User Manual

Mercury II

Content

QUICK MENU

1. Connect air exhaust system.
2. Setup computer and connect with engraving system properly.
3. Turn **ON** host computer system.
4. Install the MERCURY Driver. (for the first time use only)
5. Use Windows-based program (such as CorelDraw, PhotoShop, PhotoPaint, Illustrator, CASmate, Signlab, EasySign, AutoCAD, etc.) to operate with the engraver.
6. Turn **ON** engraver. The lens carriage moves to the home position (upper left corner) and the working table moves down 50mm approximately after system initialization. (If a rotary attachment has been installed, the working table will move down to the bottom.)
7. **Auto-focusing:** under **STOP** status, put work-piece on the table, move X-axis (Please refer to Fig. 3) and carriage by arrow keys to locate the lens carriage above the engraving material (holding carriage by hands for prompt moving is acceptable under **STOP** condition but not recommended). Press **AUTO FOCUS** the table will move upward and stop at the focal position automatically.
8. The following is an example by using **CorelDRAW V.11**. Please ready the engraving graphic in CorelDraw, and follow the instruction below to start work.
   1. **Layout**
   2. **Page Setup**
   3. **Set from Printer,** choose **Portrait**
   4. **OK**
   5. Edit desired file (picture etc.)
   6. **File**
   7. **Print**
   8. **Properties**
   9. **Options,** choose **desired Mode** (refer to Fig. 11) then set up proper resolution, power and speed
   10. **OK**
   11. **Print**
   12. File name is shown on LCD then press **START.**

NOTE:
- Turn on the air exhausting system before engraving.
- The **maximum loading weight** of working table is **20 kg**.

NOTICE:
1. In order to match Mercury II driver's color. Make sure your **CorelDRAW V.11** or **later** the **"Color Management off"** is disabling. Please fallow the steps:
   Tools ⟶ Color Management ⟶ Color Management Off ⟶ OK.

2. When operating with **CorelDRAW V.11** or later version, please choose **Layout ⟶ Page Setup ⟶ Set From Printer**.

3. When using the available artworks from the Clipart of CorelDRAW, ***to prevent the hidden vector lines shown on your engravings***. Please do as follows:
   Choose a file from Clipart, go to **Bitmaps ⟶ Convert to Bitmap,** after converting the file, go to **Bitmaps ⟶ Mode ⟶ Grayscale ⟶ OK.**

Chapter I - INTRODUCTION

1.1 Principles of CO_2 Laser

LASER is a **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation.
A CO_2 laser works by exciting the molecules of a carbon dioxide gas mixture.
To engrave, the beam is focused through a lens. The intensive beam can vaporize
the surface of the material leaving an engraved image or, in some cases, cutting through the
material.

1.2 Safety

Laser engravers that have the CDRH safety rating of Class 1 are required to have key safety
features such as an enclosed laser beam and safety interlock mechanisms designed to protect
the operator.   In addition to the safety features of a Class1 machine, the LaserPro Mercury II
has been equipped with a red guidance pointer.   This red dot allows the operator to safely see
the focal point of the laser beam. It also gives Mercury II the improved CDRH safety rating of
3R.

1.3 Precaution

1. The suitable temperature for working environment is 15 ~30 (60 ~86). In an
    appropriate and comfortable working environment, the working efficiency will be much
    better.
2. Always wear certified safety goggles.   Reflective materials such as mirrors, enameled
    brass and anodized aluminum may reflect a portion of the invisible laser radiation.
    This may cause sever eye damage if appropriate safety goggles are not worn.

    NOTE: Each LaserPro laser machine is equipped with a safety goggle, if you need
    another one, please contact LaserPro for it or try to get one that meets the following
    specification.

    > 190-398 nm OD5+
    > 10,600 nm OD5+
    > Visible light transmission: 92.9%

3. Do not attempt to modify or disassemble the laser system at any time.
4. Wear appropriate safety goggles especially when engraving with mirrors or coated
    metals such as enameled brass and anodized aluminum.
5. Good ventilation is required to remove odors and vaporized materials to the outside of
    the building or structure. An exhausted system is recommended.
6. Do not work with reflective metals, heat sensitive surfaces or other materials that may
    produce toxic substances, such as PVC and Teflon.
7. A fire extinguisher should be available on hand at any time.
8. Never leave the machine unattended during operation.
9. Follow the recommendations for maintaining and cleaning your system. Not only will
    this enable you to engrave efficiently, it will ensure that your machine runs safely as
    well.

1.4 Fire Precaution

1.   When cutting materials that easily caught on fire, such as acrylic, wood or paper, it is
     advised to have air compressor turned on to prevent flame.

2.   If cutting table, or honeycomb table, is used for cutting purpose, do not leave any

material underneath, as when material at top is cut through, the material at below will be burned easily due to trapped heat.

3. It is not encouraged leaving the cutting job unattended, especially with materials mentioned above.

1.5 The Safety Interlock System

The LaserPro MERCURY is complete with a safety interlock system that automatically shuts off the power supply to the laser whenever the top or front door is opened. There are magnets on the top and front door, which activate this safety mechanism. Do not attempt to remove or modify these magnets or any other component of the safety interlock system.

1.6 Warning Label

Notice
Please clean the Auto Focus Probe each time before turning on the machine to make sure the probe is free to move. ⚠️

| On the surface of Carriage |

DANGER
INVISIBLE LASER RADIATION WHEN OPEN.
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

| On the front cover of Laser Tube |

CAUTION
AVOID PLACING YOUR EYES IN
THE RED BEAM PATH

| On the front center of the top door |

DANGER
LASER RADIATION–AVOID
DIRECT EYE EXPOSURE

LASER DIODE 5mW MAX
OUTPUT AT 630~680nm
CLASS IIIa LASER PRODUCT
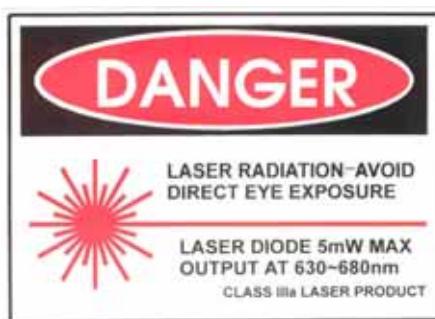
| On the backside of the machine |

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WARNING

⚠ Invisible laser radiation when door open and interlock failed. Avoid eye or skin exposure direct to laser radiation.

🥽 Please wear goggle to operate while door open.

🚫 Do not leave the machine unattended during operation.

✋ Please clean the bearings and motion system tracks everyday.

⚠ Do not use reflective metals, heat sensitive surfaces or materials that may produce toxic substances or corrosion problems, such as PVC and Teflon.

On the upper left side of the machine

1.7 Frequently Asked Questions

1. What materials can be processed by CO_2 laser?

Virtually any materials such as acrylic, wood, fabrics, glass, leather, marble, stone, rubber stamps, paper products, coated metals, plastics (especially micro plastic developed by IPI, Spectrum and Rowmark etc.) other hard-surface materials blended with polyester and fibers (Corian™, Fountainhead™, and Avonite™ etc.) or laserable simulated products of stone, wood and metal etc.

Bare metals cannot get a good engraving result by using CO_2 laser. However, ***special kind of spray*** has been developed that allows CO_2 laser to mark on the bare metals such as stainless steel, aluminum etc. Do not engrave or cut materials which are heat sensitive or toxic substances can be produced *(e.g. **PVC and Teflon coating**)*.

2. What is the life cycle of the laser source?

The life cycle of laser source is around 20,000 hours, however it can be re-filled and should be done by your dealer.

3. What is the main purpose of air assist system?

The air assist system can provide a much better engraving & cutting effect, as it will blow away vaporized particles and prevent fire due to overheating.

4. What does cutting table do?

The cutting table, also known as honeycomb table, is especially useful for vector cutting application. The space between materials and working table, gapped by cutting table, allows heat and smoke to be disbursed and vented out which may otherwise cause bad cutting effect.

5. What is the maximum engraving speed of LaserPro Mercury II?

The maximum engraving speed of LasePro Mercury II is 1066 mm/sec (42 inch/sec). When engraving an A4 (18 x 28 cm) size square with 250dpi at full speed, it takes LaserPro Mercury II about 18 minutes to complete.

6. How to engrave an extremely long working piece?

The back door (or panel) of LaserPro Mercury II can be removed by taking away the screws. For a better ventilation and safe purpose, this special design is to prevent the back door being opened without notice during operating. However, you have to use magnetic devices to short the connector of the magnetic switches on both side of the front door while opening for engraving extremely long work-piece. When doing so, make

sure that you wear safety go
ggles to operate the machine.

Front View

Press the ring to pull out the air tube.

Air Flow Fixer

Air inlet connect to air compressor
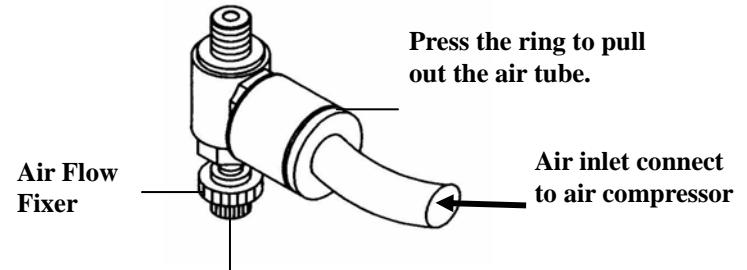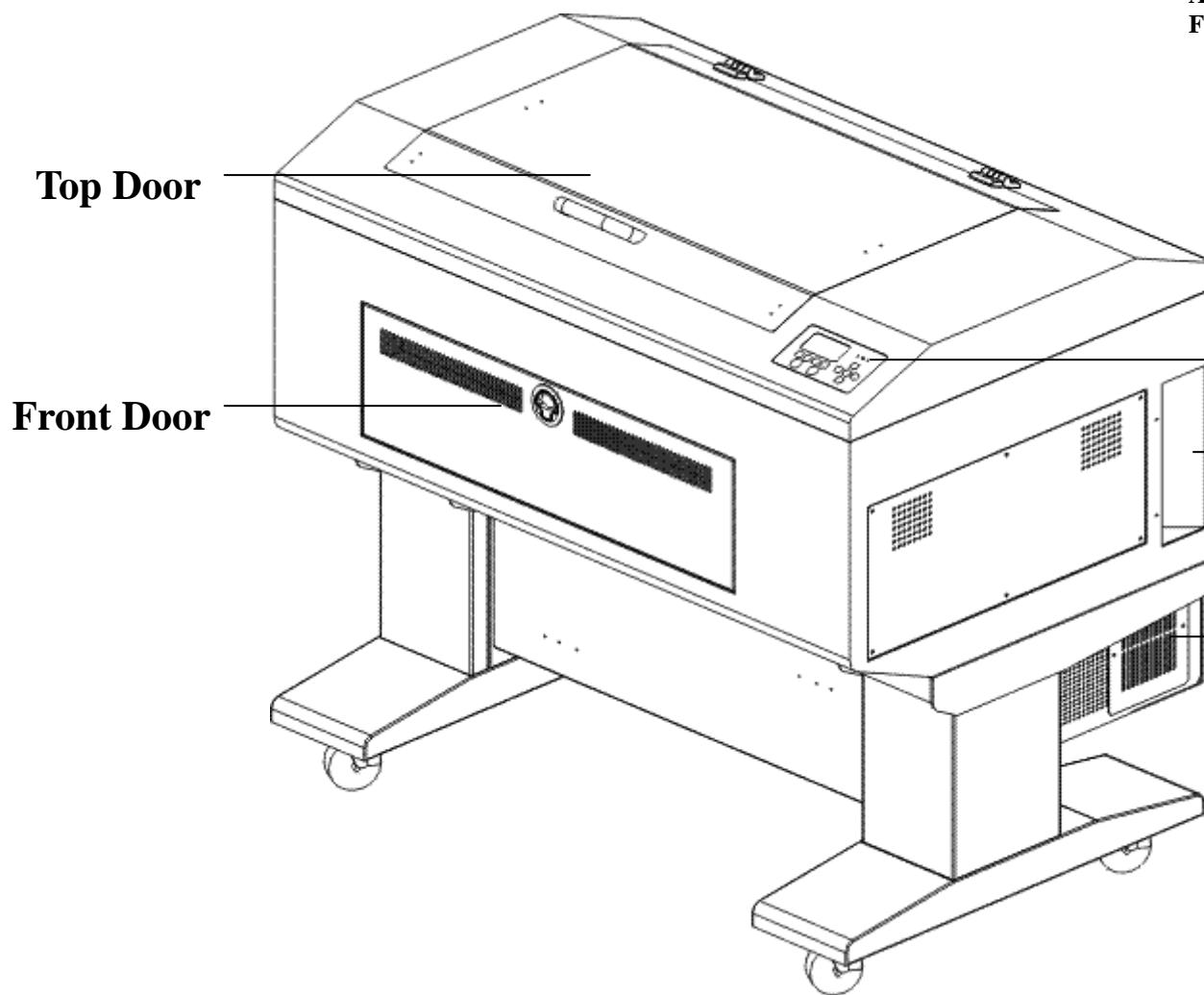
Turn clockwise to decrease the air flow and counterclockwise to increase the air flow.
Please avoid turn off.

Top Door

Front Door

Control Panel

Switches & Ports

Laser Source

Back View

Top Door

Step 1   **Step 2**   **Step 3**

Unscrew and remove the panel.

Unscrew and remove the dust prevention box.

Unscrew and pull out #1 mirror carefully without touching the surface of the mirror.

Disassemble to maintain #1 mirror. Please refer to the right layout.

Laser source inside

Rear Door

Motion System

Mirror 3 & Holder

Dust Prevention Box (Mirror 2 inside)

Release the Screw to Pull Out the Mirror

Mirror 4 and Focus Lens inside

Y-axis Belt

X-axis Bearing

X-axis Motor

X-axis Belt

Bearing Track

Y-axis Belt

Manual Focus Gauge Holder

Focal-Sharp™ Auto-focus Gauge

Magnetic Sensor for Dual Head

Port for Rotary Attachment

![LaserPro www.laserpro.com]

1.8 Lens and Manual Focus Gauge

Focal Length		LENS	Matched Color MANUAL FOCUS GAUGE
1.5"	Option	Purple	Blue (same as 2.0")
2.0"	Standard	Blue	Blue
2.5"	Option	Gold	Gold
4.0"	Option	Red	Red

Manual Focus Gauge

Insert to the hole of the holder for manual focusing

Mirror

Lens 2.0, 2.5 or 4.0

Slot position for Lens 1.5 only

Manual Focus Gauge Holder

Auto Focus Gauge Focal-Sharp™

Focus Probe
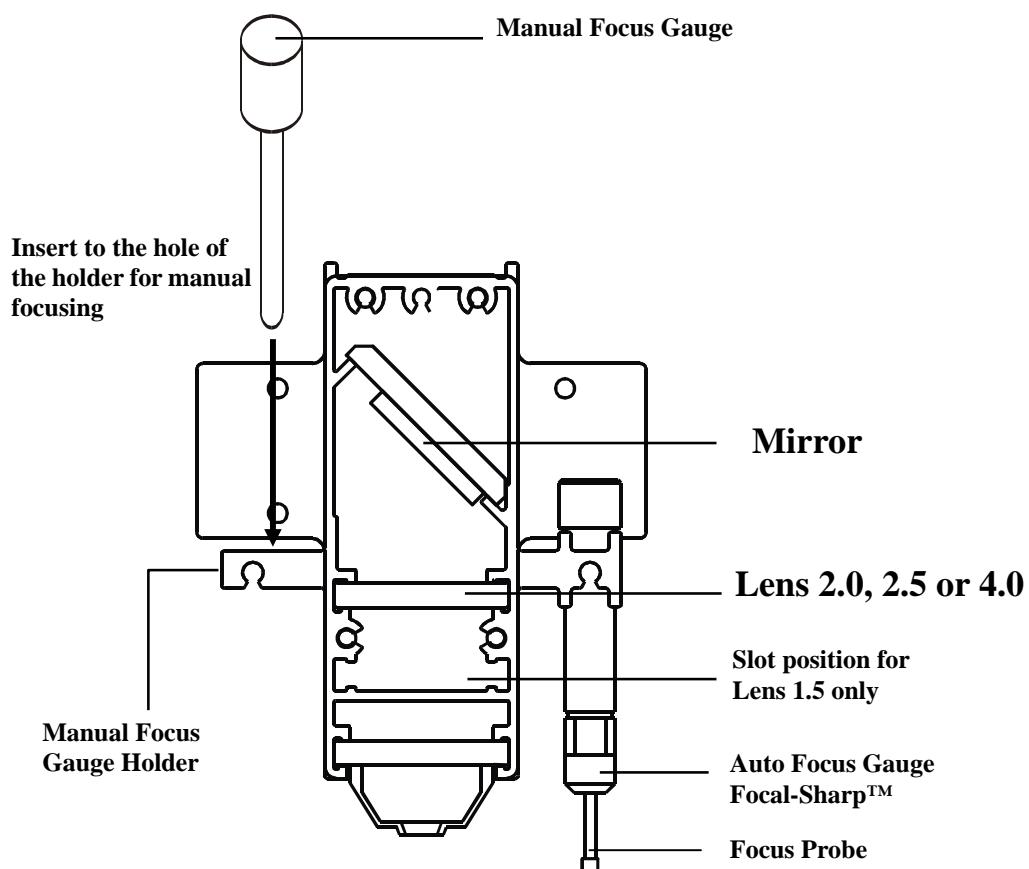
Focus Carriage Assembly

![LaserPro logo www.laserproi.com]

1.9 Instruction of Rotary Attachment
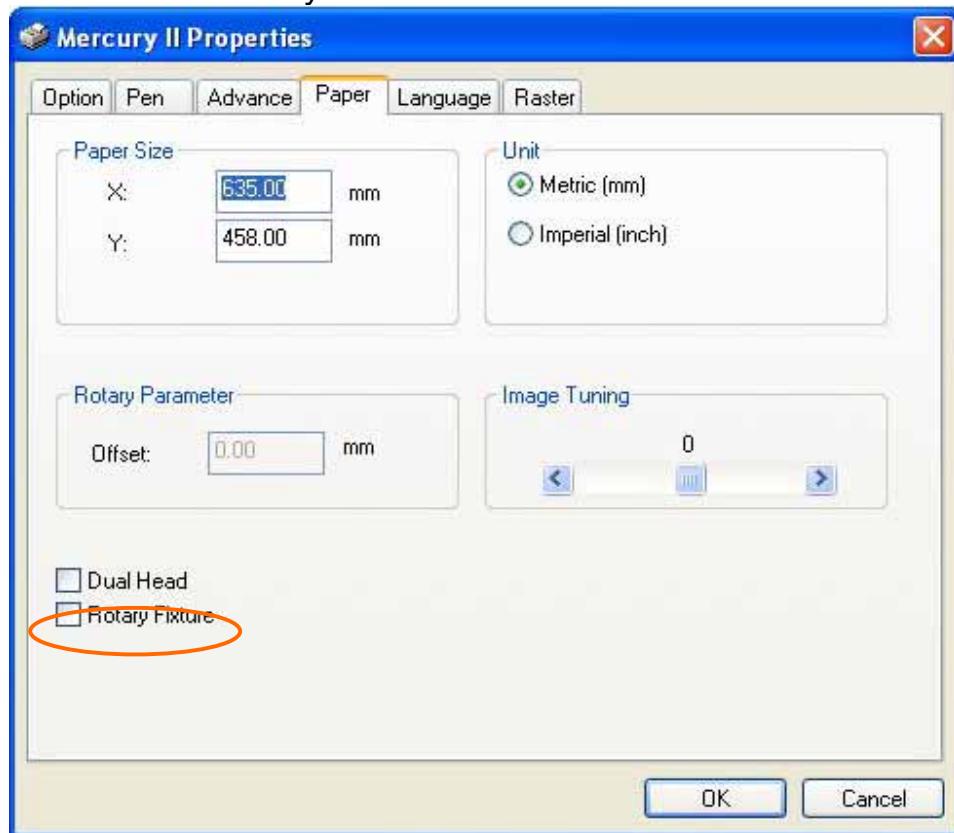
1) Turn off the power of the engraver.
2) Put the rotary attachment onto the engraving table. Ensure the two screw holes should match the two corresponding holes on the table and the white mark of the left side aligns to the position of 24cm (9.45 inch) on the ruler, and then tighten the screws.
3) Plug the cable of the rotary attachment into the port in the middle front of the engraver.
4) Turn on the power and the engraving table moves down to the lowest position automatically.

1.10 TOP VIEW
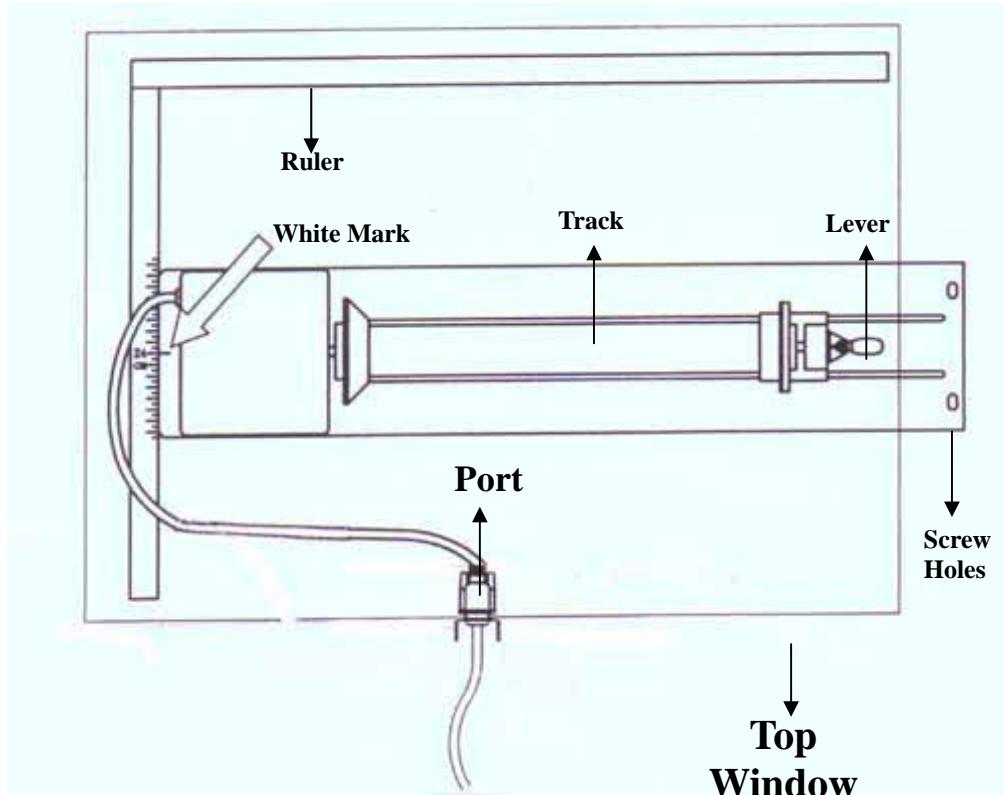
1.11 Operation:

NOTE: The maximum length of the engraving object is 450 mm (17.71 inch).   The maximum diameter of the padded rubber wheel is 94 mm. To get an accurate engraving position during rotating, it is better that the diameter of the engraving object is not smaller than 90mm (3.54 inch). However, the maximum diameter of the loaded object is 180mm and the limited loading weight is 7 Kg (15.4 Lb.).

1. Measure the diameter of the engraving area for setting up the software operation before engraving.
2. Lift the lever, loading the engraving object, slide the adjustable end to the bottom of the object firmly, then lower the lever of the fixture to secure it in place shown as in Fig II.
3. If the engraved object is too small, please use 4-inch lens to prevent collision between carriage and rotary attachment devise.

1.12 SIDE VIEW

Adjustable end

Motor

56mm 94mm

Lever

Base of the padded rubber wheel

Open end of the engraving object
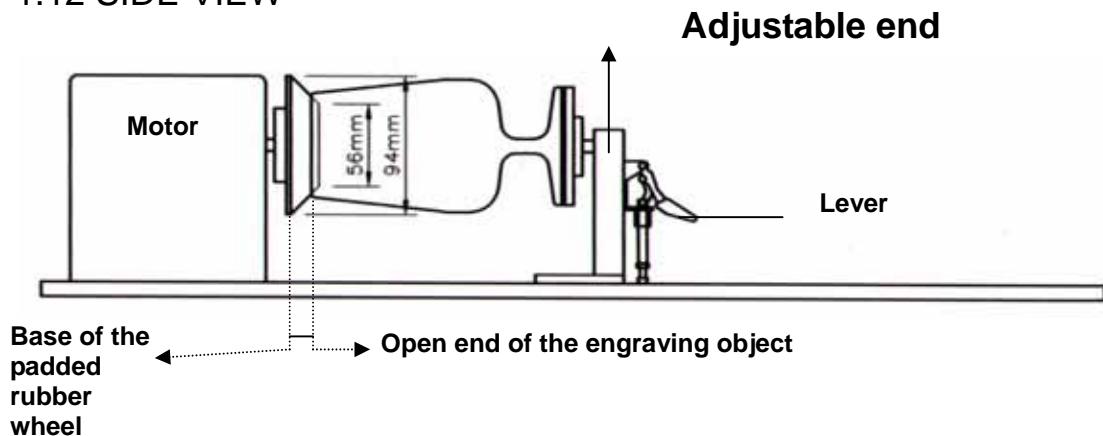
4. Turn on the power. The rotary attachment is detected and the working table moves down to the bottom automatically. The system initializes to the home position, at the same time.
5. Set up focus.
6. The following is an example of engraving process by using **CorelDRAW V.11** or after version
    a. **File**
    b. **Print Setup,** choose **MERCURY II**
    c. **Properties**
    d. **Paper,** select **Rotary Fixture**
    e. key in **Offset** value, **X** value and **Diameter** value
    f. **OK**

NOTICE:

When doing the Print Setup under print driver setting, please always choose **Layout → Page Setup → Set From Printer,** no matter operating with CorelDraw V.11, or after version.

NOTICE:

Please always choose **Portrait** for **Page Setup** on CorelDraw V.11 no matter X or Y value whichever is lager.
Layout → Page Setup → Set From Printer → Portrait

Define engraving location by moving the arrow keys and the red point will show the right position you want. Moving the red point from rotary home position (at the base of the padded rubber wheel) to the open end of the engraving object, the **Offset value** will be displayed on LCD.

Caution:
● Adjust the working table and set up the focus **under STOP status**.
● **Set up focus after initializing** the system to prevent the carriage hit the engraving object.

1.13 Dual Head Installation

Step 1 Turn off the system.

Step2 Put the dual head carriage onto the X-axis belt bearing track.

Step3 Cut 25mm (1 inch) off the air assist tube on the original lens carriage.

Step4 Connect the air assist tube of the dual head with that of original carriage by "T" connector.

" T "
Connector
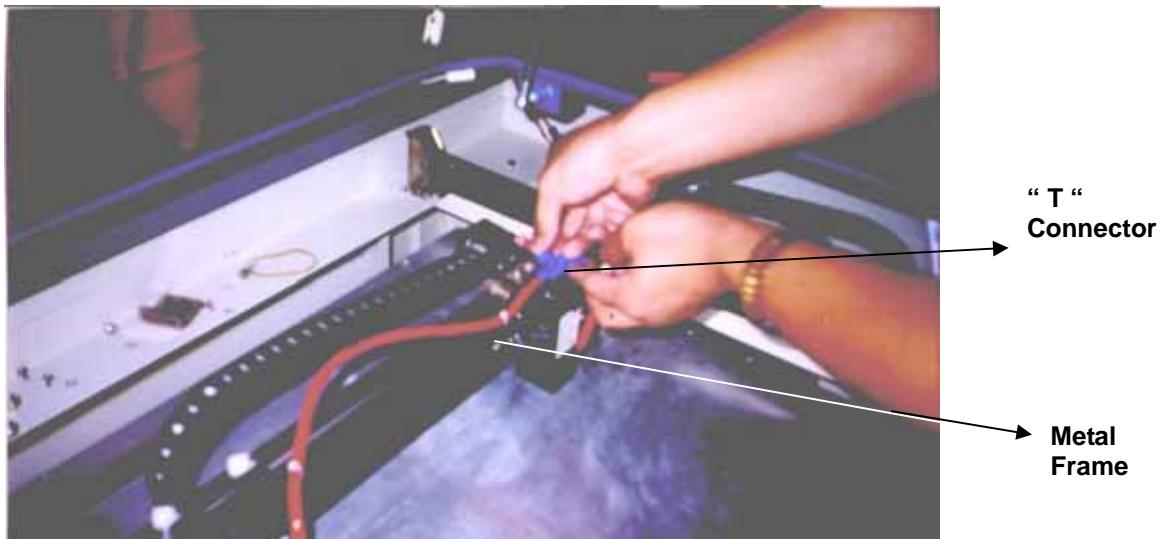
Metal Frame

Step5 Screw the metal frame which is attached to the right side of dual head to the original lens carriage.

Step6 Turn on the power to test whether the dual head is installed properly. During initiation, the system will detect the dual head carriage when it moves the lens carriage to front-right side, so it would not crash the dual head carriage when move the origin position.

Note

1. Keep the screws on the lens carriage after taking off the dual head.

2. Put the black cap on the "T" connector after taking off the dual head to prevent air flowing leaking.

3. Please choose dual head item from Paper option of printer properties before outputting a graph with dual head carriage.
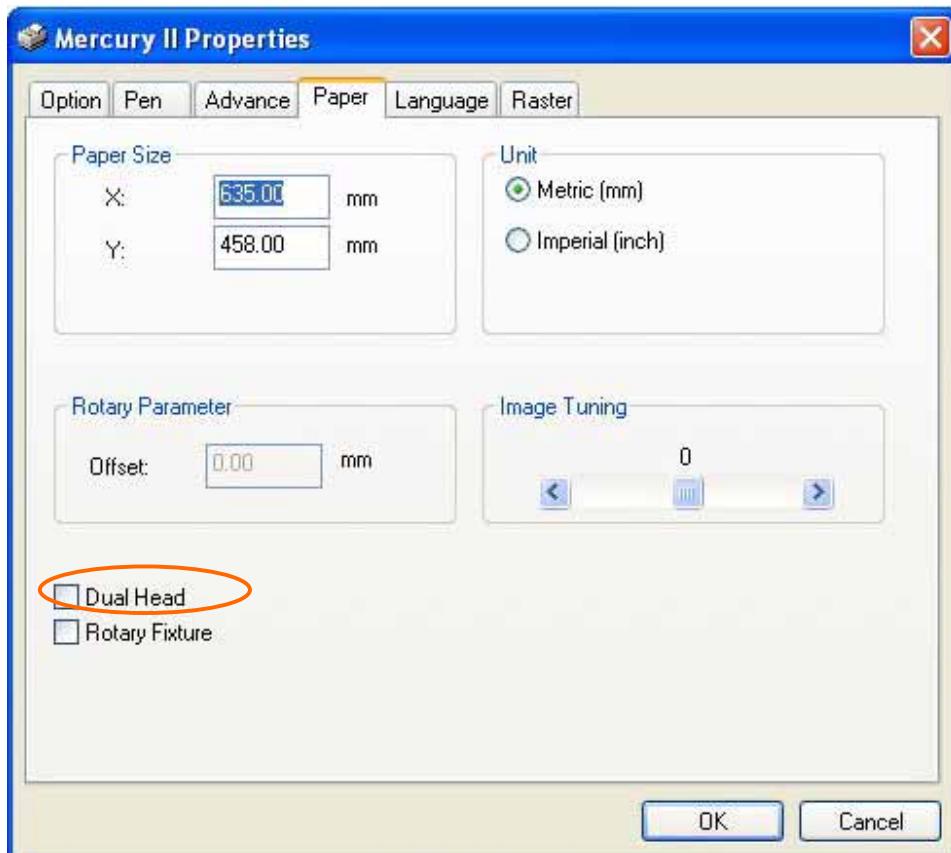
Chapter II - RECOMMENDED CONFIGURATION

2.1 Computer
Your PC must be sufficient to equip with Window 95 at least.
We recommend the specification of PC for better work as following.

CPU	Pentium at least
DRAM	32 MB RAM or up
FDD	One 3.5" 1.44 MB floppy
HDD	1.2 GB Hard Drive or up
SVGA	15" Super VGA Monitor

On Board Parallel Mode(Setup from PC BIOS):
SPP—Preferred Mode
ECP—Cable length less than 1.8meters

2.2 Scanner
Flat Bed
Minimum resolution: 200 DPI

2.3 Software
GCC driver (designed under Window 95 or higher level)

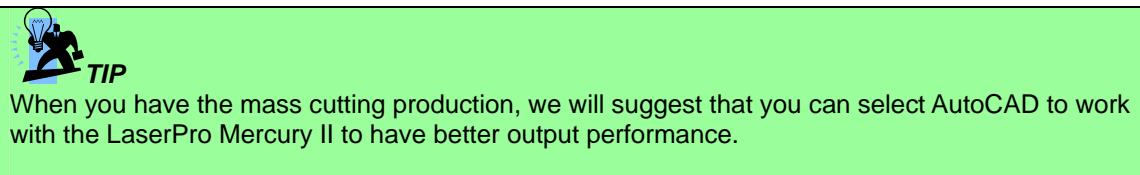|	
Windows	Window 95 or higher
CorelDRAW	Version 7.0 or higher version

Any program that can output HPGL commands

2.4 Macintosh Computer
➢ **Hardware Compatibility**
- Mac OS X Leopard
- At least 32 MB of actual RAM

➢ **Software Compatibility**
- Adobe Illustrator MAC version CS2/CS3/CS4

> **TIP**
>
> When you have the mass cutting production, we will suggest that you can select AutoCAD to work with the LaserPro Mercury II to have better output performance.

Chapter III - HARDWARE INSTALLATION

Caution:
- Turn all equipment off before making any connection.
- Check the plug of the power cord to see if it matches the wall outlet. If not, please contact your dealer.

3.1 Cabling Connection:
1. Insert the power cord (male) into a grounded power outlet.
2. Plug the other end (female) into the engraver. The engraver has been design to switch from 100 ~ 240 VAC automatically (100W engraver has to use 220~240 VAC only).
3. The engraver can communicate with a computer through either a serial (RS-232C) or a parallel port.
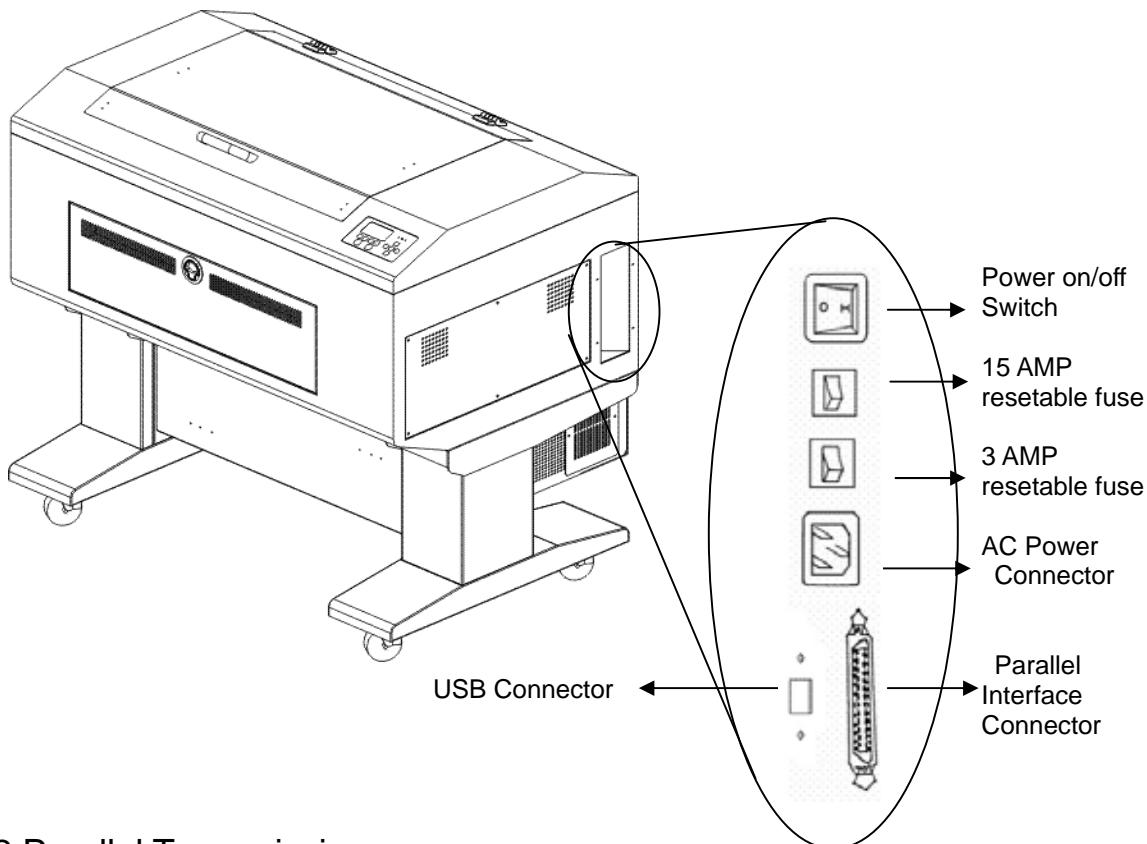
3.2 Parallel Transmission
Connect a parallel cable to the engraver (parallel port) then to the parallel port of the host computer.

Caution:
Never use a mechanical switch box when a second printer port is required.
The electrical surges can cause damage to the computer and the engraver.

3.3 USB Transmission
Connect USB cable to the engraver (USB port)then to the serial port of the host computer.

3.4 Exhaust Ventilation

Exhaust Blower

Seal Clip

4 inch diameter flexible hose

Connect to an air filter or exhaust air outside of the building
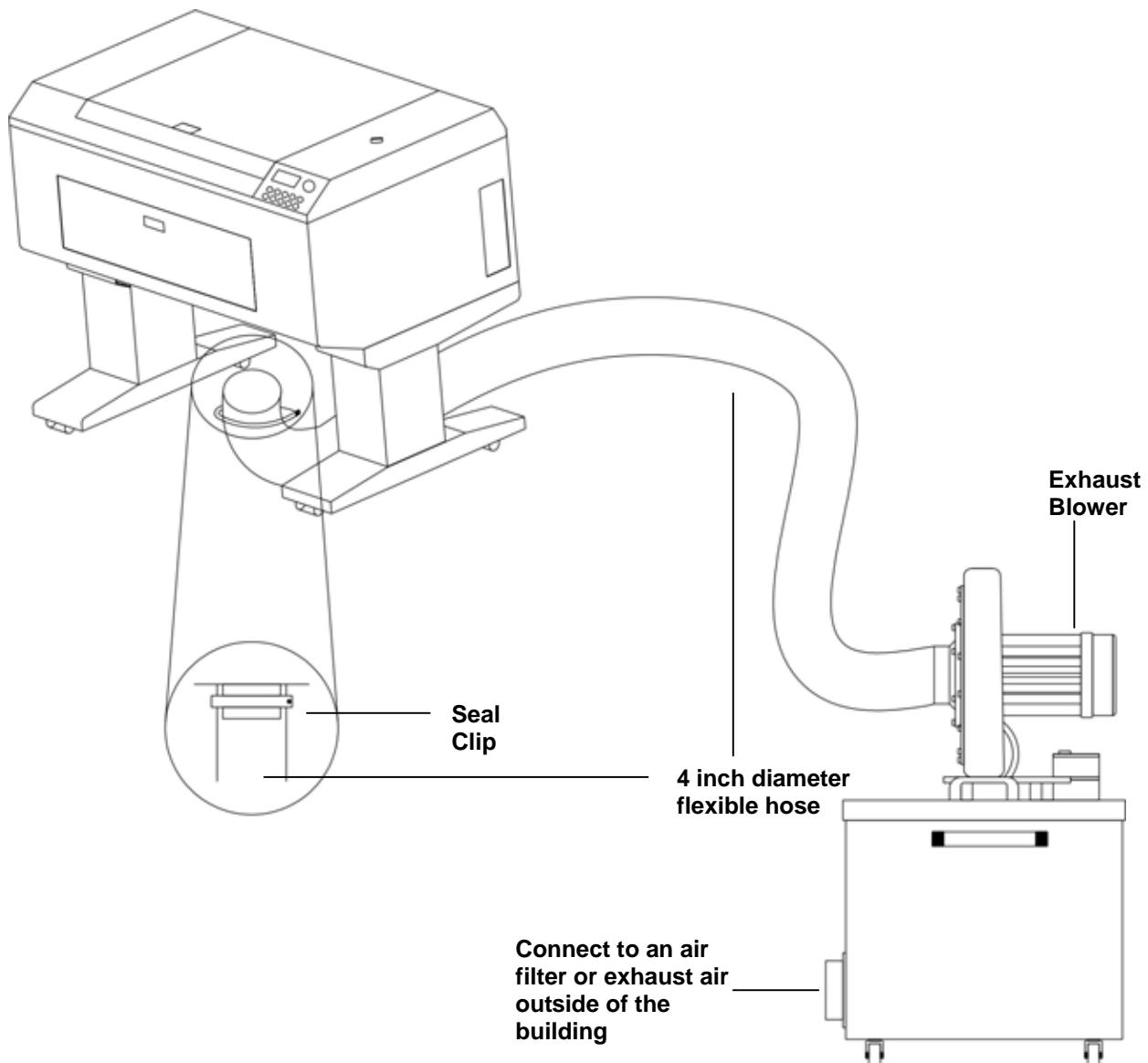
TIP

Please adjust the LCD Display Screen's Contrast before plugging in the electrical cord of your laser. LCD adjustment wheel is located underneath the control panel

Chapter IV - SOFTWARE INSTALLATION

4.1 Install LaserPro Mercury II driver to PC. Please follow the procedure below:

Use the USB One-click Installation for quick driver installation.   Follow the simple steps below for driver setup.

1.   Connect the USB connector to the machine (The Spirit GE model is used as an illustration in the following steps.)

> **NOTE**
>
> Check that the USB mode under the USB Setup wizard is set to Common USB before running the installation.
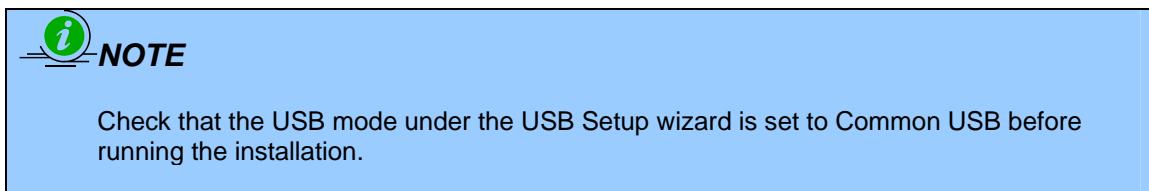
2.   Doubleclick and run the LaserPro Installation.exe file.

3.   Click "Next"

GCC Driver Installation

Installing

Current File

Copying file:
C:\GCC\parameter_SpiritGE\Wood(60w laser)\Wood3D.SGE

All Files

Time Remaining 0 minutes 0 seconds

Wise Installation WizardR

< Back   Next >   Cancel
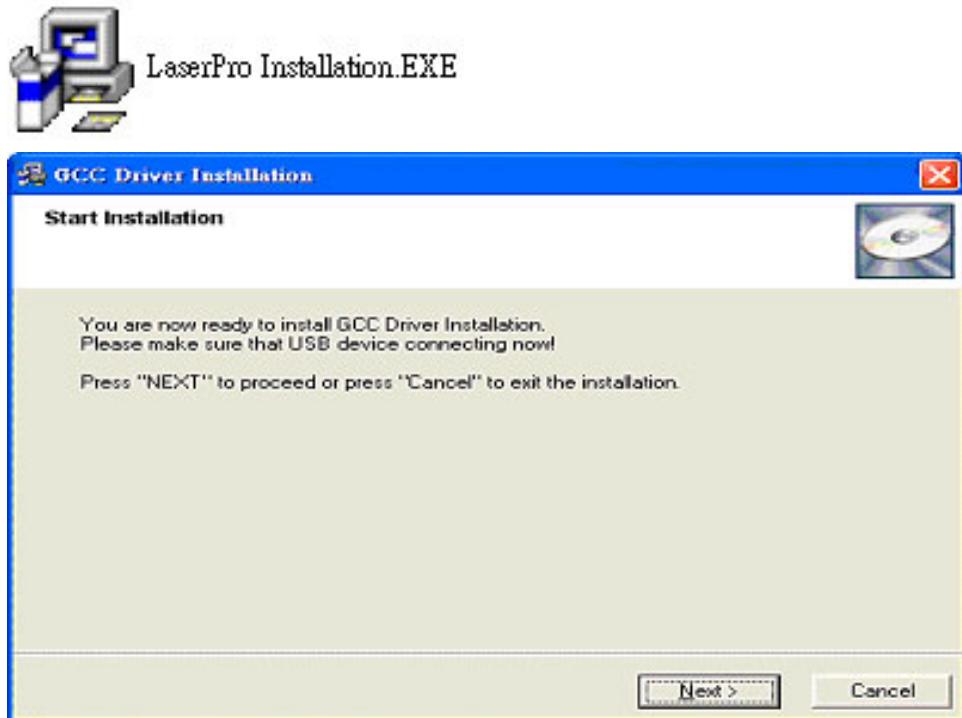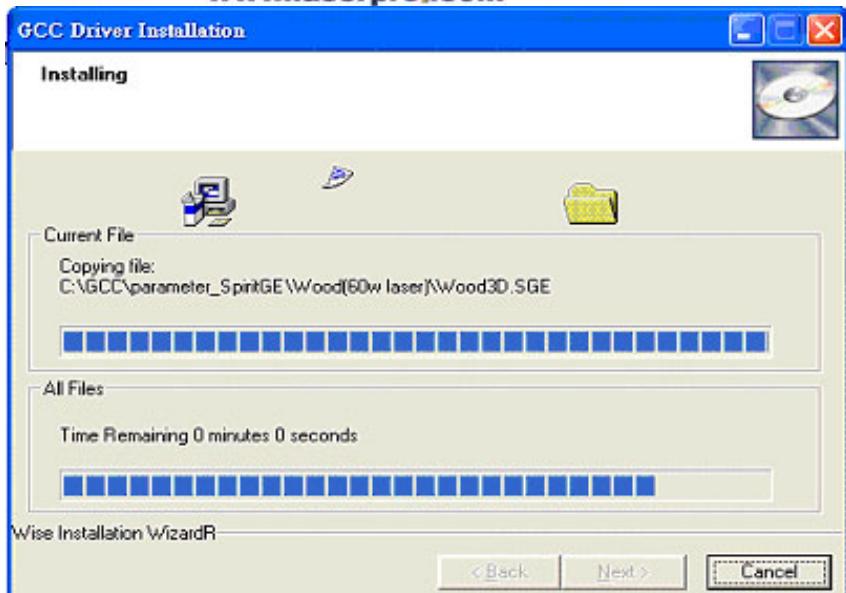
4.   Click on "Yes" upon completion

GCC Driver Installation

Add Spirit GE Printer driver Successfully

Yes

5.   If the driver is being installed for a second time, the user will be prompted as to whether a second copy of the driver installation is required.

GCC Driver Installation

The SpiritGE driver installed
Do you want add attachment

Yes   No

6.   If the user selects "Yes", a second copy of the drier will be installed.

GCC Driver Installation

Add SpiritGE_2 Printer driver Successfully

Yes

SpiritGE_1
0
Ready

SpiritGE_2
0
Ready

Chapter V - Operating the LaserPro Mercury II

Once you have installed the LaserPro USB Driver (USB connectivity only), LaserPro Print Driver, and have connected the LaserPro Mercury II to your computer, you will need to familiarize yourself with the LaserPro Mercury II'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.

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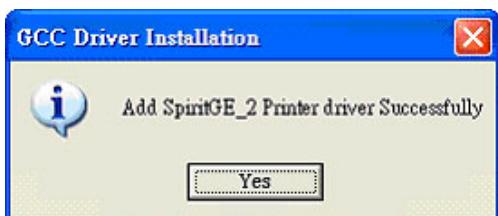is recommend to set around 18~22 . If you forget to start water chiller first, the laser will not fire. To solve this problem, just power on water chiller then restart Mercury II.

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
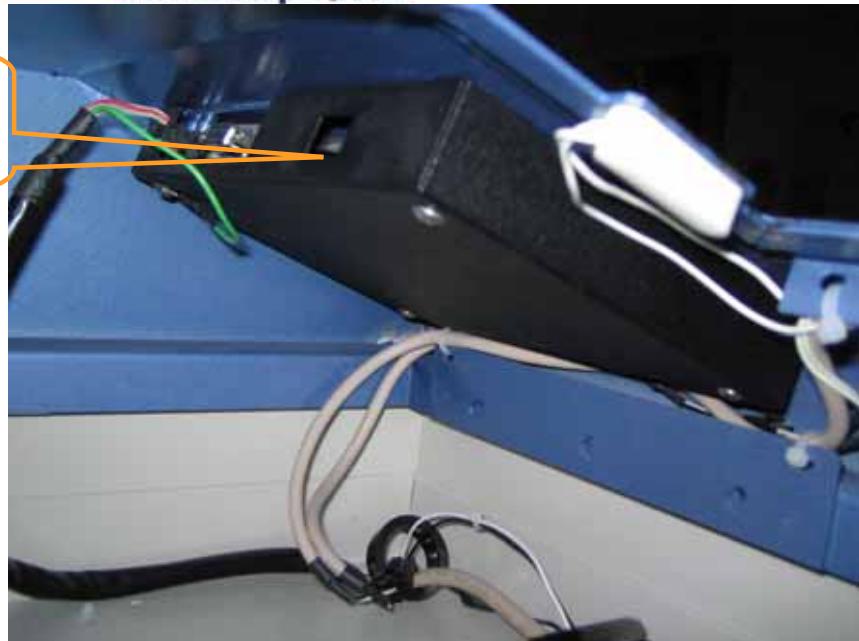
5.1.2 Graphic Control Panel Overview (Description)

The Control Panel

The control panel on the LaserPro Mercury II 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 Mercury II'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 Mercury II are open or improperly closed.

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

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

> ⚠️ *WARNING*
>
> - **DO NOT** attempt to remove or modify any component of the safety interlock system.
>
> - If at any time, any of the access doors are open and the "laser" LED is illuminated, **IMMEDIATELY** unplugs the laser system and contact GCC technical support for service instructions.
>
> - **DO NOT** operates the laser system if any component of the safety system is malfunctioning.

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.
-

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
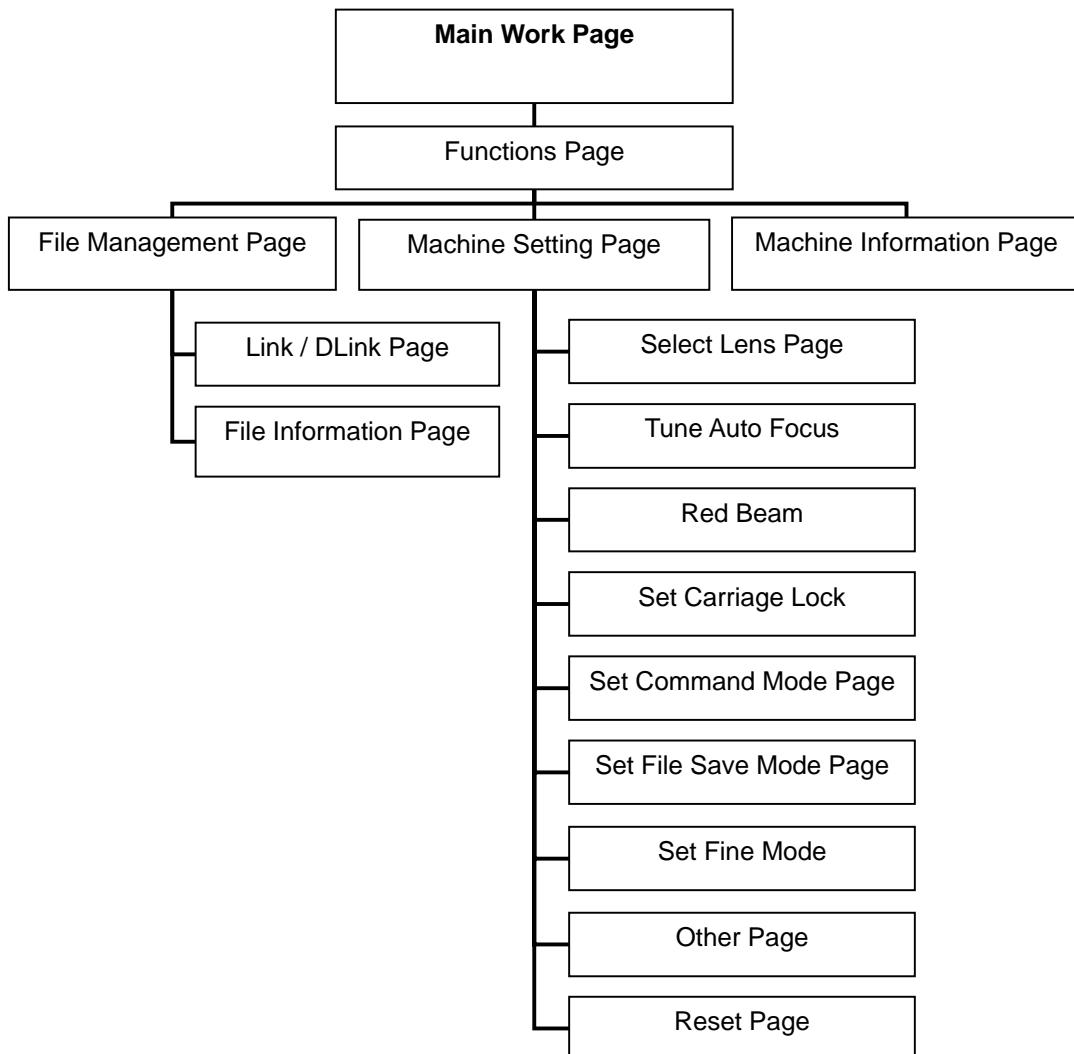
positioning the laser firing path. Once the position of laser firing is confirmed to be correct, then you can press the LASER key again to enable the laser, and start to laser engraving or cutting on materials.

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

![LaserPro www.laserpro.com]

5.1.3 Graphic Control Panel Navigation Chart

```
                    ┌─────────────────────────┐
                    │     Main Work Page      │
                    └────────────┬────────────┘
                    ┌────────────┴────────────┐
                    │     Functions Page      │
                    └────────────┬────────────┘
        ┌────────────────────────┼────────────────────────┐
┌───────────────────┐ ┌───────────────────┐ ┌───────────────────────┐
│File Management Page│ │Machine Setting Page│ │Machine Information Page│
└─────────┬─────────┘ └─────────┬─────────┘ └───────────────────────┘
          │                     │
   ┌──────┴──────────┐   ┌──────┴───────────┐
   │ Link / DLink Page│   │ Select Lens Page │
   └─────────────────┘   └──────────────────┘
   ┌─────────────────┐   ┌──────────────────┐
   │File Information  │   │ Tune Auto Focus  │
   │     Page         │   └──────────────────┘
   └─────────────────┘   ┌──────────────────┐
                         │    Red Beam      │
                         └──────────────────┘
                         ┌──────────────────┐
                         │ Set Carriage Lock│
                         └──────────────────┘
                         ┌──────────────────┐
                         │Set Command Mode  │
                         │     Page         │
                         └──────────────────┘
                         ┌──────────────────┐
                         │Set File Save Mode│
                         │     Page         │
                         └──────────────────┘
                         ┌──────────────────┐
                         │  Set Fine Mode   │
                         └──────────────────┘
                         ┌──────────────────┐
                         │    Other Page    │
                         └──────────────────┘
                         ┌──────────────────┐
                         │    Reset Page    │
                         └──────────────────┘
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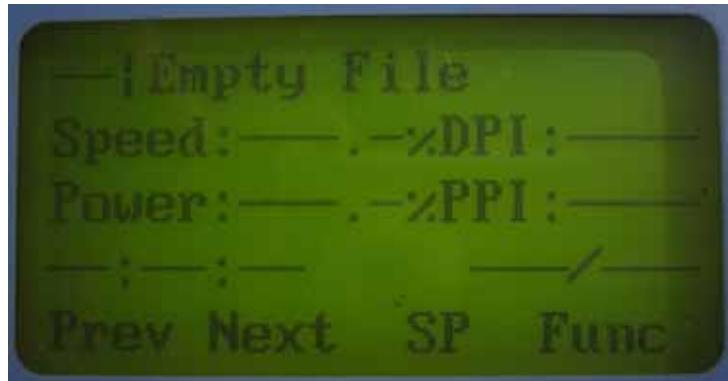
5.1.4 Graphic Control Panel Function Pages

When the LaserPro Mercury II 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 Mercury II 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**
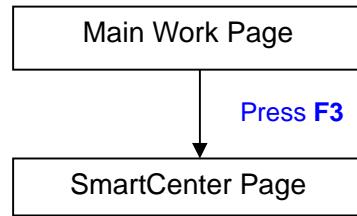
Carriage / Work Table
Adjustment Page
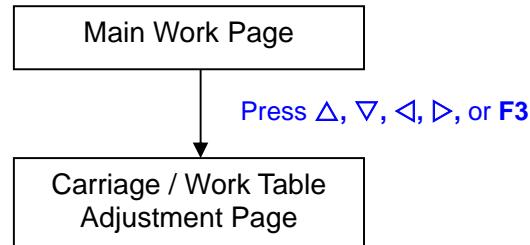
The Carriage / Work Table Adjustment Page allow you to manually increase and decrease the height of the work table (Z-axis). In addition, you can manually adjust the Y-axis and X-axis of the laser carriage.

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

☼ **navigating to this page:**

Main Work Page

Press **F3**

SmartCenter Page

Under SmartCenter mode the job will be started after the system positions the pen carriage at the center position between two or four points indicated by the user. The SmartCENTER mode has to be enabled through the driver.

Enter SmartCENTER page by pressing the F3 button.   You will be prompted to indicate and store the position points.   The positions can be indicated by moving the carriage by hand and pressing enter to save the positions indicated by the red pointer. After all points are set, the carriage will move to the center of the stored positions and the job will begin.

Carriage / Work Table Adjustment Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Reset)	Reset all saved positions
F4 (Save)	Save current lens carriage position
△ / ▽ 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
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

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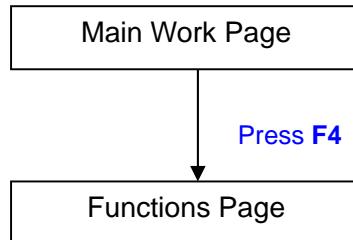
The Functions Page allows you to edit file management and machine settings. From this page, you will be able to access the File Management, Machine Setting, and Machine Information pages.

- **File Management Page** – this page allows you to manage the files that you have loaded onto the LaserPro Mercury II.
- **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.
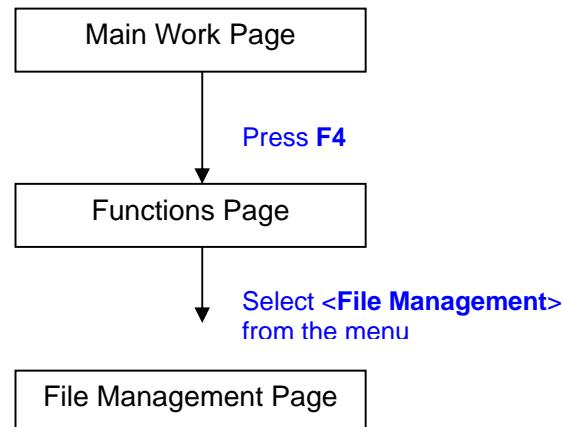
Functions Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F3 (Help)	Display help
F4 (Recall)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

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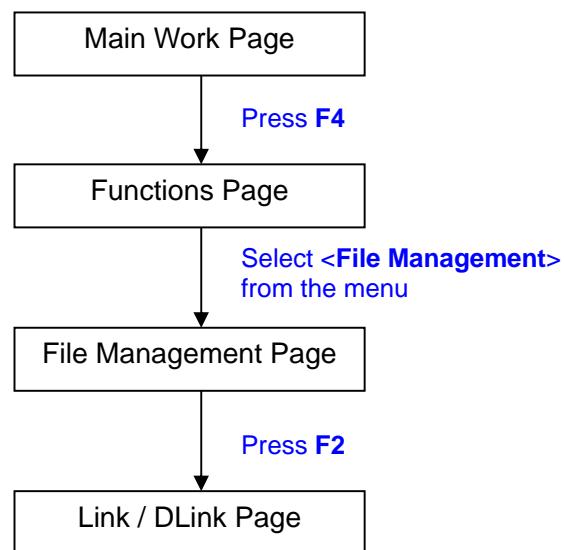
File Management Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Link)	Go to the Link/DLink Page
F3 (D-All)	Delete all loaded jobs
F4 (Del)	Delete the selected job
△ / ▽ Directional	Scroll through your loaded jobs
Enter	Go to the File Information Page for the selected job
Start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

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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.

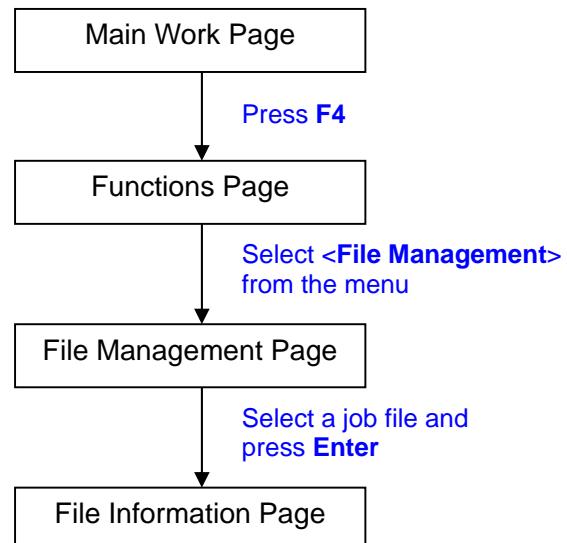| Link/DLink Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Link)	Add the currently selected job to the job queue
F4 (DLink)	Remove the currently selected job from the job queue
△ / ▽ Directional	Scroll through your loaded jobs
Start / Stop	Back to Main Work Page

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

File Management Edit Page
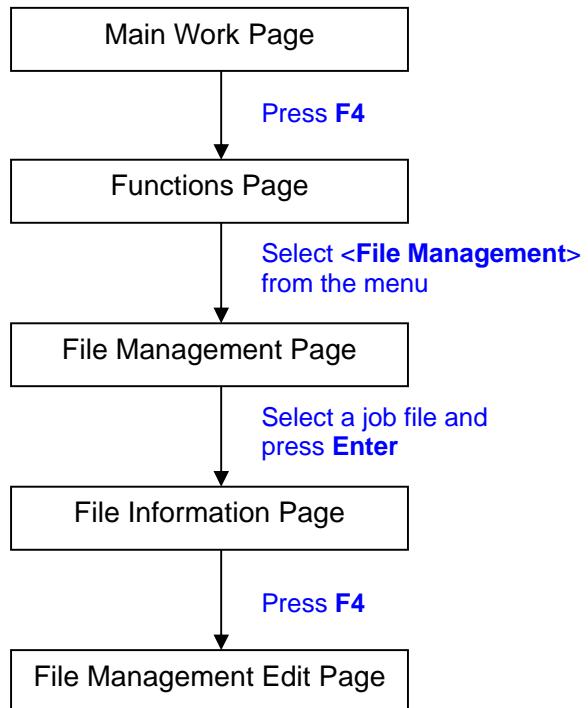
The File Management Edit Page allows you the choice to modify your raster or vector settings for the selected job, as well as setting the number of times to repeated the process of the job selected (Repeat Num).
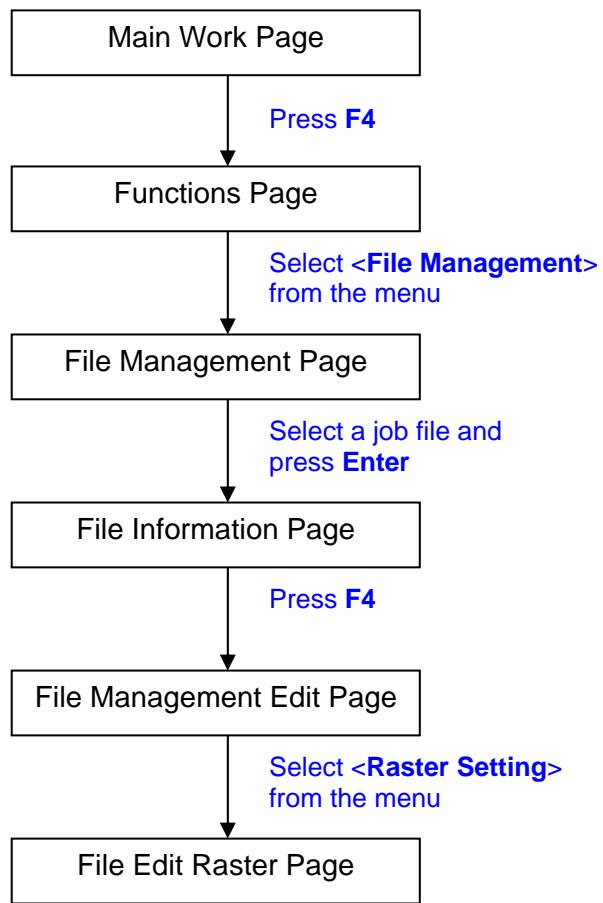
File Management Edit Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Cycle through the available selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page

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

File Edit Raster Page

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 Mercury II 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 Mercury II.

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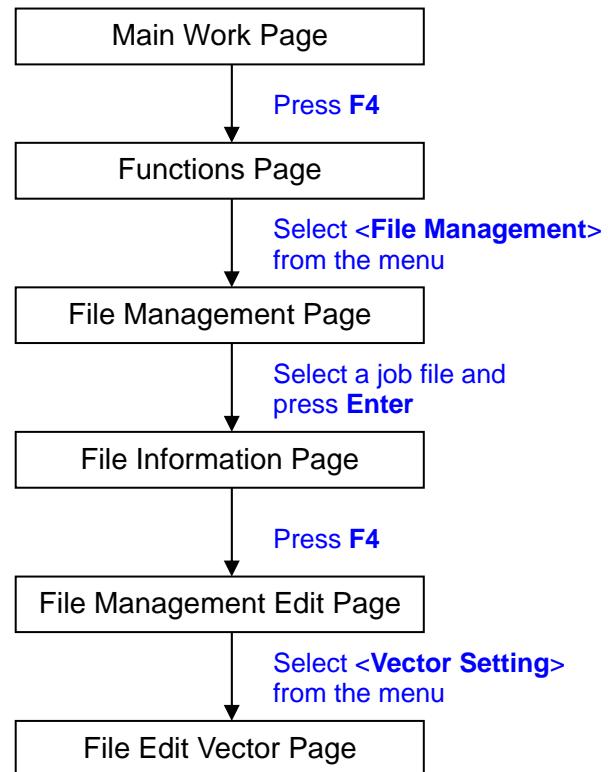
The File Edit Vector Page allows you to edit the vector pen, vector power, vector speed, and vector PPI, and power ramp settings for the selected job. These settings correspond to the same settings found on the LaserPro Mercury II print driver. This page allows you to easily adjust these values to make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

- 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

Machine Setting Page
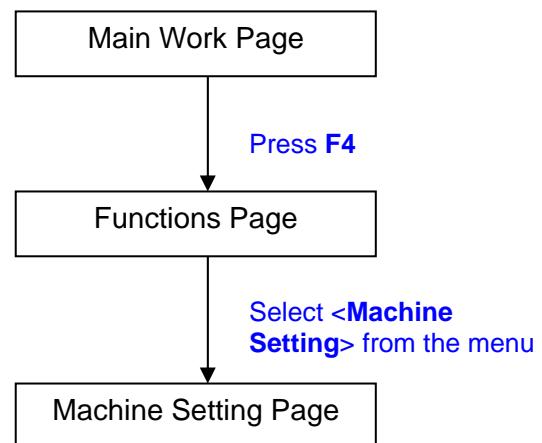
The Machine Setting Page allows you to access and modify a variety of your machine settings, including: Set Lens, Tune Auto Focus, Set Table Down, Set Red Beam, Carriage Lock, Set Command Mode, Save Position, Flash Memory, Set File Save Mode, Set Vector Mode, Tune Image Power, Set Laser Wattage, Set Fine Mode, Other, Reset.
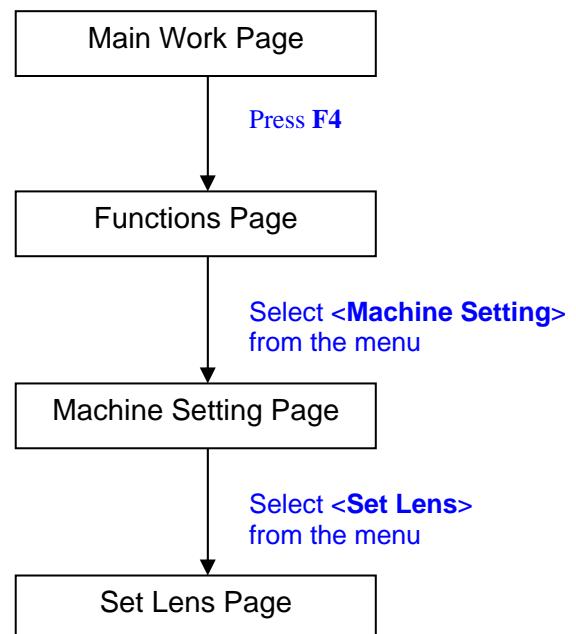
Machine Setting Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△ / ▽ Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Set Lens Page

☼ **Navigating to this page:**

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

The Set Lens Page allows you to modify the lens setting after you have changed to a different focal lens. Remember to save your settings after you have made the proper changes. Now by pressing the Auto Focus button, the LaserPro Spirit will auto focus properly using the new lens. The LaserPro Spirit's default setting is <2.0">

- Lens: 1.5" / 2.0" / 2.5" / 4.0"

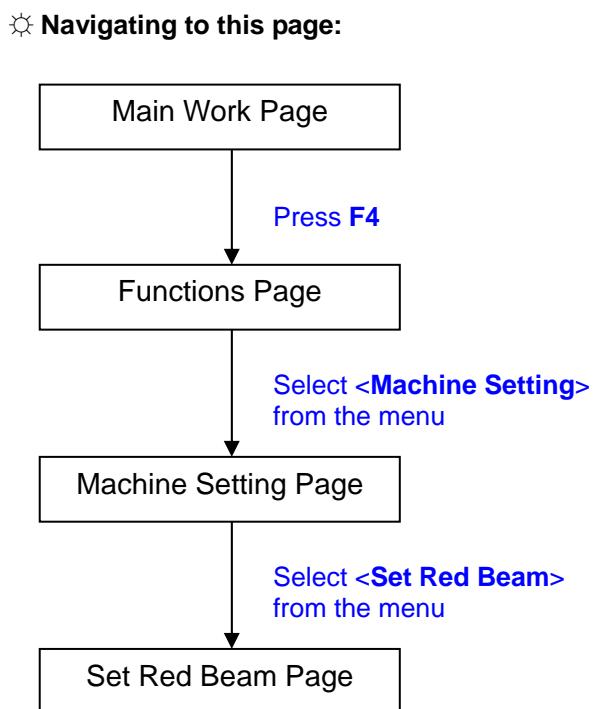| Set Lens Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle through selections
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Tune Auto Focus Page
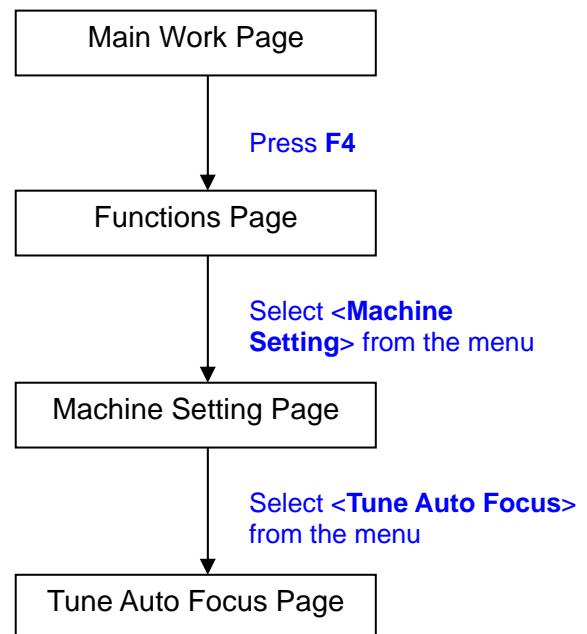
The Tune Auto Focus Page allows you to manually set the default auto focus distance / vertical height of the worktable (Z-axis) for when the Auto Focus button is pushed.

Tune Auto Focus Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△ / ▽ Directional	Manually adjust the height of the work table (Z-axis)
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

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Set Red Beam Page

The Set Beam Page allows you to turn on or off the red dot laser pointer on the laser carriage. Enabling this function will indicate the exact area the engraving laser will fire upon.

- Red Beam YES / NO

Set Red Beam Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Red Beam between YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

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
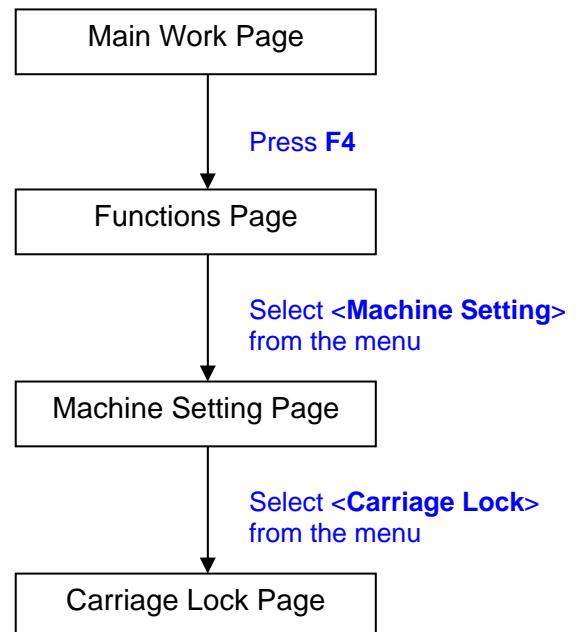
Carriage Lock Page

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

☼ **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
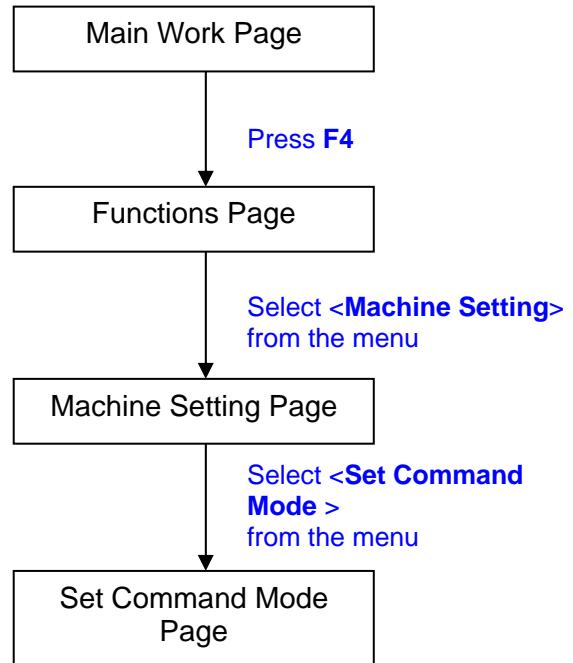
The Set Command Mode Page allows you to configure vector settings when outputting in Default or HPGL mode. Default mode is the standard Windows print driver recognized by the most popular graphic software programs, such as CorelDraw, Photoshop, Illustrator, etc. Whereas, HPGL mode is a less common output 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

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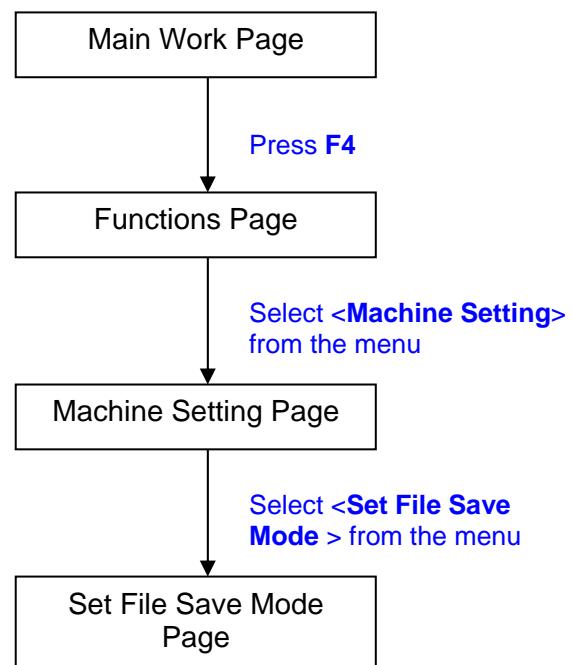
The Set File Save Mode Page allows you to set whether or not the LaserPro Mercury II automatically deletes each job file after processing. Setting File Save to <NO> will automatically and immediately delete each job file from the LaserPro Mercury II after the engraving or cutting process. Setting File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

- File Save: YES / NO

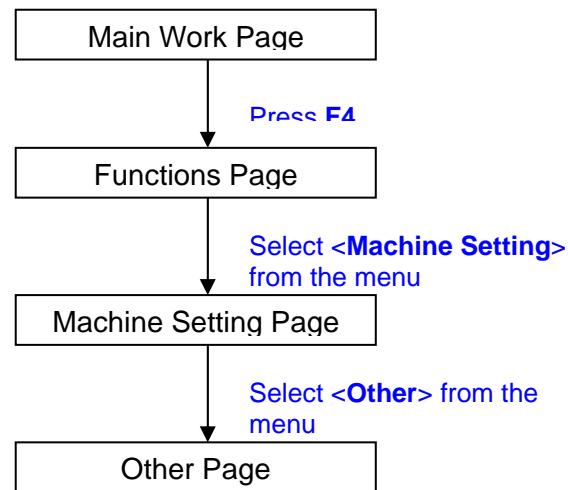| Set File Save Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle File Save between YES / NO
Start / Stop	Back to Main Work Page

Set Fine Mode Page

☼ **Navigating to this page:**
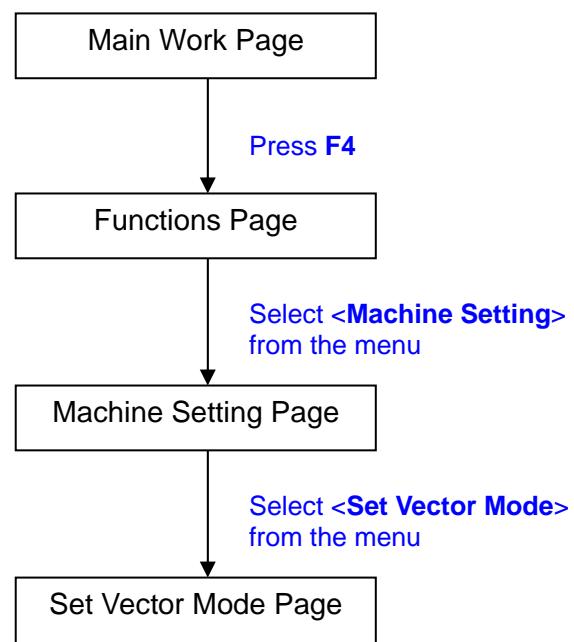
The Set Vector Mode Page allows you to adjust and balance vector mode's quality and speed settings based on your specific job. Speedy Vector Mode offers the highest output speed, sacrificing quality. Whereas Quality Vector Mode offers the highest quality, sacrificing output speed. Keep in mind that speed and quality are usually at a tradeoff. The system's default is Fine Vector mode, sacrificing some speed for higher quality. The LaserPro Mercury II'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

Other Page

☼ **Navigating to this page:**
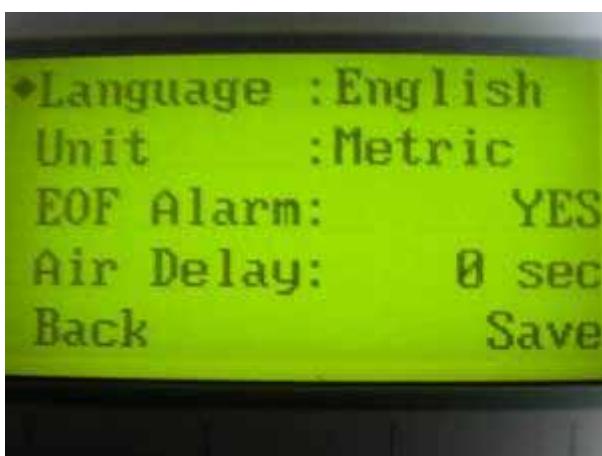
```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │  Press F4
            ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
            │  Select <Machine Setting>
            │  from the menu
            ▼
┌─────────────────────────┐
│  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.
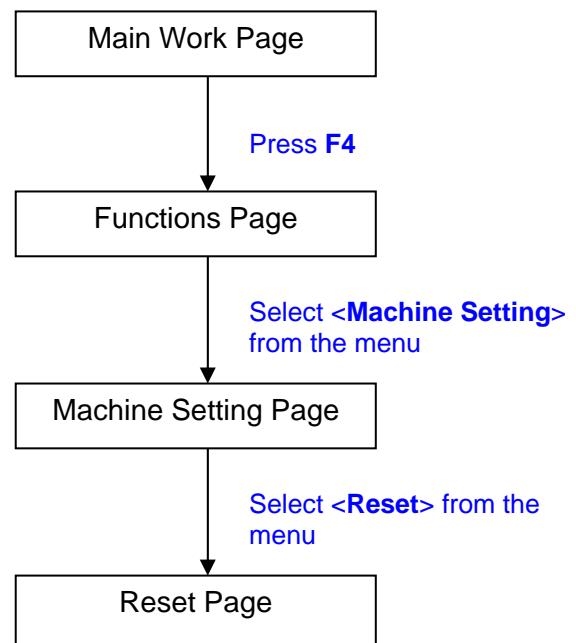
Other Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△ / ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page

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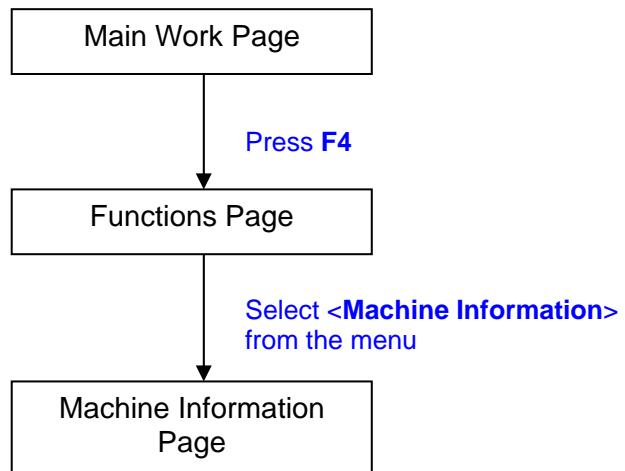
The Machine Information Page allows you to view information regarding the system such as the GCC logo, machine name, firmware version, and other information.

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

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5.2 The LaserPro Mercury II Print Driver

With the LaserPro Mercury II 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 Mercury II's worktable area.

NOTE

Please make sure Mercury II is set to the default printer before proceeding to the page and layout setup.

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

If LaserPro Mercury II 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 Mercury II as the Printer.

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

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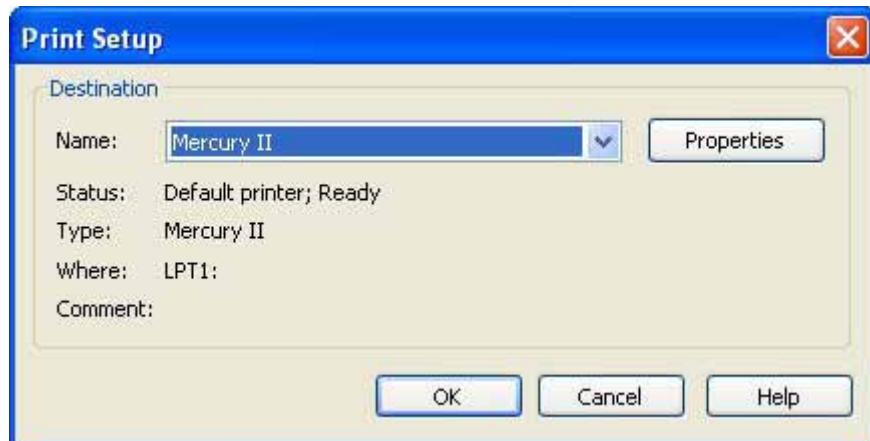
5.2.1 Page Setup and Orientation

The first thing you must do before working with the LaserPro Mercury II 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 Mercury II'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 635 mm (25 inches) and vertical height to 458 mm (18 inches).

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 Mercury II's work table dimensions of 635 mm (25 inches) and 458 mm (18 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 Mercury II's work table. (You MUST have the Mercury II set as the default printer prior to doing this.)
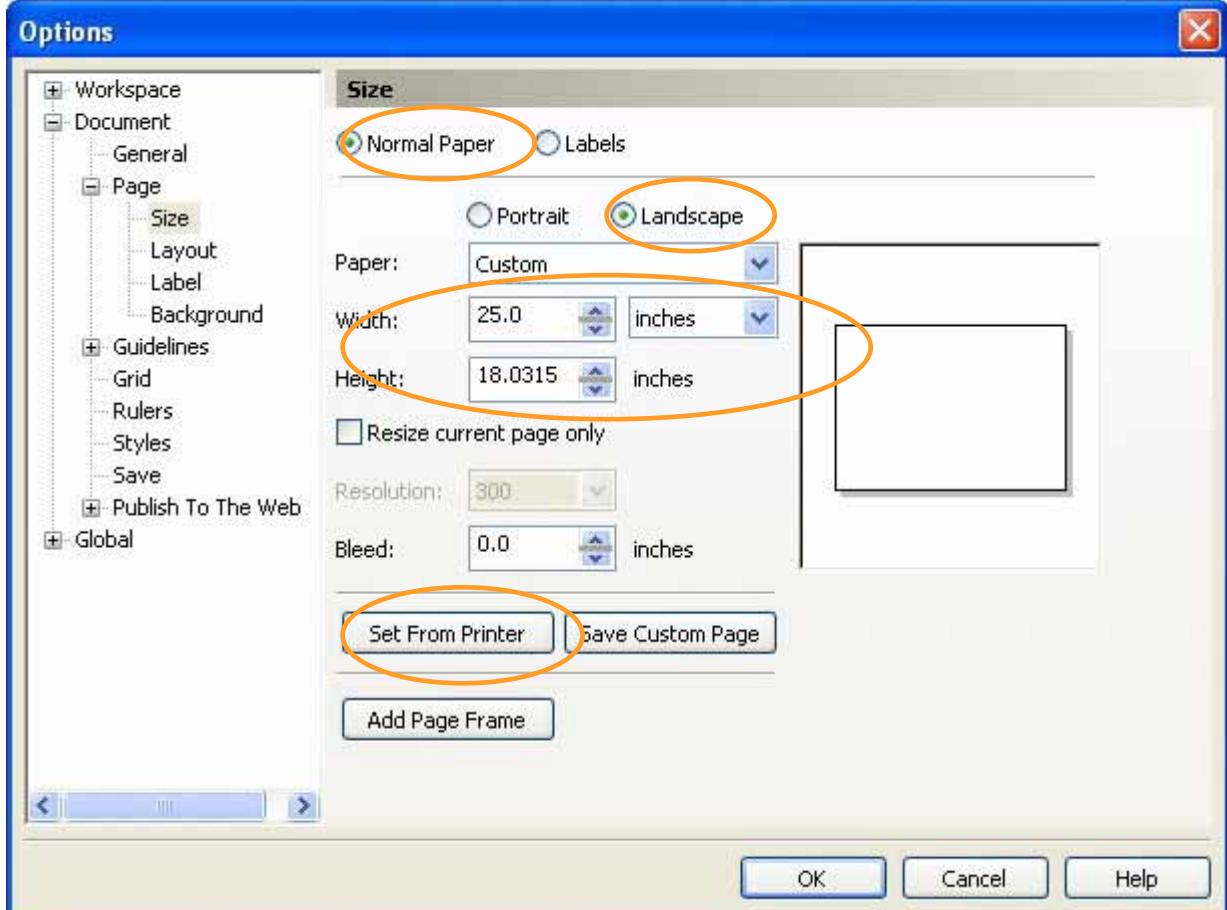
5.2.2 Color Management

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 Mercury II Print Driver.
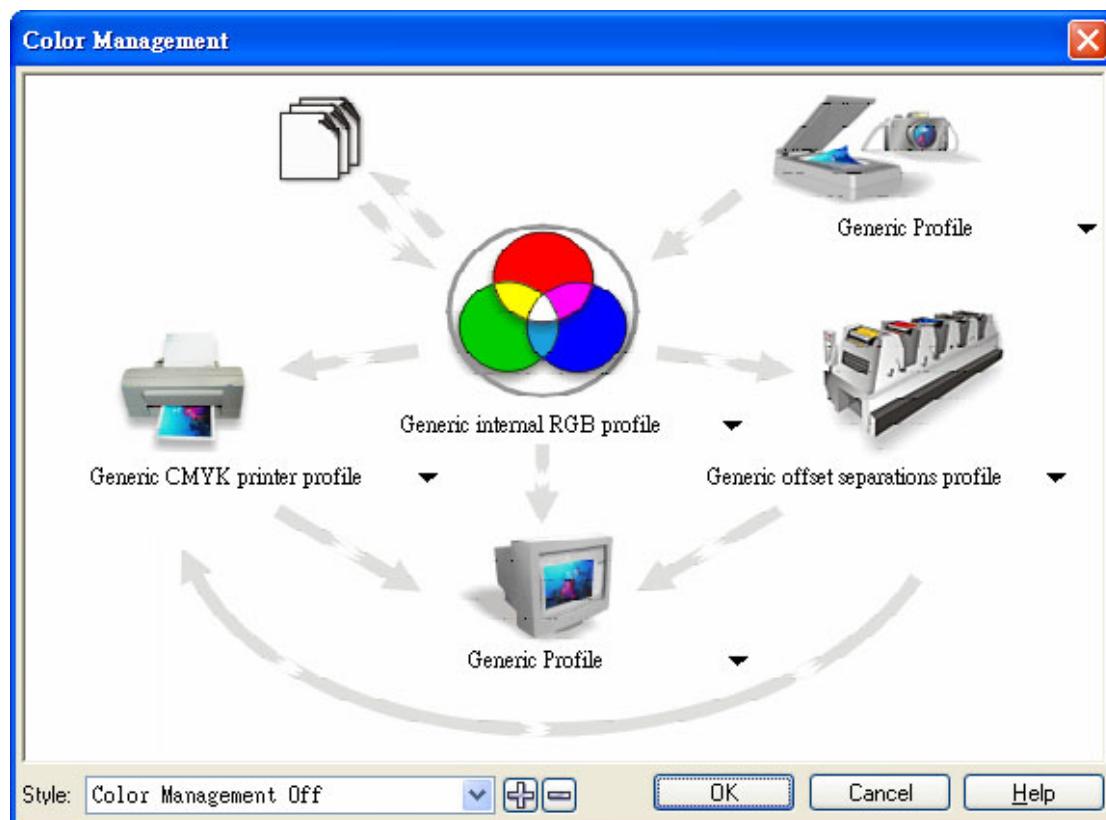
From your graphic software's Color Management page:
• Disable Color Management or set Color Management to Off.

<u>**Corel Draw Example (Color Management)**</u>

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 Mercury II 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 Mercury II Print Driver. The LaserPro Mercury II 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 Mercury II print driver by going to FILE (PRINT (PROPERTIES.

(!

! Note

For this screenshot example, CorelDraw was used as the software application.

The LaserPro Mercury II 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 Mercury II 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 Section 6, especially the Vector Cutting and Raster Engraving concepts. This will make it easier to understand the various descriptions and terminologies used in this section.

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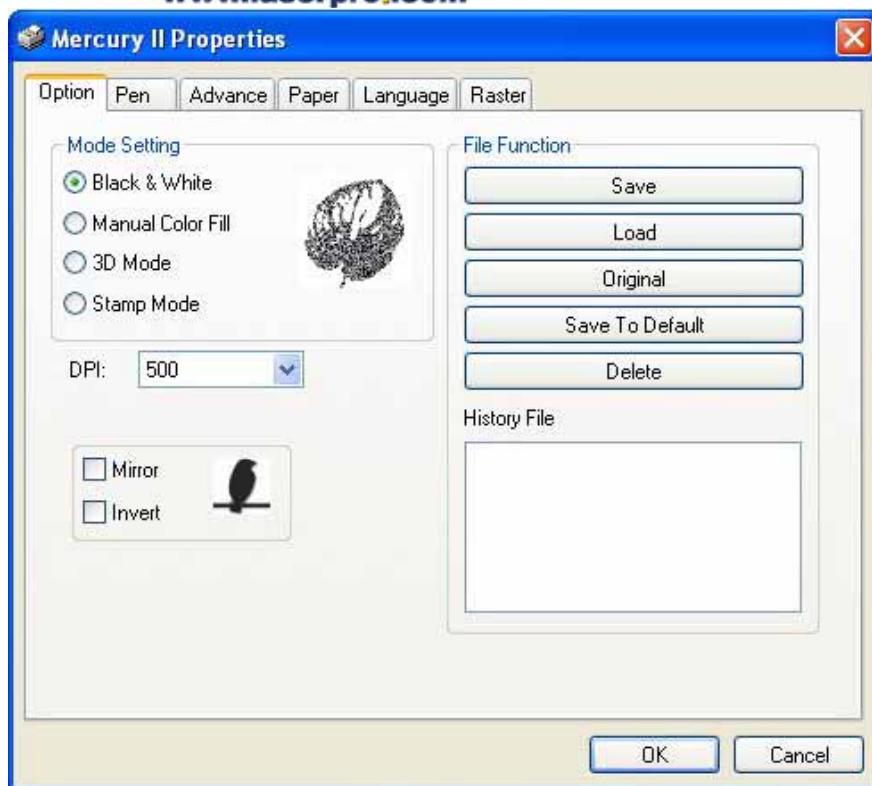
Mode Setting (OPTION PAGE)
[DEFAULT SETTING: Black & White]

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 Mercury II 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.

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 Mercury II 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 Mercury II 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 Mercury II. Due to the unique engraving nature when engraving a stamp, the stamp production requires different operational steps than most engraving or cutting operations.

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 Mercury II 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.
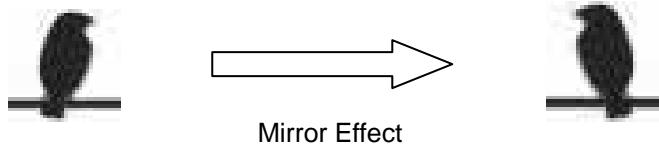
Mirror Effect

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.
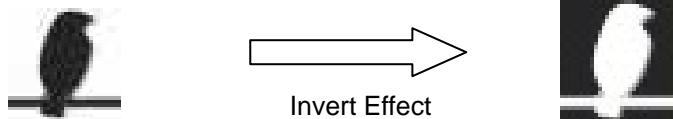
Invert Effect

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

Checking this will instruct the LaserPro Mercury II 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 Mercury II system and will need to be initialized from the LaserPro Mercury II 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 or LaserPro parameter database.

- **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.
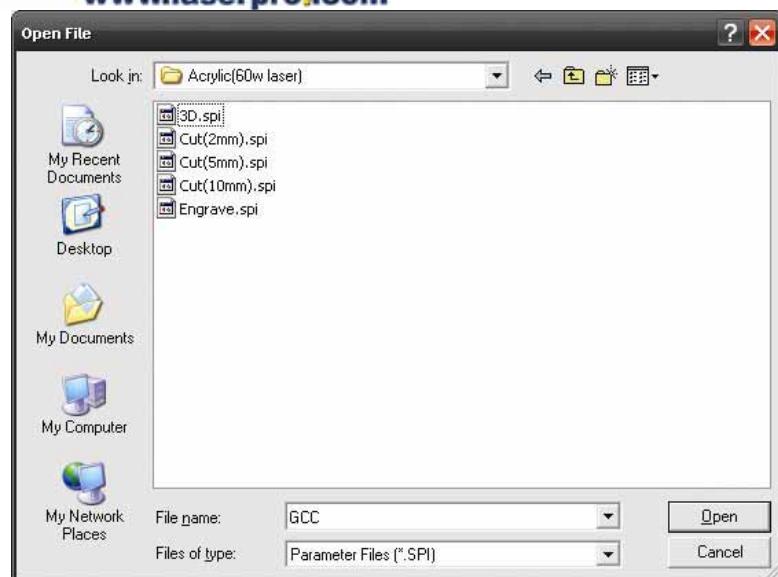
TIP

LaserPro material database settings allow you easy to load the several parameters.   If you are loading LaserPro parameter database as your operating parameter, please direct load from several build-in parameter folders.
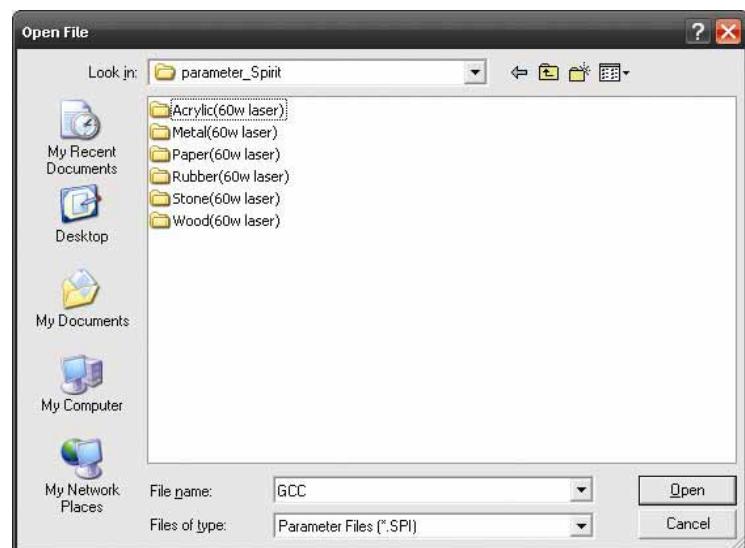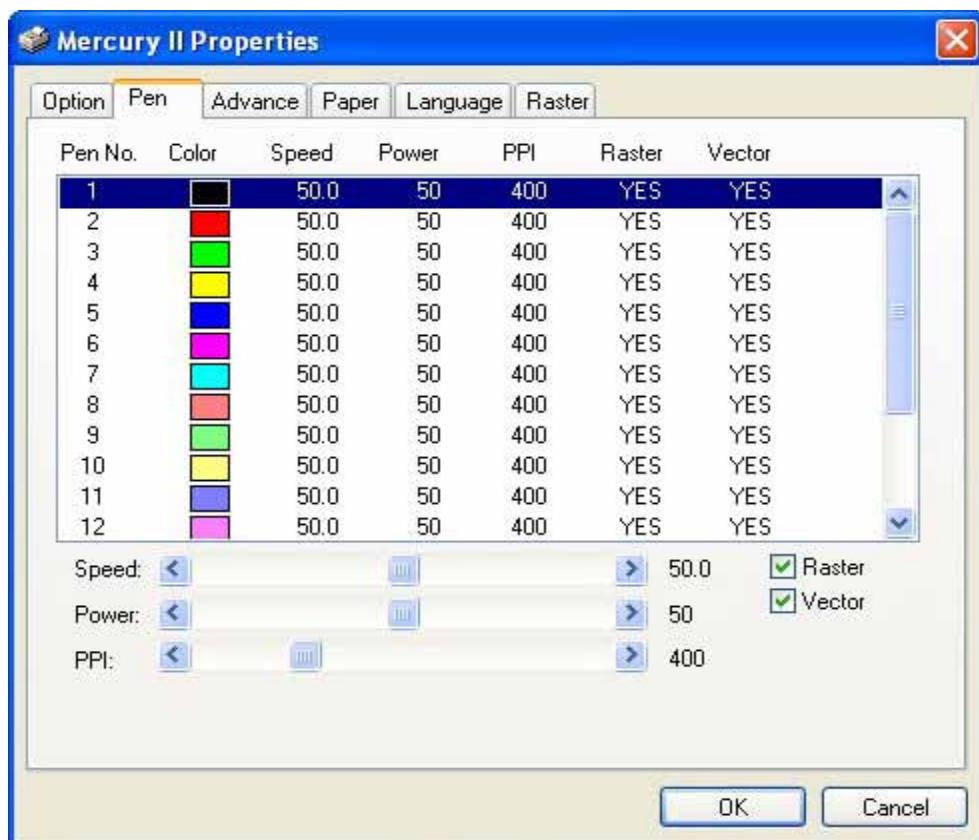
5.2.3.2 Mercury II Print Driver >> Pen Page

The LaserPro Mercury II 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 Mercury II 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

The Mercury II 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 Mercury II'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 Mercury II Print Driver >> Advance Page
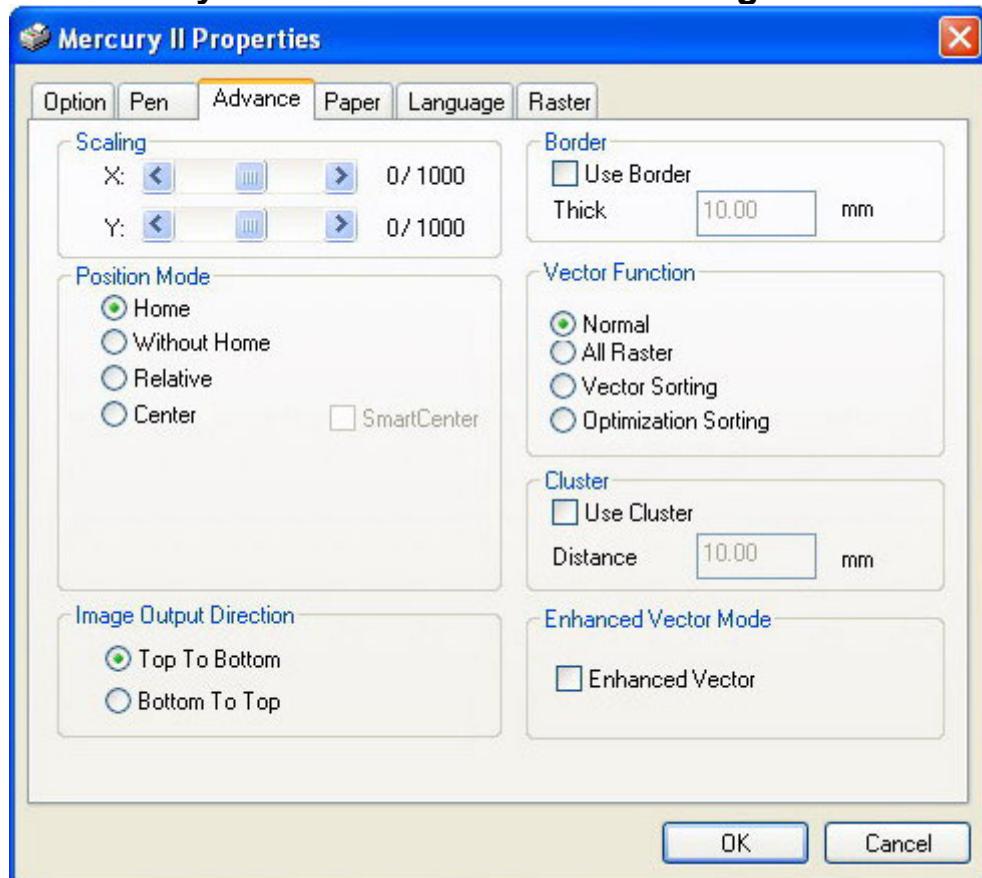
Scaling (Advance Page)
[DEFAULT SETTING: 0]

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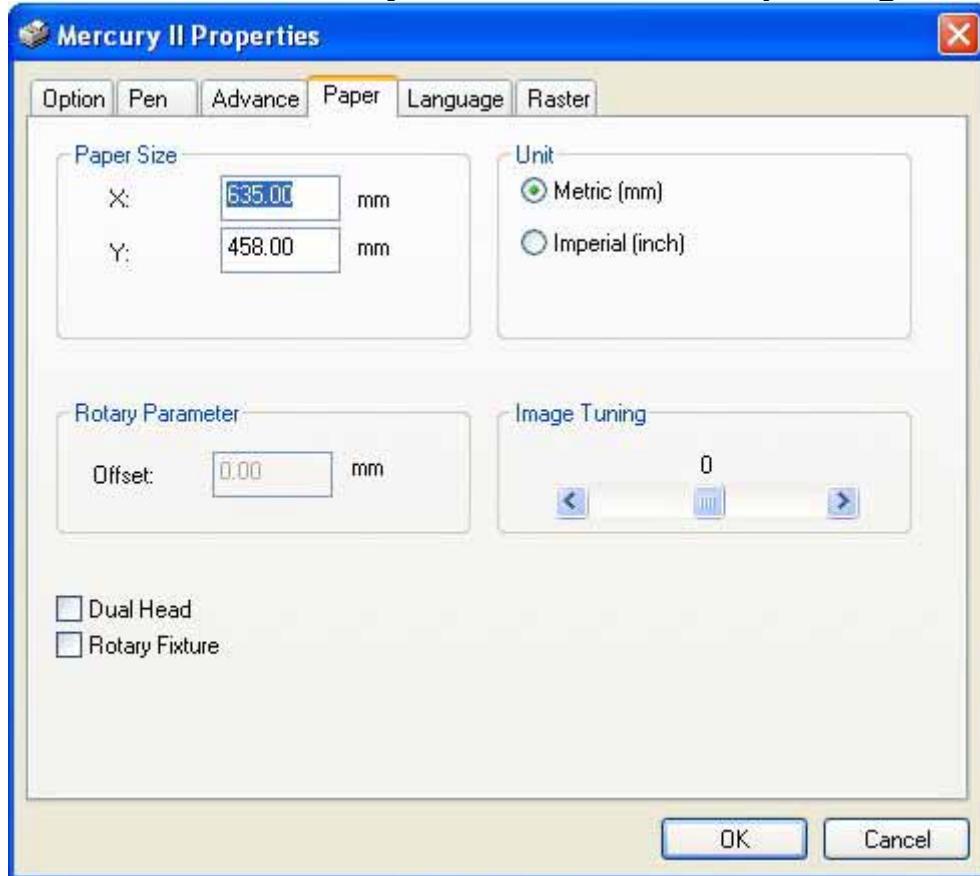
Enhanced Vector Mode (Advance Page)
[DEFAULT SETTING: Unselected]

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 Mercury II 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 Mercury II's worktable area of 25" x 18" (635mm x 458mm). The X value represents the length and the Y value represents the width.

ⓘ 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 Mercury II 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.
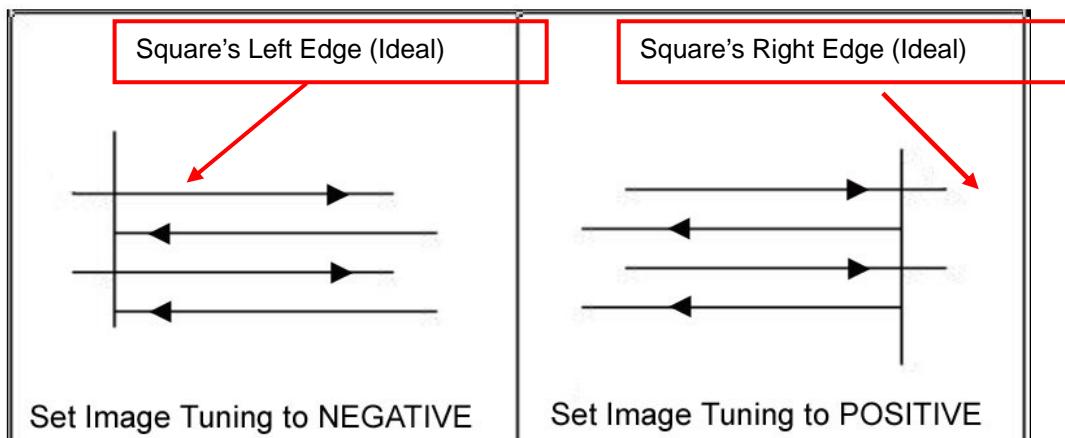

The following is an example that has the proper image tuning, and demonstrates this significance when engraving fine, small, intricate text. The following two pictures show engraved text magnified with no image tuning (left picture) and image tuning enabled (right picture).

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5.2.3.5 Mercury II Print Driver >> Language Page

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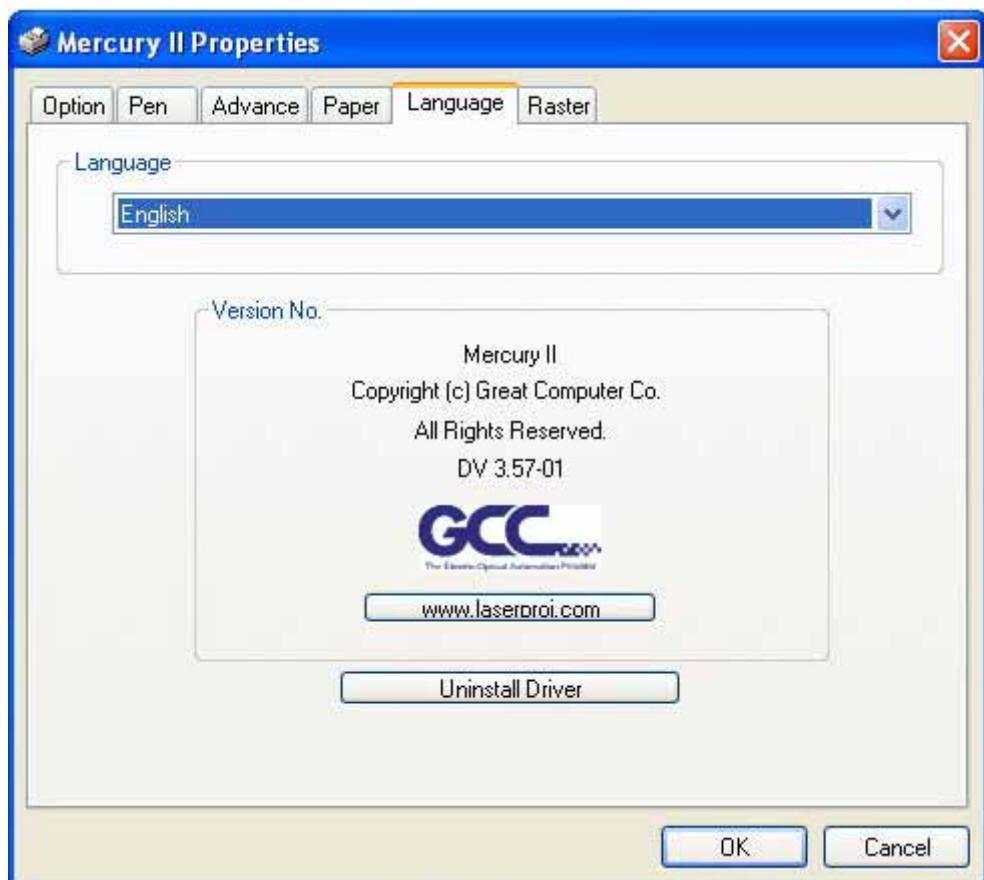
Uninstall Driver (Language Page)

Select this to uninstall the Mercury II print driver. You will then need to restart your computer to complete the process.
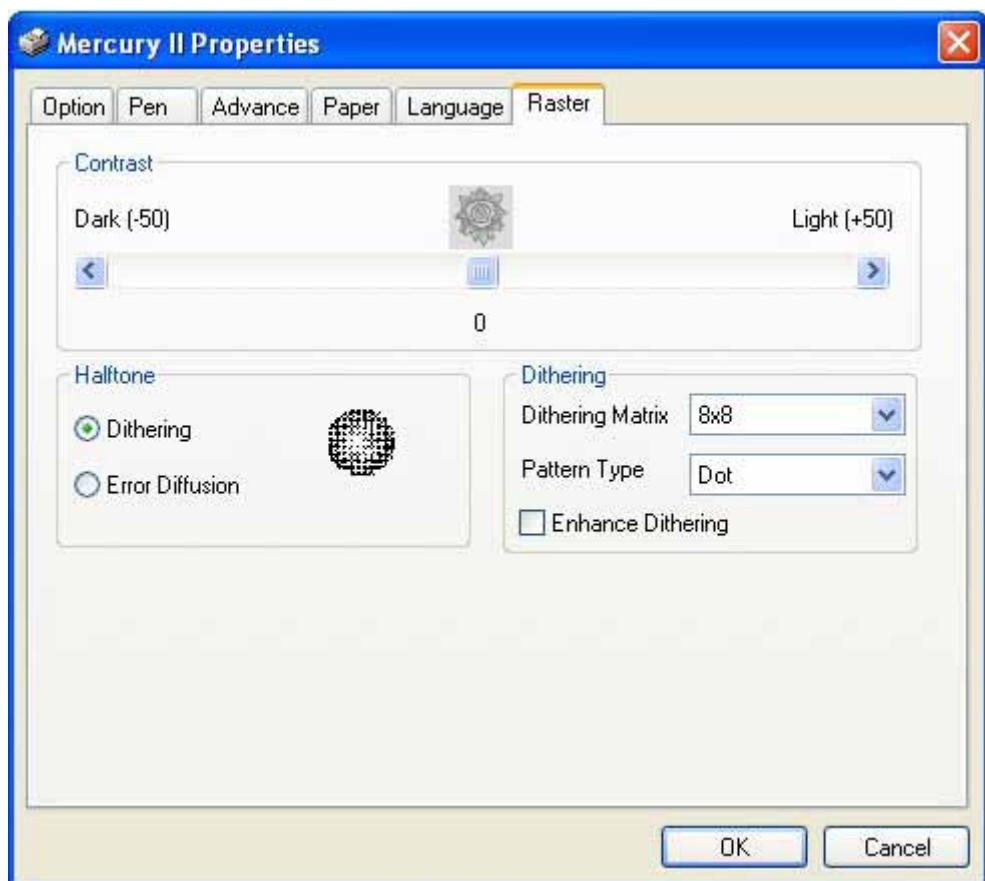
5.2.3.6 Mercury II Print Driver >> Raster Page

> **ⓘ 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** |
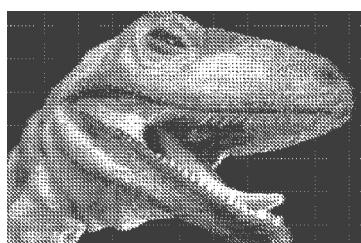
  o **Dithering Matrix:** *Variable depending on the Pattern Type selected.*
    [DEFAULT SETTING: 8x8]

    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

2 x 2 Dithering   **8 x 8 Dithering**

8 x 8

(Enhance Dithering)

(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 Mercury II 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 stamp

Slope of ridge (Shoulder Level)

Base of ridge (Pitch)
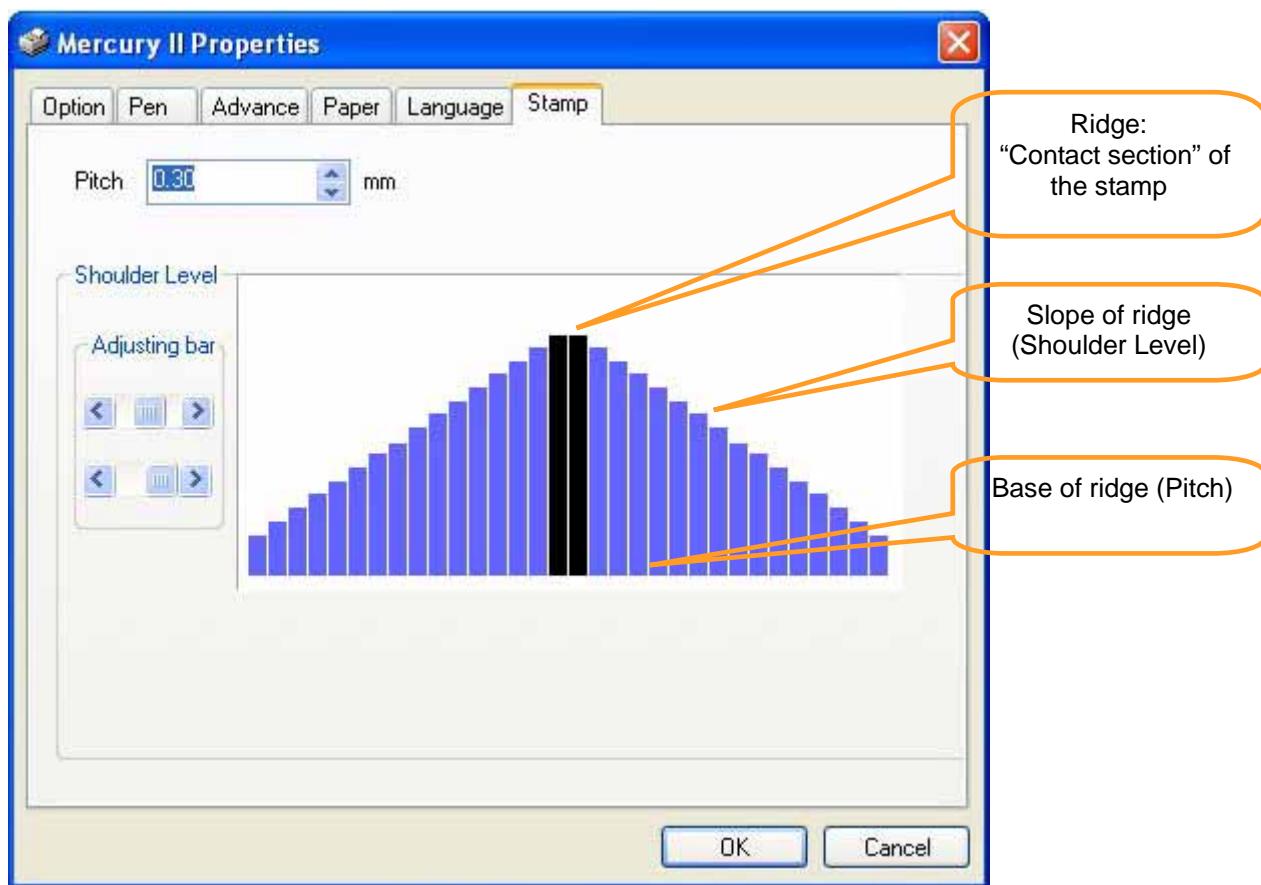
■ **Pitch (Stamp Page)**
■ Your stamp will be a reversed image composed of engraved depressions and ridges.   Think of these ridges as the "contact sections" of the stamp. If the ridges of these contact sections are too thin, they may break. The Pitch setting allows you to increase the width of the ridge 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 Mercury II 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 - BASIC MAINTENANCE

Caution:
- Keeping the optics and motion system clean is essential to an excellent quality engraving and the reliability of your engraver. **Please clean Bearing track and X-axis (DU) bearing daily to maintain good condition of machine.**
- Never pour or spray any liquid directly onto the laser system.
- Turn off the power and unplug the system before cleaning.

1. **Inside the System:** Open the top door, the front door and the back door (if necessary). Vacuum to clean inside of the engraver and vent area thoroughly.
2. **Engraving Table:** Dampen the paper towel or cloth with alcohol or cleaner to clean the Engraving Table.
3. **Motion System:** Dampen the cotton swab to clean the rails of the Motion System. Get rid off any debris built up in the bearing tracks.
4. **Bearings:** Hold a dampened cotton swab against the bearing and moving the motion system by hand to clean each bearing.
5. **Mirrors and Lens:** The focus lens and the mirror located on the carriage are the two components most likely to require frequent cleaning.

Caution:
Don't scratch out the soft coating of the mirror's surface. Excessive cleaning the mirrors and lens may cause damage and reduce their life cycle (refer to Fig. 24).
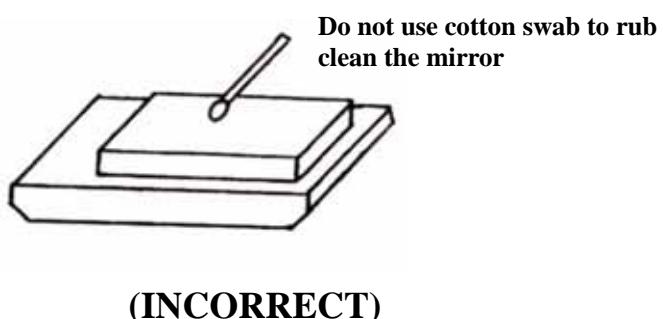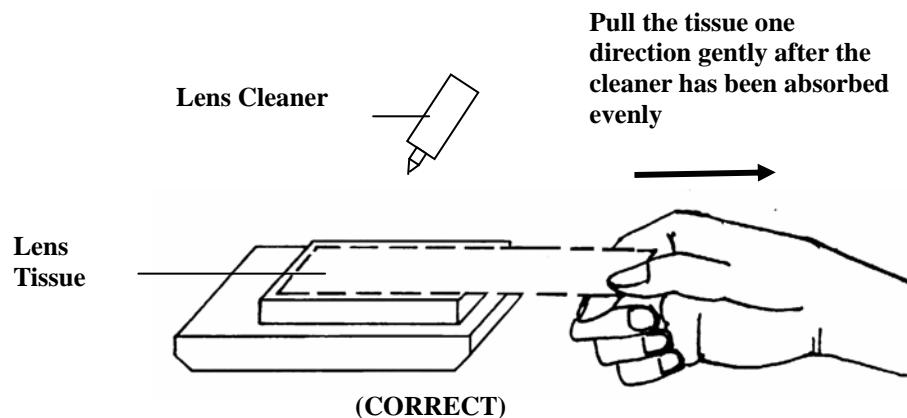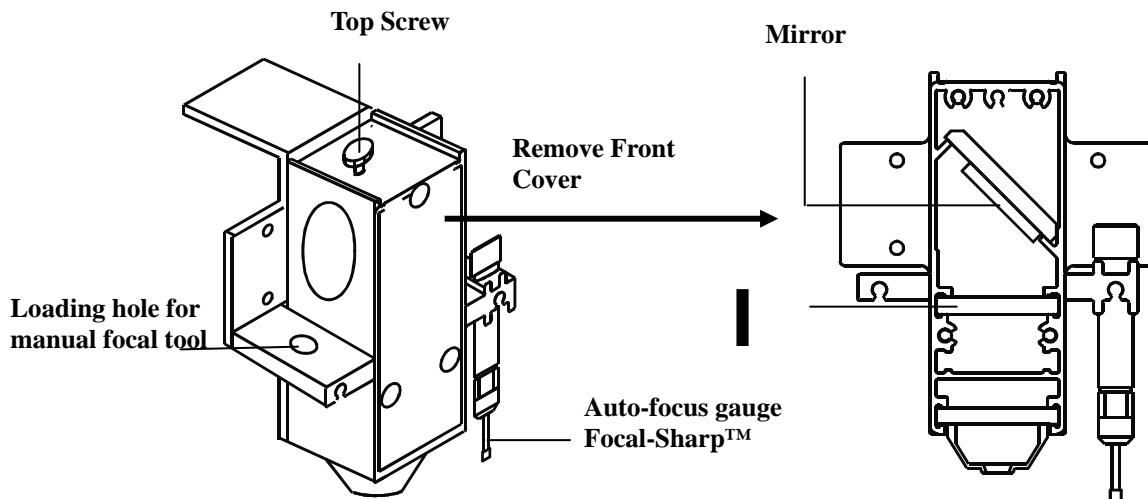

TIP

Please clean the AutoFocus pin each time after completing the engraved job to make sure the AutoFocus pin is free to move.

6.1 Clean the mirror – Please refer to the figure as below
1. Unscrew and remove front cover of the focus carriage. Release the top screw and pull out mirror carefully.
2. Put lens tissue on the mirror and drop a little lens cleaner on the middle area of the tissue, after the fluid has been absorbed evenly, pull the tissue **one direction** gently to clean the mirror.
3. Let it air dry and re-install it.
4. Unscrew and remove the dust prevention box then clean the X-axis Mirror, Y-axis Mirror and #1 mirror same as above process separately.

Lens Cleaner

Pull the tissue one direction gently after the cleaner has been absorbed evenly

Lens Tissue

(CORRECT)

Do not use cotton swab to rub clean the mirror

(INCORRECT)

Top Screw

Mirror

Remove Front Cover

Loading hole for manual focal tool

Auto-focus gauge Focal-Sharp™

6.2 Clean the focus lens –

1. Unscrew and remove the front cover of the focus carriage. Pull out focus lens carefully.
2. Flood the focus lens with lens cleanser on both sides then using a cotton swab or lens tissue to dry off the remaining solution gently.
3. Do not touch the lens surface with your bare hands or press down hard with any cleaning material.

Chapter VII - TROUBLE SHOOTING

7.1 Quality Problems
- Check focus length set under the function key to see if it matches the type of the lens installed.
- Focus Lens is not installed correctly. Focus Lens is loose in the holder.
- Debris or dust builds up in the bearing tracks or X-Axis rails.
- The focus lens and the mirror in the carriage are damaged or need to be clean.

7.2 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 purpose, the laser beam will not be generated when the top or front door is opened unless you short the connector of the magnetic switches.

Appendix A. 3D Function

Tip for 3D Application

When doing 3D sample on LaserPro Mercury II (L-25), 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 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

3D engraving / Material: 1cm Acrylic   by Mercury II 25W   Lens: 2 inch

| Step	Speed	Power	DPI	PPI	Focus	Remarks
1	25%	100%	600	auto	Auto Focus	3D Mode Engraving
2	25%	100%	600	auto	Lower down table 2.5mm	3D Mode Engraving
3	100%	100%	600	800	Lower table again 2 mm	Black and White Mode Polishing
4	0.2%	100%	500	auto	Move table up 1.3mm	Cutting off

Appendix B. To modified image settings of a picture for better engraving quality

1. Connect your digital camera to the computer by USB cable.
2. Download the picture from the digital camera to the computer
3. Select the picture that you want to engrave.
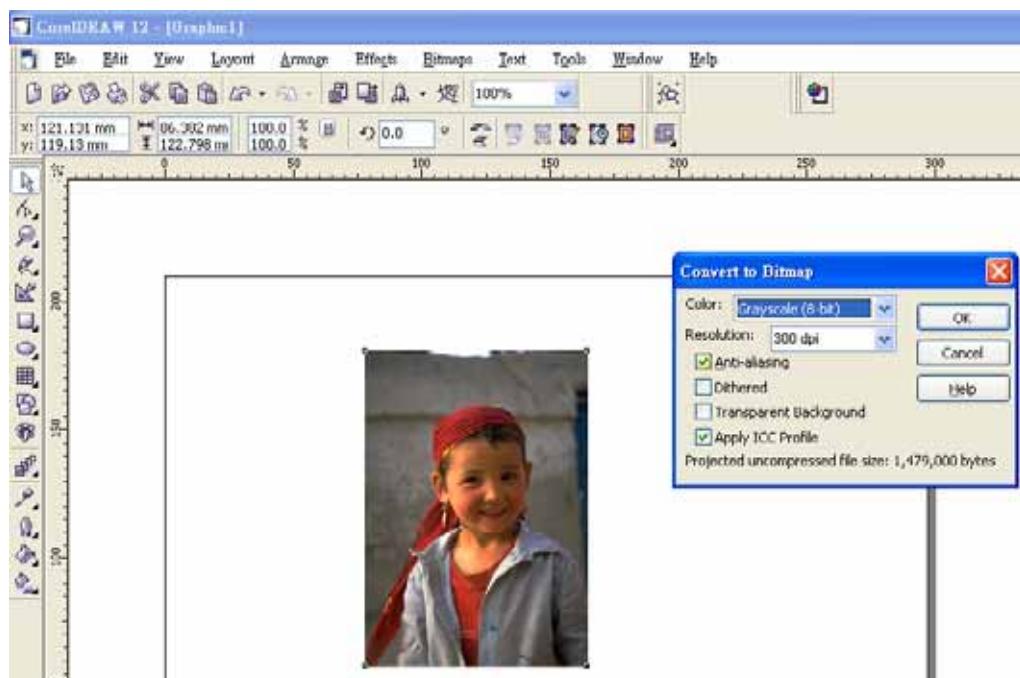4. Import the image from the folder where the picture is located by selecting File/Import
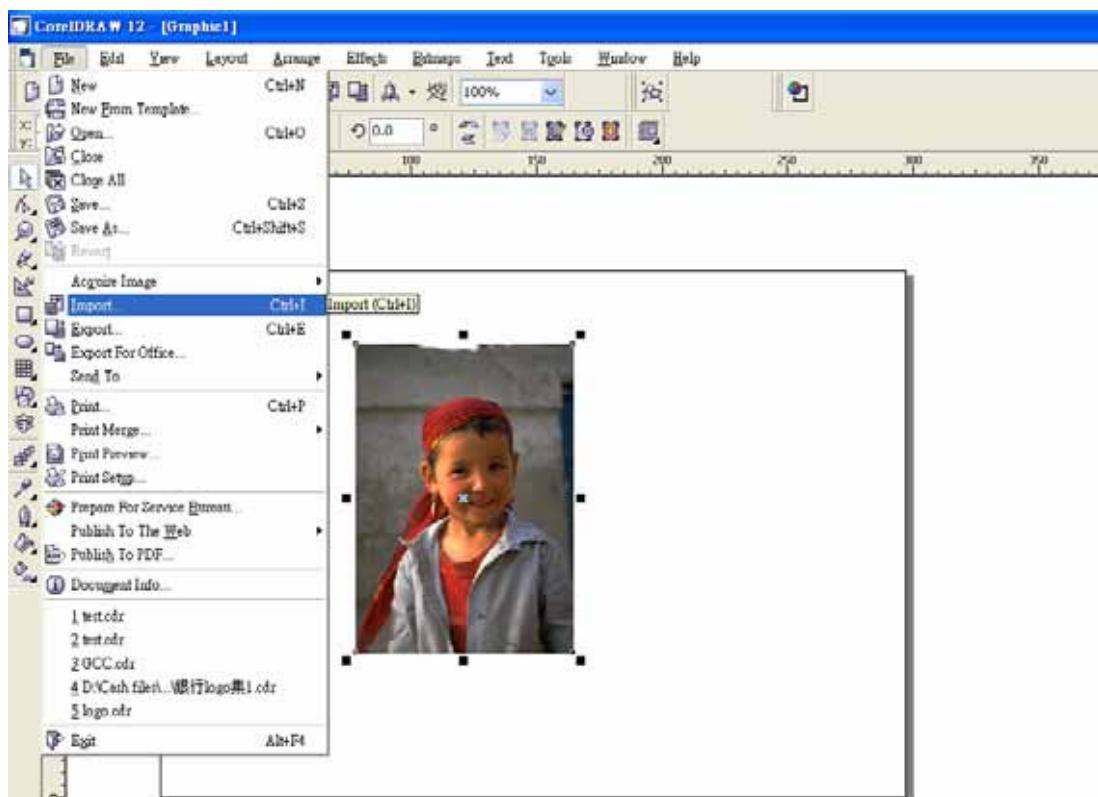
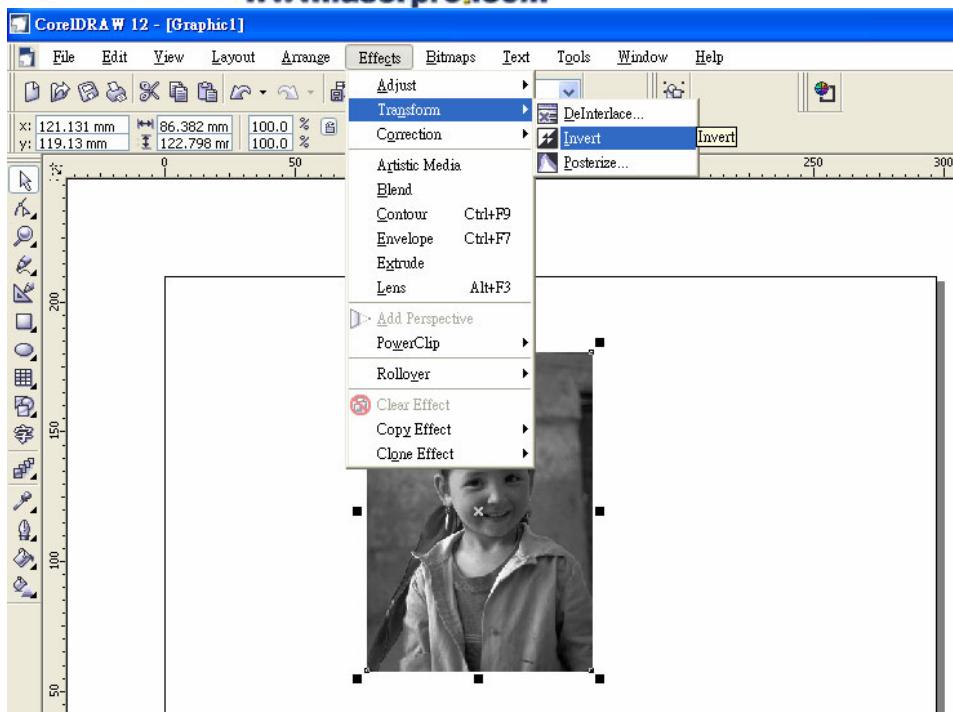5. Convert the image to Bitmap by selecting the image and click on Bitmaps/Convert to Bitmap

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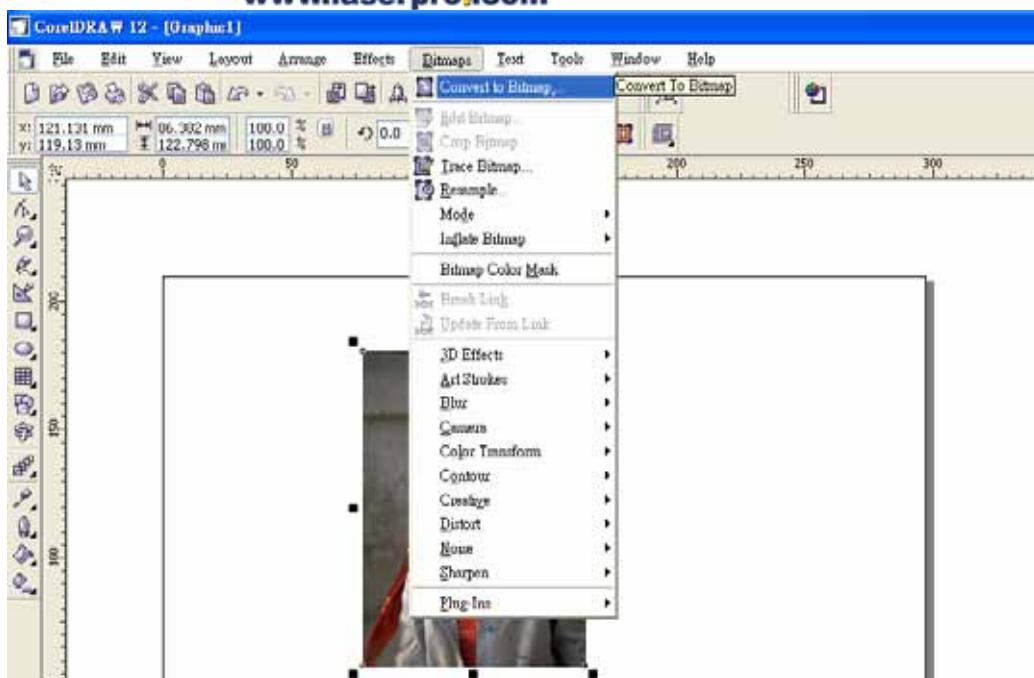
6. Change the Bitmap settings by setting "Color" to Grayscale (8-bit) and "Resolution" to 300 dpi and click OK.
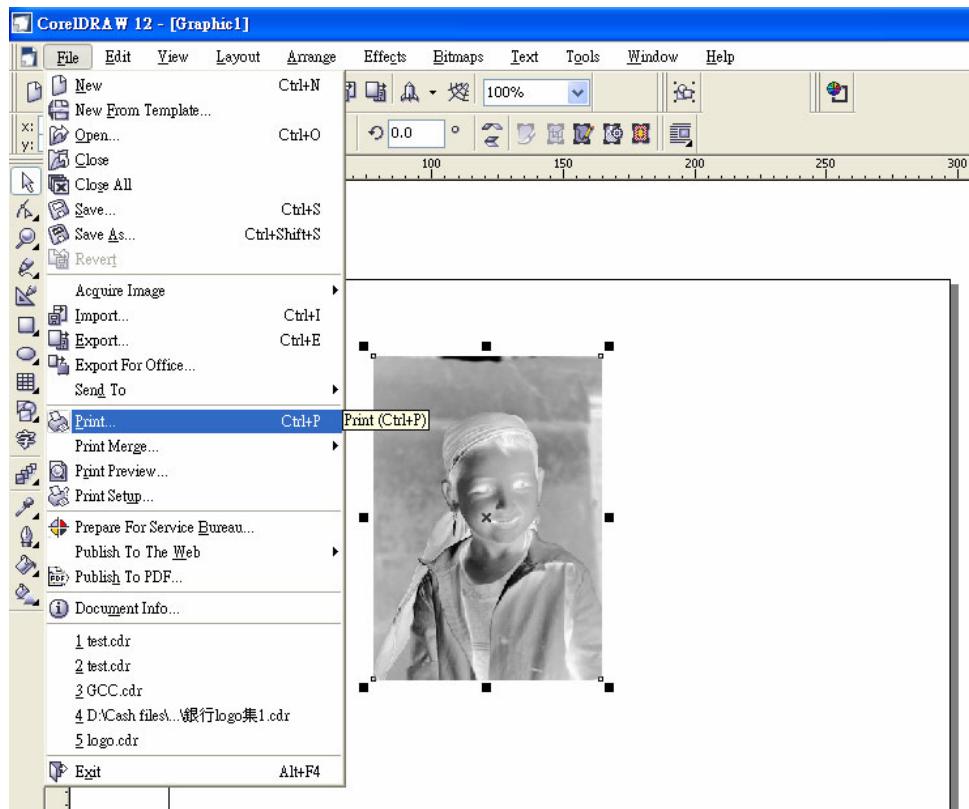

7. Finally, Invert the image by selecting Effects/Transform/Invert

8.   Now you are ready to output the modified image by clicking File/Print

Note:

This instruction is a simple example for general use. There are many tips and tricks to achieve a good engraving quality. It takes a lot of practice and experience to achieve a good engraving quality. Different picture may need different modifications and different material may need different parameters.

APPENDIX C. Specification

Mercury II		M-12	M-25	M-40	M-60
Laser Source		12W	25W	40W	60W
		Sealed CO_2 Laser			
Cooling		Air-cooled, Operating environment temperature 15°- 30° C (60° - 86° F)			
Work Area		25 x18 in. (640 x 460 mm)			
Max. Part Size (W x L x H)	All doors closed	31.5 x 22.4 x 6.5 in. (800 x 570 x 165 mm)			
	All doors open	26.8 x ∞ x 6.5 in. (680 x ∞ x 165 mm)			
Table Size		31.1 x 20.9 in. (790 x 530 mm)			
Dimensions		44.3 x 28.3 x 39.6 in. (1125 x 720 x 1005 mm)			
Drive		Closed-loop DC Servo Control			
Throughput*		166.3 in^2 / hr (1072.8 cm^2 / hr)			
Speed Control		Adjustable from 0.1~100% of 42 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		Automatic			
Resolution (DPI)		Available 200, 250, 300, 500, 600, 1000			
Computer Interface		Standard printer port and RS232 to USB Adapter			
Compatible Operating Systems		MS Windows, MAC OS			
Memory Buffer		32MB standard (Upgradeable to 64MB)			
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 3R for red pointer			
Facility Requirements					
Electrical		Below 50Watt, 100~240 Volt AC Auto Switching 50Watt or above, 200~240 Volt AC Auto Switching			
Power Consumption		700W	880W	2000W	2200W
Air Exhaust System		External exhaust system required, one 4" connection on the back of the machine.			

*Throughput value represents the Max. number of 8" x 10" 500DPI raster jobs that can be done per hour.
Above specification is subject to change without notice.