going to FILE → PRINT → PROPERTIES.
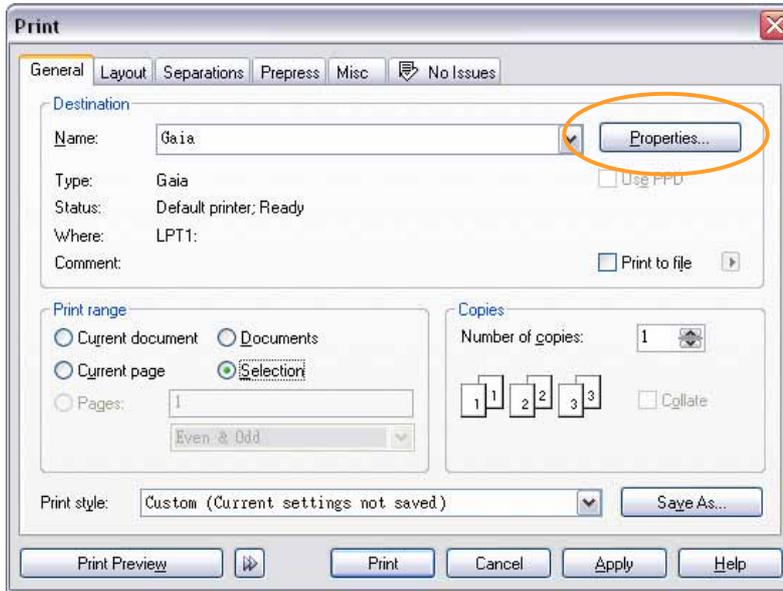
ℹ️ **Note**
For this screenshot example, CorelDraw was used as the software application.

The LaserPro Gaia Print Driver consists of seven primary sections (pages) in which you will be able to choose various engraving / cutting options and settings:
- Option Page
- Pen Page
- Advance Page
- Paper Page
- Language Page
- Raster Page (appears only in Black & White Mode)
- Stamp Page (appears only in Stamp Mode)

💡 **TIP**
The following sections describe the specific functions for each of the settings found in the LaserPro Gaia Print Driver. If you are new to laser engraving, it is recommended that you first familiarize yourself with the general principles of the laser process in

5.2.3.1 LaserPro Gaia Print Driver >> Option Page
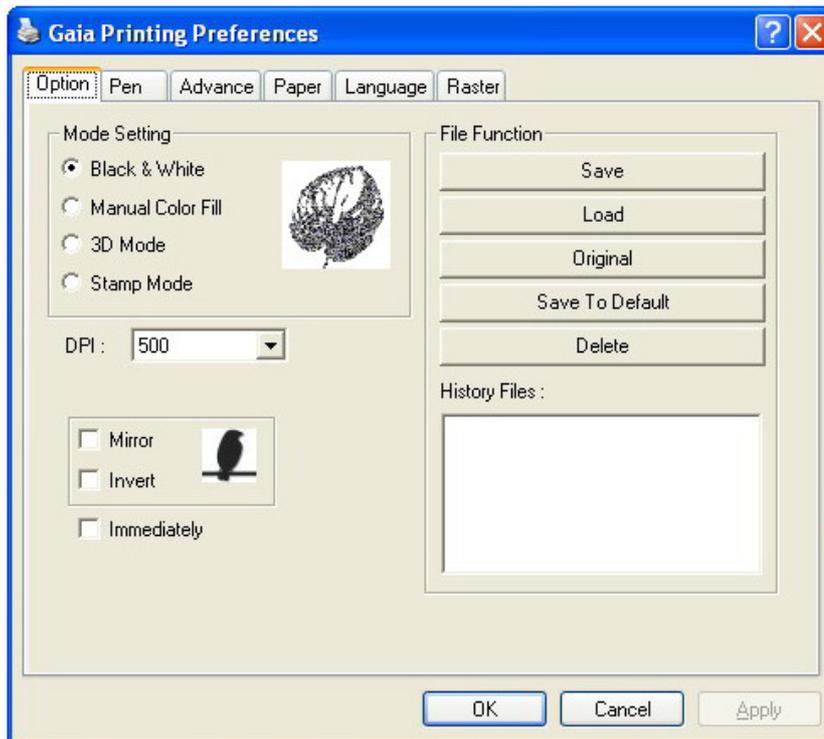
Mode Setting (OPTION PAGE)
[DEFAULT SETTING: Black & White]

You can select from four primary mode settings, depending on your application or results you would like to achieve.

Black & White: Select this mode when using clipart images or drawings with several colors, shades of gray, or many outlines. This mode outputs in a method similar to that of a black and white laser printer. The entire selected image will be engraved using a single set of power and speed settings (the black pen from the PEN menu. Please refer to the next section of the manual for details regarding the PEN functions). The LaserPro Gaia print driver will interpret colored and shaded areas as different shades of gray by producing a halftone effect while engraving. Instead of engraving only solid lines, gray/halftone areas will be a collection of dots with varying density.

The resolution and depth of these halftone areas can be adjusted with the DPI setting found on the Options page. Please note that selecting the Black & White mode will add a new Raster page to the

menu. The Black & White mode dithering settings can be changed from the Raster page. (Please refer to the Raster section below for details). Experiment with different dithering settings to attain the desired results.

> **TIP**
> The Black & White mode interprets the processed image by the varying colors and shades. For the best results, we suggest you convert the image to a grayscale image with your graphics software prior to engraving in the Black & White mode.

> **NOTE**
> Selecting the Black & White mode will enable the Raster page on the LaserPro Gaia Print Driver, allowing you to adjust advanced stamp-related settings.

Manual Color Fill: Select this mode when you would like to designate specific power and speed settings and link them to certain colors of your image. The LaserPro Gaia print driver allows a maximum of 16 pen parameters to be set.

3D Mode: Select this mode to attain a sculptured 3D effect on your engraving. By using images that have a range of gray areas, the LaserPro Gaia print driver can manipulate the image to give it an added depth, by linking the laser power (depth of engraving) to specific colors. The settings can be adjusted through the DPI setting (Option page) and PPI, power and speed settings (Pen page).

Stamp Mode: Select this mode when you would like to engrave stamps. The stamp mode is one of the more dynamic functions of the LaserPro Gaia. Due to the unique engraving nature when engraving a stamp, the stamp production requires different operational steps than most engraving or cutting operations.

> **NOTE**
> Selecting the Stamp mode will enable the Stamp page on the Gaia Print Driver, allowing you to adjust advanced stamp-related settings.

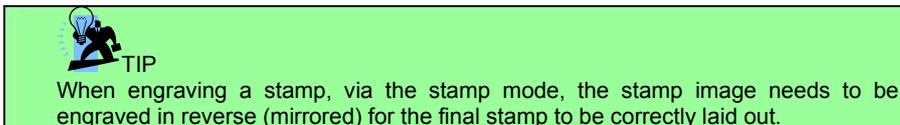### DPI (Option Page)
[DEFAULT SETTING: 500]

DPI (dots-per-inch) represents the number of times the laser will fire over a one-inch path. This setting determines the image resolution and quality when performing raster engraving functions. Higher DPI settings result in cleaner and deeper engravings, but require more time to complete. Lower DPI settings result in coarser and shallower engravings, but require less time to complete. The LaserPro Gaia offers 8 DPI options: 125, 250, 300, 500, 600 and 1000, experiment with different settings to get your desired effect.

Below is a chart for your convenience detailing the Set DPI (your input setting) vs. Actual DPI (your output results).

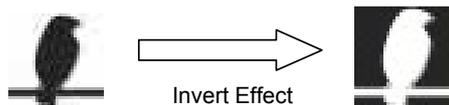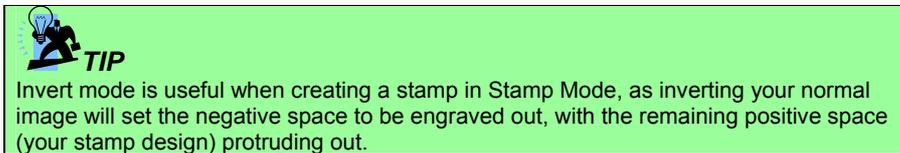| Set DPI	125	250	300 *	500	600 *	1000
Actual DPI	127	254	381	508	762	1016

Mirror (Option Page)
[DEFAULT SETTING: Unselected]

Checking this box will automatically engrave your image with a mirrored effect. This setting will flip the image along the Y-axis from left to right and vice-versa.

> **TIP**
> When engraving a stamp, via the stamp mode, the stamp image needs to be engraved in reverse (mirrored) for the final stamp to be correctly laid out.

Mirror Effect
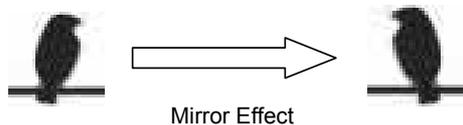
Invert (Option Page)
[DEFAULT SETTING: Unselected]

Checking this box automatically inverts / reverses the color of your image (the white areas become black and vice versa). The Invert option is not available if disabled with Manual Color File mode is selected.

> **TIP**
> Invert mode is useful when creating a stamp in Stamp Mode, as inverting your normal image will set the negative space to be engraved out, with the remaining positive space (your stamp design) protruding out.

Invert Effect

Print Immediately (Option Page)
[DEFAULT SETTING: Unselected]

Checking this will instruct the LaserPro Gaia to immediately begin the laser engraving process, when you select Print from your graphic software program. If Print Immediately is not checked, then selecting Print will transfer the job file to the LaserPro Gaia system and will need to be initialized from the LaserPro Gaia control panel.

SmartACT (Option Page)
[DEFAULT SETTING: Unselected]

SmartACT is reduces the amount of time it takes to process a job, by eliminating unnecessary travel of the laser carriage at the expense of some quality. Usually the quality loss is minimal, but will

depend on the image or design you are working with; please take some time to experiment with your particular design to determine whether the tradeoff is acceptable.

> **TIP**
> There is a greater performance gain when enabling SmartACT for designs that are vertically longer than they are horizontally wide, as the SmartACT optimization modifies the movement of the X-axis of the laser carriage.

File Function (Option Page):

The file function section allows you to manage various laser parameters. This section is useful when performing duplicate jobs on a variety of objects, allowing you to save your frequently used laser parameters and load them in the future.

- **History File:** This section contains a list of the recent files you have recently created and worked with.

- **Save:** This function will save the current print driver parameter settings to a file and location on your computer of your selection. (Saved parameter setting files will be tagged with the .Gai extension)

- **Load:** This function allows you load previously saved print driver parameters.

- **Original:** This function will load the print driver's original factory parameter settings.

- **Save To Default:** This function allows you to save your current print driver parameters as the default start-up settings.

- **Delete:** This function will delete the file you select from the History File section. Please note the Delete function only removes the file from the history file section, it does not remove the .Gai file from your hard drive, if you wish to completely remove the file from your hard disk, then you will have to manually delete the file from your operating system.)

> **NOTE**
> If you are using Windows 2000 or XP as your operating system, then make sure you log in with an administrator or administrator-rights account in order to properly save laser parameter settings.

5.2.3.2 Gaia Print Driver >> Pen Page

The LaserPro Gaia incorporates the use of 16 different colors to represent 16 different laser power and speed settings when cutting and engraving. These colors are referred to as "Pens". Think of each pen as a designated laser setting, rather than as a color. As an example, a black and white image will use only one power and speed laser setting (Black). An image that is made up of black, red and blue colors will be processed using the laser settings designated for each particular color. In order to utilize up to 16 different pens (laser parameter settings), make sure your graphics software can recognize and utilizes the 16 pen colors designated by the Gaia print driver.

If you would like to specify your own colors to designate to a particular laser setting, then all you have to do is to double-click on that particular pen color from the pen menu and a color manager window will open where you can select "define custom colors" to define your own color (shown in the picture below). This is useful when your image is composed of colors that are not part of the pen menu's default color selection, and instead of modifying your image, you simply assign the laser settings based on the existing colors based on your current image.
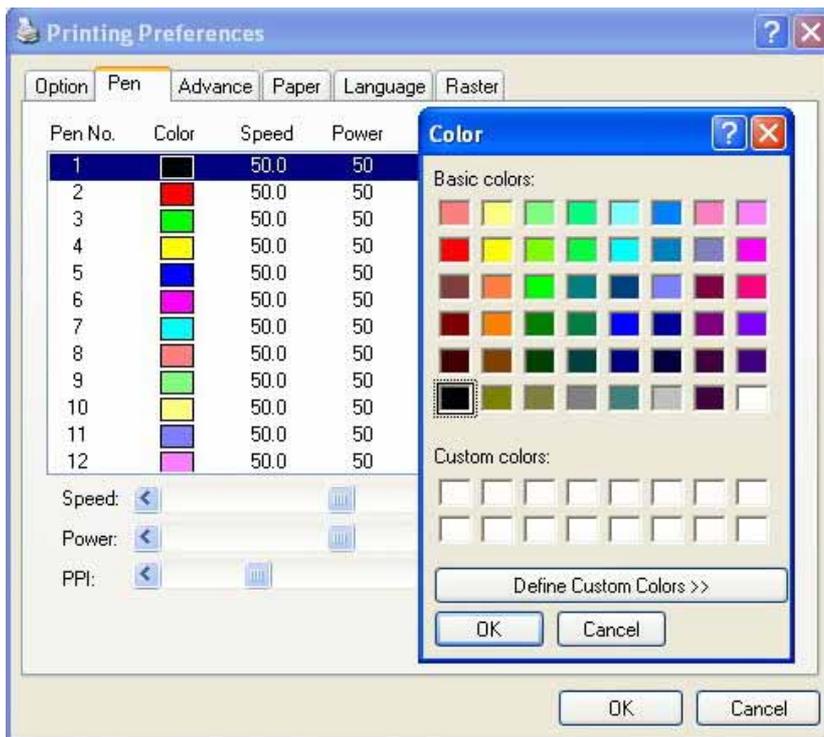
> ![NOTE icon] **NOTE**
> The Gaia print driver cannot store more than 16 pen colors or different laser parameter settings per file.

Speed (Pen Page)
[DEFAULT SETTING: 50]

The speed slider controls the laser's speed during operation (engraving speed) with a range setting from 0.1 – 100%. The Gaia's maximum laser processing speed is 30 inches per second, therefore a setting of 100% speed is equivalent to 30 inches per second and a 10% speed setting would be equivalent to 3 inches per second. Keep in mind, this is the speed the laser moves at when cutting or engraving straight lines. The machine will automatically slow down when processing curves.

> **TIP**
> Cutting / engraving depth and quality are determined by a combination of power and speed. Slower speeds at higher power will produce deeper cuts and engravings, whereas higher speeds at lower power will produce more shallow cuts and engravings.

Power (Pen Page)
[DEFAULT SETTING: 50]

The power slider controls the laser's power during operation (engraving power) with a range setting from 1 – 100%. The percentage setting represents the power for each laser pulse fired.

> **TIP**
> Cutting / engraving depth and quality are determined by a combination of power and speed. Higher power and slower speeds will produce deeper cuts and engravings, whereas lower power and higher speeds will produce more shallow cuts and engravings.

PPI (Pen Page)
[DEFAULT SETTING: 400]

PPI (pulses-per-inch) represents the number of times the laser pulses (fires) per linear inch, exclusive for vector cutting. Higher PPI settings will generate deeper, overlapping laser pulses, resulting in cleaner cuts. Lower PPI settings (lower than 150) will result in the individual laser pulses being spread apart, resulting in a perforated effect (similar to the perforation in the paper between mailing stamps).

If you drag the PPI slider to the furthest right (maximum), the value will change to X. This completely disables the PPI control and continuously fires the laser non-stop, without pulsing. Think of setting PPI to X as being equivalent to turning a water facet on with the water continuously flowing out. This also disables the power ramp functionality, which automatically controls the PPI depending on the speed of the laser carriage (such as vector cutting around the corner of a square).

> **TIP**
> For Vector Engraving jobs, we recommend a PPI setting > 150
> For Vector Cutting jobs, we recommend a PPI setting of > 400

Raster / Vector (Pen Page)
[DEFAULT SETTING: Selected]

Checking the Raster checkbox will process only the raster functions for the areas of your design that correspond to that particular "pen" color.

Checking the Vector checkbox will process the vector functions for the areas of your design that correspond to that particular "pen" color.

As an example: a particular "pen" color may be assigned to areas in your design containing color fills (raster engraving) and very thin lines (vector cutting). By checking / un-checking the Raster and Vector will force the driver to process / ignore the color fills / thin lines.

	Vector Checked	Vector Unchecked
Raster Checked	Processes both Vector and Raster functions for that particular color	Processes only the Raster functions for that particular color (Vector functions ignored)
Raster Unchecked	Processes only the Vector functions for that particular color (Raster functions ignored)	Does not process Vector or Raster functions for that particular color

Air (Pen Page)
[DEFAULT SETTING: Unselected]

This checkbox controls the SmartAIR air-assist function (if you have the optional air compressor installed). By selecting a pen color and checking this box will enable the SmartAIR air-assist function for that particular pen color. As an example, if you are performing a combination of both surface raster engraving job and deep vector cutting on a material such as acrylic, you may want to enable the SmartAIR air-assist for the vector cutting sections to get the cleanest cuts. To do this, you would simply need to select the pen color that you have assigned to the sections to be cut and select the Air checkbox for those particular pen colors.

5.2.3.3 Gaia Print Driver >> Advance Page
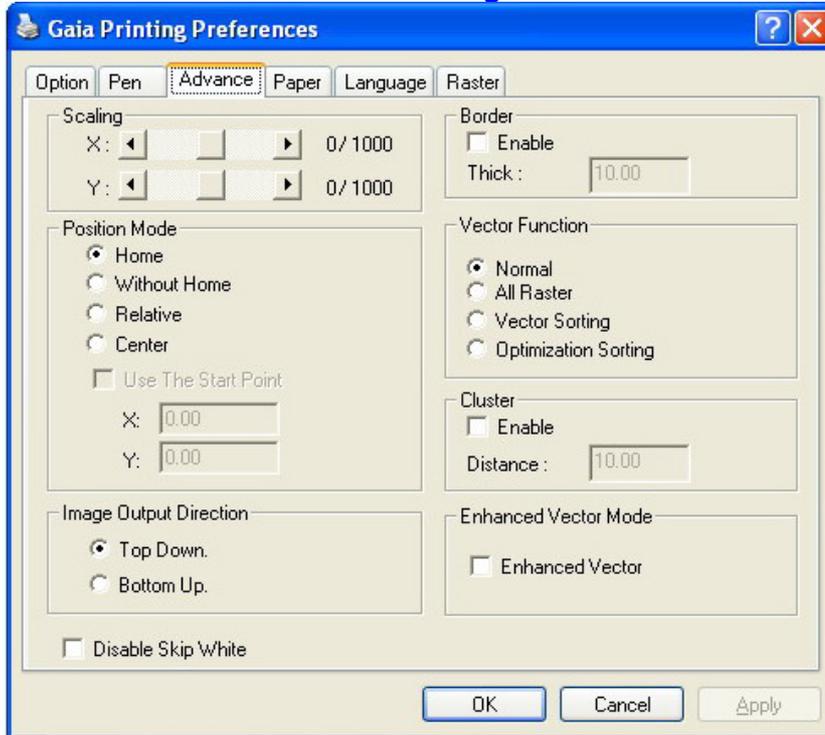
Scaling (Advance Page)
[DEFAULT SETTING: 0]

In some cases you may find a slight output inaccuracy in the actual output compared to what you have set in the computer. This margin of error or offset is extremely small (approximately 1/300). What this means is that there may be a 1-unit offset for every 300 unit increments. As an example, if you engrave a 300mm straight line, it may end up measuring only 299mm or 301mm in the final output. In this case, you will want to set the scaling setting to +1 / 1000 or -1 / 1000 respectively to compensate. A general rule of thumb is for every 300 unit increment, you will want to adjust the slider by +1 if the final output is 1 unit increment shorter or -1 if the final output is 1 unit increment longer than your graphic design setting.

Position Modes (Advance Page)
[DEFAULT SETTING: Home]

These selections allow you to control the positioning of the lens carriage after each job completion and before the next subsequent job.

- **Home:** Resets the positioning of the lens carriage to the 'home position' (upper-right) before and after each job.

- **Without Home:** The lens carriage will start the next job based on the position from its graphic application software setting, from the last position of the previous job. Upon completion of the current job, the lens carriage will remain at the last position of the previous job.

- **Relative:** This mode sets the current lens carriage position to correspond to the origin (top left) position of the graphic software. Therefore, the lens carriage will process the job from its current position relative to its setting in the graphics software.

- **Center:** Sets the current position of the lens carriage as the center point for your subsequent job. As an example, if the subsequent job is to vector cut a circle and you have the Position Mode set to Center, then the Gaia will vector cut a circle around the initial position of the lens carriage.

> **TIP**
> It is highly recommended you enable the red dot laser pointer when setting / adjusting the Position Modes, as this will ease your job positioning with more accuracy.

Image Output Direction (Advance Page)
[DEFAULT SETTING: Top to Bottom]

These selections allow you to control the direction in which the system processes an engraved image.

- **Top To Bottom:** Selecting this will force the system to process the current task by moving the laser carriage from the top to the bottom of the image (rear end to front end of the work table).

- **Bottom To Top:** Selecting this will force the system to process the current task by moving the laser carriage from the bottom to the top of the image (front end to rear end of the work table)

(Normally, the LaserPro Gaia engraves from left to right, top to bottom. Selecting Bottom Up will force the machine to start from the bottom and work its way to the rear of the working table.

> **TIP**
> In situations where the material you will be working with may produce a lot of dust byproducts and you are utilizing the optional air extraction system, it is recommended you select the Bottom To Top image output direction option. This will minimize the amount of dust byproducts lodged in the engraved sections as the air extraction system is vented from the rear of the machine, the same direction as the image is processed.

Border (Advance Page)
[DEFAULT SETTING: Unselected]

In cases where you are working with a negative image (negative outline areas of your image are engraved, rather than the positive areas), you may wish to include a border around your image. To properly add a border, you will first need to Invert your design from the Option Page, then check Use Border and specify a value for the thickness of the border you would like to add to your design.

This mode is useful for engraving rubber stamps, as it allows you to create the outline around your stamp image.

> **ⓘ *NOTE***
> If you wish to use the Border and Cluster function simultaneously, then the Border Thickness value must be **less than** the Distance value specified in the Cluster setting.

Vector Function (Advance Page)
[DEFAULT SETTING: Normal]

- **Normal:** This selection will not apply any special advanced vector function to your job. This is the default Vector Function setting.

- **All Raster Output:** This selection will instruct the print driver to process your entire image as a raster engraving. Any vector lines within the image will be treated as raster data and outputted as a raster engraving, similar to a dot-matrix printer.

- **Vector Sorting:** When performing a vector cutting job in which your image has one vector cut area enclosed within another vector cut area, select the Vector Sorting mode. This mode will automatically instruct the print driver to process the inside vector image and moving outwards. If you try to process a vector image that has multiple layers without using this mode, what may occur is the laser engraver may process the outer vector cutting first, and any inner vector cutting will not be possible as your centerpiece material may have dropped to the cutting table. This setting will always automatically direct the laser to cut from the inner most vector shape and move outwards.

- **Optimization Sorting:** This is a setting that will minimize your process time. When selected, the print driver will analyze your image and automatically determine the most efficient processing path to process your image.

Use Cluster (Advance Page)
[DEFAULT SETTING: Unselected]

This setting allows you to change how the Gaia interprets and processes individual / independent areas of an image in order to minimize job-processing times. The Cluster function is only applicable when multiple areas of an image are broken down and isolated from each other (areas not touching each other, blank space in-between). Another condition that must be met for the Cluster function is that these individual areas of your design must have some X-axis overlap, meaning that they should be to some extent side-by-side with empty spaces between them. The distance value can be set by the user and represents the limit or cutoff point in which side-by-side objects will be processed in Cluster mode or not. If the distance between side-by-side objects is greater than the set distance value, then the individual areas will be processed in Cluster mode. Conversely, if the distance between side-by-side objects is lesser than the set distance value, then the individual areas will be processed normally (not via Cluster mode).

An example of an image that would benefit from the Cluster function would be: 2 squares to be engraved, side-by-side on the X-axis with a 20 cm gap in between them. In this scenario, you would want to enable the Cluster setting and set the distance to a value less than 20. By doing so, the laser will completely process one square and "leap-frog" to the second square, rather than processing both squares simultaneously. The result: you shorten the processing time by minimizing the unnecessary travel distance the lens carriage needs to make across the X-axis in between squares, if they were to be processed simultaneously.

> **ⓘ** **NOTE**
> If you wish to use the Border and Cluster function simultaneously, then the Border Thickness value must be **less than** the Distance value specified in the Cluster setting.

Enhanced Vector Mode (Advance Page)
[DEFAULT SETTING: Unselected]

This setting allows you to improve the cutting quality at the expense of speed. Your engraving speed will be dropped by 50%, to maximize the cutting power. We recommend that you enable this function when cutting thicker materials.

5.2.3.4 Gaia Print Driver >> Paper Page
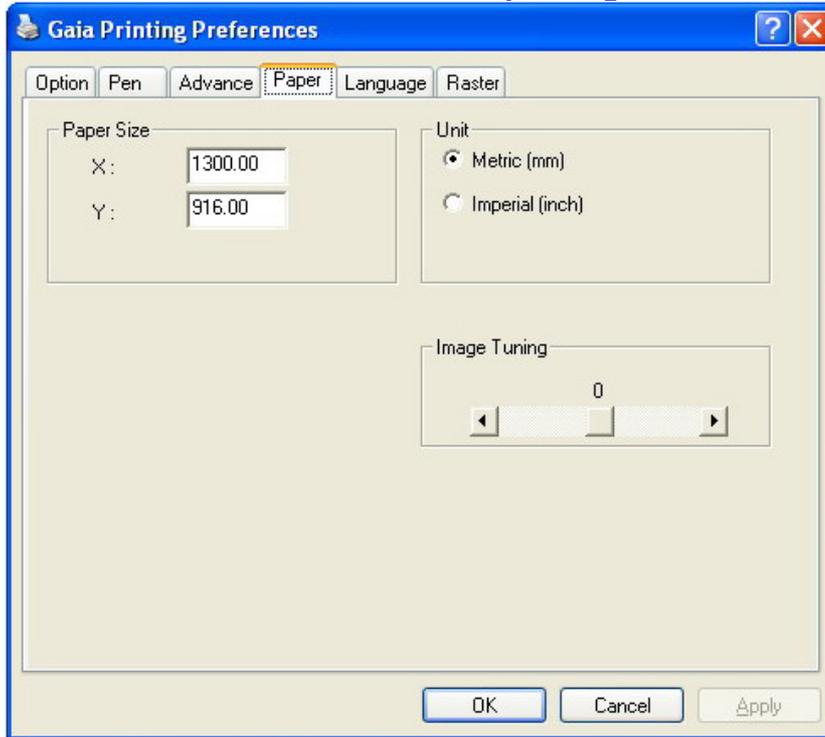
Paper Size (Paper Page)

The paper size represents your total work area. Ensure that the paper size is never set greater than the Gaia's worktable area of 51" x 36" (1300mm x 916mm) or 29" x 20" (740mm x 460mm) with the Extend option checked. The X value represents the length and the Y value represents the width.

> ℹ️ **NOTE**
> When using the optional rotary attachment system and with the Rotary Fixture option checked, the X value represents the length of your working piece. The Y value will be changed to Diameter, which represents the diameter of your working piece (at the position you wish to engrave).

Unit (Paper Page)
[DEFAULT SETTING: Metric (mm)]

Here you can set your preferred measurement standard in which you would like use with the Gaia print driver. You can choose between metric or imperial standards.

Image Tuning (Paper Page)
[DEFAULT SETTING: 0]

In the event that you are processing extremely fine and detailed designs requiring near-microscopic edge-to-edge precision, you will need to adjust the image tuning setting. To adjust this setting, we recommend that you engrave a small black square design as a sample and apply a magnifying glass to the engraved results.

When you look at your engraved test square under a magnifying glass, you may notice the edges of your square may be slightly offset, with every consecutive engraved even or odd line protruding past the square's ideal edge. This occurrence may occur on the left or right side of the square and can be compensated for by the image tuning setting. In the diagram below, the arrows refer to the direction the lens carriage is moving to generate that engraved line. If the first and every other line protrude to the **left** of the square's ideal edge, you will want to set the image tuning to a **negative value**. If the first and every other consecutive line protrude to the **right** of the square's ideal edge, you will want to set the image tuning to a **positive value**. The further the protruding lines are from the square's ideal edge, the larger you will need to set the Image Tuning value to compensate.
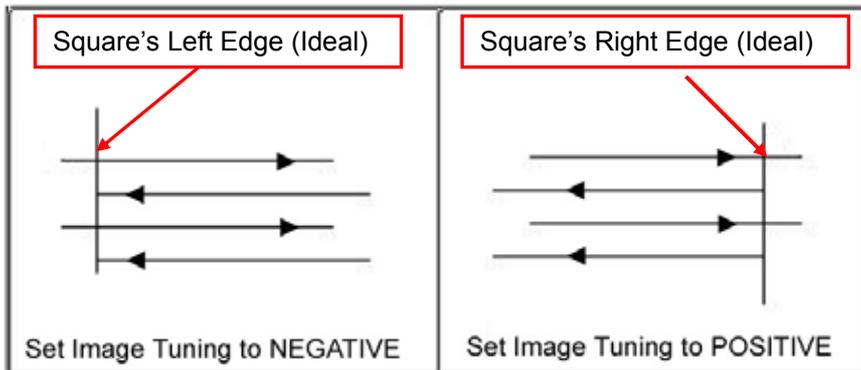
The following is an example that has the proper image tuning, and demonstrates this significance when engraving fine, small, intricate text. The following two pictures show engraved text magnified with no image tuning (left picture) and image tuning enabled (right picture).

5.2.3.5 Gaia Print Driver >> Language Page

This page allows you to specify the language displayed by the Gaia Print Driver. Current language options allow for: English, Spanish, French, and Chinese (Simplified, Traditional), Japanese, and German.
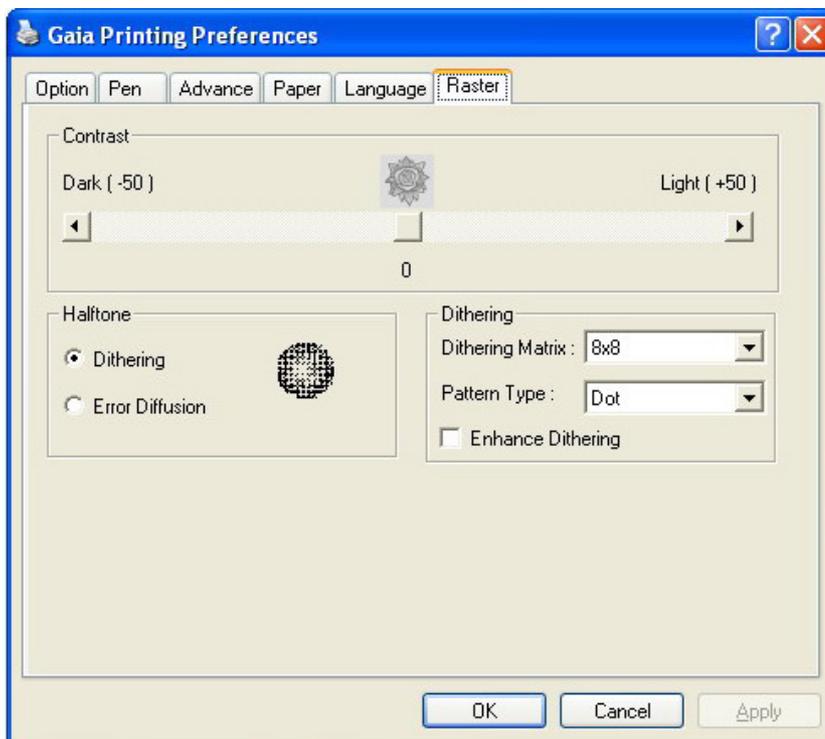

Uninstall Driver (Language Page)

Select this to uninstall the Gaia print driver. You will then need to restart your computer to complete the process.

5.2.3.6 Gaia Print Driver >> Raster Page

> ### ⓘ NOTE
> The Raster Page is only available when Black & White Mode Setting is selected from the Option Page; this page offers a number of advanced Raster Engraving output options.

Contrast (Raster Page)
[DEFAULT SETTING: 0]

This provides a quick and easy way to immediately adjust the contrast of an engraved image. Moving the slider to the Dark setting will increase the contrast levels of the engraved output, whereas moving the slider to the Light setting will decrease the contrast levels of the engraved output.

> ### 🏃 TIP
> There are other ways to adjust an engraved image's contrast such as: adjust the power / speed settings or simply adjust the contrast of the image in software with the graphic software application.

Halftone (Raster Page)
[DEFAULT SETTING: Dithering]

This option controls the way a raster-engraved image is processed. The "digital image to engraved output" process can be processed via two methods: Dithering or Error Diffusion. Each offer additional output options yielding different output effects, style, and quality.

- **Dithering:** Interprets and outputs the raster engraving via the dithering method. This mode will allow you to select the Pattern Type and Dithering Matrix, and Enhanced Dithering.

  o **Pattern Type: Dot, Bayer, Corner, 45 Degree**
    [DEFAULT SETTING: Dot]

    Each pattern type uses a different shape and arrangement of dots to compose the shading effect of a raster image.

    The following diagram is an example of the raster effects when using the different pattern types.


Dot	Bayer	Corner
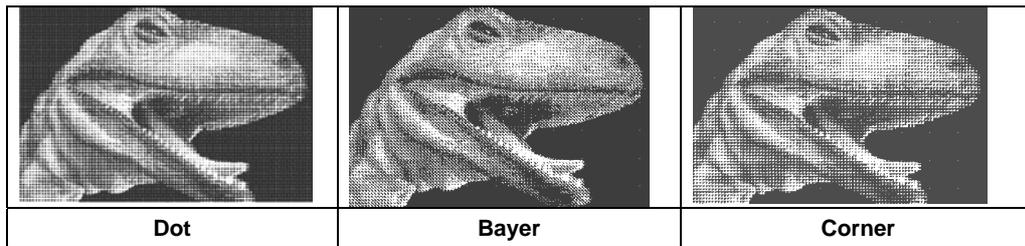
  o **Dithering Matrix:** *Variable depending on the Pattern Type selected.*
    [DEFAULT SETTING: 8x8]

    This controls the resolution (dot size) and the number of dots the image is broken down into for the dithering process. As an example, selecting 2 x 2 will shade with a 5-grade halftone, where as an 8 x 8 Dithering Matrix will dither with a 65-grade halftone.

    The following diagram is an example of the raster effects when using the different dithering matrices.

| 2 x 2 Dithering	8 x 8 Dithering	2 x 2 (Enhance Dithering)	8 x 8 (Enhance Dithering)
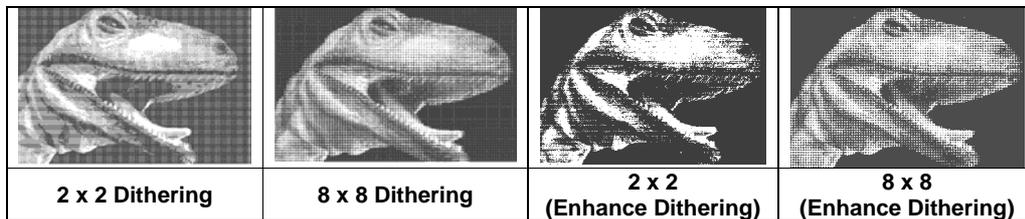
  o **Enhance Dithering**
    [DEFAULT SETTING: Unselected]

    Selecting this will produce a finer dithering output.

- **Error Diffusion (Raster Page):** Interprets and outputs the raster engraving via the error diffusion method. This mode will allow you to select from three diffusion types: Floyd, Stucki, and Jarvis.

  o **Diffusion Type: Floyd, Stucki, Jarvis**
    [DEFAULT SETTING: Floyd]

    Each diffusion type presents the shade of image as different spread halftones instead of dots to compose a raster image.

    The following diagram is an example of the raster effects when using the different diffusion types.

Floyd	Stucki	Jarvis
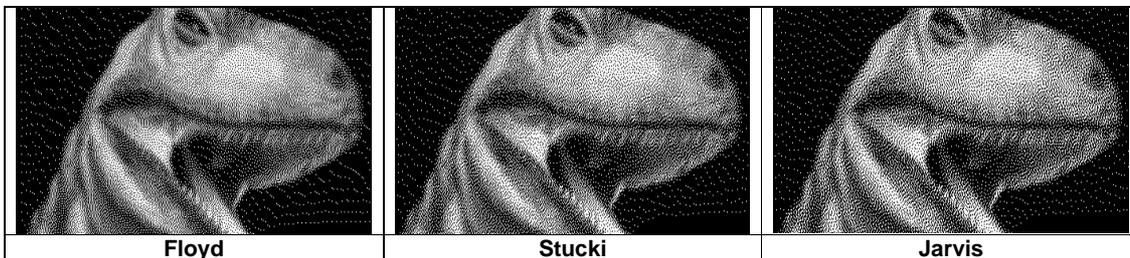
TIP
There is no "correct" or "best" setting when using the Raster options. The most appropriate settings will be based on a variety of factors: your design, the material you are engraving on, and the results you wish to achieve, etc. Please take some time to experiment with the multitude of raster options to get the one you feel is the best for your piece. This is where much of the fun in engraving is….experimentation!

5.2.3.7 Gaia Print Driver >> Stamp Page

Producing stamps require different operational steps than your standard engraving or cutting jobs. The Stamp page offers dynamic options allowing you to customize your stamp production process.

> **ⓘ NOTE**
> The Stamp page will only appear and be accessible when you have selected the Stamp Mode from the Option Page.

> **💡 TIP**
> Functions located on the other pages that are useful when making a stamp: **Set Shoulder, Pitch, Border, Invert,** and **Mirror**.

Ridge: "Contact section" of the

Slope of ridge (Shoulder Level)

Base of ridge (Pitch)

Pitch (Stamp Page)

Your stamp will be a reversed image composed of engraved depressions and ridges. Think of these ridges as the "contact sections" of the stamp. If the ridges of these contact sections are too thin, they may break. The Pitch setting allows you to increase the width of the ridge base, hence creating more stable "contact sections" and longer lasting stamp. The pitch value setting allows you to adjust the

base width of the ridge. Broad pitch gives the maximum amount of support for each ridge. Experiment with different pitch value settings in order to produce the stamp that is best suited for your application.

Adjustment Bar / Power Level (Stamp Page)

Another important aspect of creating a stamp is setting the slope level of the shoulder. The shoulder is the section from the "contact section" of the stamp to its base. This function allows you to adjust the slope for the shoulder sections of your stamp. By sliding the sliders or directly input of power levels, you will be able to change the slope of the shoulder.

> **ⓘ NOTE**
> The visual representations of the Pitch and Shoulder Levels in the Gaia driver are an exaggerated representation to allow for easy visual guidance and precise input. Remember we are working with distances less than 1 mm here.

Chapter VI - Engraving and Cutting Techniques

6.1 Raster Engraving

A laser engraver can process text, scanned image, digital picture, or design by "laser firing" grids / dots of individual pixels into a raster image. Think of this as simply "printing" your job onto any particular material. An example of a raster engraved piece would be a photo engraving on tile, as shown in the picture below.

6.2 Vector Cutting

A laser engraver can process text, design, and images composed of lines through continuous-firing of the laser to cut out various shapes. When performing vector cutting operations, imagine the lens carriage as a pair of scissors cutting out the lines specified in your design. An example of a vector cut piece would be a customized dining mat, as shown in the picture below.
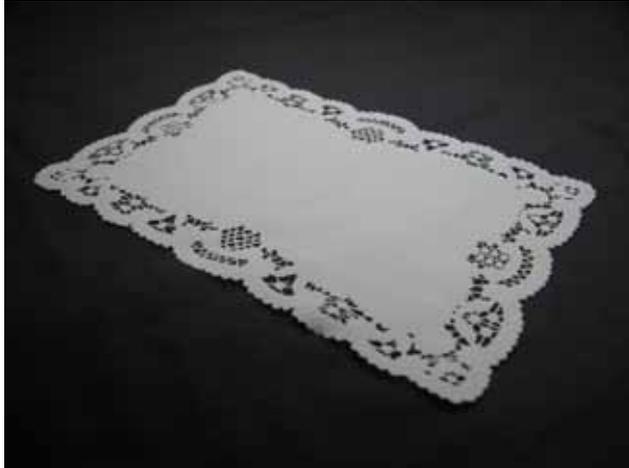
The Gaia Print Driver determines which sections should be raster engraved or vector cut based on the outline width of that particular area or section of the design. In order to prep a particular section for vector cutting, you will need to set that object's fill color to white and set its outline thickness between 0.001" (0.025mm) to 0.004" (0.1mm) via the graphics software.

Below is an example of how to prep an area (in this case, we will use a section of text) for vector cutting. CorelDraw will be used as the selected graphics software.

With the text function, create a string of characters and select those characters by clicking on the text.
Change the text fill color of the selected characters to white by left clicking on the white color from the CorelDraw Color Palette (located on the right hand side of the screen).
Change the outline color of the selected characters outline by right clicking on the desired color from the CorelDraw Color Palette.
Change the selected characters outline thickness to the thinnest width by right clicking on the selected text → select <Properties> → Click on the <Outline> tab and change the Width to its thinnest dimension. Click on "OK" to apply the changes.
Now your string of characters has been properly designated as an area to be vector cut. Simply "print" your job (output the file to the Gaia) and watch as your string of characters is vector cut.

格式化: 項目符號及編號

6.3 Vector and Raster

In some cases, you will want to process both raster engraving and vector cutting tasks within a single project. For example, if you wanted to engrave a design onto a particular material and then cut a particular shape around that engraving. The picture below is an example of an engraving on a piece of cork, which has then been cut out with a square shape:

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In these situations when there are raster engraving and vector cutting operations on a single project, the LaserPro Gaia driver will interpret between raster sections and vector sections by the types of lines and line widths of your design. Areas of your design with line widths set between 0.001" (0.025mm), 0.004" (0.1mm) will be designated for vector cutting, and the other areas will be designated for raster engraving.

6.4 3D Tips

When doing 3D sample on LaserPro Gaia, acrylic or MDF wood are ideal materials for the purpose. For acrylic the suggested PWR is 100%, SPD around 30% (depends on how deep you want to cut).

The perfect image for 3D is like those shown below. When image is ready, choose 3D Effect as the output mode in the driver. Sometimes, some material like acrylic shows better effect if you run the job with 2nd pass with laser out-of-focus. Especially with acrylic, the 2nd pass will smooth out the surface.

For engraving wood, as it burns easily and leaves blackened surface after the 1st pass, it is necessary to run the 2nd pass to remove the burned surface. To do that, simply fill the image with black color as the mask (see below) and Run the black mask image with PWR 100% and SPD100%.

Create a black image for polishing

Gaia User Manual
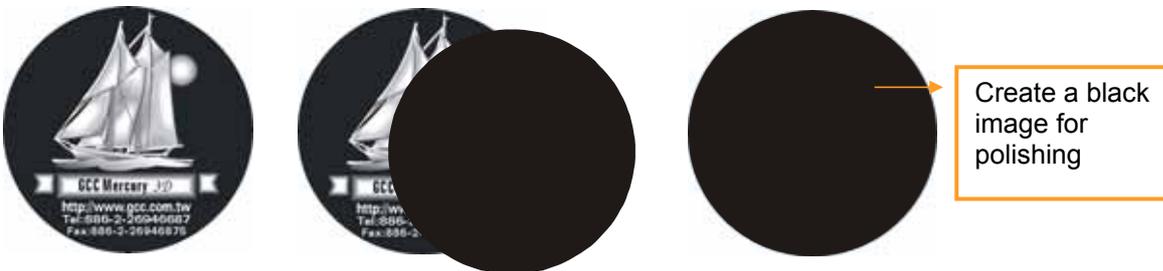
Chapter VII - Optional Items

When purchasing the LaserPro Gaia from your local authorized GCC distributor, you will be provided with a chance to purchase optional items to enhance your experience with your system. If anytime after the purchase of your Gaia, you would consider to purchase any optional item, please contact your local authorized GCC distributor.

7.1 Air Extraction System Option

To properly remove dust, vaporized materials and chemical smoke from the working area and machine, it is necessary to install a suitable air extraction system. The air extraction system and other components are readily available from your local authorized GCC distributor or you can elect to purchase and install one yourself with components found at your local industrial supply store.

LaserPro's Air Extraction Systems are specifically designed to prevent personnel from inhaling hazardous fumes and dust generated by the laser process. Available for all LaserPro engravers, the LaserPro Air Extraction System represents the latest in fume extraction and odor reduction technology for all types of applications. Quiet operation, high vacuum capacity, compact design and long life expectancy are but a few outstanding features. Each LaserPro Air Extraction System is powered by a maintenance-free, continuous-running turbine. In order to ensure personnel safety and legal compliance, the LaserPro Air Extraction System is CE-compliant for Europe and ETL-certified for the United States and Canada. To purchase a LaserPro Air Extraction System, contact your local authorized GCC distributor.

INSTALLATION (Self-Assembled Unit)

1) Purchase an exhaust system at your local industrial supply store; we suggest that you have a contractor install the exhaust system. We highly recommend you install the exhaust system outside of the building for both noise considerations and if it does not possess filtering capabilities.

2) Mount the exhaust system in an obvious and accessible location, not too far from the Gaia, so it can be routinely switched on prior to laser engraving. The maximal distance you should mount the exhaust system away from the Gaia depends on the blower's vacuum capacity. We recommend that you consult with the vendor regarding the unit's vacuum force, maximal distances, based on the available models.

3) Connect rigid and smooth walled tubing such as PVC or sheet metal with a 6" diameter to the ventilation opening located on the rear side of the Gaia. Try to keep this tubing as straight as possible as bends reduce the exhaust efficiency. Use the appropriate sized tube clamps and sealants to ensure a tight and secure attachment.

4) We have added another 4" dual hose connector with Gaia. For anyone who is not able to have 6" extraction system, we recommend that you should at least have two small extraction systems to provide better ventilation capability.

7.2 SmartGUARD Fire Alarm Option

Laser cutting and engraving operations using the SmartGUARD system protects the operator, machine, and the work products from potential fire hazards. During the engraving process, flaming may occur when working with combustible or easily-flammable materials, such as paper or wood. The SmartGUARD Fire Alarm is a pre-installed optional item that can be set to notify the operator through audio warnings and automatically shutdown the current operation.

INSTALLATION:

If you have purchased your system with the SmartGUARD option, then no installation is required, as your system will arrive with the SmartGUARD pre-installed.

For system owners that did not initially purchase this option, but would now like to add the SmartGUARD, then you will need to contact the local authorized GCC distributor to have this great feature installed. The installation process of the SmartGUARD fire alarm is complicated and not recommended to be performed by the end user.

OPERATION:

The SmartGUARD fire alarm is installed on the bottom inner side of the Gaia located beneath the top primary door (as shown in the picture below). There is a Sensor Delay Switch and Reset Button.

- **Sensor Delay Switch**: The sensor delay switch controls the delay time from when a fire is detected until alarm activation and automatic system shutdown. The sensor delay switch settings and results are shown below. As an example, if the sensor delay switch is set to the 2 position, then the SmartGUARD fire alarm will alert and automatically shutdown the laser system four seconds after detecting a fire.

Sensor Delay Switch Setting	Result
0	Disables the SmartGUARD
1	Alert and shutdown after 1 second
2	Alert and shutdown after 4 seconds
3	Alert and shutdown after 8 seconds

- **Reset Button:** If a fire is detected and the SmartGUARD fire alarm is activated, the reset button can be switched to reset the SmartGUARD fire alarm and reactivate the laser system.

> ⚠️ **WARNING**
> Setting the Sensor Delay Switch setting to 0 will completely disable the SmartGUARD fire alarm. The result is equivalent to not having the SmartGUARD fire alarm installed.

7.3 SmartMEMORY Module Option

The SmartMEMORY module option increases productivity and efficiency by allowing you to save and load unfinished tasks, without having to retransmit task settings from the computer again. It enables you to save and load your working files to and from the Gaia. In addition, the SmartMEMORY module is portable and can be used to transfer task settings from one machine to another.

INSTALLATION

⚠️**CAUTION**
It is highly recommended that you completely turn off the Gaia and unplug its cord from the power source before installing or removing the SmartMEMORY module.

1) To install the SmartMEMORY module, you will need to first access the system's motherboard. To do so, use a screwdriver to remove the two screws securing the panel on the right hand side of the Gaia.

2) Open the panel and to expose the Gaia's motherboard.

3) Simply connect the SmartMEMORY module to the connector on the Gaia's motherboard (indicated in the pictures below).

SmartMEMORY Module

Gaia's Motherboard

OPERATION

With the SmartMEMORY module installed, you will be able to SAVE and LOAD to the SmartMEMORY:

ℹ️**NOTE**
The capacity of the SmartMEMORY module is 4MB, please do not save files that exceed this limit.

SAVE files to the SmartMEMORY module

1) Navigate to the Write Flash Memory function. From the Gaia Control Panel, press the F4 (Function) → MACHINE SETTING → FLASH MEMORY → WRITE FLASH MEMORY.

2) By selecting the Write Flash Memory function, the tasks stored on the Gaia will be transferred over to the SmartMEMORY module.

LOAD files from the SmartMEMORY module

1) Navigate to the Read Flash Memory function. From the Gaia Control Panel, press the F4 (Function) → MACHINE SETTING → FLASH MEMORY → READ FLASH MEMORY.

2) By selecting the Read Flash Memory function, the tasks stored on the SmartMEMORY module will be transferred over to the Gaia.

Chapter VIII Basic Maintenance

Keeping the optics and the motion system clean is essential to quality engraving and reliability of your machine. This chapter provides information on basic maintenance that you should do to keep the machine in the best condition. It also includes a section on replacing the machine's laser module.

> ⚠ **WARNING**
> - Electrical Shock may occur if you do not turn off and unplug the Gaia before cleaning.
> - Damage may occur to the system if you do not turn off and unplug the Gaia before cleaning.
> - Always turn off and unplug the Gaia before cleaning!

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 working table
Vacuum Cleaner with a Flexible Nozzle	Only to be used in and around the worktable and motion system
Light Grade Machine Oil	
Cotton Swabs	Supplied
Lens Cleaner	Supplied
Lint Free Lens Tissue	Supplied
#2 Phillips Screwdriver	
Allen Wrench .050"	

8.2 Routine Cleaning

8.2.1 Cleaning the inside of the system

Open the front cover, and the shoulder cover. Use a vacuum cleaner to clean the inside of the machine thoroughly.

8.2.2 Cleaning the work table

Use a paper towel or cloth dampened with alcohol or cleaner to clean the knife-shaped cutting table if the machine is used as an engraver. Use a vacuum cleaner to clean the inside of the worktable if the machine is used as a cutter.

![LaserPro logo www.laserproi.com]

8.2.3 Cleaning the motion system

Use a vacuum cleaner to clean the motion system. Get rid off any debris that has built up in the motion system. You should clean the motion system every day.

> ⚠️ **WARNING**
> - Never pour or spray any liquid directly onto the laser system.

8.3 Mirrors and lenses

The mirrors and the focus lenses are the two components most likely to require cleaning periodically. Check these parts at least twice a week to see if they need cleaning.

8.3.1 Cleaning the mirrors

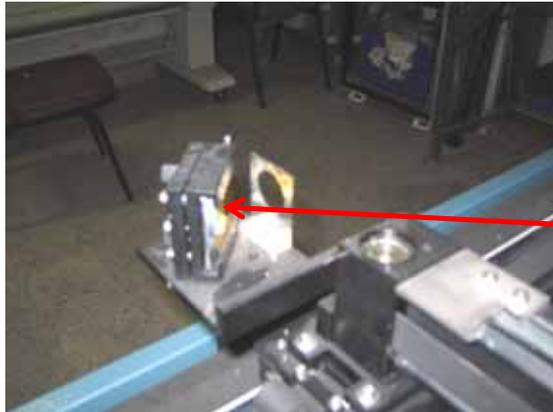1) For mirror 1 that is located inside the door at the left hand side of the machine (see Figure 8-1).

(Figure 8- 1 Cleaning the Mirrors)

2) For mirror 2, at the left hand side of working table, take the two screws off and remove the cover (see Figure 8-2).
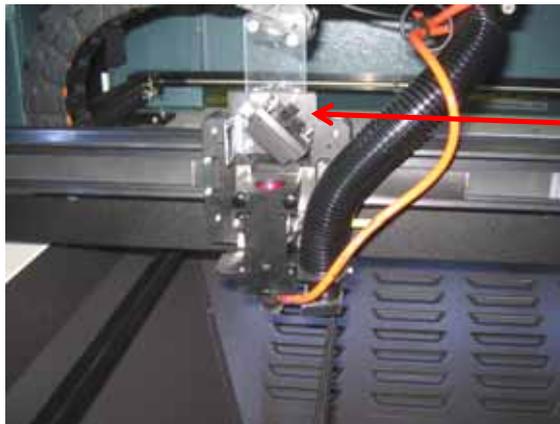

(Figure 8- 2 Cleaning the Mirrors)

3) For mirror 3, at the left hand side of X-axis, take the two screws off and remove the cover (see Figure 8-3).

Mirror 3

(Figure 8- 3 Cleaning the Mirrors)

4) For mirror 4, at the top of carriage, take the two screws off and remove the cover (see Figure 8-4).

Mirror 4

(Figure 8- 4 Cleaning the Mirrors)

> **NOTE**
> ● Do not loosen the wrong screws of mirror 1,2 and 3, in case that the optical path may change.
> ● The covers of mirrors 2 and 3 have to be taken off as well for adjusting the optical path.

5) For mirror 1, mirror 2 and mirror 3, release the mirror securing screws and pull the mirror out carefully.

6)   Use a rubber blower to blow away any dust from the surface of the mirror.

7)   Put a lens tissue on the mirror and drop an little lens cleaner on the part of the tissue that covers the mirror (see Figure8-5)

(Figure 8- 5 Cleaning the Mirrors)

8)   After the fluid has been absorbed evenly, pull the tissue one direction gently to clean the mirror(see Figure 8-6)


(Figure 8- 6 Cleaning the Mirrors)

9)   Allow the mirror to dry before re-installing it.

NOTE
- Don't scratch the coating of the mirror's surface. Excessive cleaning may cause damage and reduce the life of the mirror.
- Always handle the optics with care. Applying too much force on the optics may cause cracks or chips.

8.3.2 Cleaning the lens

1) Unscrew with one of your hands and remove the front cover of the lens carriage (see Figure 8-7 and 8-8).Pull out the focus lens carefully.
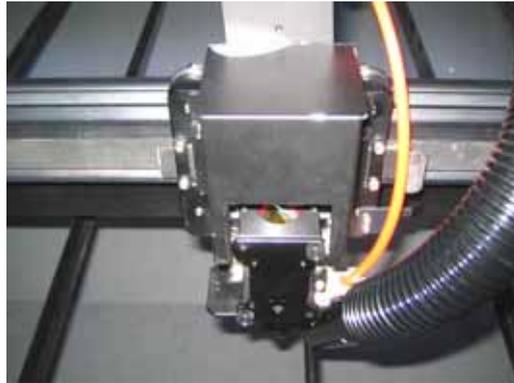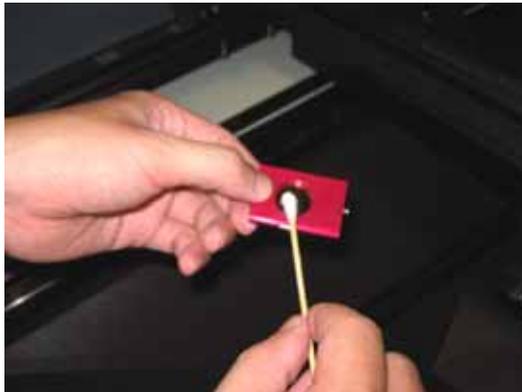

(Figure 8- 7 Cleaning the Focus Lens)

(Figure 8- 8 Cleaning the Focus Lens)

2) Flood the lens with lens cleanser on both sides (see Figure8-9), and Use a cotton swab or lens tissue to dry off the remaining solution gently. (see Figure 8-10)

(Figure 8- 9 Cleaning the Focus Lens)

(Figure 8- 10 Cleaning the Focus Lens)

3) Cover the front cover, tighten screw and cover the top cover of the lens carriage.

> **NOTE**
> - Do not touch the surface of the lens with your fingers or press down hard with any cleaning material.
> - Once you finish cleaning and are ready to reinstall the lens back in place, remember that the holes and corners must match.

8.4 Cleaning Purged Air Module

Purged air module can prevent dust from the mirror. Recommend to clean it every month, the frequency is determined by the working environment.

1) Unscrew the four screws. (Left-rear corner)

2) Take off purged air module cover.(black square plastic cover)

3) Cleaning black sponge by clear water.

4) Please assemble back after the sponge already dried.

Chapter IX - Basic Troubleshooting

Quality Problems

- Check if the focal Lens is installed correctly or if focal Lens is not fixed properly.

- Check if it is caused by the debris or dust build up in the bearing tracks of x rail.

- Check if it is caused from the damaged or dirty focal lens and mirror 4 in the laser carriage which can not deliver the laser beam effectively.

Non-operational Problems

- **Laser beam does not generate**
  1) If the red alignment beam is not revealed, the laser beam is misalignment. Adjust reflection mirrors for exact focus.

  2) If the red alignment beam is revealed, please check the driver power. The laser power may be too low to be detected. Please increase the percentage setting of the Laser Power from the software driver or the control panel.

  3) Please check if the laser power connector is loose.

  4) For safety purposes, the laser beam will not be generated when the top or front door is opened.

  5) Check water level or temperature of water cooler for Gaia 200W only. If over-heated, laser beam will shut down automatically.

> ⓘ **NOTE**
> Unplug the machine before examining the mirrors, lens, motion system or any other part of the laser system.

Chapter X - Appendix

10.1 Glossary

Color Fill – Term within the awards and engraving industry used to describe the variety of techniques used to add color or contrast to engraving.

DPI – Dots Per Inch or Pixels Per Inch. The resolution of an image as defined by the amount of dots/pixels included in an inch. The DPI setting of 500, will include tell the machine to include 500 laser firings within an inch.

Driver – A software program that allows the computer to communicate with its components and peripherals: printers, scanners, monitors, etc.

Error Diffusion (Dithering Method) - This effect uses a series of random black and white pixels to represent shading.

Firmware – Programming permanently set into a computer's ROM chips. This information is burned into the computer chips and can only be changed by replacing the chips, or in the case of EEROM, by special procedure.

Parallel Cable – The cable connection between the computer and another device (usually the printer). This allows the computer to send several bits of data simultaneously.

Parallel Port – An outlet on your computer or electronic device that allows the computer and device to be connected and share information simultaneously. Another common name for the parallel port is the LPT port.

PPI – Pulses Per Inch. PPI determines the gross amount of laser pulses there will be per linear inch. PPI is exclusively for the vector setting. A PPI setting of 500 results in the laser firing every .002" (500 times per inch). If the standard lens is producing a vector laser focal point of .007", then higher PPI settings will result in deeper, overlapping laser pulses. PPI settings lower than 150 will result in the individual laser pulses being spread far apart, so they will not touch each other. Low PPI settings are a good example of perforate paper.

Raster – The process of rendering a cutting or engraving by multiple horizontal lines. For example: when cutting out or engraving a square, the raster setting will make the laser use numerous horizontal lines to fill in the outlined space.

Raster Image – An image that is defined as a collection of arranged pixels in a rectangular array of lines. A raster image is similar to a "Bitmap" graphics image.

Raster Line – A raster line is the individual horizontal line that makes up the raster image.

Serial Communication – An interface between a computer and one of its devices that transfers one bit of data at a time.

Serial Port – A connection that allows a computer to send data to a peripheral device one bit at a time. Usually a COM port that meets the RS-232 specification.

Vector – The process of cutting or engraving an image by using single horizontal, vertical and curved lines. For example: when cutting out or engraving the outline of a square, the vector setting will make the laser use a thin single line to follow the outline of the shape.

10.2 LaserPro Gaia Specifications

Gaia		GA-5106	GA-5110	GA-5120
Laser Source		60W	100W	200W
		Sealed CO_2 Laser		
Cooling		Air-cooled		Water-cooled
Work Area		51.1 x 36.1 in. (1300 x 916 mm)		
Max. Part Size (W x L x H)	Normal	51.1 x 36.1 x 2.3 in. (1300 x 916 x 60 mm)		
	With SmartEXT	51.1 x ∞ x 1 in. (1300 x ∞ x 25 mm)		
	With Honeycomb	51.1 x 36.1 x 0.2 in. (1300 x 916 x 5 mm) / (With Honeycomb Table)		
Dimensions		71.6 x 49.2 x 52.3 in. (1820 x 1250 x 1330 mm)		
Weight		420 kg / 924 lb		440 kg / 968 lb
Drive		AC Servo Control		
Throughput*		133.2 in^2/hr (864.2 cm^2/hr)		
Speed Control		Adjustable from 0.1- 100% 30 IPS (Up to 16 color-linked speed settings per job)		
Power Control		Adjustable from 1- 100% (Up to 16 color-linked power settings per job)		
Z-Axis Movement		Manual		
Resolution (DPI)		Available 125, 250, 300, 500, 600, 1000		
Computer Interface		Standard printer port and USB port		
Memory Buffer		32MB standard (Upgradeable to 64MB)		
Lens		Standard 4" focal lens in enclosed lens carriage (Optional 2" lens available)		
Display Panel		4-line LCD panel showing current file name, total working time, laser power, engraving speed, file(s) loaded into memory buffer, setup and diagnostic menus.		
Safety		Class IIIR for red pointer		
Cutting Table		knife-shaped cutting table with dust collecting tray		
Facility Requirements				
Electrical		AC220V/15A	AC220V/20A	AC220V/20A
Power Consumption		3300W	4400W	4400W
Air Exhaust System		External exhaust system required		
Air Compressor		Air compressor required		

*Throughput value represents the Max. number of 8" x 10" 500DPI raster jobs that can be done per hour.