FIBERMARK

Laser System Manual | Model 8000

EpilogLaser

FIBERMARK

Register your system now for driver updates and access to our Training Suite!
TRAINING.EPILOGLASER.COM/REGISTER

Technical Support: +1 (303) 215-9171
Knowledge Base: support.epiloglaser.com
System Registration: training.epiloglaser.com/register
Driver/Firmware: epiloglaser.com/fibermark-drivers

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

FIRE WARNING

⚠️ **Fire Warning**

Laser systems can represent a significant fire hazard. Some engraving materials are inherently combustible (including some metals and coatings) and can ignite without warning. Should the work piece actually ignite into flames, the fire must be extinguished by the operator at once!

Please read the following warnings and recommendations and follow them closely at all times!

- **Stay with the laser.** Never operate the laser system while unattended.

- **Keep the area clear.** Clean around the machine and keep the area free of clutter, combustible materials, explosives, or volatile solvents such as acetone, alcohol, or gasoline.

- **Be prepared with a fire extinguisher.** Always keep a properly maintained and inspected fire extinguisher on hand. Epilog recommends a Halotron fire extinguisher or a multi-purpose dry chemical fire extinguisher. The Halotron extinguishers are more expensive than a dry chemical, but offer certain advantages should you ever need to use an extinguisher. The Halotron extinguisher discharges a clean, easily removable substance that is not harmful to the mechanics or wiring of the laser system. The dry chemical extinguisher discharges a sticky, corrosive powder that is very difficult to clean up.

INTRODUCTION

How to Use This Owner's Manual

Thank you for purchasing a FiberMark laser system. Your Epilog system has been designed to be easy to operate, but you will utilize it to its fullest potential by taking some time to read this owner's manual prior to use. You will be ready to use the Epilog Laser system as soon as you read the first few sections. Then you can refer to topics in the remaining sections, as you work.

Icons Used in this Manual

Look for these symbols to help you find valuable information throughout the text:

Helpful notes to keep in mind when running the laser!
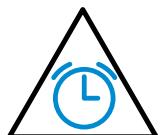
This icon signifies advice you can try that will save you significant time.

This icon highlights current contact information for receiving help.
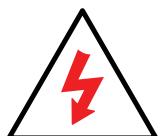
Warnings and cautions to keep in mind when running the laser.

This icon indicates the potential for fire damage when operating the laser.

SECTION 1: SAFETY

Laser Safety

The Epilog Model 8000 Laser System is a Class 2 laser product, as defined in International Standard IEC 60825-1.

The Epilog Model 8000 complies with 21 CFR 1040.10 and 1040.11, the Federal Performance Standards for Light-Emitting Products, except for deviations pursuant to Laser Notice No. 50, dated July 16, 2001. The Center for Devices and Radiological Health, of the US FDA, issued Laser Notice No. 50 to permit manufacturers to classify and manufacture their products in accordance with the International Standard.

The laser beam produced by the FiberMark laser can cause severe damage to the eye or skin if direct contact is made with the beam.

To prevent direct contact with the laser beam, it is fully contained in the laser cabinet. The laser cabinet has safety interlocks that turn the laser off if either the front door or top window is opened during operation. The green window in the top access door is made of a special acrylic that is designed to block the infrared wavelength of light that is produced by the laser. It is common to see bright reflections coming from the marking surface when viewing through the green window as the laser operates. The reflections are normal and it is not harmful to view the machine in action through the green window, but because the reflections can be very bright, it is recommended that viewing be limited while the machine is operating.

No special precautions are necessary to operate the laser safely; however the visible output beam of the Laser Diode Pointer (Red Dot Pointer) is accessible to the operator. While this device employs the same technology as the familiar laser pen-pointers, like them it is potentially hazardous if its beam is directed into the eye.

We have made every effort to make the Laser Diode Pointer (Red Dot Pointer) as safe as possible. Its beam path is located well inside the cabinet, and under normal conditions, no hazardous levels of laser radiation can escape.
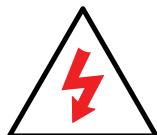
The operator of the Epilog Model 8000 should observe the following general precautions:

- **DO NOT** disassemble the machine or remove any of its protective covers while the unit is plugged in.

- **DO NOT** attempt to defeat the door interlocks.

- **DO NOT** operate the machine with any door open or cover removed.

- **DO NOT** view directly into the beam of the Laser Diode Pointer (Red Dot Pointer).

- **DO NOT** operate the Laser Diode Pointer (Red Dot Pointer) without the machine's focus lens in place. If the unfocused beam strikes a reflective surface, it could be directed out of the cabinet.

- **Caution –** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The standard reference for laser safety is the American Standard for the Safe Use of Lasers, Z136.1-2000, developed

by the American National Standards Institute (ANSI). This reference is the basis for many of the federal regulations for laser and laser system manufacturers, and for the Occupational Safety and Health Administration (OSHA) laser safety guidelines. It contains detailed information concerning proper installation and use of laser systems.

While the ANSI standard itself does not have the force of law, its recommendations, including warning signage, training, and the designation of a laser safety officer, may be compulsory under local workplace regulations when operating laser systems above Class I. It is the operator's responsibility to ensure that the installation and operation of the Epilog Model 8000 Laser System is performed in accordance with all applicable laws.

Copies of ANSI Standard Z136.1-2000 are available from Epilog Corporation or from:

Laser Institute of America
12424 Research Parkway, Suite 125
Orlando, FL 32826
(407) 380-1553

Electrical Safety

The AC input power to the Epilog Model 8000 Laser System is potentially lethal and is fully contained within the cabinet.
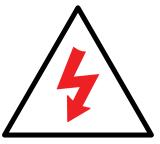
- **DO NOT** open any of the machine's access panels while the unit is plugged in. Opening a panel may expose the operator to the unit's AC input power.

- **DO NOT** make or break any electrical connections to the system while the unit is turned on.

Emergency Stop Button

The Emergency Stop Button is a safety feature designed to immediately stop the laser from firing and stop the motion control system from moving should an emergency occur. By depressing the Emergency Stop Button, the electrical circuits leading to the laser source and the main power supply are opened and all system functions, except the cooling fans, come to an immediate stop.

Emergency Stop Button

In order to restore the laser system to its standard operating mode after activating the Emergency Stop Button, follow these steps:

1. Press the main power switch to the off position.

2. Reset the Emergency Stop Button by twisting it in a clockwise direction to spring it back into its active position. This step is important as the laser system will not function if the Emergency Stop Button remains in its recessed position.

3. Power on the system using the main power switch.

Fire Warning

Didn't you see this already? Yes! That's how important we think it is for you to read this information.

Laser systems can represent a significant fire hazard. Some engraving materials are inherently combustible (including some metals and coatings) and can ignite without warning. Should the work piece actually ignite into flames, the fire must be extinguished by the operator at once!

Please read the following warnings and recommendations and follow them closely at all times!

- **Stay with the laser.** Never operate the laser system while unattended.

- **Keep the area clear.** Clean around the machine and keep the area free of clutter, combustible materials, explosives, or volatile solvents such as acetone, alcohol, or gasoline.

- **Be prepared with a fire extinguisher.** Always keep a properly maintained and inspected fire extinguisher on hand. Epilog recommends a Halotron fire extinguisher or a multi-purpose dry chemical fire extinguisher. The Halotron extinguishers are more expensive than a dry chemical, but offer certain advantages should you ever need to use an extinguisher. The Halotron extinguisher discharges a clean, easily removable substance that is not harmful to the mechanics or wiring of the laser system. The dry chemical extinguisher discharges a sticky, corrosive powder that is very difficult to clean up.

Safety Features and Regulatory Compliance

Epilog has incorporated specific safety features into the Model 8000 Laser System in order to meet the requirements of 21 CFR 1040 and the International Standard IEC 60825-1. These safety features include:

- A safety enclosure (cabinet), which fully encloses the engraving laser and its beam path.

- Dual redundant interlock systems that turn off the engraving laser when the window is opened.

- A visible emission indication when the Laser Diode Pointer (Red Dot Pointer) is operating. There is an LED indicator on the machine's front panel.

Epilog Laser systems and products are not designed, manufactured, tested, authorized, or intended to be used in any medical, surgical, non-medical or any similar or related procedure or process that would allow the laser beam to come into contact with living tissue or organisms of any kind.

21 CFR 1040 and IEC 60825-1 require that certification, identification, and warning labels be placed on laser products. Reproductions of labels on the Epilog Model 8000 Laser System follow, with their locations specified:

1. **Certification/Identification Plate:** This engraved plate is located on the rear of the machine's cabinet.

Epilog Corporation
16371 Table Mountain Parkway
Golden, CO 80403 USA

Model Number: 8000 Laser System
Serial Number: 8020-1003252412FM
Date of Manufacture: March 2007

Class 2 Laser Product

This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001.

This product complies with IEC 60825-1: 2001.

Authorized Representative:

Consultants Europe bv
PO Box 5047
1380 GA Weesp
The Netherlands
Tel.: 31-294-483355
Fax.: 31-294-414687
E-Mail: info@ce-marking.nl

Mass:
35 kg max

2. **Warning Logotype:** This label is located on the rear of the machine's cabinet, below the Certification/Identification plate.

3

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

1 mW CW MAXIMUM 600-700 nm

4

CAUTION - CLASS 4 VISIBLE
AND INVISIBLE LASER RADIATION
WHEN OPEN

AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

5

CAUTION - CLASS 4 VISIBLE AND
INVISIBLE LASER RADIATION
WHEN OPEN
AND INTERLOCKS DEFEATED

AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

6

DANGER

HIGH VOLTAGE INSIDE CABINET

DISCONNECT POWER
BEFORE OPENING PANEL

7

DANGER

FIRE HAZARD

DO NOT OPERATE
MACHINE UNATTENDED
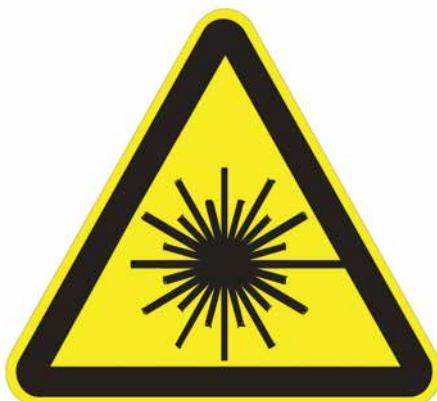
8

AVOID EXPOSURE - Visible and invisible
laser radiation is emitted from this aperture

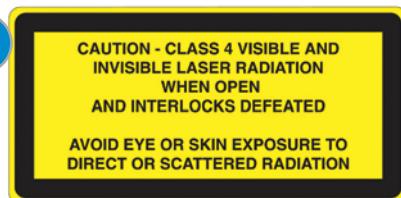3. **Descriptive Label:** This label identifies the classification of the Model 8000 in accordance with 21 CFR 1040.10 and IEC 60825-1. It is located on the rear of the machine's cabinet, beside the Warning Logotype.

4. **Non-interlocked Protective Housing Safety Labels (4):** Two of these labels are located on the rear of the machine beside the edges of each of the cabinet's end covers. The other two are located on the cabinet walls under the covers, so that they are visible when the covers have been removed.

5. **Defeatably-interlocked Protective Housing Safety Labels:** This label is located on the machine's cabinet door, in the upper left hand corner.

6. **Electrical Safety Label:** This label is located on the access panel on the rear of the machine's cabinet.

7. **Fire Safety Label:** This label is located on the machine's cabinet door, in the upper right-hand corner.

8. **Aperture Safety Label:** This label is located on the steering mirror cover inside the machine's cabinet, beside the aperture where the laser beams enter the cabinet.

Supplier's Declaration of Conformity
47 CFR Paragraph 2.1077 Compliance Information

Laser Materials Processing System Model 8000

Epilog Laser Corporation
16371 Table Mountain Parkway
Golden, CO 80403

Telephone: (303) 277-1188

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation..

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equpment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Do's and Don'ts

Don'ts

Do Not Run the Laser Unvented: Never operate the machine without a properly operating vent to the outside or to a filtration unit! Most material will only produce an irritating smoke when engraved. Some materials, including but not limited to paint, varnish, composition board and plastics, produce compounds that can be harmful if concentrated. A properly installed vent is the only way to ensure that problems do not occur.

Do Not Engrave or Mark PVC: Never engrave or mark *any material* containing PVC or vinyl. When engraved, a corrosive agent is produced that will destroy your machine. Your warranty will be void if your machine is damaged by corrosion from engraving or marking PVC or Vinyl.

Do Not Operate Machine While Unattended: Never operate your machine without someone watching the system. There is a significant risk of fire if the machine is set improperly, or if the machine should experience a mechanical or electrical failure while operating.

Do Not Operate in Vector Mode Unattended: Never run the laser in vector mode without someone watching the system. Because vector mode moves relatively slowly compared to raster engraving, a tremendous amount of heat is applied to the material. This buildup of heat can cause significant fire risk and the machine should always be monitored.

Do Not Operate The System While Doors are Open: Never operate with any of the covers or enclosures removed, and never modify the enclosure. The laser beam is invisible and is very dangerous!

Do's

Clean the System: Please allow a few minutes a week for cleaning your machine. Just a small amount of effort at the end of the week will pay off with years of trouble free operation of your machine.

See the **"Section : Cleaning & Maintenance" on page 73** for specifics.

SECTION 2: GETTING STARTED

Setting up your Epilog Laser System is easy to do! If you've ever installed a paper printer, this is only slightly more difficult. The following information will help you understand the entire system and how it works.

Your laser system consists of the following components:

1. FiberMark Laser System

2. Epilog Driver Disc

3. USB and Ethernet Cables

4. Air Assist Pump

You will also need:

1. A computer or laptop.

2. An exhaust fan: The exhaust fan is mandatory and is used to remove smoke and debris from the laser's work area. The exhaust air can be ported to the outside or into a filter box.

Follow these steps to setup your FiberMark Laser system:

1. Unpack the laser system.

2. Choose where to locate the system.

3. Connect the exhaust system to your laser.

4. Connect the electrical power.

5. Connect the laser to your computer through USB or Ethernet.

6. Sign up for driver update and register your system at www.epiloglaser.com/register.

1. Unpacking the Laser System

Unpack the laser system from the crate provided by Epilog. **Please be sure to hold on to all packing materials and crating in case you need to move the system in the future.**

2. Choose Where to Locate the System

Cooling Requirements and Operating Temperatures

All Epilog Laser systems use air-cooled laser sources. Laser technology is such that the laser tubes generate a lot of excess heat and the tubes must be cooled for proper operation. There are cooling fans located at the back of the laser. The fans and vents should always be clear of restrictions and should never be covered. Use compressed air to remove any dust buildup on the fans or laser cooling fins.

Warning: The cooling fans and vents are located on top and back of the FiberMark and should never be covered or blocked in any way. Lasers that overheat will not operate properly and may begin to produce erratic laser output or possibly complete failure.

Cooling Fans

Cooling Vents
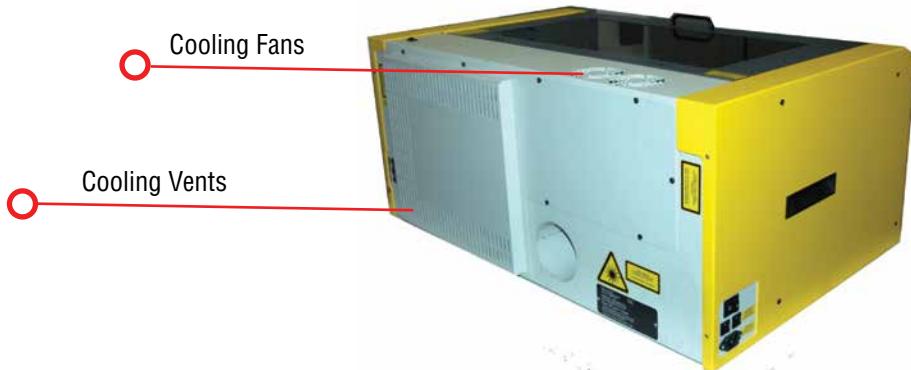
Ambient air temperature where the laser system is operating should not exceed 90 degrees F (32 C). Operating in an environment where the ambient air temperature is above 90 degrees F (32 C) will void the Epilog warranty.

3. Connecting the Exhaust

It is mandatory that an exhaust blower is hooked up and operating whenever your laser system is running a job. The exhaust blower removes the dust, debris and smell from the engraving cavity and exhausts it to the outside of the building. You should never operate your laser system without a properly working exhaust. Prior to the installation of the laser system, a contractor should install the exhaust system. The blower should be mounted outside your building for noise considerations. The blower should not be more than 20 feet (6 meters) from the laser. You should provide a rigid, smooth duct (either PVC or galvanized sheet metal will do) from the blower to the vicinity of the laser. All Epilog model 8000 laser systems require an exhaust fan that is rated at a minimum of 350 CFM for external exhaust.

Epilog provides recommended exhaust flow rates (CFM) only for direct ventilation exhaust systems that are ported to the outside. Please note that this is also a recommendation and not a requirement because factors such as length and type of tubing from the Epilog laser to the exhaust fan and from the exhaust fan to the outside of the building can produce significant losses on the true amount of air that is drawn from the Epilog laser.

Exhaust flow rates (CFM) for filter systems are not specified in this document. However, exhaust flow rates for filtration units will be lower than a direct ventilation exhaust systems because filters are designed to be placed directly adjacent to the laser system and do not exhibit the air-flow losses that are typically found with direct exhaust fans. Epilog has worked with most major filter manufacturers to recommend a specific filter system for each model of Epilog laser. Please contact your Epilog distributor to match a filter to the Epilog laser system you are using.

Note: Remember to put the blower switch for the laser system in an obvious and accessible place so it can be routinely switched on prior to using the engraver. Please connect the exhaust blower to the laser as shown below and on the following pages.

Remember, you may need a contractor to install the exhaust. This must be done PRIOR to installation of the laser system.

Warning: It's important that either rigid or flexible metal ducting be used for all connections leading to and from the laser system and the exhaust fan. Vinyl, plastic, or any type of "soft" ducting is potentially flammable and should not be used unless provided by the filtration system manufacturer and made from fire-proof materials.

Epilog Exhaust/Filter Connections

As part of the unpacking process you will find a 4" (100mm) exhaust port in the accessories kit. This part needs to be attached to the rear of the system chassis before connecting the Exhaust blower to the system.
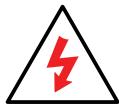
The mounting screws for the exhaust port are in the mounting holes in the chassis. Remove these four screws, align the exhaust port to the mounting holes and secure the exhaust port with the four screws. There is one 4" (102 mm) port attached to the back of the laser system. Attach your ducting to the machine as shown in the diagram.
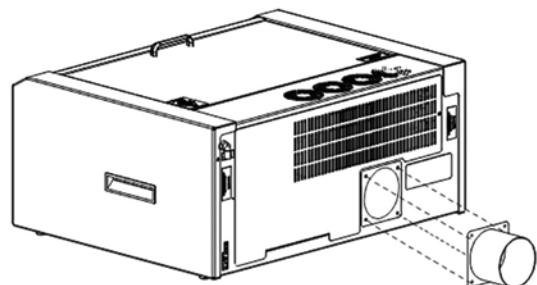
Once the exhaust ports are installed on the back of the laser system, use the flexible aluminum or galvanized sheet metal ducting to connect the laser system to the intake side of the exhaust fan. Then connect the exhaust side of the exhaust fan to the metal duct leading outside.
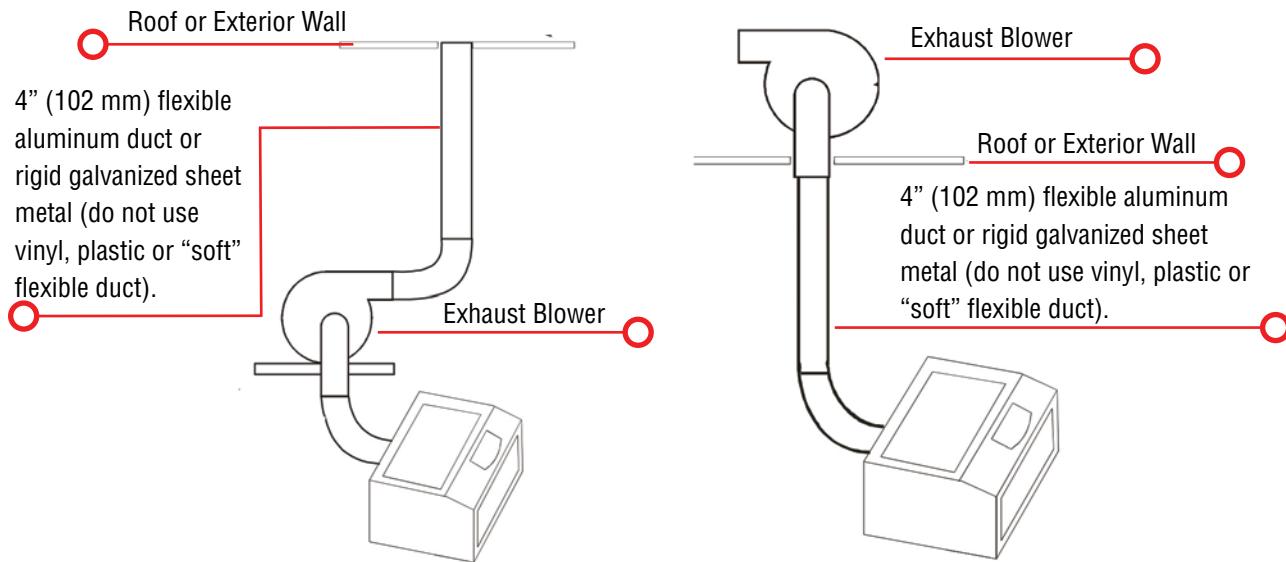
Check your exhaust system for leaks. Most small leaks can be remedied with duct tape. **DO NOT OPERATE** your laser with inadequate or leaking exhaust.

The drawings show the typical exhaust setup. The left drawing shows the exhaust near the machine and the right drawing shows the exhaust fan on the roof. Where the exhaust fan is placed is a choice of personal preference. Some users like the exhaust fan outside because of noise considerations.

Roof or Exterior Wall

Exhaust Blower

4" (102 mm) flexible aluminum duct or rigid galvanized sheet metal (do not use vinyl, plastic or "soft" flexible duct).

Exhaust Blower

Roof or Exterior Wall

4" (102 mm) flexible aluminum duct or rigid galvanized sheet metal (do not use vinyl, plastic or "soft" flexible duct).

4. Connecting Electrical Power

All Epilog Laser systems have an auto-switching power supply that detects the incoming voltage and automatically switches itself to operate properly at any single-phase voltage between 110 and 240 VAC. The power supply will also automatically compensate for either 50 or 60 Hz. Epilog supplies the appropriate power cord for all of our equipment. The electrical cord is found in the accessory package with your machine. It is recommended that a dedicated 15 amp circuit be used if available, but it is not required.

AC MAIN CIRCUIT BREAKERS

POWER
100-240V AC
47-63Hz 8A

5. Connect the Laser to Your Computer

You can choose to connect your laser to your computer with either an Ethernet cable or a USB cable. For your convenience Epilog includes both an Ethernet crossover cable and a USB cable in the Accessories kit.

⚠️ Choose one or the other, but do not plug both cables into the laser at the same time.

Test Port: Not intended for consumer use.

Ethernet Port
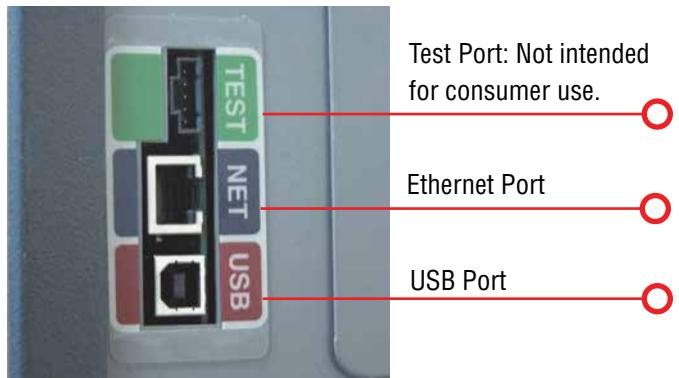
USB Port

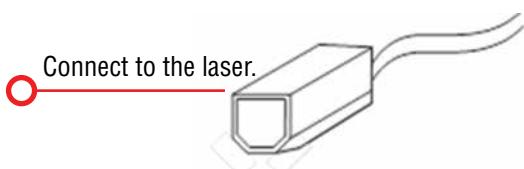## USB Connection

A USB cable is included in the accessory kit. The USB port is located on the right side of the laser, at the rear of the system. USB cables have different connectors on each end. **Before plugging in the USB cable, turn the laser OFF**, then connect one end to the laser and connect the other end into any available USB port on your computer. **After** connecting the USB cable, turn the laser back on.

Your computer will recognize a new USB device and walk you through the print driver installation. **See "Windows 8 and 10: USB Installation" on page 15**.

If your laser will be a long distance from your computer, you will see better performance using the Ethernet cable.

Connect to the laser.

Ethernet Connection

The Ethernet Port is a standard 10BaseT connection. Your Epilog Laser has all of the versatility of a network capable peripheral. As such, there are many different ways that the laser can be connected to a computer or a network. A direct connection using a crossover cable is the only method that will be described in this manual. Connect the crossover cable (included in the accessories kit) to the Ethernet port, located on the right side of the machine near the rear. Plug the cable into the Ethernet port on the laser, then plug the other end into the Ethernet port on your computer.

The Epilog Dashboard is the print driver that allows your computer to talk to your Epilog Laser system when either the USB or Ethernet Crossover cables are connected. The driver is included in the accessories kit on a CD-ROM or on our website at www.epiloglaser.com. To install the print driver, **see "Windows 8 and 10: Ethernet Installation" on page 15**.

6. Set the FiberMark IP Address

1. To set the IP Address, press the **Go and Pointer keys on the control panel at the same time**. You will see **FUNCTIONS MENU** displayed on the control panel LCD screen.

2. Press the **Go** key. **SERIAL #** will appear on the screen. This is a factory set number and corresponds to the serial number of the laser system. You should not change this number.

3. Press the **Go** key again. **IP ADDRESS** will appear on the screen.

4. Press the **Go** key again. The factory set IP address will appear on the screen. It will look similar to **192.168.003.004** with a flashing box over the 1 in 192.

> Most Epilog users will use the IP Address of 192.168.003.004, which is what we use in this manual.

5. If you want to change the IP address, follow these instructions:

*   The numbers are treated as groups of three. If you want to change the first number to 4, press the corresponding number on the keypad (the Power key).

*   Repeat for the second and third numbers in the group.

*   After changing the third number in the group, the flashing cursor will move back to the first number. Press **Go** to move to the next group of numbers.

*   Repeat this for each of the four groups of three numbers.

*   You cannot skip to change a single number in a group of three - all three must be typed in to change that group. For example if you want to change 003 to 004, you must press all three numbers to change that grouping.

*   To save your new IP Address, continue to click **Go** through the Subnet Mask and Gateway settings until you see **Save-GO No-Stop**. Press **Go** to save your changes (or stop to not save your changes.)

7. Sign Up for Driver Updates and Register Your System

Go to www.epiloglaser.com/register and register your system. You can also sign up for our monthly e-newsletter, quarterly customer printed newsletter, and sign up for driver update notifications.
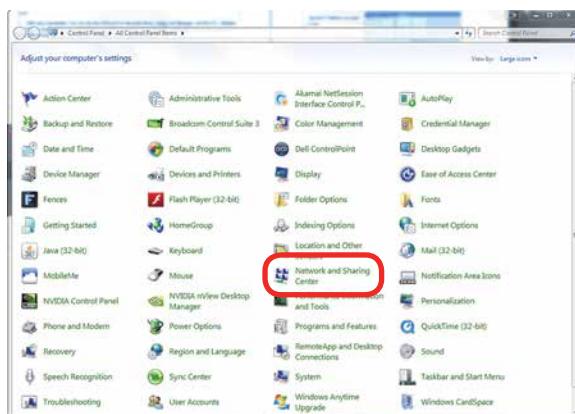
SECTION 3: DRIVER INSTALLATION

Next we'll be installing the print driver. Choose your operating system. We demonstrate Windows 7, 8, and 10 installations.
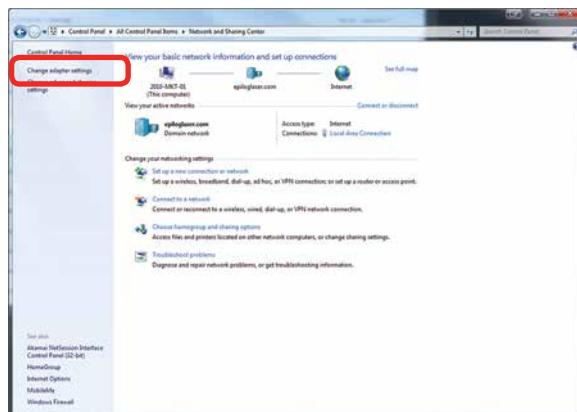
Windows 7: Ethernet Installation

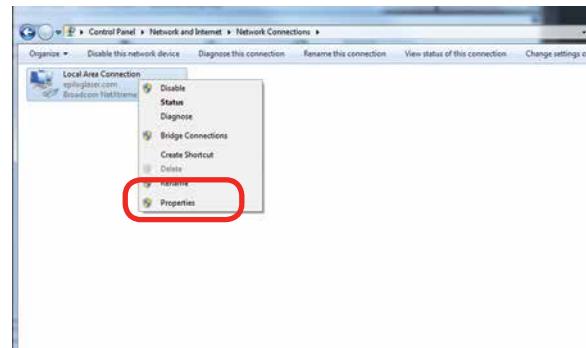### Set Up TCP/IP Address in the Computer

1. Go to your **Network and Sharing Center** in your computer's **Control Panel**.
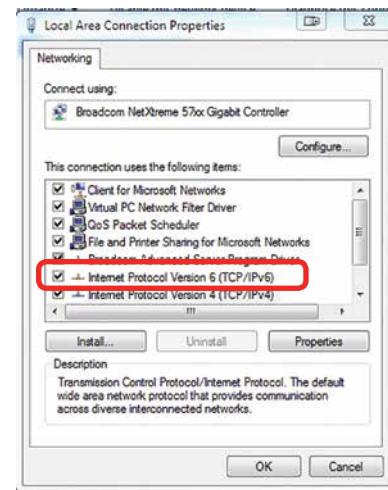

2. Click **Change Adapter Settings**.

3. Right click **Local Area Connection**, then click **Properties**.

4. Select **Internet Protocol Version 4 (TCP/IP).** Make sure you do not select Version 6.

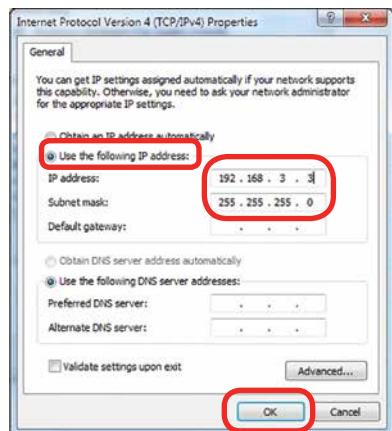5. Select **Use the following IP Address**. Type in the following IP Address: **192.168.3.3**.

This number is not an error; the last digit of the IP address in **this window must be different than the IP address you set in the laser**.
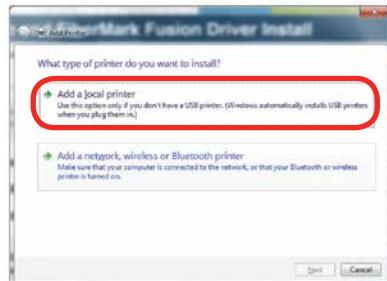
SECTION 3: DRIVER INSTALLATION

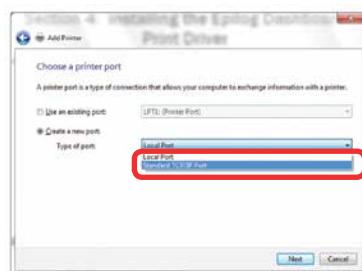6. Type in a Subnet Mask of **255.255.255.0**, then click **OK**.

Installing the Driver

1. Insert the Driver CD in the computer and select your laser system.

2. Select the Dashboard Driver.

You can also download the latest driver from epiloglaser.com/tech-support/epilog-drivers.htm. Go to **Devices and Printers** on your computer and click **Add a Printer** to start the process.

3. Click **Add a local printer**.

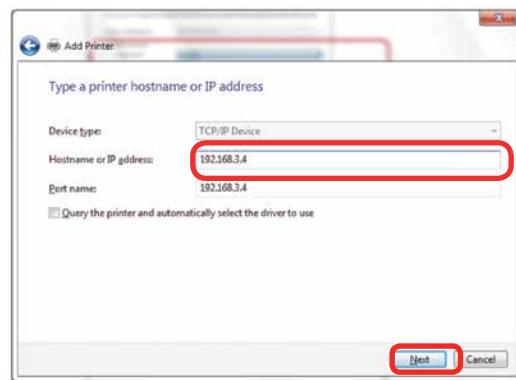4. Click **Create New Port**, then click on the drop-down menu and select **Standard TCP/IP Port,** then click **Next**.

5. Enter the IP Address to match the IP Address you set at the laser in **"Setting the IP Address" on page 17**. Most Epilog users will use the IP Address of 192.168.3.4, which is what we use in this document. After typing in the IP Address, click **Next**. Wait while the computer identifies the port.

6. Select **Custom** and then **Settings**.
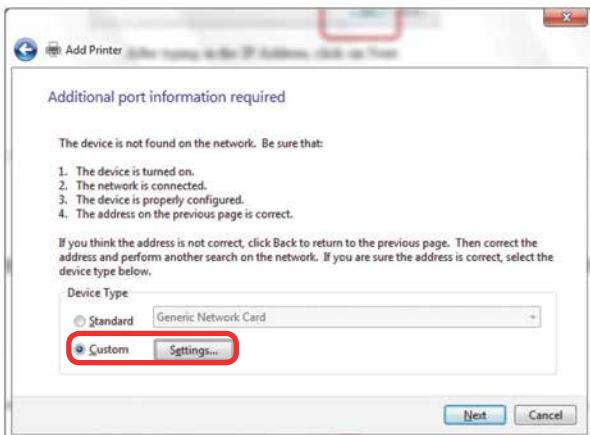
7. **Set Protocol to LPR**. This is a very important step. Your download time will increase significantly if LPR is not selected. Type **Legend** into the Queue Name, then click **OK**.
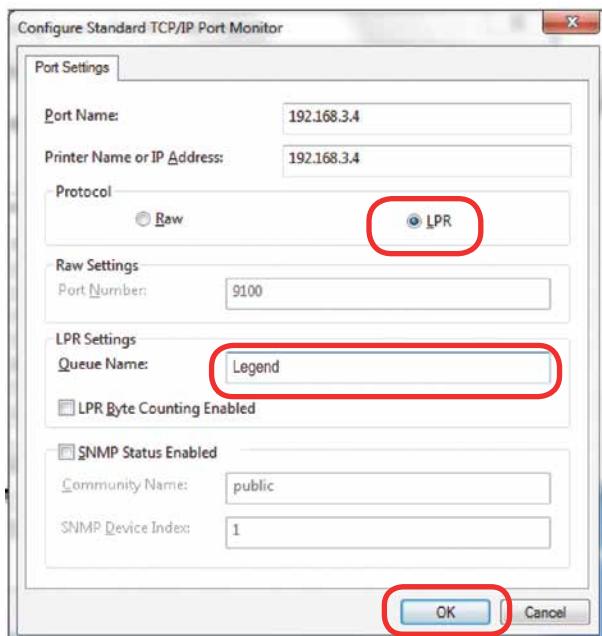
8. Click **Next**.
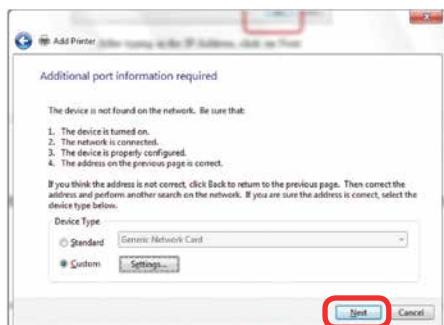
9. Click **Have Disk**.
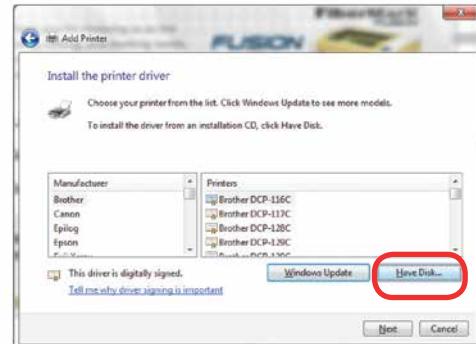
10. Click **Browse** and go to the folder where you saved the driver and click **Open**. (The default location is c:/ fibermark_driver.)
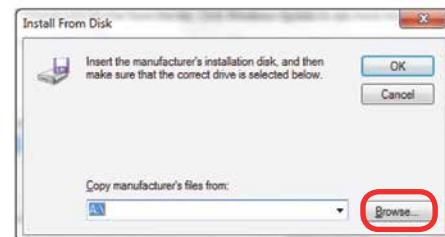
11. Click **EpilogWinALL** file and click **Open**.
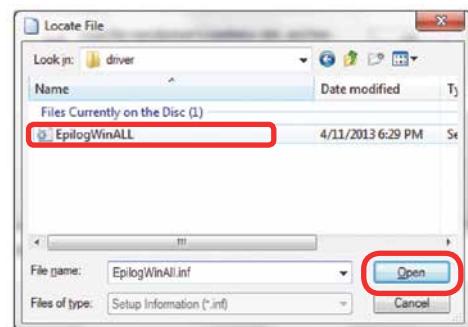
12. Click **OK**.
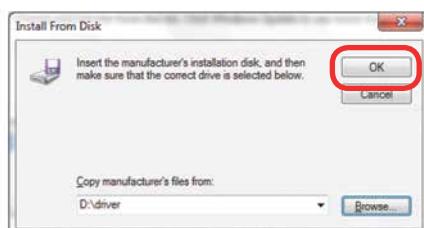
SECTION 3: DRIVER INSTALLATION

13. Click **Next**.

14. Click **Replace the current driver** if requested, then click **Next**.
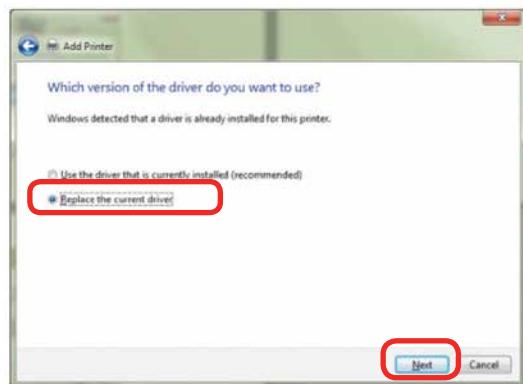
15. You can rename your printer here. We have not changed it for this document, but many users like to associate the driver name with the IP Address they are using, for example Epilog FiberMark 192.168.3.4. This is especially helpful if there is more than one laser connected to a single computer. Click **Next**.
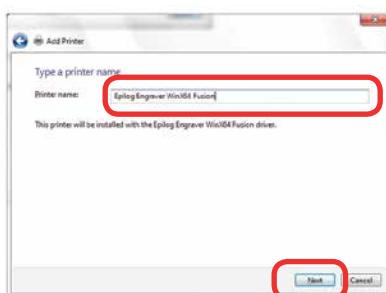
16. If you see this screen, click **Install**.
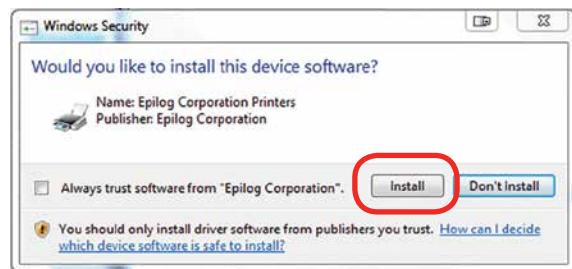
17. Click **Next**.
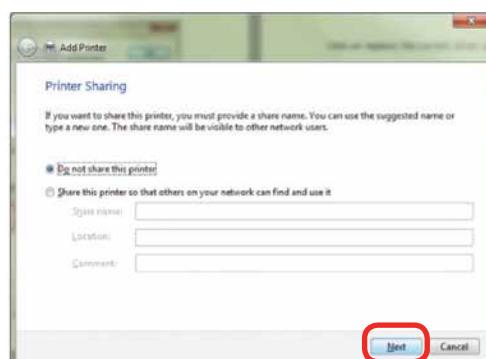
18. Click **Finish** and your driver is installed.
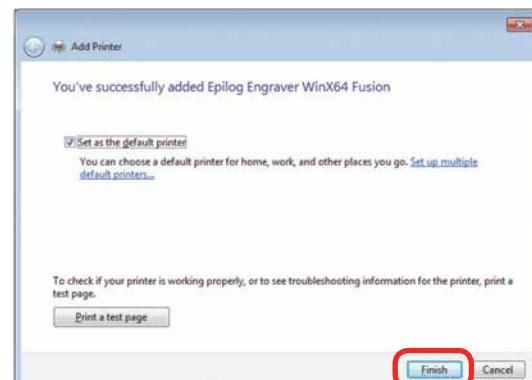
19. **You must now restart your computer** before you continue.

Windows 7: USB Installation

Please follow these instructions closely! Using a different process to install the Dashboard driver is likely to fail if you are using Windows 7.

1. Insert the Epilog driver install disc into your computer (or download the files from the website). One of the following screens will appear. For the USB installation, you will want to close them. We do not want the computer to automatically try to install the driver.

2. With the power of your laser turned off, **connect the USB cable** to your computer and your laser.

3. **Power on your laser system**. It will take about a minute for the laser to initialize. After it initializes it will start the process of installing the driver. You will see activity on the USB icon in your system tray (lower right corner of your computer screen).

4. A small window will appear in the lower right corner of your computer screen that indicates installation was successful. This is only partially true.

5. After a short wait you will see another small window

that indicates the installation was not successful. This is what we hope to see and will lead us to the next step in the process. If your computer is connected to the Internet, it will take a few minutes for your computer to display these windows. Please be patient during this process and let the computer finish trying to install the drivers. Interrupting the computer at this point will require you to restart the process.

6. After the failure notification, go to the Windows start button (lower left corner of your computer screen). Click **Devices and Printers**.

7. Right click on the **FiberMark icon**. Then click **Properties**.
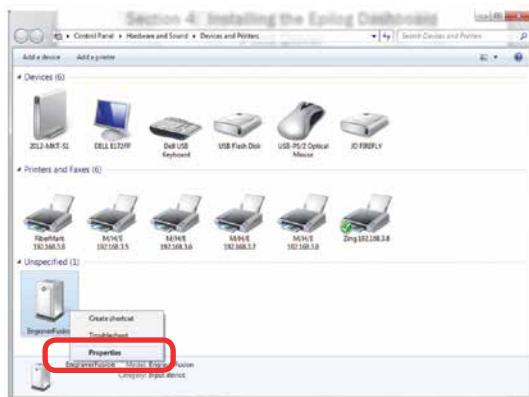
8. Select the **Hardware** tab.
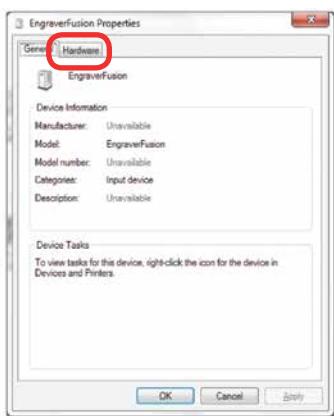
9. Select the device **EpilogEngraver** then click **Properties**.
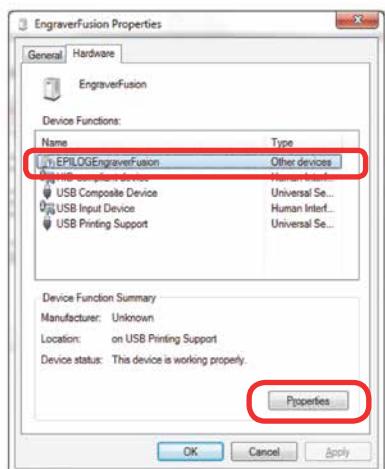
10. Click **Change Settings**.
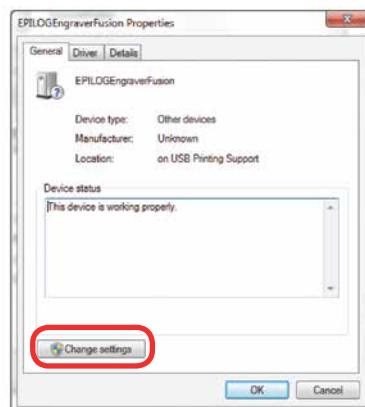
11. Click the **Driver** tab.
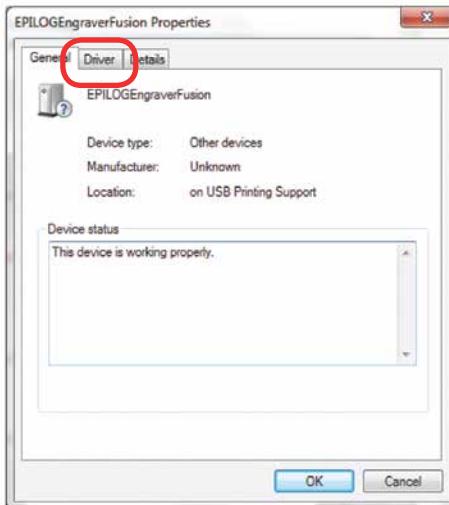
12. Click **Update Driver.**
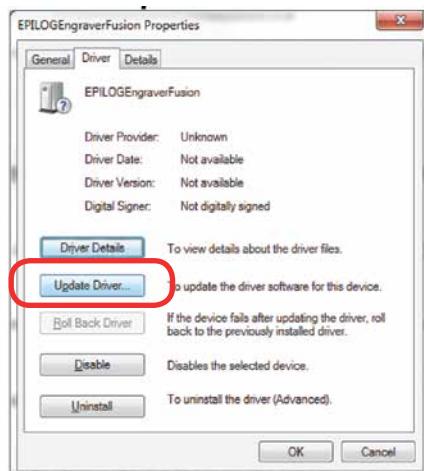
SECTION 3: DRIVER INSTALLATION

13. Click **Browse my Computer for driver software**.
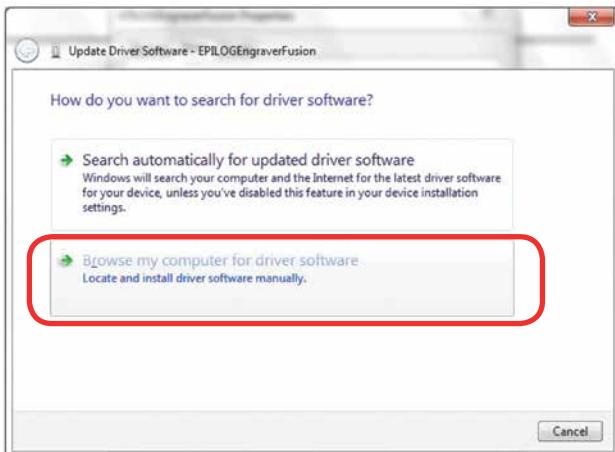
14. Use the **Browse** button to direct your computer to your disc drive that contains the Epilog driver disc that you inserted earlier in this process. (You can also download the latest driver from epiloglaser.com/tech-support/epilog-drivers.htm.)
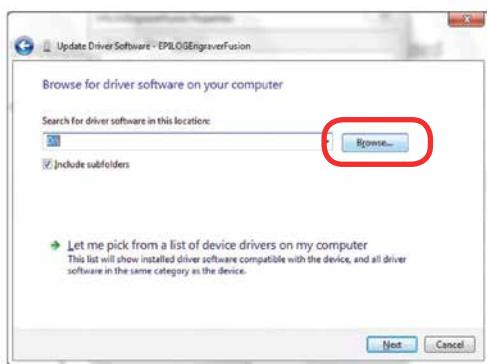
15. For this document we show the DVD RW drive as the drive where the disc is located.

16. Once you have the proper disc drive showing click on the **Next** button.
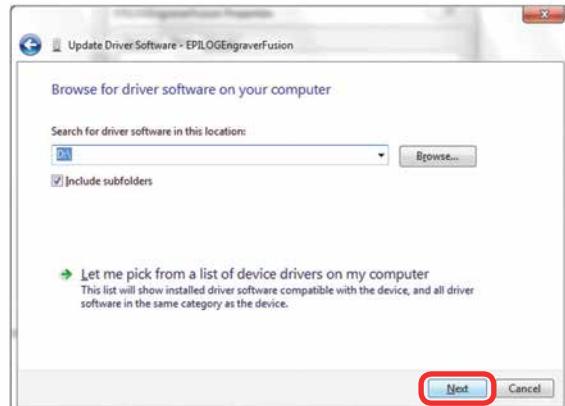
17. The progress window will appear.

18. If you see this screen, click **Install**.
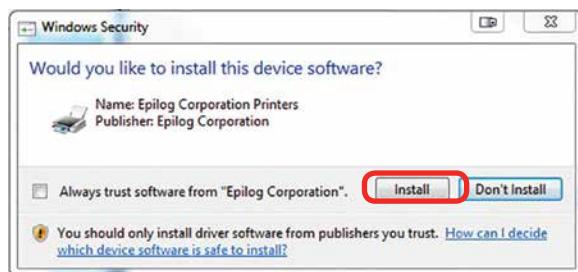
19. Your Epilog Laser Dashboard print driver has been successfully installed on the USB port. Click **Close**.
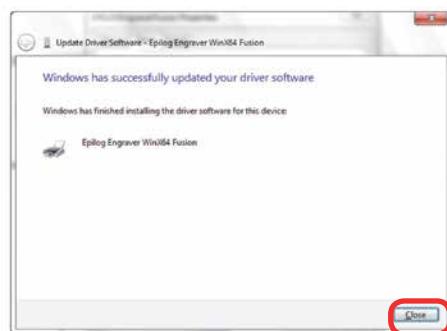
20. Click **Close** in the next window and then **Close** again. You will then see your laser driver in the Devices and Printers page. Click on the red **X** in the upper right corner of this page. That's it! You are ready to print to your laser.

SECTION 3: DRIVER INSTALLATION

Windows 8 and 10: Ethernet Installation

Set Up TCP/IP Address in the Computer

1. Go to your **Network and Sharing Center** in your computer's **Control Panel**.

2. Click **Change Adapter Settings**.

3. Right click **Local Area Connection**, then click **Properties**.

4. Select **Internet Protocol Version 4 (TCP/IP).** Make sure you do not select Version 6.

5. Select **Use the following IP Address**. Type in the following IP Address: **192.168.3.3**.

> This number is not an error; the last digit of the IP address in **this window must be different than the IP address you set in the laser**.

6. Type in a Subnet Mask of **255.255.255.0**, then click **OK**.

You can also download the latest driver from epiloglaser.com/tech-support/epilog-drivers. htm. Go to **Devices and Printers** on your computer and click **Add a Printer** to start the process.

Windows 8 and 8.1/10 have different paths. Choose your operating system:

In Windows 8:
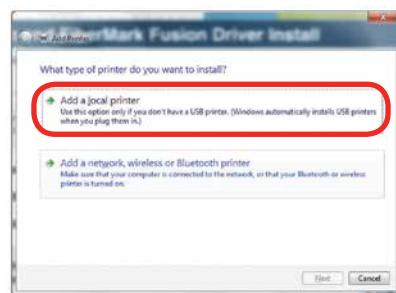
In Windows 8.1/10:
Select **The printer that I want isn't listed**.

Installing the Driver

1. Insert the Driver CD in the computer and select your laser system.

2. Select the Dashboard Driver.
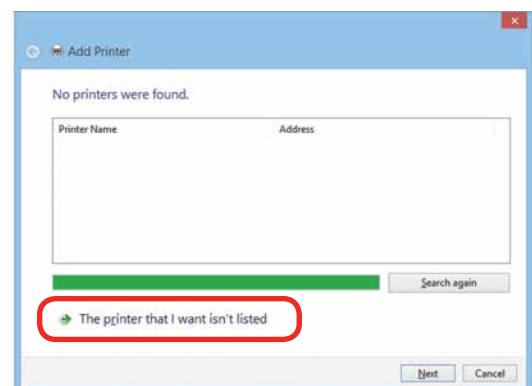
Click **Add a local printer or network printer with manual settings.** Click **Next.**

SECTION 3: DRIVER INSTALLATION

3. Select Create a new port, then **Standard TCP/IP Port**. Click **Next**.
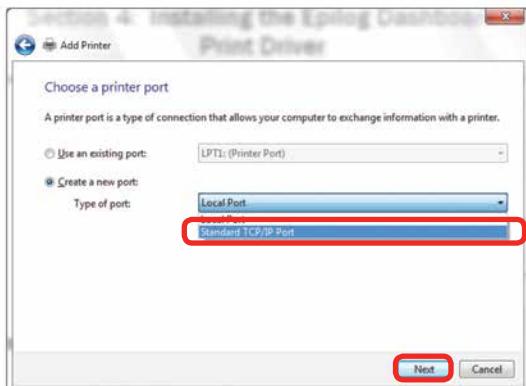
4. Enter the IP Address to match the IP Address you set at the laser in **"Setting the IP Address" on page 17**. Most Epilog users will use the IP Address of 192.168.3.4, which is what we use in this document. After typing in the IP Address, click **Next**. Wait while the computer identifies the port.
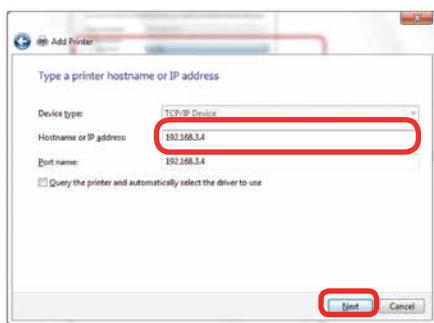
5. Select **Custom**, then **Settings**.
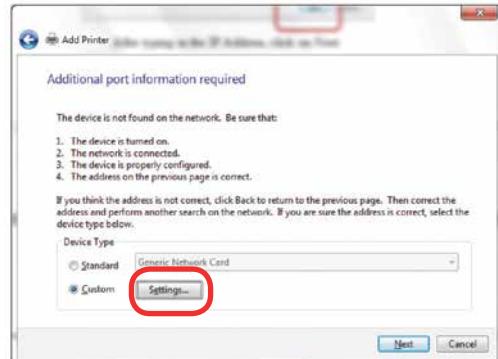
6. **Set Protocol to LPR**. This is a very important step. Your download time will be greatly increased if LPR is not selected. Type **Legend** into the Queue Name and click **OK.**
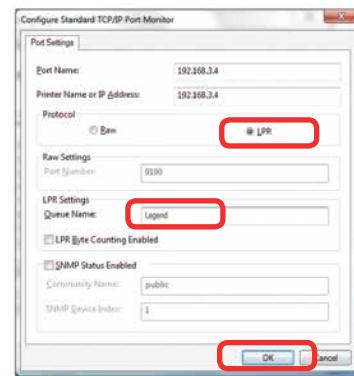
7. Click **Next.**

8. Click **Have Disk.**

9. Click **Browse,** browse to the folder where you saved the download**.** The default location is c:/fibermark_driver.
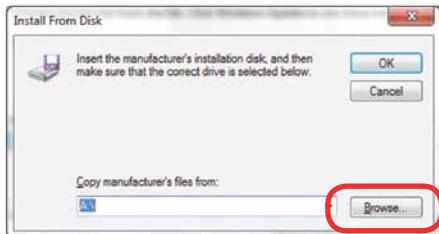
10. Click **EpilogWinALL** file and click **Open**.
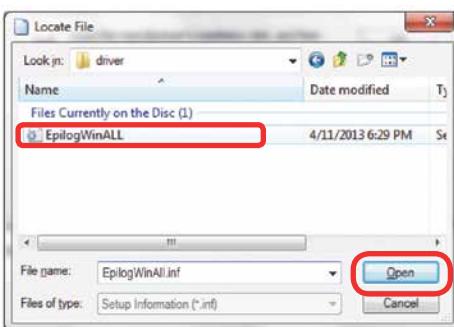
11. Click **OK.**

12. Click **Next**.
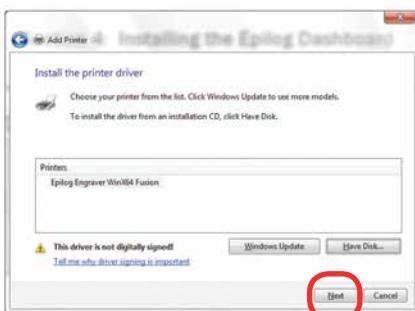
13. Click **Replace the current driver** if requested and click **Next**.
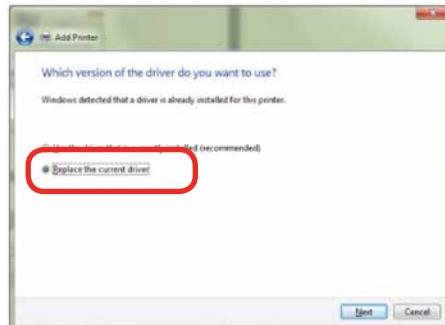
14. You can rename your printer here. We have not changed it for this document, but many users like to associate the driver name with the IP Address they are using, especially if there is more than one laser connected to a single computer. For example, we might rename the driver **FiberMark 192.168.3.4**. Click **Next**.
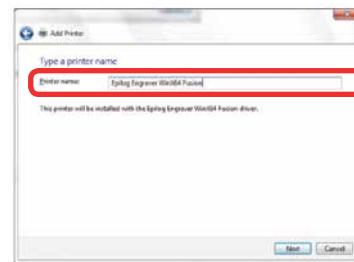
15. If you see this page, click **Always trust software from "Epilog Corporation"** then **Install**.

16. Click **Next.**
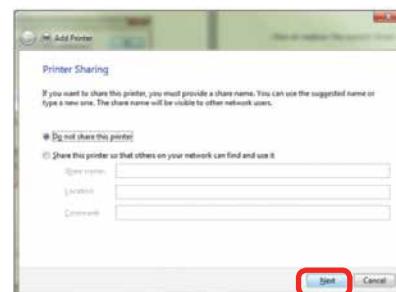
17. Click **Finish** and your driver is installed.

18. **You must now restart your computer** before you print to the laser.

Windows 8 and 10: USB Installation

Windows 8 will not automatically walk you through the installation process so it is important to follow the instructions below.

1. Insert the Epilog driver install disc into your computer (or download the files from the website). One of the following screens will appear. For the USB installation, you will want to close them. We do not want the computer to automatically try to install the driver.

2. With the power of your laser turned off, **connect the USB cable** to your computer and your laser.

3. Power on your computer, **then** connect the USB cable to your computer and your laser.

4. Power on your laser system. It will take about a minute for the laser to initialize.

5. Once your laser has initialized, there will not be any real indication on your Windows 8 computer that it is ready to install the Epilog driver, but it is ready.

6. **In Windows 8**, open the Charms Bar and click on the **Search** charm. To access the Charms Bar move your mouse into the lower right corner of your display.

7. Type the word **Control** into the search bar. Click on the Control Panel box under Apps in the upper left of this window. **In Windows 10**, you can search for this from the desktop.
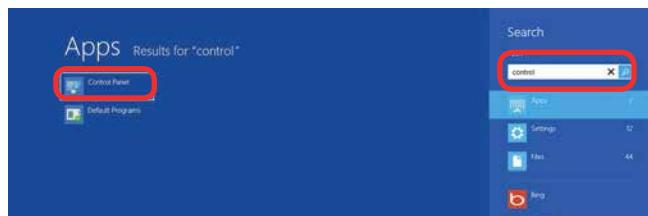
8. Click **Devices and Printers**.

9. In the Unspecified section of Devices and Printers, **right click on the laser's icon**, then click **Properties**.
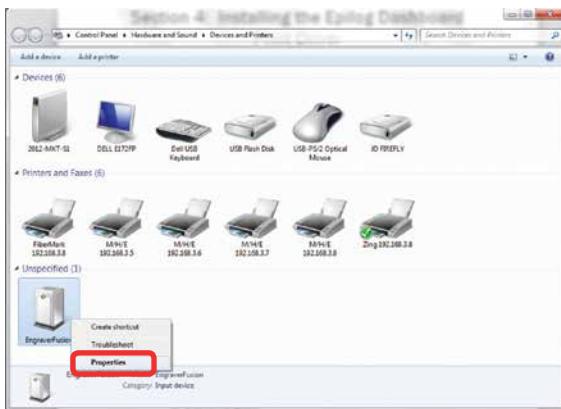
10. Select the **Hardware** tab.

11. Select the device **EpilogEngraver**. Then click **Properties**.
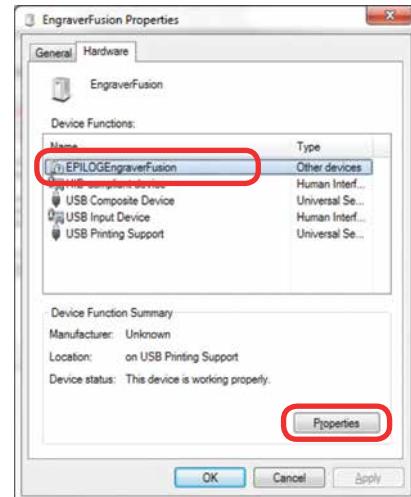
12. Click **Change Settings**.
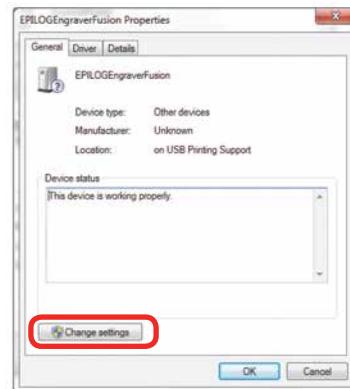
13. Click the **Driver** tab.

SECTION 3: DRIVER INSTALLATION

14. Click **Update Driver**.

15. Click **Browse my Computer for driver software.**

16. Use the **Browse** button to direct your computer to your disc drive that contains the Epilog driver disc that you inserted earlier in this process.

17. Find the disc drive with the Epilog install disc and click **OK**.
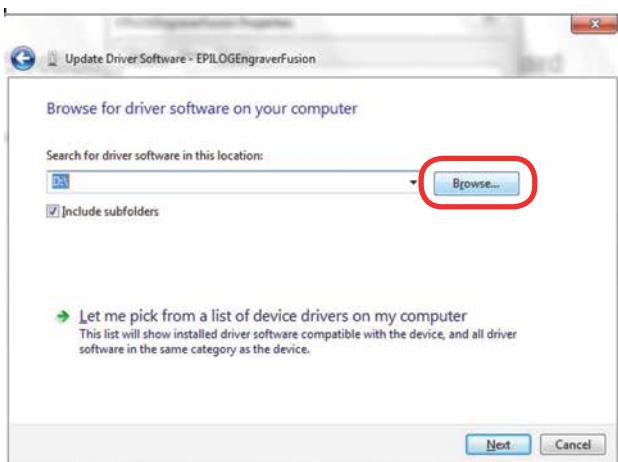
18. Once you have the proper disc drive showing click the **Next** button.
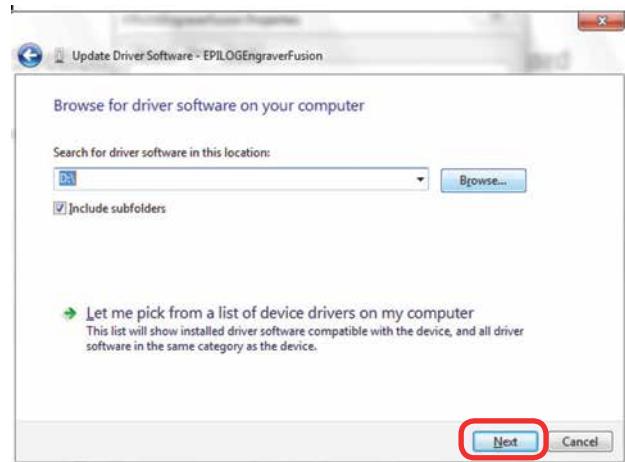
19. Wait while until the progress window disappears, then you may be asked if you want to install this driver. Click **Always trust software from "Epilog Corporation"** then **Install.**
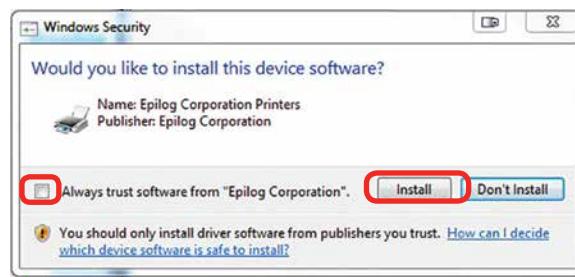
20. Your Epilog Laser Print Dashboard has been successfully installed on the USB port. Click **Close**.
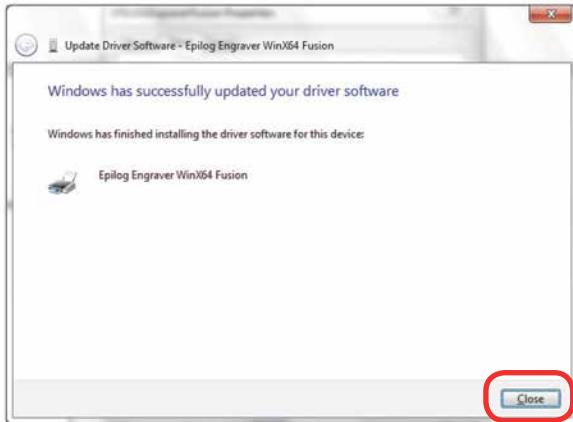
21. In the next window, click **Cancel**.
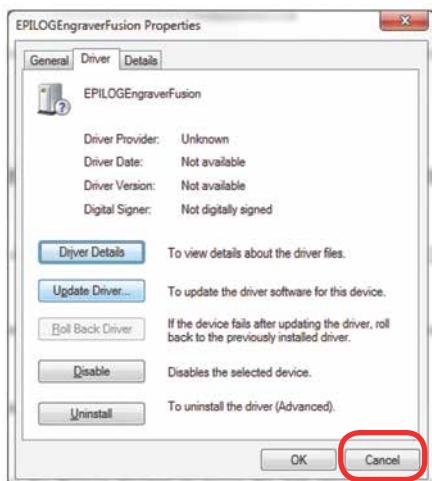
22. You will see your driver in the Devices and Printers page. Click on the **red X** in the upper right corner of this window and you are ready to print!
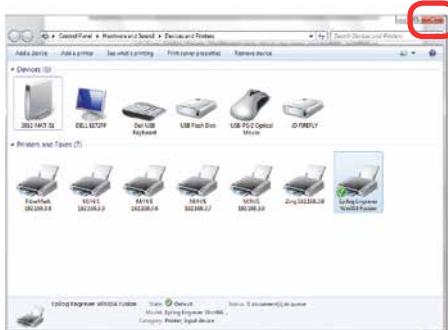
SECTION 4: THE EPILOG JOB MANAGER

Epilog Job Manager Instructions

The Epilog Job Manager is a powerful new tool that will quickly become one of your favorite features on your laser system. From one piece of software, you can access any job you have sent to the laser, view the settings you used on any past job, re-run projects, access your material database, and much more. It's a great addition to the Epilog Laser product features, and we look forward to seeing how our customers use this software!

- **Windows 7/8/10 is required** to use the Epilog Job Manager.

How to Install the Epilog Job Manager

1. If you have a previous version of the Epilog Job Manager installed, **you must uninstall it** before you continue.

2. On the Driver CD, select the Job Manager.

 You can also download the Job Manager from epiloglaser.com/tech-support/drivers.htm.

3. In Windows 8 or 8.1 you **may** see this message. Click **More Info**.
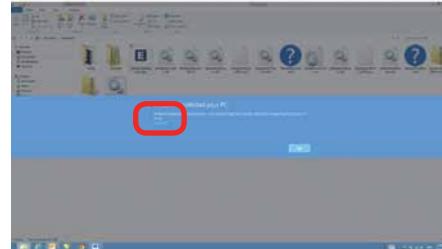
4. Click **Run Anyway**.

5. Click **Next**.

6. Click **Next**

7. Click **Next**.

8. **Accept the license**, then click **Next.**
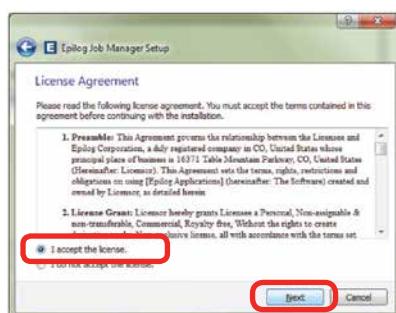
9. Click **Next.**
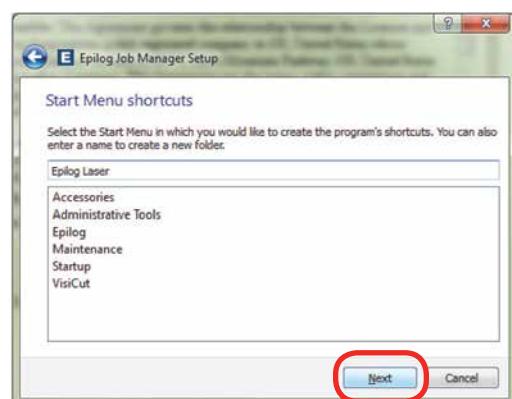
10. Click **Install.**
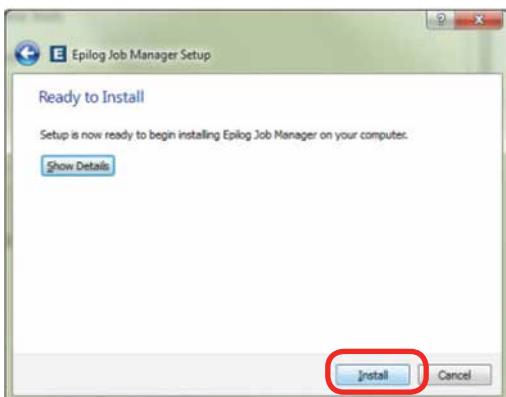
11. The installation will take a few moments.
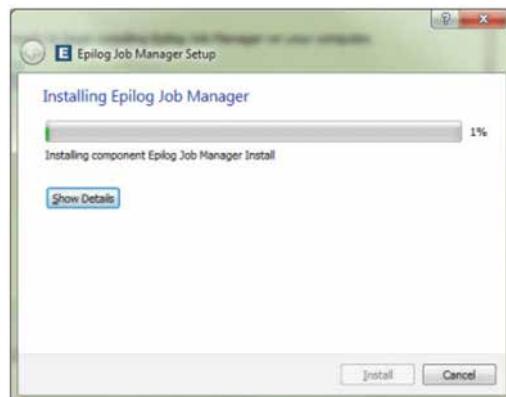
12. Click **Finish** and the Job Manager is installed.
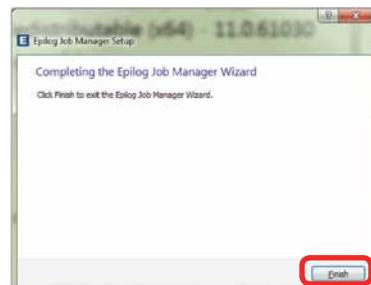
13. A Job Manager icon will be automatically added to your Desktop. You are now ready to use the Job Manager.

SECTION 4: THE EPILOG JOB MANAGER

Trouble Shooting Job Manager Installation

If you were unable to install the Job Manager it's possible that your Anti-Virus software is blocking installation.

To disable Symantec Anti-Virus software, choose **Options**. Other anti-virus packages should have something similar to Symantec.

Disable all Virus and Spyware Protection Features. After the Job Manager has been installed go back into your Anti-Virus software and re-enable the setting that was disabled.
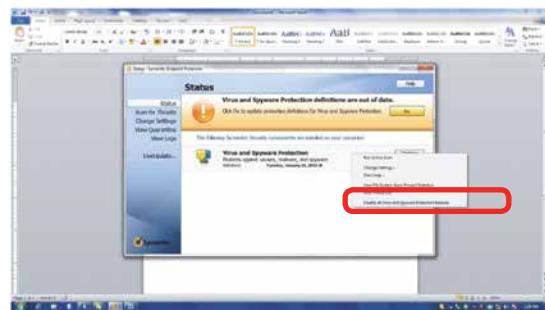
Important Epilog Job Manager Notes

- We suggest a **minimum of 1 GB of free RAM** space when managing very large raster and vector jobs.

Using the Epilog Job Manager

Activate a Laser

1. The first time you open the Job Manager you'll see a tab for each of the models. You will need to activate your laser system to get started. **Click the correct tab, then your system**. You can activate multiple machines if you have more than one laser.

2. To activate your machine:
   - Give your machine a name.
   - Choose your laser from the drop-down list of printers. This is very important - if you do not choose the correct printer you will not be able to print from the Epilog Job Manager!
   - Select the correct machine type, wattage, etc. The Laser Power is very important because it will automatically load the proper material setting files for your specific wattage of laser.
   - Click Save.

3. Your new laser has been activated in the Job Manager and appears in the left panel. Use the **Add or Delete** buttons to add additional machines or to remove a laser. The Job Manager is now ready to accept jobs from the print driver.
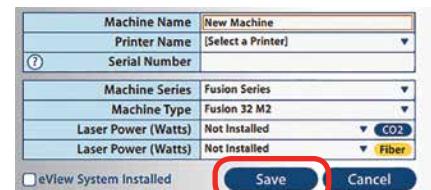
Printing to the Epilog Job Manager

Create a file in your graphic software and set your laser parameters in the print driver.

In the driver you'll see a selection available under the Center-Engraving area. You can choose to print to either the printer (your laser system), the Job Manager, or both. This allows you to send your job to the Job Manager without sending it to the laser so you can then print that job directly from the Job Manager at a later time without accessing your graphic software. This is an easy way to set up an entire day's jobs all in one place.
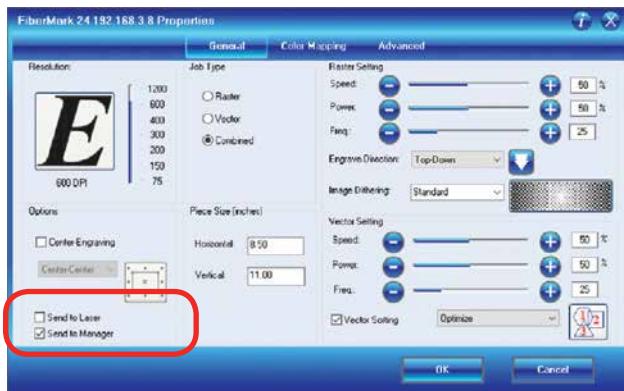
Organizing Your Print Jobs

Click the **Jobs tab**. All print jobs will be displayed in the Uncategorized folder. Click on your job to highlight it (the skateboard file is highlighted in light blue). You can now Print, Edit, Preview or Delete this job using the available icons.
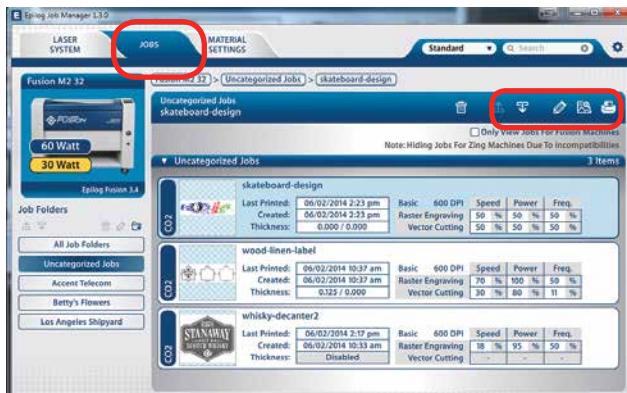
Create and Delete Job Folders

Click the **Add Job Folders** icon to add folders. We added folders for this customer's three largest customers. You can add as many folders as you'd like.

Create Subfolders

First, **highlight the Job folder** in the left panel where you want to add a subfolder. Below we have highlighted the Los Angeles Shipyard folder. Click the **Add Subfolder** icon. We have typed February into the Add SubFolder field, so after clicking on the **check mark** we will create the February subfolder.

Move an Uncategorized File to a Subfolder

When you highlight a subfolder you will see **From Uncategorized** on the right side of the folder. Click **From Uncategorized** to move a job from the Uncategorized folder to this subfolder.

Move a Job Between Folders

You can also move any job to another folder or subfolder by **double-clicking on the job**. Select the Folder and Subfolder from the drop-down menus where you want to save the job. You can save the job with the same name or you can save as a new job. You can also modify your laser settings and save them with the job. Click **Save** to continue.
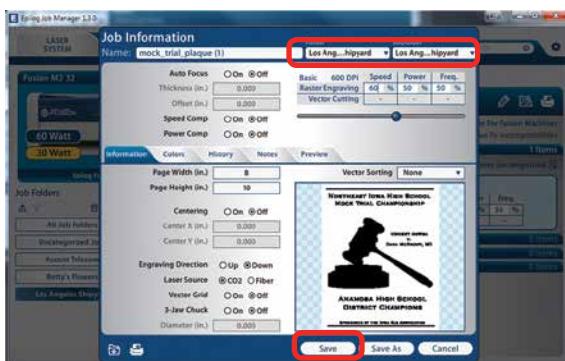
Using the Material Setting Configurations

The Material Settings tab stores all of the suggested laser parameters like speed, power, etc. These settings were loaded based on the wattage you specified in the Laser System tab (adding your laser was the very first thing you did to start using the Job Manager).
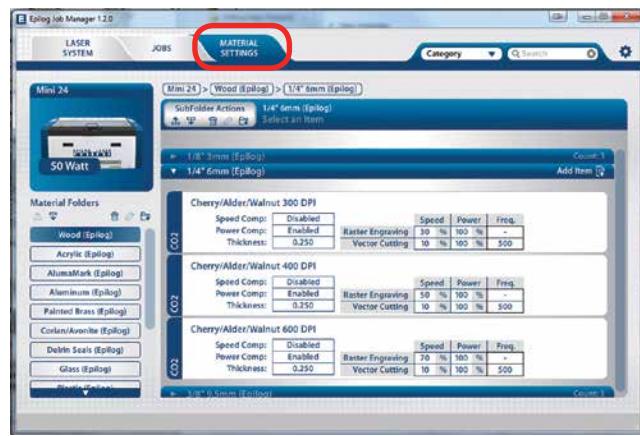
To use the material settings that are automatically loaded in your Job Manager, go to the **Jobs tab** and **double-click on the job** you want to process.

Click the **Import** icon.
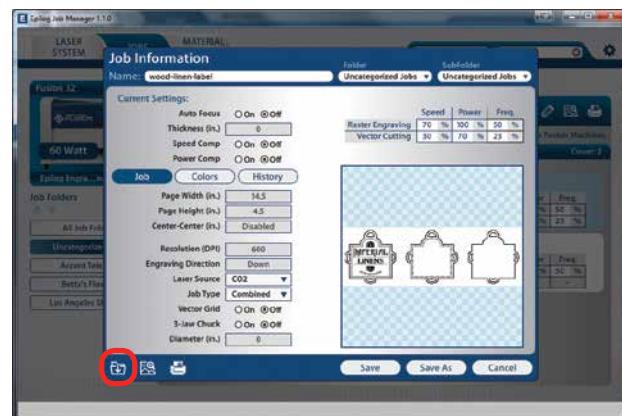
Navigate to the material setting you need. We have highlighted **1/8" Cherry/Alder/Walnut 600 DPI**. Click **OK**.
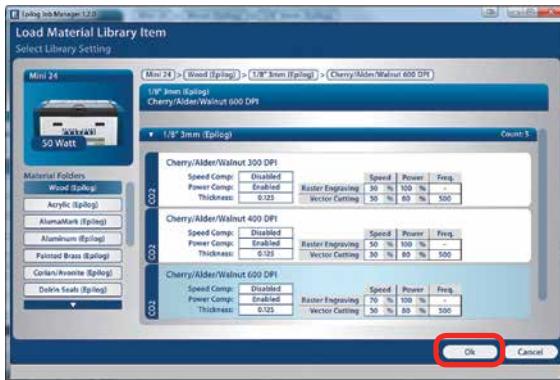
Your new settings have been automatically applied to your job file. You can now save this file, save the file as a different name or print from this window. Double clicking on the artwork will take you to the full preview window, which is explained in the next frame.

Previewing Your Job

To view a preview of the job, click on the Preview tab.
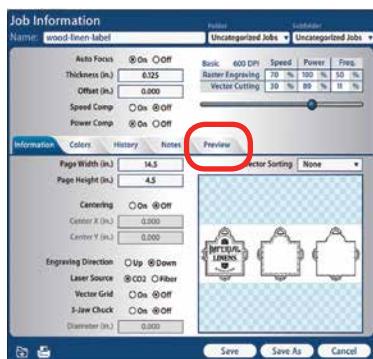
In the Preview mode you can preview just the raster components of your job, or just the vector components. We have selected vector to show only the vector components of this job. The preview mode is very useful in identifying unwanted vector components in a job.
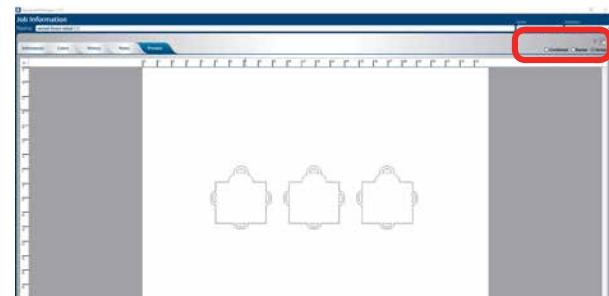
Searching For a Job

The Job Manager has a powerful search function. Type in part of a file name and press enter to find all files related to that name.

You can organize files by standard, created, last printed, or alphabetically to find a specific file.

Notice that the jobs are displayed differently if you change the search category to **Alphabetical**. Your jobs are now displayed in alphabetical order. Once the search is finished and the job is found, most users revert back to the default selection of category.
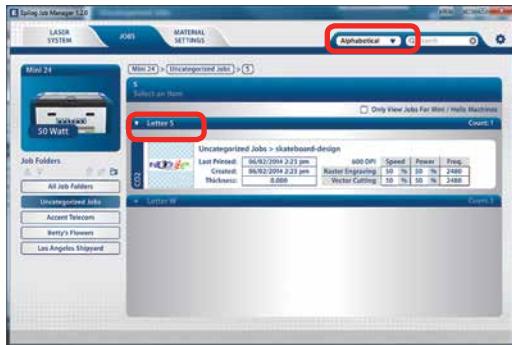
Finding Job History

The Job Manager allows you to see a full print history of a job, including settings you used in each print. The History window shows you the history of this job, what machine it was printed to, when it was first printed (Initial Print), all subsequent prints, and all laser parameters used. To access this, double-click on the job, then select **History**.
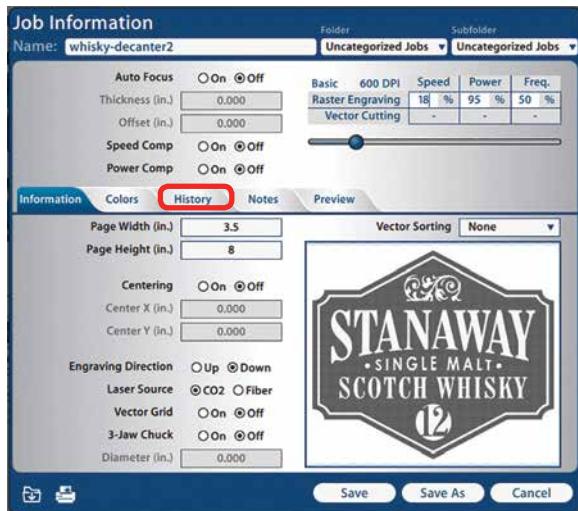
You can now modify, print or save from this window using the listed settings or with new setting. The new setting will be saved as the next print job complete with time stamp and date.
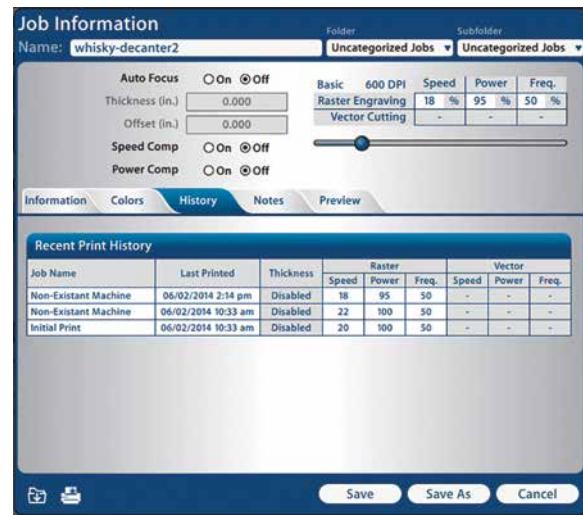
Color Mapping

To access the Color Mapping settings used in a file, double-click on the file to open the Job Information, then click the **Colors** button.
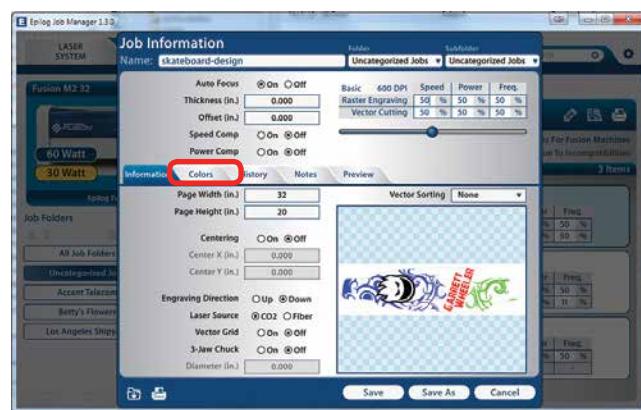
You can modify the settings, save as a new job, save as the same job, print, preview, etc from this window.
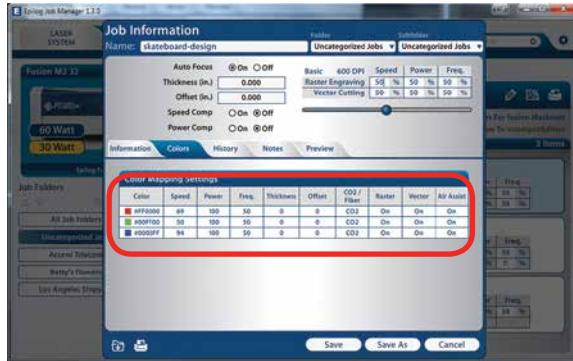
Changing Program Settings

You can access the Program Settings by clicking on the gear at the top right of the page.

On this screen you can set several different system settings, including:

- **Language:** Choose from several languages.

- **Default Length Units:** Choose from inches, millimeters, or centimeters.

- **Job/Material List Display:** To speed up job loading when you have a long job list, you may want to change to basic view for faster loading.

- **Delete Machine/Folder/Subfolder/Job/Material Confirmation:** Turn delete confirmation message on or off.

- **Backup Database:** Save a backup of all files, material settings, etc.

- **Restore Database:** Reload settings from a previous backup.

- **Clear Entire Database:** Delete all settings, machines and jobs from the database.

- **Clear All Jobs:** Delete all jobs in the database.

- **Clear Uncategorized:** Clear out all uncategorized jobs in the database.
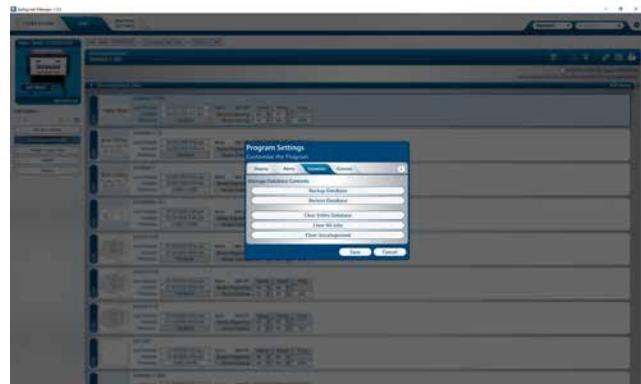
We will be adding new features to the software often, so sign up for the Driver Update Notification list at www. epiloglaser.com/register.

SECTION 5: USING THE LASER DASHBOARD™

The Epilog Dashboard is the print driver that sends your artwork and laser parameters from the computer to the laser.

The Dashboard can be installed from the driver CD that came in your accessories kit. It can also be downloaded from the Epilog website. If you are just getting started and are in a hurry to engrave a job, you can do so by setting just a couple of parameters in the Dashboard without having a detailed understanding of what different choices are available to you.

Note! When using the slider bars, there are several different ways to get the desired setting. These different methods all follow standard Windows protocol, so they will work in other Windows software applications too.

- Change the settings by clicking on the slider bar to move it, or type in exact numbers to the right of the slider.

- Holding down the Alt key while clicking close to the slider will bring up a box outlining the slider and allow you to move in increments of ten.

The following sections provide detailed explanations of the different features in the Print Driver. Most engraving and marking jobs can be accomplished by using only the General tab of the Print Driver. Advanced features for more complex jobs can be found under the Advanced and Color Mapping tabs.

Changing Laser Dashboard Defaults

If you would like to permanently change any of the settings that we walk through on the next few pages, you can easily set a new default for each of them.

1. Go to **Control Panel** | **Devices and Printers**

2. Right mouse click on the Epilog Engraver.

3. Click **Properties.**

4. Click **Printing Preferences.**

5. Change any of the settings. These changes will become the default settings for each new print job.

6. Click **OK** and close out all open windows.

When would you want to do this?

Most users set their defaults to match the materials they use the most. They might set the speed default to 30% because they only engrave anodized aluminum. They might only vector mode, so they set the default Job Type to vector, or they might set the page size to match the size of the engraving table. By following these quick steps you can make sure that these are the settings you see every time you open the print driver.

General Tab

The General Tab is where you will find 90% of the features you will utilize when sending jobs to the laser. Everything from resolution to speed and power settings are all located on this one page.
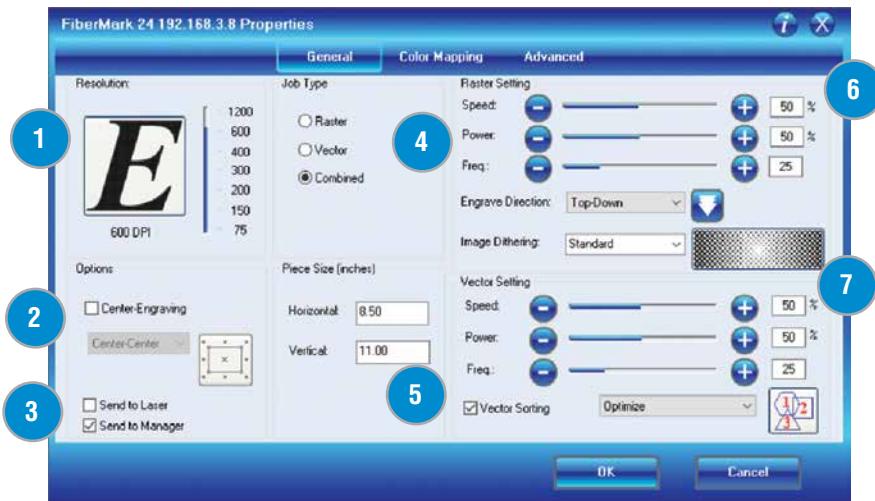
1 Resolution

Set your print resolution from 75 to 1200 DPI. For the best engraving results, use a resolution equal to the resolution in the raster images within your project setup. The resolution setting in the print driver will affect the engraving time (there are twice as many engraved lines at 600 DPI as at 300 DPI) and the quality. For a detailed discussion on Resolution, visit **"Resolution" on page 68**.

2 Center Engraving

The Center Engraving feature allows you to define the center of your artwork as the primary reference point (Home Position) of your engraving. The Center Engraving feature has been designed to be used in conjunction with the X/Y Off feature on the Control Panel. Center engraving differs from standard printing where the upper left corner of the page and the upper left corner of the laser table define your primary reference point. For more information, visit **"Center Engraving" on page 88** in the manual.

3 Job Manager

You can choose to print to either the printer (your laser), the Job Manager, or both. This allows you to send your job to the Job Manager without sending it to the laser so you can then print the job directly from the Job Manager at a later time without accessing your graphic software. This is an easy way to set up an entire day's jobs all at one time. For more information on the Epilog Job Manager, see **"Using the Epilog Job Manager" on page 40**.

④ Job Type

Choose between the three modes of operation.

- **Raster Mode:** Used for engraving or marking materials. Typical applications include engraving clipart, scanned images, photos, text and graphic images. Vector lines that you want to engrave rather than vector mark should be set 0.006" (0.152 mm) or greater line thickness.

- **Vector Mode:** Selected when you are marking a thin line drawing, or for use with the Red Dot Pointer for previewing the job processing area. In vector mode, a line is recognized as a line to be vector marked based on the line width (or stroke). These lines can also be affected by resolution, but we'll discuss that in a later chapter. To make things easy, set any vector lines to a line width of 0.001" (.0254 mm), or hairline width in CorelDRAW.

- **Combined Mode:** Used when you engrave and vector mark in the same job. The laser will always engrave first, then follow with the vector marking mode.

Note on Vectors: If you are in Vector or Combined mode, all thin lines will be vector marked! This can be disconcerting because even if the lines are not visible in your artwork they will still vector. Usually, this happens when incorporating a clipart image that has hidden lines that are not readily apparent. Please refer to **"Setting a Vector Marking Line" on page 67** for an illustrated explanation of how this can affect your work.

⑤ Piece Size

Enter the size of the page you used when creating your artwork. Some laser users prefer to design their piece with a page size matching the page they are engraving, while others prefer to design with the page size set to the full engraving table.

⑥ Raster Settings

Speed: Determines the travel speed of the carriage in Raster mode and is adjustable in 1% increments from 1 to 100%. The slower the speed, the deeper the engraving. Speed settings are heavily dependent on the hardness and the thickness of the material being engraved with harder materials requiring slower speeds for deeper engraving. Slower speed settings will produce greater depth of engraving. Please refer to **"Appendix B: Material Settings" on page 127** in this manual.

Power: Determines the amount of laser energy that is delivered to the piece being engraved and is adjustable in 1% increments from 1 to 100%. The higher the power, the deeper the engraving. Please refer to **"Appendix B: Material Settings" on page 127** in the manual.

Frequency: The frequency refers to the pulsing frequency as well as the average output power per pulse of the laser. While the average output power in a given period of time remains constant, the frequency allows you to adjust the power of each pulse. Each pulse at a low frequency setting will have a greater peak output than the same pulse at a high frequency setting.

Frequency is a useful setting mostly because it tends to greatly increase the peak power output of the laser at low frequencies. This allows you to mark materials that would otherwise require a more powerful laser to mark.

The Frequency adjustment range is determined by the power of your laser:

• 20 Watt Fiber: 20 kHz - 80 kHz

• 30 Watt Fiber: 30 kHz - 80 kHz

• 50 Watt Fiber: 50kHz - 100 kHz

The frequency slider bar in the driver shows the relative frequency that is being output by the laser is adjustable in increments of one from 1 to 100. The frequency (kHz) associated with the number in the slider bar is shown for the different wattage lasers with slider numbers shown in increments of five:

20 Watt Fiber																				
Frequency (kHz)	21	23	26	29	32	35	38	41	44	47	50	53	56	59	62	65	68	71	74	77	80
Slider Number	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

30 Watt Fiber																				
Frequency (kHz)	31	33	35	38	40	43	45	48	50	53	55	58	60	63	65	68	70	73	75	78	80
Slider Number	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

50 Watt Fiber																				
Frequency (kHz)	51	53	55	58	60	63	65	68	70	73	75	78	80	83	85	88	90	93	95	98	100
Slider Number	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Most materials do not need a specific frequency so we use a relative slider bar that can provide rough estimates of low, medium and high frequency settings. Frequency can be controlled either from your computer or from the control panel on the engraver. Frequency affects to the amount of power that is output with each pulse of the laser. Low Frequency settings (20 and below on the slider) will provide higher bursts of power at a low pulse rate, while higher Frequency settings (80 and above on the slider) will produce slightly lower bursts of power, but at greater frequency. On most materials, lower frequency settings will produce darker marks, while most plastics use high frequency settings. Please see **"FiberMark Suggested Material Settings" on page 127** for more information.

Speed, Power and Frequency settings can sometimes be confusing because not all materials that can be marked at the highest speeds and powers should be marked at the highest speed or power. Many users feel that if a mark can be made at high speed, it's just a matter of adjusting the power to produce an acceptable mark. Unfortunately, for some materials, this isn't always the case. For some materials, the length of time the laser reacts with the material is much more important to producing a good mark than the raw speed of the system or the amount of laser power that is output by the laser.

Engrave Direction: This feature applies to raster engraving only and allows you to engrave your project either from the top-down or the bottom-up direction.

Dithering: This setting defines how the dot patterns will be engraved in raster images that contain grayscale images, blends, or color. The Dashboard offers six different dithering patterns to enhance your engraving projects. The default

mode is Standard. This mode can be used for all images, including photographs, but some images improve when engraved with other dithering patterns Dithering is used only for Raster engraving and has no effect on vector lines. For more information, go to **"Image Dithering" on page 79**.

⑦ Vector Settings

Speed: Determines the travel speed of the carriage in vector mode and is adjustable in 1% increments from 1 to 100%. Most vector applications require relatively slow speed settings, and the speed is heavily dependent on the hardness of the material being vectored. High speeds are provided for draft mode only and are not intended for production applications.

Power: Determines the amount of laser energy that is delivered to the piece being marked and is adjustable in 1% increments from 0 to 100%. The amount of power necessary to vector mark a given material is also heavily dependent on the hardness of the material.

Frequency (kHz): Frequency refers to the pulsing frequency as well as the average output power per pulse of the laser. While the average output power in a given period of time remains constant, the frequency allows you to adjust the power of each pulse. Each pulse at a low frequency setting will have a greater peak output than the same pulse at a high frequency setting.

Frequency is a useful setting mostly because it tends to greatly increase the peak power output of the laser at low frequencies. This allows you to mark materials that would otherwise require a more powerful laser to mark. The frequency (kHz) associated with the number in the slider bar is shown for the different wattage lasers with slider numbers shown in increments of five:

- 20 Watt Fiber: 20 kHz - 80 kHz

- 30 Watt Fiber: 30 kHz - 80 kHz

- 50 Watt Fiber: 50kHz - 100 kHz

The Frequency slider bar in the driver shows the relative frequency that is being output by the laser and is adjustable in increments of 1 from 1 to 100. The frequency (kHz) associated with the number in the slider bar is shown for the different wattage lasers in the following graphs:

20 Watt Fiber																				
Frequency (kHz)	21	23	26	29	32	35	38	41	44	47	50	53	56	59	62	65	68	71	74	77	80
Slider Number	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

30 Watt Fiber																				
Frequency (kHz)	31	33	35	38	40	43	45	48	50	53	55	58	60	63	65	68	70	73	75	78	80
Slider Number	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

50 Watt Fiber																				
Frequency (kHz)	51	53	55	58	60	63	65	68	70	73	75	78	80	83	85	88	90	93	95	98	100

Slider Number	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Most materials do not need a specific frequency so we use a relative slider bar that can provides rough estimates of low, medium and high frequency settings.

Frequency can be controlled either from your computer or from the control panel on the engraver. Frequency affects to the amount of power that is output with each pulse of the laser. Low Frequency settings (20 and below on the slider bar) will provide higher bursts of power at a low pulse rate, while higher Frequency settings (80 and above on the slider bar) will produce slightly lower bursts of power, but at greater frequency. On most materials, lower frequency settings will produce darker marks and most plastics use high frequency settings.

Vector Sorting: A check mark in the vector sorting box will order the sequence of vector marks. If sorting is enabled, you have two choices of how the vector lines will be sorted: Optimize and Inside-Out. In Optimize mode, vectors will be marked in the most efficient manner, and will generally vector the next closest line to the one just finished. This is by far the most preferred method as it saves the most time, is the most predictable and will create a continuous line path out lines that look connected, but are actually discrete line segments in the artwork. The continuous path of discrete lines is most often found in AutoCAD or other CAD programs.

Inside-Out mode will vector from the inside object first to the outside objects last. As an example, if you have a small circle surrounded by a large circle, the small circle will mark first. If sorting is not checked, the vectors will mark in the order in which they are presented, which with most software applications will mean in the order they were drawn.

Color Mapping Tab

The Color Mapping feature is an advanced feature that must be checked to activate. Color Mapping is designed to be used in either Raster mode or Vector mode, but not in Combined mode. While Color Mapping is a very powerful tool, most users use it for a few main reasons:

- Using color to define different levels of focus. Many objects need to be marked at different locations that are at different relative heights. Using color mapping to change the focus in a single job setup is a convenient way to simplify marking complex parts.

- Using different colors allows users the ability to sequence the order that objects will be marked.

Color Mapping accomplishes these tasks by assigning laser attributes to the different colors in your artwork. The functions that can be controlled by color are: Speed, Power, Frequency, and Focus. For a detailed look at the laser's Color Mapping capabilities, visit **"Color Mapping" on page 80**.

1 Enable Color Mapping

When this check box is selected, the laser will use the settings assigned to each color. For any colors that are in your artwork, but not in the color mapping settings, the General settings will be used.

2 Adjust Settings

Use the slider bars to create any RGB color and set the laser parameters. Adjusting the settings does not actually change the values. Select the Right Arrow button to finalize the settings.

③ Color Map Summary

The Color Map Summary area is located on the right side of the window and offers a visual display of all of the color mapped settings. You can quickly see each color and the speed, power, frequency and focus settings for each of the different colors within your file.

Advanced Tab

The advanced tab contains advanced features including firmware updates and configurations.
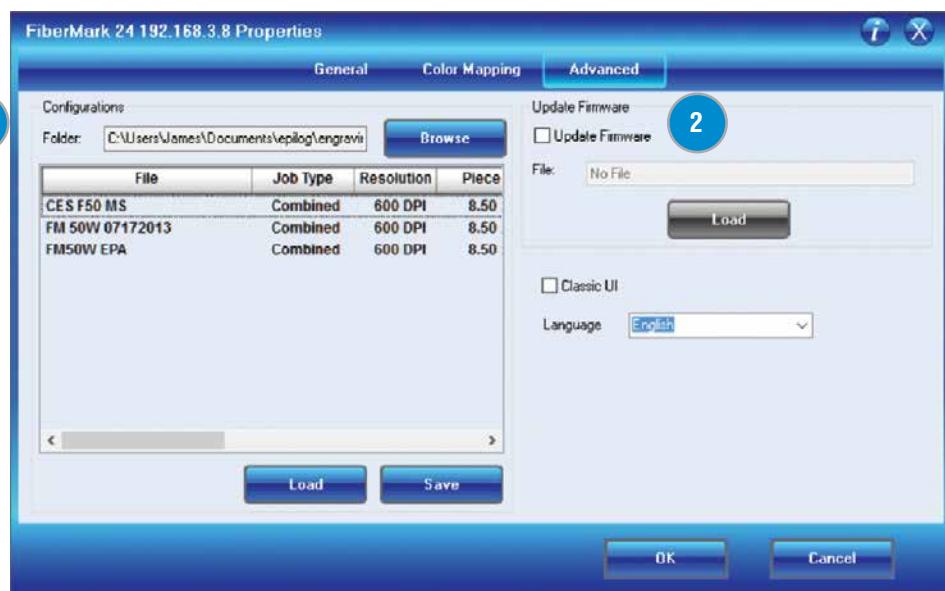
Configurations

① The Configurations feature is a comprehensive data management tool that is used to save all of your Dashboard settings for individual jobs. Saving the Dashboard settings as a database file allows you to retrieve the job parameters at a later time. This saves you the trouble of trying to remember what speed, power and other settings you used on a job you did three months ago. All of your settings can be stored as a permanent record.

For example, in your database you can have settings for stainless steel annealing, polishing and etching, brass, anodized and many more materials. After each configuration file name, you can see if the saved settings are for a Raster, Vector or Combined job, the resolution, and the piece size within that file. To use any of these settings, click the **Load** button.

If you find a setting you would like to save into a new configuration file, simply create the settings within the three Laser Dashboard tabs, then click **Save**.

② Update Firmware

When you are ready to update your laser's firmware, click here and load the file. For more information, visit **"How to Upgrade Your Firmware" on page 109.**

Additional CorelDRAW Laser Dashboard Features

Each program you use will provide different ways to manage these functions. CorelDRAW offers a very straight forward way to access each of these features.

Multiple Passes

You can automatically engrave or vector mark a job multiple times by setting the Number of Copies to the number of passes that you want to make. When each pass is finished the laser will automatically start another pass until all passes are complete.
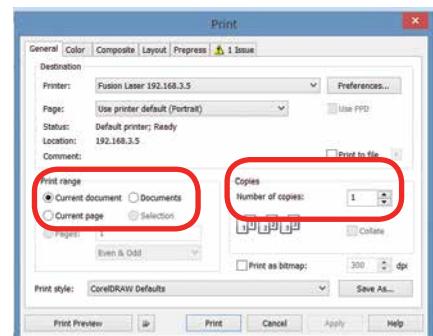
Print Range

If you only want to print one aspect of your project (for example, just the text in the document), you can select that part of the file, then click Selection and the laser will only engrave or vector mark that piece of your file.

Multiple Pages

When you want to engrave multiple pieces within one document, such as five different engraved parts, each with a different name, you can use the Multiple Pages feature of CorelDRAW. Set up each of the mug files on a separate page in your single CorelDRAW file, then when you print to the laser you can choose either **Current document** to print all of the pages or you can specify which pages you want to print by adjusting the settings in the **Print range box**. You can view the different pages in the Print Preview screen.

When a multiple page job is printed to the laser, each of the pages will transfer to the Control Panel with the first file coming across as Job:1. File Name, then Job:2. Page 2, Job: 3.Page 3. Remember, the last page of the job will be the current file when you go to the laser's control panel, so scroll back to Job 1: File Name to run that one first.

If you start engraving the jobs and become uncertain about which pages are which, you can refer back to your print preview screen and the page number in the laser will correspond to the page number in the print preview.

SECTION 6: FIBERMARK CONTROL PANEL

Display

You will see one of two displays - icon only or text. The display shows valuable information associated with the highlighted Functional Menu items. We will explain the different information that will be displayed as we go through the description of each menu item.

Icon Only Control Panel:

Icon	Label	Icon	Label	Icon	Label	Icon	Label	Icon	Label
	Go		Set Home		Data		Speed		Up/Down Fast
	Pause		X/Y Off		Jobs		Power		Up/Down Slow
	Reset		Pointer		Config		Frequency		Focus

Text Control Panel:

Go

- Press the Go key to start or resume a job. Once the job starts, the display changes to show a job timer and the engraving resolution. The timer is a useful production tool that displays the elapsed time of job as it runs.

Pause

- Pressing the Pause key will stop the lens carriage and the laser beam will be shut off. If the Pause key is pressed during raster engraving mode the lens carriage will stop on either the far left or far right of the engraving line that is in process. If the Pause key is pressed while in vector mode, the lens carriage will stop at the end of a line segment or at the next line node location.

- Once the lens carriage has stopped, you can open the door to examine the engraving. By closing the door and pressing the Go key, the engraving job will commence where it left off. If the item being engraved is not moved the engraving registration will not be affected.

- **Note:** Opening the door on the laser during engraving will stop the laser from firing; however, the lens carriage will continue to move. It is important to stop the job before you open the door to ensure the engraving is completed.

- If you press the Pause key while in vector mode it may take some time for the system to actually stop. The system needs to get to the next node in a vector before it can stop.

Reset

- Pressing the Reset key will move the carriage back to its Home Position. Press the Reset key after you have pressed the Pause key, or after you have moved the carriage when using the X/Y off function.

- Reset does not erase the job from the laser systems memory; rather it will stop the engraving job in process and send the carriage back to the Home Position.

Set Home

Once you have moved the lens assembly by hand to a temporary Home Position, pressing the **Set Home** key will set this new position as you new temporary Home Position. This temporary home now becomes your new upper left corner.

The process of setting a temporary Home Position involves the following steps:

1. Press **X/Y Off.**

2. Press **Go** to disable X and Y axis (press Pause to cancel and send the carriage back to its park position.)

3. Move the lens assembly by hand to your desired location (remember to turn the Red Dot Pointer on as a visual locator aid).

4. Press **Set Home** to establish your new Home Position.

5. After you have set home, pressing the **Reset** key will move the carriage to its park position approximately 1/2 inch (12 mm) to the front of where you set home.

6. **Resetting Home Position:** Once you are finished with your temporary Home Position and want to restore the carriage to the upper left corner of the machine, press the **Set Home key** and **Reset key** at the same time. Press the **Go** key and the carriage will move back and to the left to its normal upper left corner park position.

X/Y Off

Pressing the X/Y Off key and then pressing the Go key disables the X and Y motors and allows the operator to move the carriage by hand to any location on the table. Moving the carriage by hand allows you to perform several different functions:

1. **Manually focus anywhere on the table or on the optional Rotary Attachment.** To manually focus anywhere on the table, disable the axes by pressing the **X/Y Off** key, then the **Go** key. Move the carriage to the desired focus position. Place the manual focus gauge on the carriage and press the **Up or Down cursor keys** on the keyboard to move the table up or down until the focus gauge is just touching your work. Your focus is now set to the proper focus height. After you have focused, press the **Reset** key to send the carriage back to its park position.

2. **Accurately determine the X- and Y-axis location.** When you disable the axes and move the carriage by hand, the X- and Y-axis coordinates will be displayed on the LCD panel.

3. **Create a new temporary Home Position.** Using the Red Dot Pointer helps to locate the precise position where you want your new Home Position to be located. Use the X/Y Off key in conjunction with the Set Home key to create a temporary Home Position.

Be careful to avoid touching the optics while moving the carriage!

Pointer

The Pointer key is a toggle switch that turns the laser system's Red Dot Pointer on and off. When the Red Dot Pointer is on, the indicator light directly to the left of the pointer key will be illuminated. For more information visit **"Red Dot Pointer" on page 86.**

Data

This light will illuminate when data is being passed to the laser. This is a handy tool when you are checking to see if your laser is connected to your computer.

Jobs

Pressing the Jobs key displays the file name of the last job stored in memory. After pressing the Jobs key, pressing the Up or Down arrows allows the operator to scroll through all of the saved jobs that are stored in the laser system's on-board memory.

You can loop continuously through all of the jobs stored in the laser system. Pressing the go key will start the job that is displayed. The jobs are numbered, so if you send the same job more than once, you will still be able to distinguish it from the other jobs with the same name.

Jobs stored in the laser system will be erased when it is turned off. Turning off the laser system also serves to clear the laser system's memory.

Config

There are a number of factory settings that normally only need to be set once at the factory to calibrate the system. All of the calibration settings can be accessed using the Config key. To access the settings menu, press the **Config** key, then use the right arrow to scroll through the options.

1. **X Home:** Increasing this value moves X Home closer to the left ruler. Range: -600 to 0.

2. **Y Home:** Increasing this value moves the Y Home closer to the top ruler. Range: -600 to +200.

3. **X R Home:** Increasing this value moves the X Rotary Home closer to the left ruler. Range: -3000 to +600.

4. **Y R Home:** Increasing this value moves the Y Rotary Home closer to the top ruler. Range -1200 to +1200.

5. **Laser Match:** Establishes left to right vertical alignment of alternating raster lines. Range -20 to +20.

6. **Sys Units:** Choose between inches and millimeters.

7. **Europe:** If set to yes, European system regulations are implemented in the system.

Two-Key Configuration Menu Items

The Epilog Fibermark has several additional configuration settings that can be changed with two-key combinations on the key pad. Press the two-key combination, then use the up or down arrows to change the settings. Press the **Go** key to save the new setting.

1. **Auto Delete:** Automatically deletes every job after it has finished running or if the job is stopped and reset. The factory default is No. Press the **Reset** and **Job** keys simultaneously. Range: Yes or No.

2. **Laser Pwr:** Sets the system to match the wattage of the laser source. This is important because if it does not match, the system will act erratically. Press the **Reset** and **Power** keys simultaneously. Range: 20, 30 or 50 watts.

Speed

During an engraving job or when the laser is idle at Home Position, the speed of the job can be viewed on the control panel by pressing the Speed key. In raster mode you can change the speed on the fly. Speed can only be changed on the fly in raster mode. You cannot change the speed on the fly during vector marking.
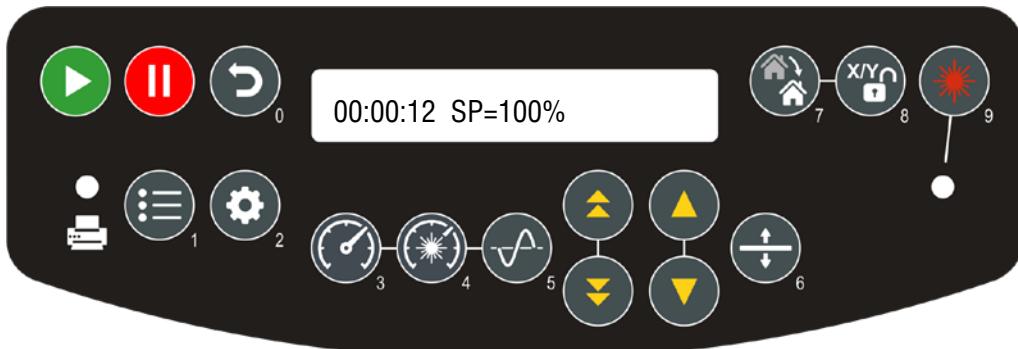
Pressing the **Speed** key while engraving will change the display to show the speed setting of the job while it is running (see image above). Pressing the **Up or Down arrow key** will increase or decrease the speed of the carriage. Normally you will need to increase or decrease the speed by 10% or more before you start to notice a visible change in the speed.

Changing the speed on the fly is a useful way to experiment to get just the right speed setting for a material you are not used to engraving. You cannot change the speed on the fly in vector mode.

Power

During an engraving job or when the laser is idle at Home Position, the power of the job can be viewed on the control panel by pressing the Power key. In raster mode you can change the power on the fly, but you cannot change the power on the fly during vector marking.

Pressing the power key while engraving will change the display to show the power setting of the job while it is running. Pressing the Up or Down arrow key will increase or decrease the power output of the laser in raster mode. Normally you will need to increase or decrease the power by 10% or more to see a visible change in the laser's speed.

You can also change the power from the laser system when it is in idle mode. To do this, press the **Power** key, then press the **Up or Down arrow keys** to change the power. Press Go and job will run at the changed power setting.

Frequency

During an engraving job or when the laser is idle at Home Position, the laser frequency of the job can be viewed on the control panel by pressing the Laser Freq key. In raster mode you can change the frequency on the fly, but you cannot change the frequency on the fly during vector marking.

Pressing the **Frequency** key while engraving will change the display to show the power setting of the job while it is running. Pressing the **Up or Down arrow** key will increase or decrease the frequency output of the laser in raster mode. Normally you will need to increase or decrease the frequency by 10% or more to see a visible change in the laser's output.

You can also change the laser frequency from the laser system when it is in idle mode. To do this, press the **Frequency** key, then press the **Up or Down arrow** keys to change the frequency. Press Go and job will run at the changed frequency setting.

Focus

Pressing the Focus key allows the operator to raise or lower the table by pressing the two sets of Up or Down arrow keys.

There are two sets of cursor keys that control the up and down movement of the table:

The double-triangle cursor keys control the coarse speed of the table and move the table up and down quickly in large increments of .030" to .050" (0.75 mm to 1.2 mm).

The single-triangle cursor keys control the fine speed of the table and move the table up and down slowly in small increments of .001" to .003" (0.02 mm to 0.07 mm).

If the table is too high, the carriage may collide with any material that is between the park position and focus position. To prevent the carriage from colliding with your material you can do one of two things:

1. Press the **Pause** key first before pressing the Focus key. Pressing the Pause key immediately before pressing Focus holds the carriage in its park position allowing you to lower the table with your material in place.

2. Remove your material, press the **Focus** key and use the **Down arrow** to lower the table.

To manually focus anywhere on the table see the description for the X/Y Off key and Set Home key for a full explanation of this feature.

Z-Axis Position: When the Focus key is pressed, a numeric readout is displayed. Wherever the table is when the machine is initially powered on is the 00.000 (Z-axis) position. Once the table is moved, the readout will display how far the table has moved up or down from this position. Once you move the table up or down to the position you want, you can zero out the numeric display by pressing both double-triangle keys simultaneously. This feature is very helpful when very precise focus is important.

Job Storage: Temporary Memory

While there is no key for this, the laser has the capability to store multiple jobs in temporary memory. The machine will store any and all jobs sent until there is no free temporary memory left. For all practical purposes, there is no limit to the number of jobs you can send to the laser.

Note: Temporary jobs stored in the laser systems will be erased when the laser system is turned off. For permanent job saving, print the file to the Job Manager, where you can file the job for later retrieval along with all settings you used in the past.

First Test Job

When you have your laser and print driver installed, you are ready to start engraving! To get started quickly and run a sample piece of material on your new laser, the following is a quick setup guide outlining the general steps for running a first job. A detailed set of instructions for each step of the process follows this quick start guide:

1. Find a piece of scrap material to engrave. This might be a piece of anodized aluminum or other metal.

2. In your graphic program, create a new page that is the same size as the piece of material you will be engraving.

3. Turn on your laser and wait for a **beep** to note the machine is initialized.

4. Place your sample material on the table in the upper left corner. Make sure the table is low enough to accommodate the material. If not low enough, press the **Focus button**, then the **down arrow** to lower the table before placing your item on the table. Focus your material by placing the Focus Gauge on the lens assembly and raising the table by pressing the **up** arrow until it is just touching the material.

5. In your graphic software, **print** the file. Select the laser as your printer.

6. Click Properties to see the Laser Dashboard. Set a resolution (300 or 600 DPI usually), set a page size to match the page size of the file, and choose a speed and power setting under raster settings. See **"FiberMark Suggested Material Settings" on page 127** for suggested speeds and powers.

7. Click **OK** to exit the Laser Dashboard and click **Print** to print the page to your laser.

8. Turn on your exhaust fan or filtration unit.

9. At the laser, the job you sent over will be shown on the LCD display. Press the **Go** button to run the job. The job will start running.

Artwork Setup

When setting up artwork for the laser, you can use most graphic software package of your choice, such as CorelDRAW or Adobe Illustrator. There are three different modes of operation for the laser and the way you setup your artwork will determine if you raster engrave, vector mark, or use combined mode.

Raster Engraving

Raster engraving can best be described as very high resolution dot matrix "printing" with a laser. Raster engraving is used to create highly detailed graphic images. The laser head scans back and forth, left to right, engraving a series of dots one line at a time. As the laser head moves down line by line, the dot pattern forms the image that was printed from your computer. You can raster engrave scanned images, text, clipart, photographs, bar codes or line drawings.
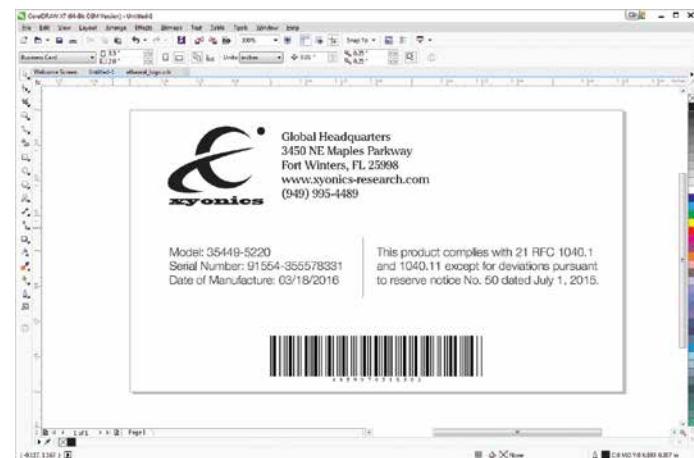
Vector Marking

When you are vector marking, the laser is following a continuous path that follows the outline, or profile, of an image. Vector marking is normally used to quickly mark materials. It can also be used for quick marking of characters and geometric patterns. You can vector mark with the laser by setting objects and text to be unfilled and drawn with a 0.001" (0.025 mm) outline. The thin outline will produce a vector mark.

This graphic shows a vector image made up of lines. You can tell it is a vector image because you can individually select any of the lines and manipulate that part of the graphic.
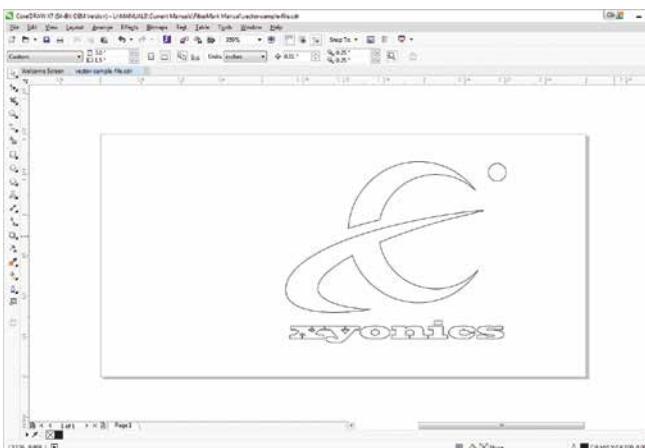
Note: If your raster artwork contains thin lines between .001" (.025 mm) and .007" (.177 mm) depending on resolution, and you are using Vector or Combined mode, those thin lines will all vector mark. The most common setup where this occurs is when you have a clipart image with hidden lines that you send to the laser using Combined mode. The artwork shown below is a good example of a piece of clipart as it appears on the screen (top) and the hidden lines (bottom) that will vector mark if you are in Combined or Vector mode. If you only want to raster engrave, make sure you select Raster mode in the Epilog Dashboard.

Clipart that looks like it is a raster file is actually often made up of small lines. If the lines are set too thin, then they may vector mark as well as engrave if you send to the laser in combined mode.
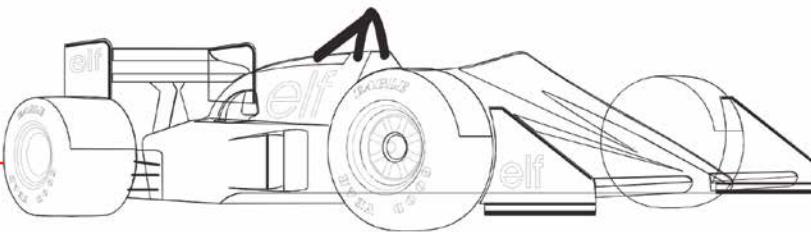
In CorelDRAW you can view just the lines (bottom view) by clicking on the **View** button in the menu bar and selecting **Simple Wire Frame**. The upper image is a complex piece of clipart. The lower image shows all of the hidden lines that are in this piece of clipart. If this clipart image were run in Combined mode, it would first raster engrave most of the car then vector mark any of the thin lines below .007" (.177 mm). You can also use the Preview function of the Epilog Job Manager to view only vector lines. See **"Previewing Your Job" on page 43**.

Setting a Vector Marking Line

The laser determines which lines to engrave or vector mark based on the width (stroke) of each line. If you're using CorelDRAW, any line set to hairline width will vector mark. But in other software what width should you set a line to? Different line weights will engrave and vector mark at different widths and resolutions.

The table below shows various line widths and which will vector mark at the different resolutions. To be safe, set all vector lines to .004" (.101 mm) or less to make sure they will always vector mark.

Line Width	150 DPI	200 DPI	300 DPI	400 DPI	600 DPI	1200 DPI
.001" (.025 mm)	Vector	Vector	Vector	Vector	Vector	Vector
.002 (.058 mm)	Vector	Vector	Vector	Vector	Vector	Vector
.003 (.076 mm)	Vector	Vector	Vector	Vector	Vector	Vector
.004 (.101 mm)	Vector	Vector	Vector	Vector	Vector	Vector
.005 (.127 mm)	Vector	Vector	Vector	Raster	Raster	Raster
.006 (.152 mm)	Vector	Vector	Vector	Raster	Raster	Raster
.007 (.177 mm)	Vector	Vector	Raster	Raster	Raster	Raster

Where do I set the Vector Line Width?

Different software packages set the line width in different places. In CorelDRAW, you can find the outline width in the top menu bar when a vector line is selected. In Adobe Illustrator it is called the stroke width and you can find this setting in the Stroke Panel.

If you can't select a line to set the width, it may be because it is part of grouped object. Try to ungroup the object, then select the line. You also can't select an individual line if that line is part of a raster image.

a
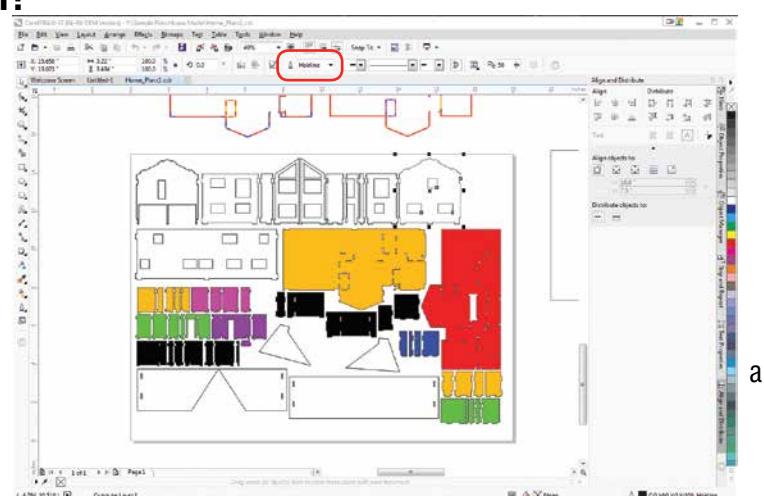
Resolution

Print quality is commonly referred to as Resolution and is one of the variables that determine image quality. Resolution is expressed in dots per inch (DPI) and is determined by the number of lines or dots that are engraved for every inch of movement. Each horizontal line is referred to as a raster line. The higher the resolution setting, the finer the detail that can be achieved. Keep in mind that engraving resolution is only one factor in determining image quality. The quality of the artwork being sent to the laser can have a bigger influence on the look of the final product than the resolution. If low quality artwork is being used, even the highest resolution will not improve it. Also keep in mind that image quality is subjective. 300 DPI may be just fine for some images and some customers, while 600 DPI is the absolute minimum for others.

The diagram below shows the concept of raster lines and dots-per-inch (DPI). The arrows show the change in direction of the carriage between raster lines. The difference in dot density between 300 DPI and 600 DPI.

300 DPI   600 DPI
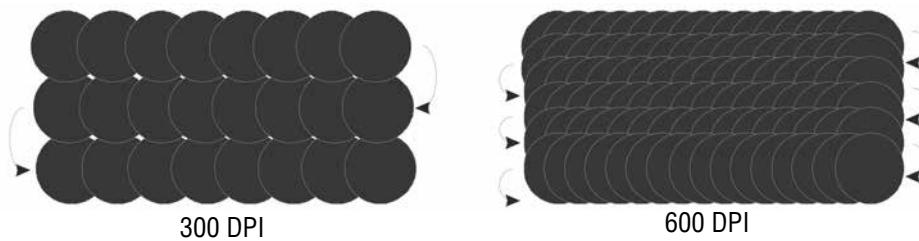
Resolution Settings:

75 – 200 DPI
These resolution values are typically used for non-production purposes where you want to experiment with image location, or if you want to quickly produce a rough draft.

300 DPI
This resolution can be good for production work where image quality needs to be good but not great. Attempting to produce fine detail with 300 DPI is not recommended.

400 DPI
This resolution value is ideal for many applications. It combines very good image quality with fast engraving times. Many users like 400 DPI for all of their work.

600 DPI
When really fine detail or overall excellent results are required, most users choose 600 DPI.

1200 DPI
This resolution is used for projects that require the best engraving quality possible, or if engraving extremely small fonts. Although it's seldom used because, under normal circumstances, most people cannot visually discern the difference between 1200 and 600 DPI. There are some users that appreciate this high level of quality and are willing to take twice as long to produce an image at 1200 DPI as it would take them at 600 DPI.

Helpful Hints

- There are four times as many dots engraved at 600 DPI as there are at 300 DPI. Twice as many horizontally and twice as many vertically.

- The gap between the dots is very small at 600 DPI. At 300 DPI the lesser overlap is responsible for the jagged edges that are visible when engraving at lower resolutions.

- It's important to remember that while resolution plays a part in producing good image quality, the artwork that is sent to be engraved is just as important. If the artwork that is sent to the laser is poor quality, trying to engrave it at 600 DPI will not improve the quality. It's always best to start with high resolution images. Poor artwork will probably always look poor at any resolution, while good artwork will look good at any resolution.

- Twice as many dots and twice as many lines at 600 DPI produces a much deeper burn into materials like wood than you would see engraving the same image at 300 DPI. This is important to understand because depth of burn is closely associated with engraving resolution – the higher the resolution, the greater the depth of burn for a given speed. The relationship between resolution, depth of engraving and Speed and Power setting is something that most people figure out with just a little experience. **"Appendix B: Material Settings" on page 127** helps to make this easy to understand by providing different Speed and Power settings and suggested engraving resolutions for each different material listed.

The photos below show a clipart image engraved at 300 DPI (top) and at 600 DPI (bottom). This clipart image is full of different shades of gray and you can see that the dot spacing is spread out more on the 300 DPI than it is on the 600 DPI. Just changing the resolution to 600 DPI produces so much dot overlap that the fill patterns tend to blend together. It's a matter of personal preference as to which resolution looks better, but these photos show the dramatic difference resolution can make, especially when engraving with grayscale images.

300 DPI
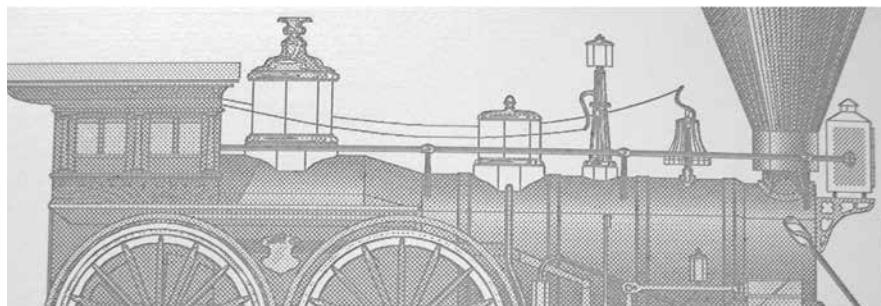
600 DPI
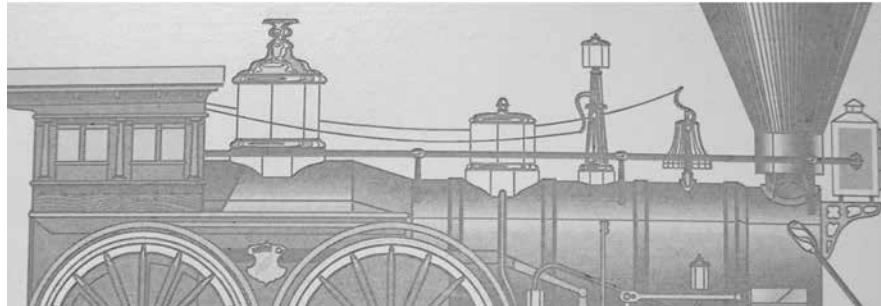
Landscape or Portrait

You can engrave using either landscape or portrait modes. Depending on the artwork, you can increase your efficiency and decrease the time it takes to engrave an image by changing the orientation of your file. Many users set up their artwork in portrait mode and then rotate the artwork 90 degrees if they are going to print from landscape mode.

This project setup shows the same job in portrait mode (left) and landscape mode (right). The landscape mode will engrave quicker because there is less turnaround time as the laser makes longer passes across the engraving table. For example, at 100% speed and 100% power in portrait mode this graphic will take 56 minutes, 56 seconds, while in landscape mode it takes 38 minutes, 54 seconds, a 34% time savings.

Engraving Time: 56:56   Engraving Time: 38:54
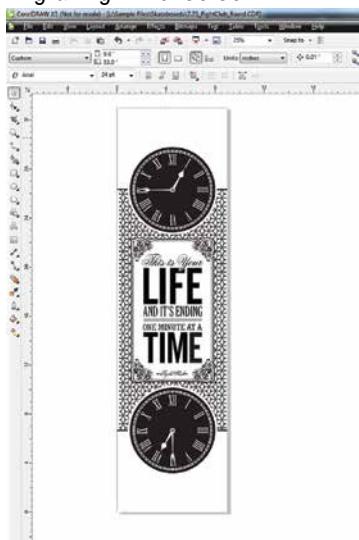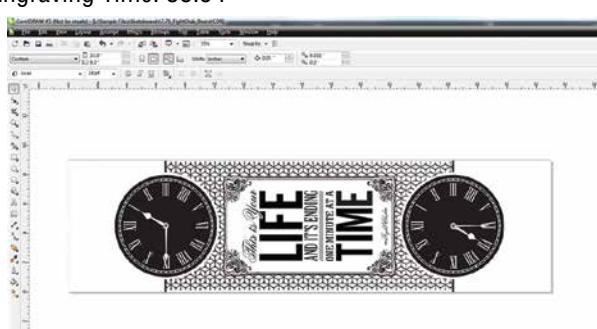
The drawings below show a job that works in the opposite way - the horizontal mode will take longer than the portrait mode. You'll notice in the portrait mode there are a number of white space lines that the laser can skip through, saving engraving time. In the landscape mode there is not white space for the laser to recognize as it moves down the page, taking the engraving time from 10:12 to 17:14. Experiment with the artwork that you use. It will quickly become second nature which mode works best for different types of artwork.

Engraving Time: 10:12   Engraving Time: 17:14
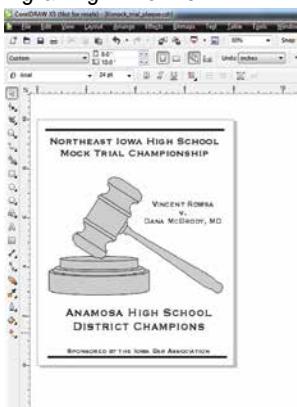
Piece and Page Size

Many users like to create their artwork on a page size that matches the size of the piece that is to be lasered. Compensating for beveled edges or placing an image in an exact location is easy when there is a one-for-one relationship between the material and the page size of the artwork. If this method works for you, remember that you must also set the Piece Size dimensions in the Laser Dashboard to match the page size you have set in your graphics software.

On the other hand, many users do not want to change the Piece Size dimensions in the Dashboard every time they print something new. They prefer to use a page size that matches the table size and place their artwork into the upper left corner of the page. Both methods are effective and it is a matter of personal preference which method is used.

Place the material to be engraved on the engraving table in the upper left hand corner, pressing the material firmly against the metal rulers along the top and left edges.

Most material does not need to be held or clamped in place. Simply setting it on the table and letting gravity hold it in place is enough. If you are using a material that is likely to move during operation or is very thin, you can hold it in place using the Epilog Integrated Vacuum Table. Simply place it on the table flush against the upper left hand rulers, then cover any remaining holes in the metal table with scrap material or a jig. This will create a semi-suction and hold the piece of material in place. The material can also be held with a variety of materials such as masking tape, clay, magnets, etc. Creating jigs is also an excellent method of holding materials that are high volume, or high value.

SECTION 8: CLEANING & MAINTENANCE

Cleaning on a Regular Basis

The single most important thing you can do to keep your laser working as if it were new is to keep it clean. Five minutes once a day will keep the residue and debris from building up and causing problems. There is almost no maintenance required for you laser if you keep it clean!

Cleaning the Optics

About once a week, or if you notice dust building up, you will need to clean the optics (mirrors and lenses) of your laser. If smoke, resin, or other contaminants are allowed to accumulate they will reduce the available laser power and may cause damage to the optics.

The two optical components most likely to require cleaning are the focus lens and the mirror directly above it. The lens and mirror are a single assembly and can be removed from the machine for cleaning, but it is generally not necessary. If you need to remove the assembly for a more complete cleaning, remove the two 3/32" hex screws that hold the lens to the carriage.

Mirror

Focus Lens
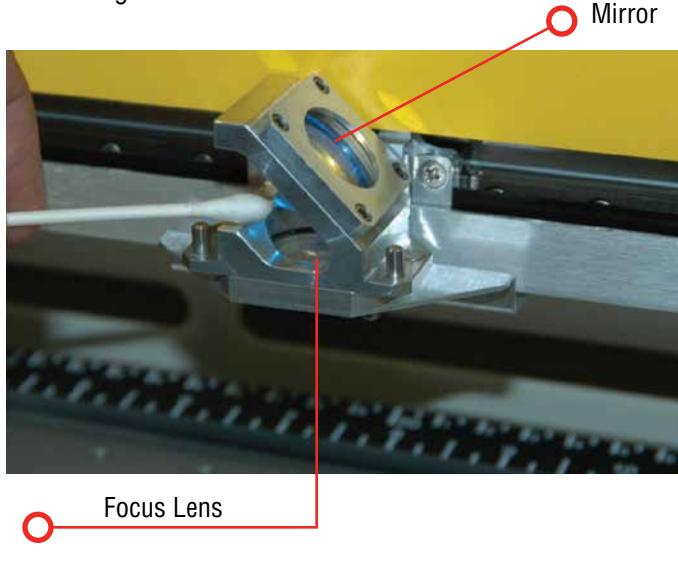
To clean the optics, use a high-quality cotton swab moistened with the optics cleaner supplied in the accessory kit. Please read the label on the bottle carefully.

If you run out of the cleaner supplied by Epilog, Reagent or laboratory grade Acetone can be substituted. Another option is a 10 to 1 water to white vinegar mixture. This is very good at removing finger prints and other minerals which can be left behind on the optics. Also, if "Golden Grain" or "Everclear" are available in your area these are also good substitutes for the optical cleaning solution.

Never use Alcohol or Hardware grade Acetone, they contain impurities which can damage the optics in your machine.

Wet the swab thoroughly with the solvent, and then blot it against a piece of cotton so that it is no longer soaking-wet. Then daub the optic gently, rotating the swab after each daub to expose clean cotton to the surface until the optic is free of visible contamination. At that point, prepare a fresh swab and clean the surface with a gentle zigzag motion across it. Avoid any hard "scrubbing" of the surface, especially while there are visible particles on it, and try not to use repetitive circular motions. When you are done, be careful to remove any cotton threads that may have snagged on the mountings. Allow the optics to dry before you operate your engraver.

In addition to the focus lens and the mirror directly above it, there is a mirror located on the left side of the laser system that is mounted to the X-beam.

This mirror is very well protected and should not need regular cleaning. It can be accessed with a cotton swab if it does need cleaning.

Secondary Mirror

Exhaust Cleaning

Cleaning the Vents

Make sure the exhaust blower you are using receives proper maintenance. Periodically clean the exhaust blower and duct system to remove built-up debris. If you detect odor while engraving, or if the smoke in the cabinet is visible in the area off the lens carriage, inspect the exhaust system. Check for loose or broken hose connections or obstructions.

Clean the vents from the inside of the machine. It is best to use a flexible plastic or wire brush that can access the inside of the vent.
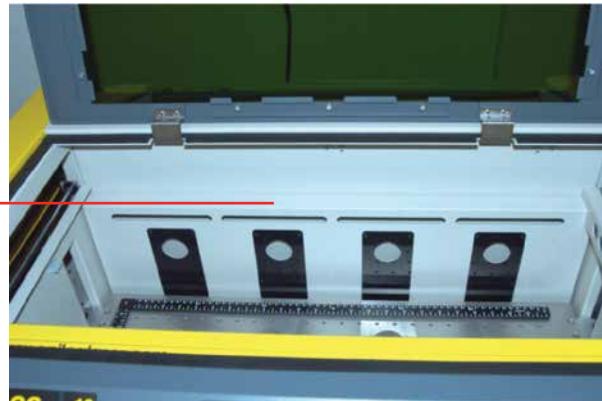
Periodically clean the exhaust plenum at the back of the laser. To access the plenum, remove the two small screws to the left and right of the exhaust port.

Lubricate the X-axis Bearing Rail

After cleaning the rail, place about an inch long bead of Epilog supplied grease into the top and bottom grooves of the X-axis rail. The following photo shows where to grease the bottom groove of the rail.

After applying the grease to both grooves, run the X-carriage over the grease to work it into the bearing block and rail. Turn the machine off to easily move the X-carriage back and forth over the grease.
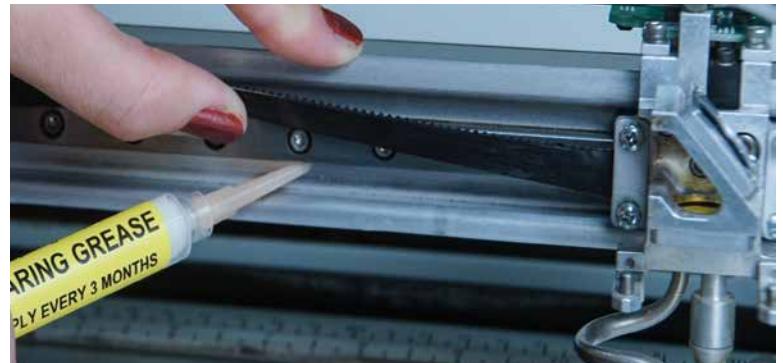
Cleaning and Lubricating the Bearing Rails

Clean the Right Side Y-Axis Rail

Clean the length of the right side Y-axis rail using a soft cotton cloth. Lubrication is not required.

Clean the right side Y-axis rail with a soft cloth.
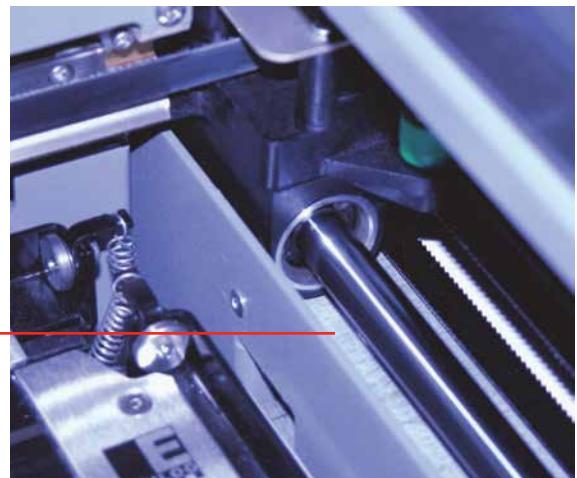
Clean the Left Side Y-Axis Rail

Clean the length of the left side Y-axis rail using a soft cotton cloth. Lubrication is not required.

After cleaning the rails and bearings, clean off the table and the rest of the inside of the machine. Spending just a few minutes a week will pay off in the long run with better quality and performance.

The left side Y-axis rail should also be wiped with a soft cloth.
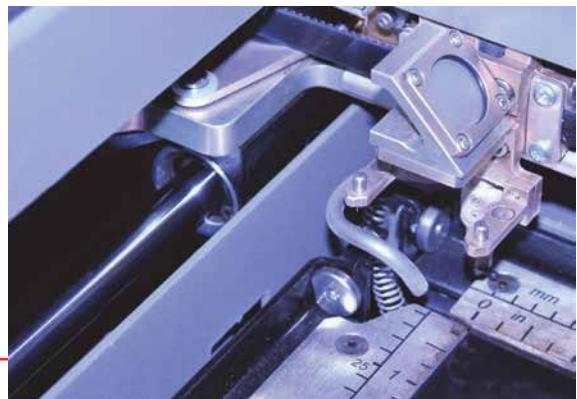
After cleaning the rails and bearings, clean off the table and the rest of the inside of the machine. Spending just a few minutes a week will pay off in the long run with better quality and performance.

Cleaning the Optical Strip and Encoder

If you engrave a lot of material that generates dust and debris, this can build up over time and prevent the optical encoder from working properly. Occasionally you may need to clean the optical encoder strip and the reader assembly. These are located under the protective cover of the X-axis assembly. The optical encoder provides precise positioning for the X-carriage. If the encoder reader or encoder strip gets dirty, the X-axis can lose position. If the X-axis carriage loses position,

Optical Strip

it is just a matter of removing the X-beam's protective cover and wiping off the optical encoder strip using a soft cotton cloth or cotton swab soaked in water or a mild dish washing soap.
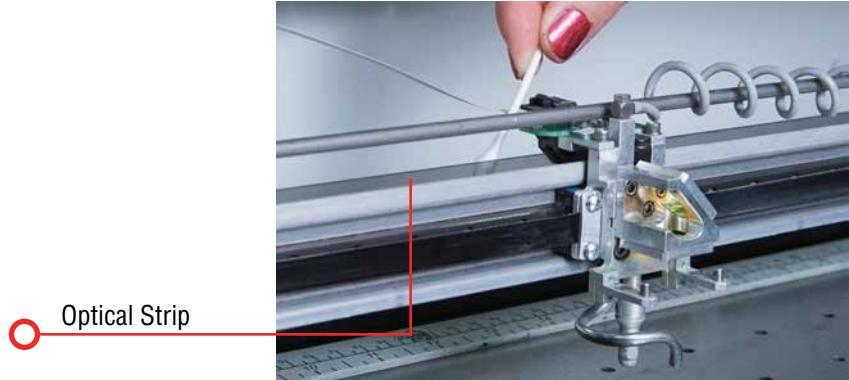
To remove the X-beam cover, turn off the laser and loosen the two screws in front of the cover and five in the rear of the cover. You do not need to remove the screws - they just need to be loosened to remove the cover. Lift the cover from the beam to expose the optical encoder and the optical strip.

Viewing Window

Special care should be taken when cleaning the top viewing window in the lid of the FiberMark. Use only a soft cloth and a mild glass cleaner to wipe off the window. Do not use paper towels or other coarse materials to clean the window. The window is susceptible to scratching if not properly cleaned. Damage to the window from cleaning is not covered under the warranty.

Laser Source

The laser source used in your system does have a maximum service life, and there is very little maintenance that is required. At some point in the life of the laser you will need to replace it for electrical repair or mechanical repair. Replacing the laser source is common practice and Epilog has made the process of changing tubes extremely easy for users to perform with a minimum amount of effort. The laser source can be refurbished and are available on an exchange basis by contacting Epilog technical support.

SECTION 9: SYSTEM FEATURES

Air Assist

The integrated Air-Curtain Air Assist consists of a perforated tube that is mounted to the X-beam. A continuous stream of air is pumped into the tube and exits through the perforations. The perforations direct the air toward the work surface at an angle that pushes the air down and toward the front of the machine. The Air Assist is designed to move engraving debris or combustible gases generated from engraving away from the mechanical components of the machine. You should always use the Air Assist any time the laser is in operation.

You can use clean, dry shop air or the Air Curtain Pump included with your FiberMark laser system. There is .25" (6 mm) air receptacle at the back of the machine on the side where the light switch is located.
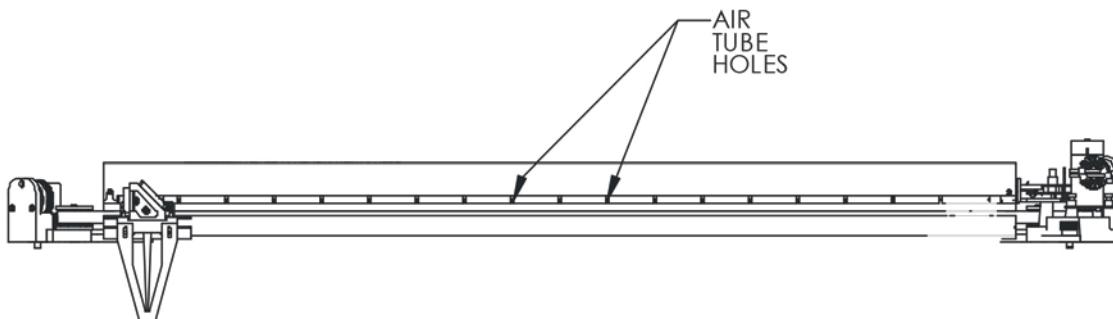
Air Assist Compressor

The Air Assist Pump attaches to the back of the FiberMark using a .25" (6 mm) flexible hose. This is a standard accessory for the FiberMark .

Manual Focus

In order to engrave or vector mark a crisp, clean image, your material must be the correct distance from the bottom of the focus lens. Setting the distance from the bottom of the focus lens to the top of your material is the process of focusing, and is accomplished by placing your material on the table and moving the table up or down.

The photo shows the "V" shaped manual focus gauge that is used to determine the correct distance from the focus lens to the top of your material. This gauge is included in the Accessories Kit that comes th your system. Place the manual focus gauge on the carriage and place the object to be vector marked or engraved

in the upper left corner of the machine. Press **Focus** on the keypad, then use the Up and Down Arrows to move the table to the correct height. Once the focus position has been established, remove the gauge. Press the **Reset** key.

If your material has a taper or curve, pick an intermediate point between the highest and lowest points being engraved and focus on that point. In general, the area of the material being engraved needs to be relatively flat. If the area being engraved differs in height by more than about an .125" (3 mm), the image will begin to look "fuzzy" or out of focus.

When you press the Focus key, the laser carriage will move out and away from the edge of the table. To prevent the carriage from moving out before focusing, press the **Pause** key first before pressing the Focus key. The laser carriage will remain in the parked position, allowing you to use the Up and Down Arrows to move the table to the correct focus height.

Manually Focus Anywhere on the Table: If you wish to focus at a point on the table other than in the upper left corner, you can do so by disabling the axes and moving the carriage by hand to the location where you would like to focus. Press the **X/Y Off** key, then the **Go** key. This disables the X- and Y-axes and you can now move the carriage by hand to any point on the table. Press the Up or Down cursor keys on the keyboard to move the table to the proper focus height. After you have focused, press the **Reset** key to send the carriage back to its park position. This process also works with the Rotary Attachment.

Image Dithering

Dithering defines how the dot patterns will be engraved in raster images that contain grayscale graphics, blends, or color images. The Dashboard offers six different dithering patterns to enhance your engraving projects. The default mode is Standard. This mode can be used for all images including photographs. Dithering is used only for raster engraving and has no effect on vector marked lines.

What is Dithering?

The best way to show dithering is to look at the exact same photo engraved in Standard mode and Stucki mode. Both photos were engraved at 300 DPI. With the two different dithering patterns you achieve a very different result, with a more structured pattern for the Standard mode, while the Stucki mode results in a more random pattern that looks more natural and pleasing to the eye.

300 DPI Standard Mode   300 DPI Stucki Mode

Dithering is a great way to enhance your engraved products, but it is very material dependent. A dithering pattern that looks good on marble might look very different when engraved on plastic. Give yourself some time to experiment with the different dithering patterns. It's easy to do and once you have a feel for it, you will be able to use it with confidence.

The drop-down list of dithering patterns is easier to think about if you separate the six options into two categories that we will refer to as Clipart and Photograph:

Clipart Modes

- **Standard:** This mode is the default mode and will be used for most engraving jobs that include text and clipart at 600 DPI.

- **Brighten**: This lightens the clipart and decreases the number of dots in the engraving pattern.

- **Low Res:** Adds an artistic half-tone type look to the engraving which sometimes helps when engraving low-resolution photos.

Photograph Modes:

- **Floyd-Steinberg:** Produces an almost wave-like pattern to an image. This works well for some photos containing a great deal of detail. Photos with more monotone swatches of color may not be as pleasing as Jarvis or Stucki modes.

- **Jarvis:** Many users find this mode good for engraving photographs at 300 DPI. This mode produces a very nice looking pattern on almost all photos.

- **Stucki:** This mode produces results that are only marginally different than the Jarvis dithering pattern. It is also very good for engraving photographs at 300 DPI. The differences between Jarvis and Stucki are very subtle.

Experiment with the different dithering patterns to determine which effect is most pleasing. It is not mandatory that you use the clipart modes with only clipart images or photograph modes with all photographs. Many users prefer one of the photograph modes for many clipart images, and one of the clipart modes for photographs. The choice is entirely up to you and will take some experimentation.

Color Mapping

The Color Mapping feature is an advanced feature that allows you to set different raster and vector settings to different colors within your artwork, and can be used in both raster and vector modes. The functions that can be controlled by color are: Speed, Power, Frequency and Focus. While Color Mapping is a very powerful tool, most users use it for three main reasons:

1. Using different colors to engrave at different speeds and powers within one document.

2. Using different colors to allow users the ability to sequence the order that objects will be marked.

3. Using color to define different levels of focus. Many objects need to be marked at different locations that are at different relative heights. Color Mapping can be used to change the focus in a single job setup.

Using Color Mapping

① Enable Color Mapping

When this check box is selected, the laser will use the settings assigned to each color. For any colors that are in your artwork, but not in the color mapping settings, the General settings will be used.

② Adjust Settings

Use the slider bars to set any RGB color and create the laser parameters. Adjusting the settings does not actually change the values until you have finalized the settings by selecting the **Right Arrow** button.

③ Color Map Summary

The Color Map Summary area is located on the right side of the window and offers a visual display of all of the color mapped settings.

1. To use Color Mapping, start by enabling the Color Mapping section by **clicking the check box** in the upper left corner of the screen.

2. **Select a color** in the Summary area. We selected the color Red.

3. **Adjust the laser settings** in the Settings area.

4. Once the laser values have been adjusted, press the **Modify button** in the Settings area. The available buttons are:

Add a Color	Modify a Color	Delete a Color	Move Color Up in List	Move Color Down in List

5. You'll see that in the Summary area, the new settings assigned to the color red are now displayed.

Color Mapping Functions

Speed: Applies a speed setting for all objects of the same color.

Power: Applies a power setting for all objects of the same color.

Freq: Applies a frequency setting for all objects of the same color.

Focus: Each increment of one will change the table height by .001" (.0254 mm). A minus sign in front of the number (-260 for example) will move the table up closer to the X-beam by 0.260" (6 mm).

Using Color Mapping for Multiple Settings

The most typical way that Color Mapping is used for the FiberMark is when users want to produce a different metal etched look on two separate areas of a single piece of material using different speed, power and frequency settings. In this example we are etching a luggage tag with three different types of marks - annealed, polished and etched, and vector marked with an annealed mark as well.

We've set the four RGB colors in the file to match the four RGB colors setup in the Laser Dashboard's Color Mapping tab. The red is set to etch into the metal, the green to create a white, polished mark, the blue to anneal the metal, and finally the yellow to vector mark an annealed mark. You **MUST** use an RGB color scheme in your artwork with the Color Mapping feature. **CMYK values will not translate.**
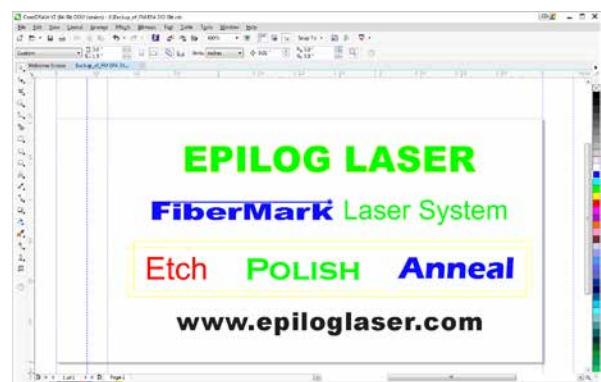
It's best to use one of the six basic colors (red, green, blue, cyan, yellow, magenta) when color mapping, because the values in Color Mapping **must match exactly** the colors that are used in your graphics package. The RGB color scheme uses numbers to define all colors and the six basic colors have the following numerical definitions:

Color	Red Color Value	Green Color Value	Blue Color Value
Red	255	0	0
Green	0	255	0
Blue	0	0	255
Cyan	0	255	255
Yellow	255	255	0
Magenta	255	0	255

A CMYK palette will not work! The six basic colors are easiest to use because they only use combinations of 255 and 0 (255 is the highest number value and 0 is the lowest in the RGB color scheme). Because all graphics packages use the six basic colors, this is easy to do. The Laser Dashboard loads the six primary colors as presets for your convenience. Any color can be added or deleted to meet your needs. Once your vector outlines are set up in your artwork, Select **File/Print** and go to the **Color Mapping Tab** in the Laser Dashboard.

6. Make sure **Color Mapping is checked** so we can set up our color mapping settings.

7. In our example we want to laser etch first, so red must be the first color at the top of the list. If it is not at the top of the list, use the Up and Down Arrows to move it into position.

8. With the red color selected in the summary, we adjust the settings to 30% speed, 100% power, and 1 frequency to etch the metal. When you have your settings as you'd like them, click the **Modify** button.

9. Repeat by selecting the Green color in the summary area, then adjusting the settings, then clicking the **Modify** button, and continue through the four colors.

10. When you have the file ready, click OK and print it to the laser.

Using Color Mapping to Adjust Object Order

Another popular use for color mapping is to adjust the order a series of objects engraved or vector marked. In this example there are three columns of names we are engraving. If we engrave the left file in the image below, the laser carriage will have to travel all the way across the table, covering a lot of empty space, to engrave the image.

If we adjust the colors in each bar, we can setup the color mapping to engrave first the red bar, then the green bars in the center, and finally engrave the blue bar on the right side of the page. The engraving time drops from 39:09 to just 22:14 by using Color Mapping in the file setup.

Engraving Time: 39:09   Engraving Time: 22:14
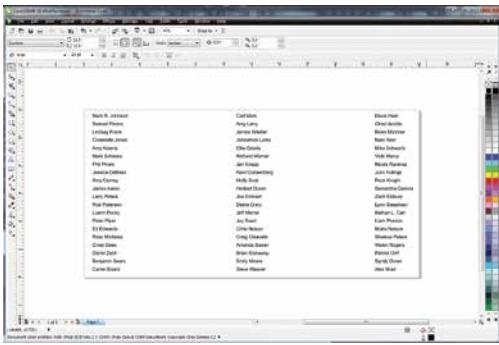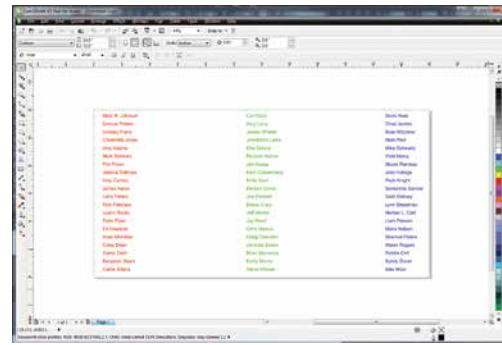
Using Color Mapping to Adjust Focus

To engrave at multiple focal points on an object with several levels, the Color Mapping feature is very useful. In the following example we want to mark on both Surface 1 and Surface 2 on the following part where Surface 1 is 0.250" (3 mm) higher than Surface 2.

We will set up our artwork so that we engrave the Model Number on Surface 1 and the Serial Number on Surface 2. For this job, the only change we will make is to the Focus distance. Everything else will be the same. A glance at the Summary section shows the Focus for the color red at 0 and the Focus for blue at -250. When you run the job, the red will engrave on Surface 1 first and then the table will move up and engrave the blue text.

Surface 1

Surface 2

We've setup the graphic with the model number in red and the serial number in blue. In the Color Mapping tab you can see that we've set the blue to engrave at a focus point of -250. Since every increase of 10 moves the table further from the laser by 0.001" (0.0254 mm), we are telling the table to raise .025" (0.635 mm).
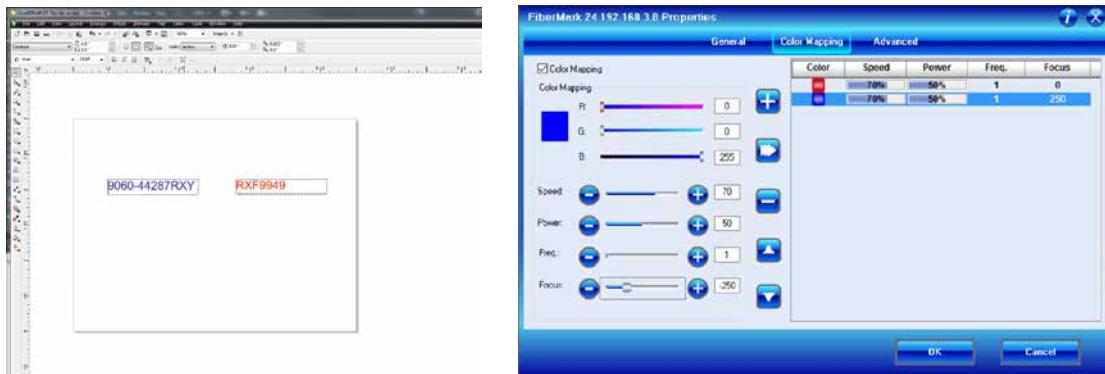
Additional Color Mapping Notes

• When color mapping is used, it always starts from the top color in the Map List and then descends through the remaining colors.

• There's one important distinction to recognize about how colors are raster engraved in standard engraving mode vs. Color Mapping mode. In standard engraving mode different colors are interpreted as different shades of gray that will produce different fill patterns when engraved. In Raster Color Mapping mode all of the different colors are engraved as if they have a black fill. There is no way for a color to produce both a fill pattern and be color mapped at the same time.

Non-Mapped Colors

Non-mapped colors will be processed last and will be processed using the Speed and Power settings from the General Tab. An example would be artwork that has black lines as well as the red and green we are mapping. The black lines will be processed last at the speeds and powers that are set in the General Tab.

Color Mapping in Combined Mode

Color Mapping in combined mode requires a little more planning than Raster-only or Vector-only modes.

1. Any object that is color mapped will be raster engraved first in the order the colors appear in the Summary section of the tab. Any other raster objects that are not color mapped will then be raster engraved using the raster settings found in the General Tab.

2. After all of the raster objects have all been engraved, the vector objects will be vectored in the order they appear in the Summary section of the tab. Any other vector objects that are not color mapped will then be vectored using the vector settings found in the General Tab.

For most jobs, Color Mapping is a powerful and easy tool to use and understand. Please keep in mind that because you can control seven different variables and 17 different colors doesn't mean that you should. With so many different settings available in a single setup it has the potential to get overly complicated. Sometimes it's easier to scale back on how many colors a job should use.

Reset Home Position

To reset your Home Position, press the **Set Home key** and **Reset key** at the same time. Press the **Go** key and the carriage will move back and to the left to its normal upper left corner park position.

Red Dot Pointer

The Red Dot Pointer is a visible laser beam that runs in the same line as the invisible fiber laser beam. The Red Dot Pointer serves several purposes on the laser, and will become one of your favorite features of your laser system. It is activated by pressing the **Pointer** button on the display panel. While the device employs the same technology as the familiar laser pen-pointers, like them it is potentially hazardous if its beam is directed into the eye. When the Red Dot Pointer is tuned on, do not place your head inside the engraving area as you may look into the beam.

Set a New Home Position

Use the Red Dot Pointer to set a new Home Position by pressing the **X/Y Off button**, then **Go**. Move the laser to the new Home Position by hand and set a new Home Position by pressing the **Go** button.

Position Your Artwork

This is a popular use for the Red Dot Pointer and is one of the easiest ways to make sure each project you run is going to engrave or vector mark in the correct position. **Learn this easy task and use it!**

1. For a visual representation of the engraving area on a project, create a box around your engraving area with a stroke width of .001" (.025 mm).

2. On the General Tab, set a vector setting of 0% power. **With the door of the laser raised so the laser won't fire**, run the job. The Red Dot Pointer will outline the area where the job will run, so you can make sure that you have the correct positioning before running any job. (Setting the power to 0% will also protect you in case you forget to leave the door open).

3. Now you can reposition the artwork, or the piece you area engraving, so you have a perfectly placed engraving project.

Movable Home Position

When engraving irregularly-shaped objects, Epilog's Movable Home Position feature will quickly become one of your favorites. You can simply set a new Home Position display panel on the FiberMark system.

Setting a new Home Position has never been quicker or easier. Let's say you're engraving on a custom key chain that won't quite fit in the upper left corner of the work area. By moving the key chain out into the center of the table and setting a new Home Position at the upper left corner of the key chain, you can rest assured that your engraving will be placed accurately on your engraving piece every time in a few easy steps.

1. Start by turning on the Red Dot Pointer at the Control Panel by pressing the **Pointer** button.

2. Press the **X/Y Off button**, then the **Go button**.

3. You can now move the laser carriage by hand. Using the Red Dot Pointer as a visual reference point, move the carriage until you have positioned the pointer above your new Home Position.

4. Press the **Set Home** button.

5. Your new Home Position has been set. Once you are finished with your temporary Home Position and want to restore the carriage to the upper left corner of the machine, press the **Set Home key** and **Reset key** at the same time. Press the **Go** key and the carriage will move back and to the left to its normal upper left corner park position.
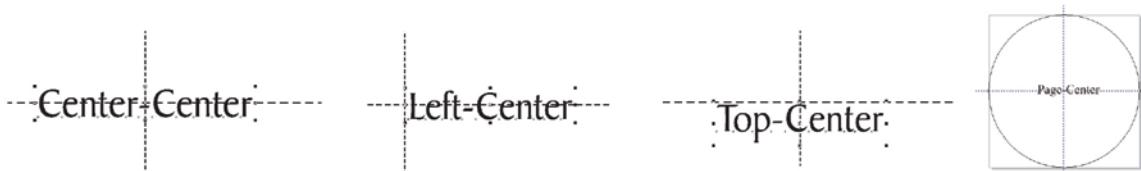
Center Engraving

The Center Engraving feature allows you to define the center of your artwork as the primary reference point (Home Position) of your engraving. The Center Engraving feature has been designed to be used in conjunction with the Set Home feature of the laser. Center engraving differs from standard printing where the upper left corner of the page and the upper left corner of the laser table define your primary reference point. To see where to set Center Engraving in the driver, **see "Center Engraving" on page 48**.

- You can identify a Center Engraving job at the laser when you see an asterisk at the end of the job name.

- If you get a Position Error reading on the display screen, your artwork is going to go outside of your available work space.

- There are four choices for Center Engraving: Center-Center, Left-Center, Top-Center and Page-Center.

Center-Center

When using Center-Center, the overall size of your work piece and the upper-left corner reference point are not important. With Center-Center engraving the important starting points are the size of your artwork and the available space for it on your work piece. With Center-Center you're interested in positioning the center of your artwork to a specific point on your work piece, no matter where your work piece is on the laser table. When using Center-Center you can place your artwork on almost any size of page and almost anywhere on that page.

The detailed examples on the next few pages show how easy it is to think differently about Center-Center jobs.

Example: A customer brings you a small electronic item to engrave, such as an iPhone. To quickly engrave the item without extensive measuring, follow these quick steps:

1. Measure the area you have available for engraving. For the iPhone we have about 2" x 1.5" (51 x 38 mm) of engraving area.

2. In your graphic software, create a new page. Page size is not important, so set the page size to larger than the area you want to engrave. We have created a page 4" x 4" (101 x 101 mm). Place your image anywhere on the page and size it to fit in the 2" x 1.5" (51 x 38 mm) engraving area.

3. To ensure the graphic is correctly positioned, draw a vector box around your artwork with a vector line stroke width (.001" or .025 mm). **Print** the box to the laser.

4. Click the check box next to **Center Engraving** in the General Tab of the driver.

5. In the drop-down box, select **Center-Center**.

6. Set the page size to match the page size in the Laser Dashboard (4" x 4" or 101 x 101 mm).

7. Select **Vector** as your job type.

8. Set a **Vector Power Setting of 0%** and print the job to the laser.

9. **Run the job with the laser door open** (so the laser won't fire). If the engraving area is lined up, delete the outline you created and print the engraving job to the laser.

10. Once you are finished with your temporary Home Position and want to restore the carriage to the upper left corner of the machine, press the **Set Home key** and **Reset key** at the same time. Press the **Go** key and the carriage will move back and to the left to its normal upper left corner park position.

While Center-Center is the most common use for the Center Engraving features you can also use **Center-Left** and set a Home Position that is the left portion of your engraving area. **Center-Top** is at the middle, top area of the area you want to engrave. Depending on the object you are engraving, this may be easier to find than the center point of the engraving area.

| Center-Center | Center-Left | Center-Top |
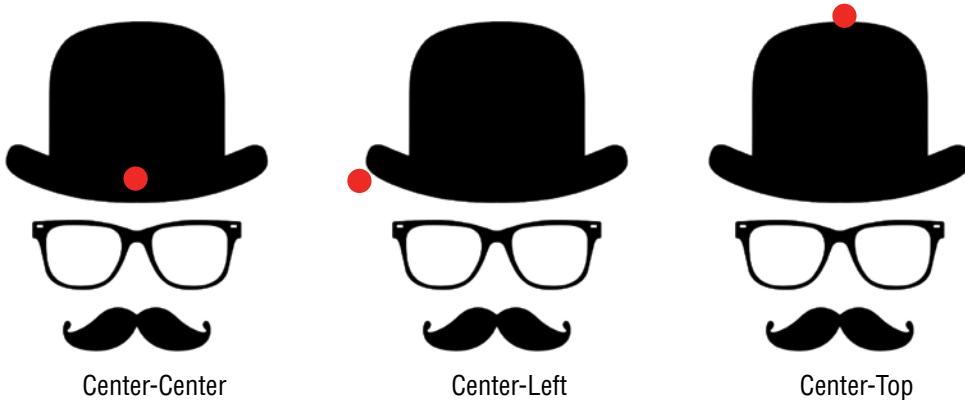
The red circle signifies the Home Position for each Center Engraving choice.

Page-Center

When you are engraving an unbalanced image (not equal left to right or top to bottom), you will want to use the Page-Center feature. For this example, if we engrave the image with Center-Center settings, the graphic will not look centered on the object because the actual center point is to the right of the point we want to center in the logo. To get around this, we'll use Page-Center.
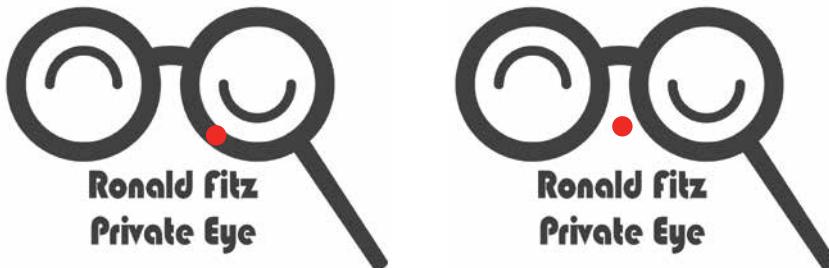
Actual center point.   Center point we want to use.

1. **Set the page size** to the area you want to engrave. Unlike when we used Center-Center, **page size is important when using Page-Center**.

2. **Center** your graphic on the page with the center point you want to use (the image on the right).

3. In the Laser Dashboard, check the box next to **Center Engraving** in the General Tab, then select **Page-Center** from the drop-down box. **Set the piece size to the size of the page you created**.

4. Set the Home Position as the center of the object you are engraving using the steps in the previous example.

5. Run the job and you'll have a perfectly centered image.

Integrated Vacuum Hold-Down Table

The unique design of your FiberMark system incorporates several valuable features into the engraving table. The exhaust system is designed so that it evacuates from both the top and the bottom of the table, so as the exhaust pulls air through the small holes in the table, it forms enough of a vacuum that it will flatten slightly warped sheet stock.

As long as the exhaust is operating and the table is no more than 1" (25.4 mm) below its highest point, the vacuum table will work.

If you have a piece of sheet stock that does not flatten out because it is not covering enough of the vacuum holes, you can use any material (including paper) to cover some of the exposed holes. Simply blocking most of the vacuum holes will be enough to flatten most sheet stock as long as it is not too severely warped, bent or too rigid. Magnets can be used to hold oddly shaped items in place if needed.

Top-Access Door

The green viewing window in the top-access door is an acrylic sheet that is specifically designed to block infrared light between 830 nm and 1700 nm (the FiberMark laser produces a wavelength of 1062 nm).

Fold-Down Front Loading Door

The FiberMark system has an interlocked front door that folds down and allows access to the front of the system. This fold-down door makes inserting and removing parts and pallets quick and easy and is much easier than loading pallets through the top window.

- **Do not** attempt to defeat the door interlocks.

- **Do not** operate the machine with the door open.

Internal LED Lighting

The inside of the cabinet is equipped with a viewing light that enhances your ability to see inside the machine when the top access window is closed. The switch for the lights is located on the top of the machine at the back right corner.

SECTION 10: OPTIONAL FEATURES

Rim-Drive Rotary Attachment

The optional Rim-Drive Rotary Attachment allows you to mark and engrave on cylindrical objects.

Rotary Attachment Installation

1. Lower the engraving table to its lowest point.

2. **Turn off the power to the laser**.

⚠️ **Remember to turn off the power to the engraver.** It's important that the laser system is turned off before installing (or removing) the Rotary Attachment!

3. Insert the Rotary Attachment into the offset locating holes. There are three pins in the bottom of the Rotary Attachment that mate to three holes in the table. It is important to place the Rotary in the offset locating holes so the Home Position is properly maintained. Two of the holes are shown in the photo.

4. **With the machine off**, insert the connector from the Rotary Attachment to the mating connector on the inside of the cabinet.

5. **Turn the power on**. The FiberMark will recognize that the Rotary Attachment is installed and changes its Home Position to a point directly above the center point of the drive wheels on the attachment.

Placing Your Item in the Rotary Attachment

The wheels on the left are the drive wheels which spin the cylinder. The wheels on the right are for support. The right-side wheels are mounted on a scissor jack so they can be raised or lowered to level the top surface of your cylinder with the X-beam. The scissor jack can be moved left and right to accommodate cylinders of different lengths.

In most cases you will want to load your cylinder with the larger diameter on the left (drive wheel side). The scissor jack is used to elevate the right side of your cylinder so that the top surface is horizontal. Load your cylinder onto the Rotary Attachment so that it is just touching the black bumper. Using the clamp to hold the cylinder in place is optional. Some oddly shaped parts rotate better if they are clamped to the drive wheels, but most mugs and other cylindrical objects do not require clamping.

Set your item so that it is close to this bumper but not touching the rubber.

Use the scissor jack to raise the right side of the cylinder so that the engraving surface is horizontal. The photo below shows the same flashlight at a severe angle to horizontal. If your cylinder is not horizontal to the X-beam, the laser will lose focus as the carriage head moves across the flashlight. This causes the engraving quality on the right hand side to suffer dramatically.

To ensure the area you want to engrave is flat, try placing a small level on the cylinder to double check the levelness of the area you are going to be engraving.

Incorrect Setup: The flashlight is not horizontal. Raise the right side of the flashlight by turning the jack screw.

**Correct Setup:** The flashlight is horizontal to the X-beam

Setting Focus with the Rotary Attachment

To manually focus your item, place your cylinder on the Rotary Attachment, place the focus gauge on the lens carriage and press the **Focus button**. Use the **Up and Down Arrows** to move the table to the correct focal distance.

If you want to move the focus gauge to a different area of the cylinder, press the **X/Y Off button**, then the **Go button** to move the laser carriage to the point where you want to focus the laser, then press the **Focus button** and use the **Up and Down Arrows** to bring the table to the correct height. Press the **Reset button** to move the laser back to the Home Position.
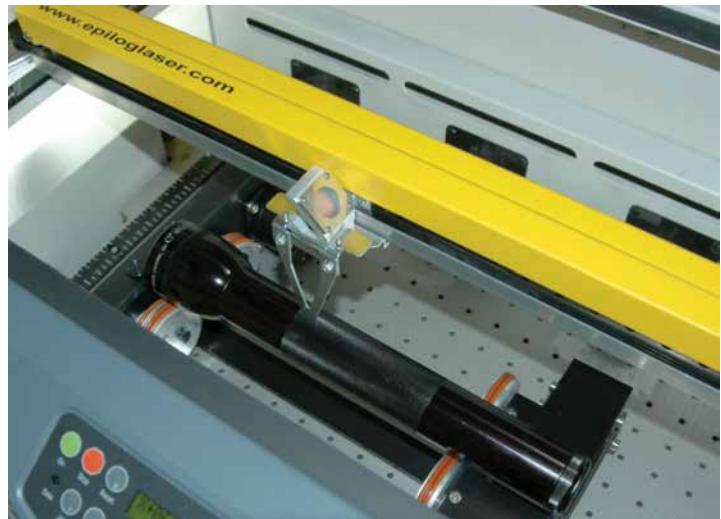
Removing the Drive Wheel

The drive wheels are each two-piece assemblies when fully assembled. Removing the front part of the drive wheel enables users to accommodate a wide variety of mugs with handles. Not all mugs with handles require the front drive wheels to be removed, but for certain types of mugs removing the front wheels adds flexibility to the Rotary Attachment.

Loosen the two thumb screws on each wheel to remove them.
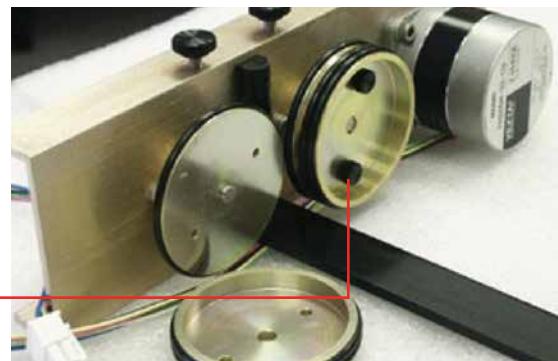
Artwork Layout

Because the Rotary Attachment automatically compensates for the diameter of the cylinder, artwork setup is relatively easy. The most important thing to remember when working with the rotary is that your artwork needs to be rotated 90 degrees to the way it would normally be setup for flat work. There are several visual tools later in this procedure that will help make artwork setup easy.

1. **Set the width of your page (in the X direction) to the length of the cylinder you are engraving.** For this flashlight the width of the page is 11" (279 mm).

2. **Set the height of your page (in the Y direction) to the circumference of the cylinder you are engraving in the area where you will be etching.** Use a flexible tape measurer to find the circumference of the cylinder at its largest diameter. For this flashlight, the height of the page is 6" (152 mm).

3. **Place your artwork close to the top edge of the page**. When the job starts, the first part of the process is for the cylinder to rotate through any white space that is between the top of your page and the top of your artwork. Once it has rotated through the white space it will begin to laser your artwork. It is useful to visualize the orientation of the cylinder when it is being engraved, as is show in the screen shot on the right. We want to have the logo start engraving half way at 4" (100 mm) down the shaft of the flashlight, so we've positioned the logo at 4" in on the page.
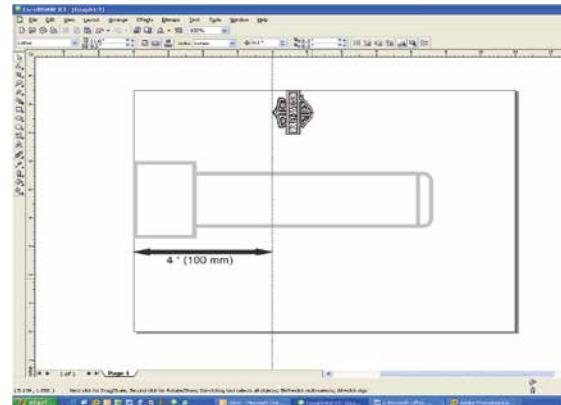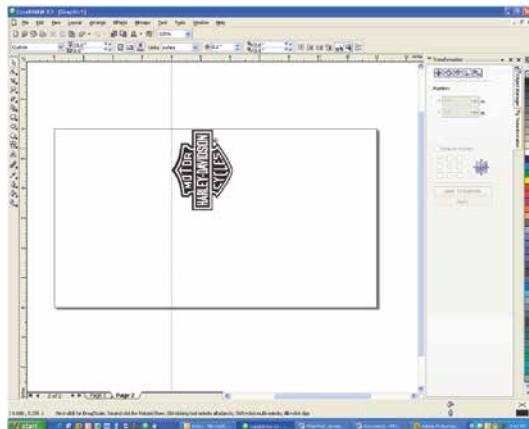
Stretching or Shrinking Your Artwork for Objects with Multiple Circumferences

These instructions show you how to shrink or expand your artwork to accommodate a cylinder where the area being engraved is a different circumference than the circumference at the drive wheels. The Rotary Attachment works with the assumption that the cylinder is the same circumference from end to end and that your artwork doesn't need to be stretched. But some cylinders have a big difference in circumference from the middle to the end that affects how the engraved image looks. It is sometimes necessary to stretch or shrink your artwork so it looks proportional on uniquely-shaped items.

This part has a circumference of 4" (100 mm) at the ends and a circumference of 3.2" (81 mm) in the middle where we want to engrave. Most artwork will look acceptable on this part without stretching or shrinking, but because the middle of the part is a smaller diameter than the ends, some artwork will look compressed (more as an oval than a circle), so we'll want to adjust the artwork before engraving.

To determine how much to adjust your artwork, we'll need to do a simple calculation that tells us the percentage of stretch or shrinkage we need to perform. You can use either the diameter or the circumference to make the calculation; just don't mix the two.

Determining whether you use diameter or circumference is a matter of which one is easier to measure. If you want to measure circumference, use a flexible ruler and wrap it around the part. To calculate circumference, measure the diameter and multiply by Pi (3.1416):

Circumference = Diameter x 3.1416.

For objects with a larger middle section:
Shrink the artwork by dividing the drive wheel side diameter by the middle diameter and multiply by 100 to calculate the percentage of adjustment. For our example the calculation is:

$$\frac{3"}{4.2"} = .715 \times 100 = 71.5\%$$

Because our calculation percentage is less than 100, we need to shrink the artwork to 71.5% of its original size. Adjust the size of your artwork in one axis only.

For objects with a smaller middle section:
Expand the artwork by dividing the drive wheel side diameter by the middle diameter and multiply by 100 to calculate the percentage of adjustment. For our example the calculation is:

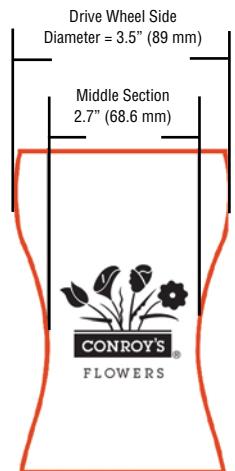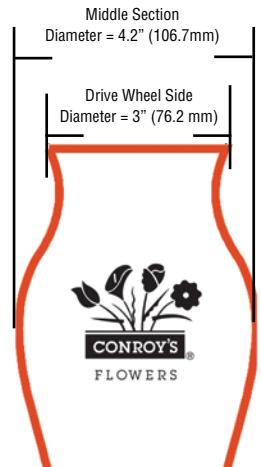$$\frac{3.5"}{2.7"} = 1.296 \times 100 = 129.6\%$$

Because our calculation percentage is greater than 100, we need to expand the artwork to 129.6% of its original size. Adjust the size of your artwork in one axis only.

Middle Section
Diameter = 4.2" (106.7mm)

Drive Wheel Side
Diameter = 3" (76.2 mm)

Drive Wheel Side
Diameter = 3.5" (89 mm)

Middle Section
2.7" (68.6 mm)

Other considerations:
In these two examples you'll notice that the "middle" varies depending on where you measure. Because of this, you'll never be able to get every piece of artwork perfectly sized. Depending on how much room the artwork takes up, you may want to experiment with the expansion or shrinkage of your artwork to fit your particular shape.

Rotary Removal

1. **Turn off the power** before removing the Rotary Attachment.

2. **Unplug and remove** the Rotary Attachment.

3. **Turn on the machine** and the Home Position will return to the Home Position.

3-Jaw Chuck Rotary Attachment

The 3-Jaw Chuck style rotary is an extremely versatile tool for marking and engraving cylindrical objects. It comes with a variety of interchangeable components that make it easy to hold different sized and shaped cylinders. There are two basic setups:

1. 3-Jaw Chuck

2. Fixture plates

This photo shows the 3-Jaw Chuck style Rotary Attachment with the large fixture plates installed.
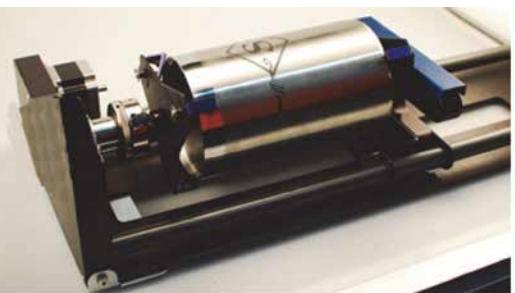
Fixture Plates and Additional Components

The following fixture plates and additional components are included with all 3-Jaw Chuck Rotary Attachments:

1. Small fixture plates (2 each)

2. Large fixture plates (2 each)

3. Idle-side centering fixture (1 each)

4. Plate spindle (1 each)

5. Plate fixture thumb screws (2 each)

6. 3-Jaw tightening pins (2 each)

3-Jaw Chuck Rotary Attachment Installation

1. Lower the engraving table to its lowest point.

2. **Turn off power to the FiberMark.**

Important! It is important that you power down the machine before inserting the rotary connector at the table. The FiberMark laser system will not recognize the Rotary Attachment until the system is rebooted and you could damage the electronics if the rotary is installed while the laser system is powered on.

3. With the FiberMark powered off, place the pins on the bottom of the 3-Jaw Chuck Rotary Attachment in the three offset holes in the table.
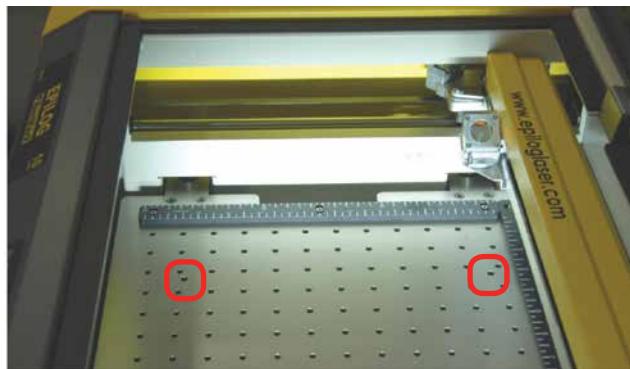
4. Insert the connector into the mating connector on the inside of the cabinet.
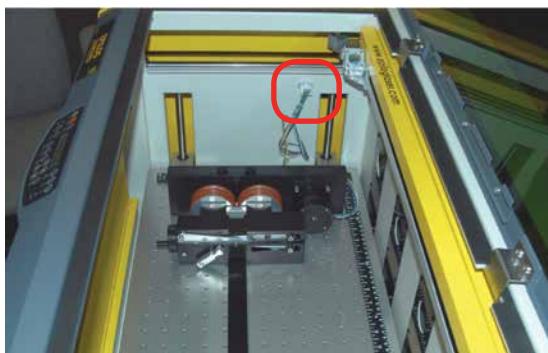
5. Once the Rotary Attachment is plugged in you can power on the system.

6. When the FiberMark powers on with the Rotary Attachment installed, the carriage moves to the Rotary Home Position, which is directly above the 3-Jaw Chuck.

Set the Rotary Numeric Display Units (First Time Use Only)

With the laser system turned on, you will see numbers displayed on the Rotary Attachment's display panel. The numeric display is used to set the diameter of the cylinder you are engraving.

The display can show number is either inches or mm. The only indicator is if there is a decimal point showing on the display. A decimal indicates that the display is showing millimeters. To toggle between inches and millimeters, **press and hold the Lock/Unlock key** for several seconds until you see the display change. Once the display is set to the units you want, the Rotary Attachment will default to those units every time it is powered on.

In the above example there is no decimal, so the measurement is in inches and 1220 is equivalent to 1.220".

3-Jaw Chuck Rotary Attachment Setup

1. **Measure your Cylinder:** The cylinder diameter will be used in the print driver.

2. **Enter the Diameter:** The numeric display on the Rotary Attachment is used to set the diameter of the cylinder you are engraving. Pressing any of the cursor keys will increase or decrease the diameter settings. The single triangles will increment in small units, and the double-triangles in larger units.

3. **Adjust the Rotary for Cylinder Length:** Depress the blue anodized idle-side handle to move the support mechanism left or right to accommodate different length cylinders. There are photos later in this section that show the different configurations available for the Y-Axis idle side support.

4. **Clamp your Cylinder:** insert your cylinder into the 3-Jaw Chuck and tighten the chuck so the cylinder is held firmly in place.

   You will need to use the two tightening pins that are provided with the chuck in order to clamp the cylinder tightly into place.
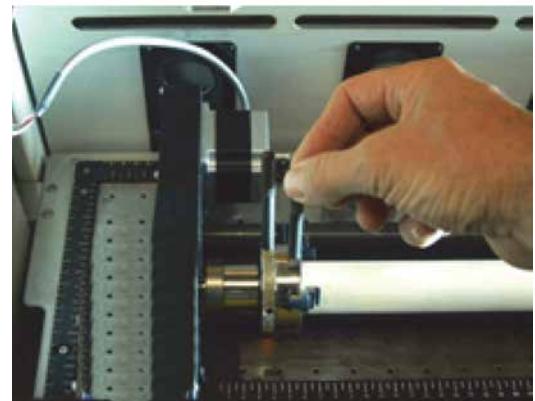
Cylinders can be held from the outside diameter or the inside diameter.

The chuck jaws can be flipped from Standard mode to Wide mode (180 degrees) to accommodate larger radius cylinders.

Notice that there is a stamped number on each side of each jaw and next to each slot. For wide-radius turning, simply remove jaws 1 and 3, flip them, and then insert jaw 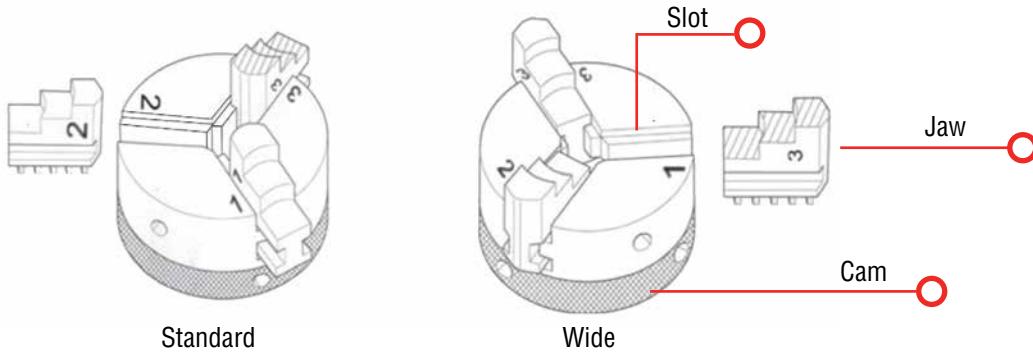1 into slot 3 and jaw 3 into slot 1. Remove jaw 2, flip it and return it to slot 2. The jaws do not need to be inserted all the way just yet. You will need to rotate the cam to capture the jaws in ascending order (1,2,3). Rotate the cam so that it catches jaw 1 first, then jaw 2, then jaw 3.

Standard   Wide

Pay particular attention to aligning the numbers as shown on the diagram when flipping the jaws! Failure to align the correct jaw in the correct slot will result in uneven spacing of the jaws when they are tightened.

3-Jaw Chuck Diameter Capacities

The 3-Jaw Chuck allows four different ways to hold your object based on cylinder diameter and whether you are holding it from the inside or outside diameter.

	Jaws in Standard Mode	Jaws in Wide Mode
Piece Held From Inside Diameter	0.875" to 3" (22.2 to 76.2 mm)	2.125 to 3.125" (54 to 79.4 mm)
Piece Held From Outside Diameter	0.040" to 1.25" (2.54 to 31.7 mm)	1" to 3" (25.4 to 76.2 mm)

Vector Speed Limitations based on Cylinder Diameter

Important! There are speed limitations in Vector mode based on cylinder diameter. Speed should be set between 40 and 80% and your power setting will need to be adjusted according to the speed.

The 3-Jaw Chuck Rotary was designed to rotate cylinders that range in size from 0.040" (12.7 mm) to approximately 3" (76.2 mm) in diameter. However, from a practical point-of-view, it is difficult to produce a legible mark on cylinders that are smaller than .080" (2 mm).

3-Jaw Chuck Focus

With your cylinder in place on the Rotary Attachment, place the focus gage on the lens carriage and press the **Focus** button on the FIberMark Control Panel. Press the **Up and Down Arrows** to raise or lower the table.

When you are finished focusing press the **Reset** button on the Control Panel. The lens carriage will go back to its standard Rotary Home Position. You are now ready to start the job.
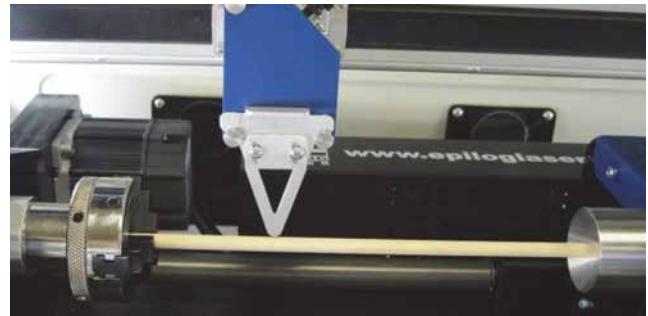
The 3-Jaw Chuck can be used with the standard 3" lens, or the optional 1.5" lens can be used to accommodate larger diameter pieces.

Artwork Layout

There are two different methods used for artwork layout with the 3-Jaw Chuck, and each is based on cylinder size:

1. **Method 1:** 0.5" - 3.0" (12.7 to 76.2 mm) in Diameter Artwork Setup

2. **Method 2:** 0.5" or Smaller in Diameter Artwork Setup

Method 1: 0.5" - 3.0" (12.7 to 76.2 mm) in Diameter Artwork Setup

Set up a custom page size in your engraving software that will accommodate the length and circumference of your cylinder. To set up your page, measure the length of the cylinder you are engraving. Use this as the minimum size of the horizontal dimension of your page. Measure the diameter of the cylinder and multiply this number by Pi (3.1416) to determine the circumference of the cylinder. Use the circumference as the minimum size of the vertical dimension of your page.
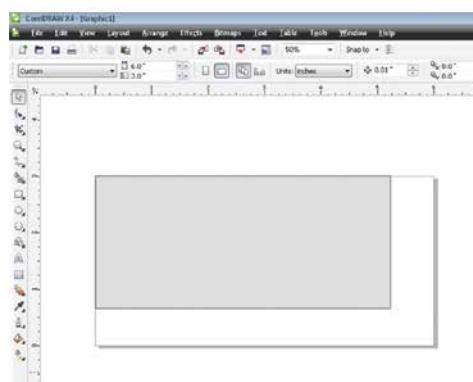
The actual size of the page is not overly important. If you have a cylinder that's 5.23" (133.8 mm) long with a circumference of 2.3" (56.7 mm), use a page that's slightly larger, say, 6" x 3" (152 x 76 mm).

This image shows a page size of 6" x 3" (152 x 76 mm). The gray inner rectangle represents the cylinder that is 5.23" x 2.3" (133.8 x 56.7 mm). Insure your artwork fits within the cylinder size.

It's important that you set up your artwork so the top of the artwork is as close to the top of the page as you can comfortably place it.

Any white space between the top of the page and your artwork is considered part of the print job and your cylinder will rotate that amount until it reaches the first point of engraving.

Once your artwork is set up, you can print and run your job.

Method 2: 0.5" or Smaller in Diameter Artwork Setup

Processing small diameter cylinders involves two significant changes from Method 1:

• Inputting the circumference instead of the diameter of the cylinder onto the rotary keypad.

• Stretching the artwork in your graphics package in the vertical dimension only.

For our example we're going to use the same type of image as we did earlier in these instructions that will engrave all the way around a cylindrical rod. We're going to use a 0.250" (6.35 mm) rod in this example.

The number we need to input on the Rotary Attachment's keypad is the circumference (**not the diameter**) of the cylinder. The formula for calculating circumference is D x Pi, where D is the cylinder diameter and Pi is 3.1416. For our example multiply 0.250 x 3.1416 = .785 (19.94 mm). Enter 0.785 inches (or its nearest equivalent) into the rotary keypad (remember, the decimal point does not appear when the rotary display is in inches so we have to use 0785. For millimeters we would insert 19.94.

Setup the artwork using the circumference of the cylinder as your vertical dimension. Once you have set up your artwork you will need to stretch the artwork. Measure the vertical dimension of your image and multiply that dimension by Pi (3.1416). In this situation we have measured .785" for the circumference of the rod. Because we are engraving around the entire circumference of the rod, the vertical high of our artwork before stretching will also be .785".

Multiply .785 x 3.1416 = 2.466. Stretch your artwork so that it has a vertical dimension of 2.466" (62.63 mm). You will also need to increase the page size in the vertical dimension to accommodate this larger stretched image.

You're now ready to print to the laser. Set your speed and power as you normally would and print to the laser.
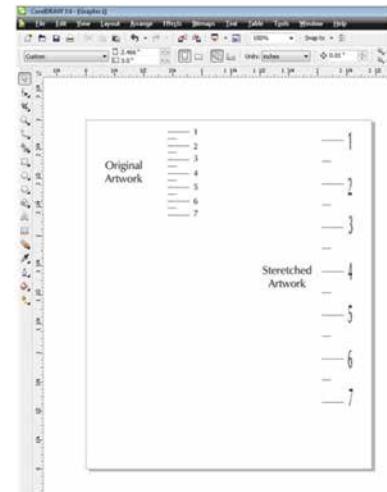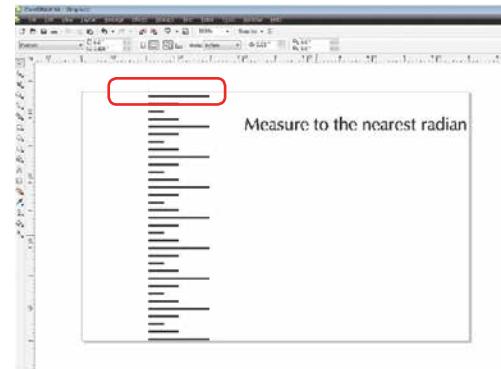
Rotary Removal

1. Turn off power to the laser.

2. Open the door.

3. Depress the release tabs on the connector and unplug the connector.

## Using the Fixture Plates and Additional Rotary Components

The 3-Jaw Chuck Rotary comes with additional attachments that make it easy to hold different sized and shaped cylinders. The photos below show different configurations that can be used to hold a wide variety of cylinders. The components can be mixed and matched. There is no single, correct method of holding a cylinder.

Attaching the Fixture Plate to the Chuck

Secure a large or small fixture plate to the spindle using one of the plate thumb screws.

The fixture plate will look like the photo when the spindle is assembled.
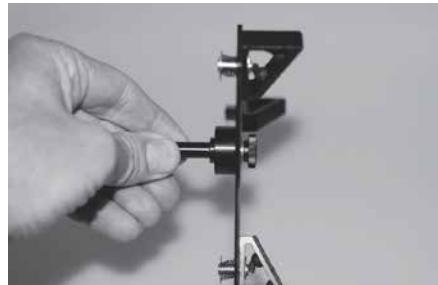
Slide the spindle into the chuck. Make sure the spindle is fully inserted into the chuck, then secure it using the chuck tightening pins.

Be sure to check that your Home Position is where you need it once the fixture plate has been installed.
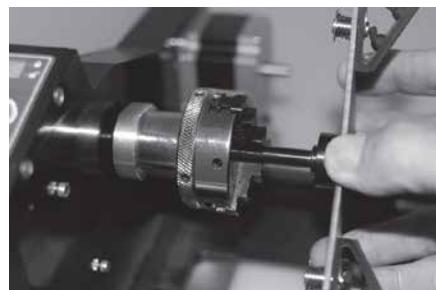
Attaching the Idle-Side Centering Fixture

The idle-side centering fixture is used to hold small diameter cylinders in place. It can be removed if the fixture plates are required for larger diameter cylinders. Remove or install it using the supplied hex wrench.

Attaching the Idle-Side Fixture Plates

The fixture plates can be used on both the chuck side of the rotary as well as the idle-side. Attach the plate by placing it on the idle-side spindle and securing with a thumb screw.

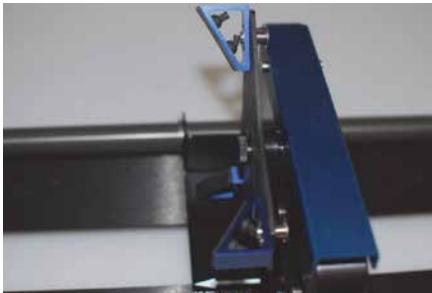The splines on all the fixture plates can be reversed to accommodate parts using the inside diameter (ID) or outside diameter (OD). To reverse the spline orientation, pull the spring-loaded splines away from the plate and rotate them 180 degrees.

This photo shows the small idle-side plate fixture. The small plate fixture can accommodate sizes up to 1" in diameter.

Different Configurations for Fixturing Cylinders

This photo shows a typical example of a part that might be used with the 3-Jaw Chuck on the left side and the small idle-side plate fixture on the right.

This configuration is used when the cylinder diameter on the right side is too large for the centering fixture.

This photo shows a typical example of a larger part that requires a fixture plate on both the left and the right sides. Notice that the left side fixture plate is held in place with the 3-Jaw Chuck.

This photo shows the standard 3-Jaw Chuck on the left side and the idle-side centering fixture on the right. The idle-side centering fixture can accommodate sizes up to 1" in diameter.

The centering fixture is used to support small diameter parts that sag when held in place using only the 3-Jaw Chuck.

Some parts do not need the idle-side centering fixture for support and can be held using only the 3-Jaw Chuck.

Optional Lenses

Epilog offers three optional lenses for the FiberMark system: 1.5" (38 mm), 5" (127 mm), and 8" (203 mm) lenses.

The 1.5 inch lens is intended for use with larger diameter objects on the rotary device, or with taller (longer Z dimension) objects. By using the 1.5 inch lens, the maximum diameter that can be marked with the rotary attachment is 4.25 inches (108 mm). The maximum material thickness (Z-height) of a flat object (not using the rotary attachment) is 6.75 inches (172 mm).

The 5.0 inch lens is being offered for those products that have a slight curvature or marking area that is not perfectly flat. The 5.0 inch lens produces a slightly longer depth of field which will provide for a more consistent mark over a non-flat surface. The 5.0 inch lens cannot be used with the Rotary Attachment.

The 8.0 inch lens offers the greatest depth of field for the FiberMark and provides consistent engraving and marking on the most curved surfaces. It is excellent for engraving on the inside or bottom surface of an item, such as a bowl, box or tooling, up to 8" tall.

Remove the two screws that hold the lens assembly to the mounting block.

SECTION 11: UPGRADING THE OPERATIONAL FIRMWARE

How to Upgrade Your Firmware

Your laser system is capable of having its operational firmware upgraded. The firmware is the command software in your laser system that controls how your laser system operates. A firmware upgrade reprograms your laser system to take advantage of new capabilities or enhancements to the system. To accomplish the reprogramming, you just print a special file to your laser system. The process is explained below.

Upgrading your laser is a two-step process:

1. Download the new firmware to your computer and unzip it.

2. Transfer the new firmware from your computer to your laser.

Installing New Firmware onto Your Computer

Start by checking your current firmware version by powering on the laser. The current version is displayed on the LCD panel, and will read Version 1_0_X_X.

Downloading: From the Epilog web site download the new firmware under **Support + Service > Driver and Firmware Downloads** and save the zip file.

You can also join our Driver Notification mailing list on the download page to be automatically notified when new versions of firmware or the driver become available.

When you download the firmware it comes as a compressed file in the following format: 1.0.X.X.zip. The X's designate the actual version of the firmware. Once downloaded, unzip the file by double-clicking the file. It will open your unzip program.

Find the Unzip To or Extract To selection, and unzip the file to your computer. You will need to pay attention to the folder it is extracted:
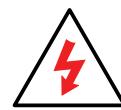
Important! Keep track of the folder where you saved the extracted .hex file. You will need to access this file again in the next step.

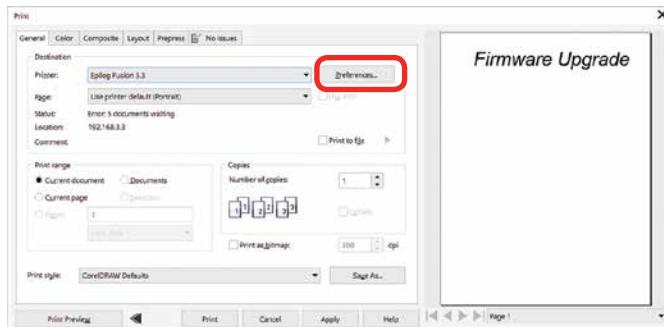## Transferring New Firmware from Your Computer to Your Laser

Create a simple drawing in your graphics package. For this example, we've typed in the text **Firmware Upgrade**.
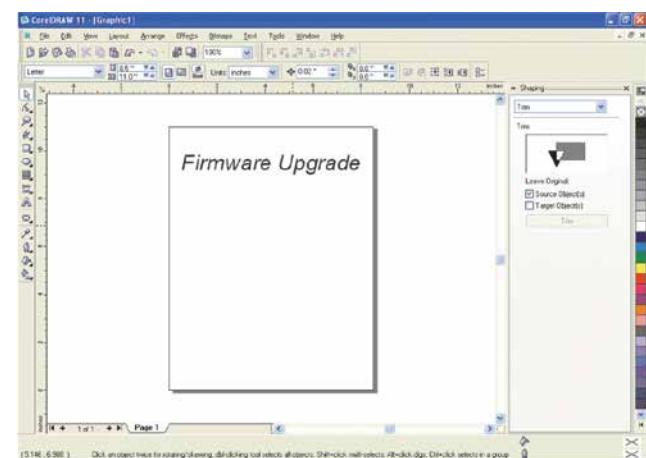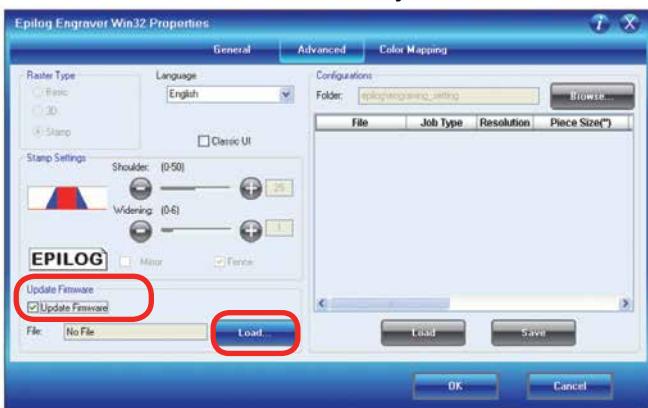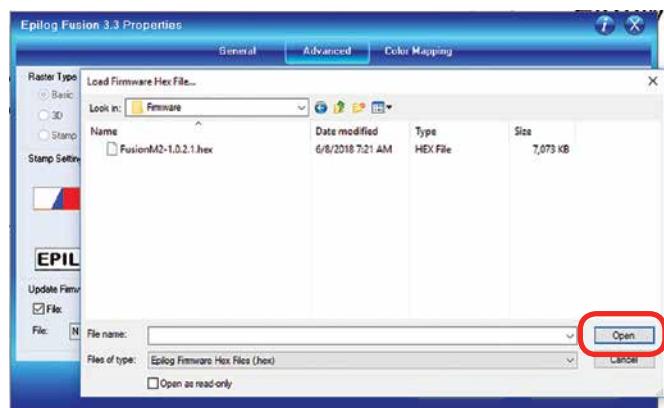
The next step is to **Print**, select your laser in the printer drop-down box and click **Preferences (or Properties).**

Go to the **Advanced** tab, **check the Update Firmware box** and then click on the **Load** key.

Go to the folder that contains the extracted file, select the .hex file and click on **Open**:

The .hex will show in the Update Firmware File box. Click **OK.**
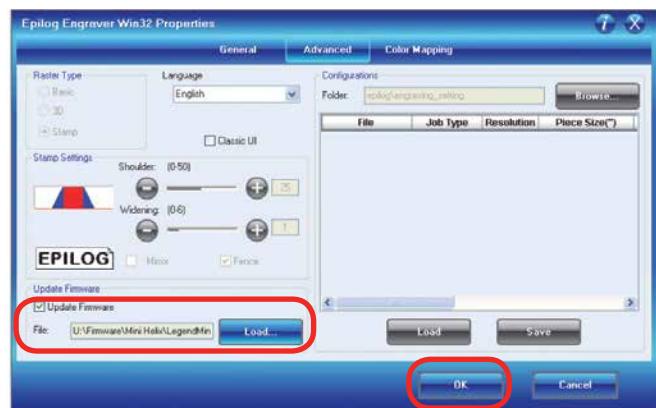
Click **Print.**

At this point, the .hex file will begin transferring to your laser. The laser knows that it is being upgraded and the graphic that you created will not print, nor will it show up as a Job. Instead, the cursor keys will light up. When the upgrade is complete, the display will read **Reboot**!
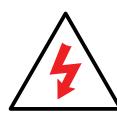
The programing process takes a few minutes to complete. **Do not disturb the laser during the upgrade process!**

After you have rebooted your laser, the process is complete and you will see the new version number of firmware on your LCD as the laser powers up.

Depending on the type of upgrade you may be requested to reboot more than once. Close your software page and you are ready for your next job!

How to Print from AutoCAD to the Laser

AutoCAD is a very powerful software tool that is often used in conjunction with the laser for vector applications. Like any tool, understanding how it works and its limitations are helpful in getting the most out of it. Below are general instructions for printing from AutoCAD. AutoCAD versions 14 to the present are mostly compatible with Epilog systems. Each version of AutoCAD uses slightly different printing conventions that may or may not affect the way you print from AutoCAD and each different version may produce different output from the laser.

Printing/Plotting

Sending jobs from AutoCAD is heavily dependent on the print settings in the AutoCAD Print/Plot window. Since there are so many different settings that AutoCAD requires, it is important that you double-check all of the settings that are critical to success. Previewing your image before sending it to the laser is very helpful in preventing print problems.

AutoCAD is capable of producing extremely complicated drawings with many layers, colors, etc. Since there is no limit to the level of complexity that an AutoCAD drawing can achieve, users should keep in mind that the laser is a 2D marking machine that usually marks a single piece of material in any given job. While your laser system is capable of handling complex drawings, users may find that eliminating extraneous detail before "Printing/Plotting" may make their laser equipment more productive.

Color Mapping

Creating objects of different colors in AutoCAD allows the user to take advantage of the Vector Color Mapping capabilities of the Epilog Dashboard print driver. Color mapping assigns different Speed and Power settings to an object based on its color allowing you to both engrave and mark in a single setup. For a detailed description of how Color Mapping works, refer to **"Color Mapping" on page 80**.

Model Space, Paper Space, and Precise Location

AutoCAD was designed to print to paper plotters and some of the assumptions (especially Scaling and Margins) that AutoCAD makes when printing can cause frustration for laser users that are used to being able to send a job to the laser and have its precise location be very predictable. Printing from either Paper Space or Model Space will work. Be aware that the scaling and margin assumptions made by AutoCAD can affect both the size and location of the work.

Helpful Hints

When printing from AutoCAD **you need to set up your AutoCAD page so that it is square**. This prevents the objects from rotating 90 degrees when you print them. The page in the example below is set to 24" x 24" (610 x 610 mm).

Place all of your objects in the upper portion of the AutoCAD page (see illustration below). If you are printing to a bed size of 24" x 12" (610 x 305 mm) and you have a 24" x 24" (610 x 610) page, the objects in the lower 12" (305 mm) will not be processed.
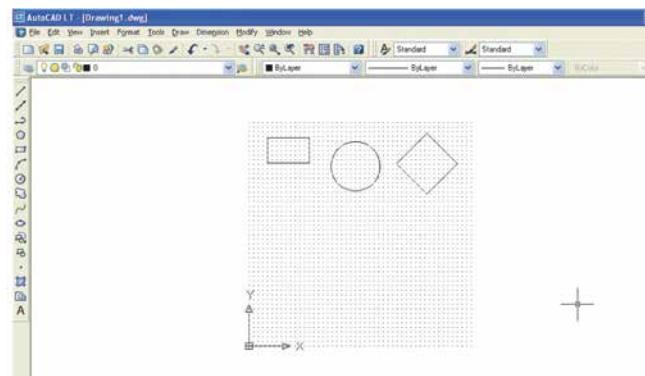
SECTION 12: PRINTING FROM AUTOCAD

Set the Piece Size to match your AutoCAD page size. Setting your AutoCAD page and the Dashboard print driver settings to a square configuration (36" x 36", for instance) is necessary to overcome AutoCAD's tendency to rotate your artwork 90 degrees.
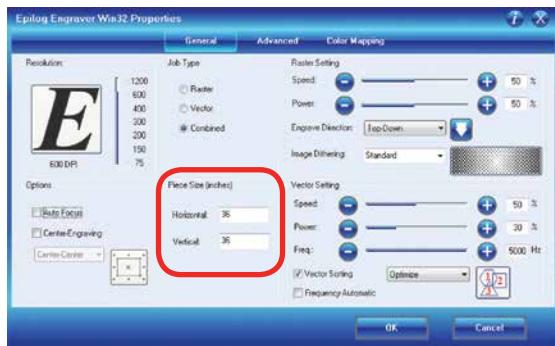
In the AutoCAD print window, set the pen colors that you are using to .001" (.0254 mm).

The AutoCAD default for all pens is .010 and a line weight this large disables vector marking. If the line weight is not changed to .001 inch, vector marking will not be possible.
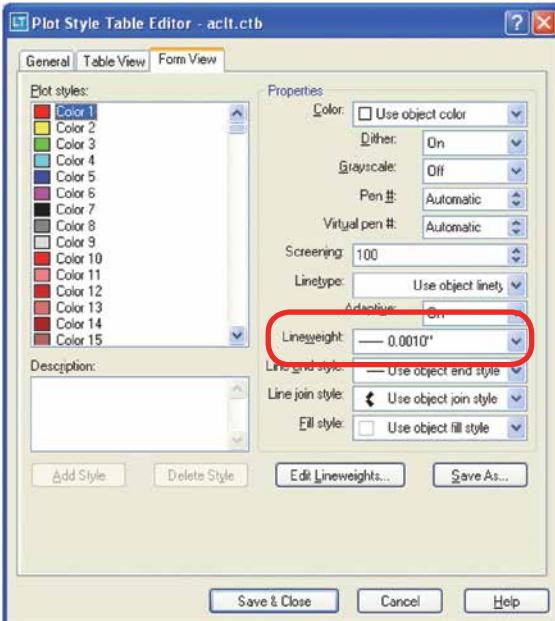
When the laser receives a job where the line weights are too large, the laser system will just beep when you attempt to run the job.

Other useful settings in the AutoCAD print window are:

- Set the page orientation to Portrait.

- Set Plot area to Limits.

- Scale set to 1:1.

- Pen Sizes .001 inch (0.0254 mm).
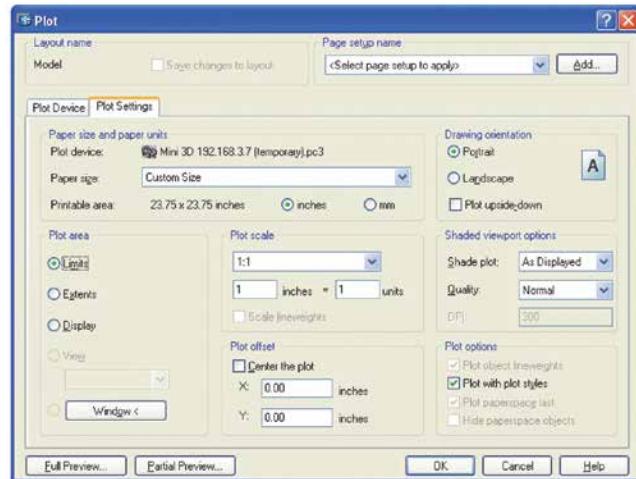
Fiber Laser Materials/Techniques

The fiber laser can etch and mark a wide variety of metals and plastics. Below are a few techniques for creating different marks including annealing, polishing and etching into metals, as well as information on plastic marking with the fiber laser.

Metal Annealing

Annealing can be done on most metals that contain high levels of carbon and metal oxides. These are generally, but not limited to, steel alloys, iron, titanium, cobalt, molybdenum, and chrome-plated iron/steel. To anneal, you must use a slow rate of speed to heat and change the surface color of the material, but a higher wattage Fiber laser will help reduce the cycle times.

To change the surface color without penetrating the metal, the laser beam's focal point is crucial in achieving a dark mark. An annealed mark is accomplished with the focal point up (closer to) .070" to .110" (1.778 to 2.794 mm) or down (further away) -.060" to -.090" (-1.524 to -2.286 mm) from zero. Adjusting the speed, focus and frequency setting will vary the contrast of mark generally resulting in shades of blue, purple and black.

The frequency is the amount of laser power per pulse. The lower the frequency, the more burst of power is being applied. Because we're intentionally applying a broader beam of laser light to achieve an annealed mark, frequency is almost always set in the lower 1-5% range.

For best results, print at 600 DPI. 1200 DPI should be considered for metals that are more difficult to anneal, if there is inconsistent color change at the recommended settings, or when cycle times aren't a concern. The extra overlapping of pixels offered at 1200 DPI will assure a deeper, darker mark.

Metal Etching

Deep metal engraving is a common application for the fiber laser. Using a slow speed setting doesn't necessarily equate to depth. Longer laser dwell time typically results in more eruption of metal, leaving a raised mark instead of deep penetration.

We find for the best deep metal etching, moderate speed settings (20-30%) and more passes slowly chip away at the metal for a better mark. Deep metal engraving requires maximum wattage. For these applications, a 30- or 50-watt fiber laser is recommended.

Frequency is generally set between the 1-5% range. A lower frequency range provides more bursts of laser power per pulse and is crucial to ablating the metal. We've found that focusing "into" the metal by .010" to .030" (.254 to .762 mm) helps in the removal of metal. No technical data is available on whether refocusing after each pass is helpful or not. To better assist in removing metal cleanly, higher resolution (1200 DPI) with more overlap of laser pulses tends to provide a cleaner, more defined etch.

Deep engraving will require multiple passes, which can be easily accomplished by changing the number of copies in the

print dialogue box for CorelDRAW. As with all materials including metals, the hardness or grade will ultimately determine what settings and how many passes are needed to achieve a certain depth. Use the guidelines above as starting points and experiment for best results.

Metal Polishing

Polishing of metals is accomplished by quickly heating up the metal's surface, changing its color, resulting in a mirror-like finish. Polishing can be done on just about any metal including, but not limited to, raw alloys, heat-treated metals, plated metals and precious metals.

For a high-contrast mark, polishing is best done on darker, matte finish metals. Cleaning the surface prior to processing is recommended as oils, grease and other chemicals can affect the consistency and finish of the final marks. Dialing in the settings for a polished mark is the most difficult of the three most popular metal marking techniques. Speed, power and frequency play the biggest role.

- Speed is generally set on the high side, 50-100%, depending on wattage.

- The power is set in the 30-60% range, depending on wattage.

- Frequency is also set on the higher side, typically around the 50-100% range. A higher frequency setting equates to less power per laser pulse. Too strong of a laser pulse and the laser beam starts penetrating the metal instead of polishing, resulting in a dull or browning effect.

Focus should be set at zero. Printing resolution is in the range of 300 to 600 DPI but is mostly done at 400 or 600. Start by determining your base speed, frequency and resolution setting. From there, select a power setting and start fine tuning by adjusting the power in 1% increments or decrements.

Plastic Marking

The term "plastics" is commonly used to describe various grades and types of polymers. To keep things simple, we'll refer to all polymers as plastic. There are many plastics that are compatible with the fiber laser's 1065 nm wavelength of light. We refer to these as "engineered plastics" because many were designed to be laser-etched at some point during the manufacturing life cycle. These plastics are doped with an additive that results in a contrasting mark when the 1065 nm wavelength of light is applied.

There are many other plastics that work just as well as the engineered ones. It's amazing how many different plastics we receive for applications testing, most of the time their trade name and chemical composition aren't disclosed or are unknown. The guidelines below will help in your quest to provide the best possible mark.

Most plastics that tend to work on the FiberMark are those that are mold-injected and are physically hard. Industries where injection molded parts are common include automotive, aerospace, medical device and general manufacturing, to name a few.

Some of the more common compatible plastics include PET, ABS, polycarbonate and colored delrin. Some that are more difficult to mark using this wavelength of light include polyethylene, polypropylene and nylon.

Settings for processing plastics:

- Moderate to fast speed, typically in the 50-80% range.

- Moderate power, generally around the 30-60% range, depending on wattage.

- Medium to high frequency (50-100%) is helpful for processing plastics as it provides a steadier stream of laser power per pulse. Using a low frequency would result in inconsistent contrast and possibly cause foaming of the surface.

- Focus is generally left at zero. Adjusting the focus up or down in .010" (0.254 mm) increments can provide slightly better contrast but instead, consider adjusting the speed / power / frequency for the same effect.

Most plastics are processed at 600 DPI for high contrast and detail. Cycle times are generally fast, so dropping the resolution would only affect print quality. Increasing resolution may prove helpful only on those plastics that are difficult to mark. The majority of compatible plastics will provide a high-contrasting mark using the above settings. Darker plastics will turn white or varying shades of gray. Lighter plastics will turn dark gray to black. Fine tune the mark by increasing/decreasing power or frequency. Speed and focus can be left alone.

Incompatible plastics will either be transparent to the 1065 nm wavelength of light or will require the use of metal marking settings (low to medium speed, high power, and low frequency). The final mark for these plastics isn't as appealing, consistent or contrasting as their compatible counterparts.

Pigmentation of plastic can also dictate what settings are needed to produce a nice mark. The core polymer may be compatible, but due to chemicals used to add color, some colors may mark better than others. Having to adjust the printing parameters for different colors of the same compatible plastic is not uncommon.

SECTION 14: SPECIFICATIONS

Epilog FiberMark Laser Technical Specifications

Epilog FiberMark 24	
Maximum Engraving Area	24" x 12" (610 x 305 mm)
Max Material Thickness	5.0" (127 mm)
Laser Source Wattages	20, 30, or 50 watt Fiber Laser. Air cooled, includes collimator. 1065 nm. Beam quality: M2 <1.1.
Standard Features	Relocatable Home Position, variable focus control, work table of .05" (12.7 mm) tool plate with integrated vacuum hold-down capability, internal LED lighting, front and top access doors.
Intelligent Memory Buffer	Store multiple files up to 64 MB. Rolling buffer allows files of any size.
Operating Modes	Optimized raster, vector and combined modes.
Motion Control System	High-speed, continuous-loop, DC servomotors using linear and rotary encoding technology for precise positioning.
X-axis Bearings	Ground and polished, stainless steel long-lasting bearings.
Belts	Advanced B-style double-wide Kevlar belts.
Resolution	User controlled from 75 to 1200 DPI.
Speed and Power Control (engraving depth)	Computer controlled speed and power in 1% increments to 100%. Color mapping links speed, power, frequency and raster/vector mode settings to any RGB color.
Print Interface	10Base-T Ethernet or USB connection. Compatible with Windows XP/Vista/7/8/10.
Size (W x D x H)	34.5" x 24.5" x 16" (W x D x H) (876 x 622 x 406 mm)
Weight	120 lbs (55 kg) without stand
Electrical Requirements	Auto-switching 110 to 240 volts, 50 or 60 Hz, single phase, 15 amp AC.
Ventilation Systems	350-400 CFM (595 - 680 m3/hr) external exhaust to the outside or internal filtration unit is required. There is one output port, 4" (102 mm) in diameter.
Laser System Classification	Class 2 Laser Product - 1 mW CW MAXIMUM 600-700 nm.

Technical specifications and product configurations subject to change without notice.

Compatibility

Your Epilog Laser has been designed as an "open architecture" product that can be run from almost any Windows based software. Epilog provides both Windows 32-bit and 64-bit print drivers.

Recommended PC

For Optimum Computer Performance
Investing in a new computer is a great way to make sure you're getting the most out of your new laser equipment. Why? Because today's software (CorelDraw for instance) requires a lot of computer processing speed and memory to function properly. A good computer won't make a big difference in how your laser runs, but when compared to a slow computer it will save untold amounts of time and frustration setting up the artwork that you "print" to the laser. Many users do not purchase new computers for use with their new laser because their current computers are perfectly adequate. There's no magical cut-off that makes a computer too slow. If you're comfortable with the performance and speed of your current computer, there's probably no reason to purchase another one. The following recommendations are just advice to consider if a new computer is necessary.

A new computer doesn't have to be expensive to work great. Even many of today's lower cost computers work great for laser applications. Read these recommendations and consider spending just a few dollars more for those components that will save you time and frustration.

Operating System
While the laser is compatible with Windows 32-bit or 64-bit XP, 2000, Vista, Windows 7, Windows 8, and Windows 10 operating systems. The Epilog Job Manager will only work with Windows 7, 8 or 10.

RAM – Random Access Memory
4 GB is the minimum that is recommended. RAM is like short-term memory. It's fast and readily available for the computer to access and makes time consuming tasks go much quicker if you have lots of it. Having more than 4 GB of RAM is nice if you demand a lot from your computer.

Processor Speed
A faster processor will allow you to do more tasks in less time. While it's not necessary to purchase the fastest processor available, you'll want adequate speed to operate your graphics program. Processor speeds are always improving, but processor speeds of about 2.0 GHz or faster are a good place to start.

10/100 Network Interface Card (NIC)
All new computers have a 10/100 network connection as standard equipment. As well as allowing multiple computers to be linked together in a network, this technology also allows direct printing from the computer to the laser. Epilog supplies a network Crossover cable with each laser system that allows one computer to print to a single Epilog Laser system.

Hard Drive
This is the permanent memory in your computer. Many users feel that you can never have a large enough hard drive. Luckily, most computer manufacturers put high capacity drives in new computers these days. When in doubt, buy bigger than you think you might need. It's so in-expensive that it's worth the peace of mind to have it available.

Software
Many users use Corel as their graphics software. Many other Windows software applications can also be used, although all software is different and may not be predictable, user friendly or functional. Additionally, the technical support staff at Epilog may be less familiar with software other than Corel and less able to help with questions. Consult with your Epilog distributor on software compatibility issues. Epilog does not guarantee compatibility with any software.

PhotoLaser Plus is a third party software for converting photos to laser compatible format. This is an indispensable option for engraving photos.

Heavy Duty Surge Protector
The need for a surge protector varies greatly throughout the world. If the laser is operated anywhere that the electrical power is subject to spikes, outages, lighting, fluctuations, etc, a surge protector should be used on both the laser and the computer. A surge protector is a very cheap insurance policy against catastrophic electrical damage. A surge protector is designed to be an inexpensive device that absorbs any electrical problems before they can damage the expensive equipment (computer and laser) they are protecting.

About the Fiber Laser Source

The fiber laser source generates a laser beam by pumping intense diode light into the end of fiber optic cables that have been doped with ytterbium. The energy from the diode light is absorbed by the ytterbium in the fiber optic cables. The ytterbium then releases the energy in the form of photons that travel down the optic cables. The photons that leave the optic cables create the laser beam. The wavelength of light generated from a fiber laser is 1065 nm.

The fiber laser source generates laser light by pumping intense diode light into fiber optics cables that are doped with the rare-earth element, ytterbium (Yb3+), which is referred to as the medium or gain medium. As this diode light energy travels into the fiber optic cable, it energizes the electrons in the ytterbium and the ytterbium electrons go from a ground or stable state, to an excited state.

Essentially, all that is happening in this first step is that the electrons in the medium are absorbing and storing the energy that's coming from the external energy source (diodes). For reference, the CO_2 medium is the CO_2 gas in the tube, and the external energy source is RF electrical current. In the fiber laser (and also most YAG lasers these days and YVO lasers) the external energy source is a laser diode.

The electrons in the medium don't really want to store the external energy they've absorbed, so they emit the extra energy by releasing a photon (a quantum packet of light). Once a photon has been emitted by one electron in the medium it stimulates other excited electrons to also emit photons, creating a chain reaction where the absorption and emission of energy is at a constant rate. The photons travel through the optic fibers and some are released through the end of the fibers as the laser beam.

By continually pumping energy into a medium, that medium tries to shed the excess energy by emitting photons. The type of medium is important because different mediums absorb different types of energy (for instance, a CO2 gas medium is not going to absorb the energy from a diode in a way that will make the CO2 gas lase). Different mediums also emit different wavelengths of photons, and hence, the different properties of different wavelength lasers.

Federal Communications Commission (FCC) Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy; and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

SECTION 15: TECHNICAL SUPPORT

Contacting Technical Support

The technical support department at Epilog is available to assist with solving problems you may encounter using your Epilog. Please review first the common problems and solutions as noted below, then if you are still in need of assistance you may contact Epilog's technical support department at the number or website listed below. Technical support is available in Golden, Colorado USA during the hours of 6 a.m. and 6 p.m. Mountain Time.

Technical Support Direct Line: 1 (303) 215-9171
Email: tech@epiloglaser.com
Technical Support Online: support.epiloglaser.com

What to do prior to contacting Epilog Technical Support:

1. Have the machine serial number available.

2. Have time to work on machine. Many issues will require troubleshooting.

3. Clean your machine (especially the optics), this will solve many issues.

The machine serial number can be found on the Certification/Identification Label. This engraved plate is located on the back of the machine's cabinet. The ID label shown on next page is for the Model 8000 20-watt FiberMark system.

Frequently Asked Questions

Engraver Will Not Vector

1. Verify that the print driver is set to Vector or Combined mode.

2. Verify that the lines that you want to vector are set to .001" (0.025 mm).

3. Make sure the images are vector lines. Scanned and raster images will not vector.

4. Filled or solid images will not vector (outlines only).

Engraving Appears Lighter Than Usual

1. All mirrors and lenses need to be cleaned and inspected for damage. **See "Cleaning the Optics" on page 73** for cleaning instructions.

2. Verify that the lens is in correct focus.

3. Verify correct Speed, Power and Frequency settings for the type of material that you are engraving.

The Exhaust Is Not Pulling Enough Air

1. Move the blower closer to the machine. The closer the two are, the better exhaust you will receive.

2. If you are using a flex hose, do not bundle up the excess. Stretch out the flex hose, cut it to the desired length and use only what you need.

3. Clean your exhaust system on a regular basis, including the engraver and blower. Use a bottle-brush and a vacuum on the areas where the exhaust buildup accumulates.

The Engraver Will Not Power Up

1. Verify there is power being supplied to the engraver, that your outlet is in good, working condition and that the engraver is plugged in.

2. Check to make sure the carriage can be moved freely with the power off. If the engraver can't find the Home Position, it will not power on properly.

The Laser isn't Communicating with My Computer

1. Is the computer's TCP/IP address set to a different number than the IP address of the laser? **See "Set Up TCP/IP Address in the Computer" on page 28.**

2. Is the computer's ethernet connection enabled? Go to the **Network and Sharing Center**, select **Change Adapter Settings.** If the Local Area Connection says Disabled, right click and choose Enable**.**

LCD Screen Displays "Position Error"

The engraver is informing you that it has lost its correct positioning. Power off the engraver and verify there is nothing obstructing the travel of the carriage both left-to-right and front-to-back. After removing any obstruction, turn the laser back on. Contact Technical Support if there still is an error displayed.

How Can I Increase the Life of my Laser System?

- **Clean your system**: Debris in the laser and on the mechanics of the system can reduce the life of parts in your system. Wipe down your system on a regular schedule to keep the mechanics clean and long lasting.

- **Clean the lenses**: Lens life is greatly increased by keeping them clean and free of debris. Get in the habit of wiping them off on a regular schedule to keep them clean and well maintained.

- **Reduce speed when running very small items**: When you run at 100% speed on a graphic with a very short stroke, the lens assembly comes up to speed and slows down extremely quickly, which can place wear on the mechanics of the laser. Slow down to 80 - 90% speed and increase the lifetime of your laser system.

How to Shorten Your Engraving Time

- **Lower the Resolution:** How important is the highest resolution image? Processing jobs at 400 DPI vs. 600 DPI can reduce cycle times by up to 30%, and processing at 300 DPI could mean half the cycle time.

- **Reduce White Space:** Orientate the parts to minimize engraving dead space (area where head travels, but has nothing to engrave).

- **Horizontal Layout:** If an option, horizontal text will engrave faster than vertical or curved (fit text to curve) text.

- **Color Mapping:** Use the Color Mapping feature to save time by adjusting the order in which the objects engrave/mark.

- **Run Multiples:** If you need to engrave multiples of the same image. You'll find you have a time savings per piece.

If these do not correct your issue or your issue is not listed, please contact the Technical Support Team at +1 303-215-9171 or tech@epiloglaser.com.

APPENDIX A: WARRANTY STATEMENT

Warranty Statement for the Epilog FiberMark Laser

Epilog Corporation warrants to the original purchaser of Epilog Model 8000 that this product will be free from defects in material or workmanship when purchased, and under proper, normal use within one (1) year from the original date of purchase.

Epilog will replace or, at its option, repair the defective part(s). Normally, Epilog will supply a replacement part for the customer to replace. Once the replacement has been performed, the replaced part must be returned to Epilog. In the case where repair is required, Epilog requires that the defective part, or machine, be returned to the Epilog factory or other Epilog designated facility. Epilog will be responsible solely for the cost of repairs, including parts and labor, which are made at an authorized Epilog facility. All other costs for replacement or repair, including, but not limited to, packaging and shipping both to and from Epilog, shall be paid by the owner. A "Core" charge may be required by Epilog to insure the return of replacement and repair parts. This warranty excludes any damage from abuse (including, without limitation, incorrect voltages, power surges, fires, improper or insufficient ventilation "acts of God" or other situations out of the control of Epilog), failure to operate in accordance with instructions provided in the Owner's Manuals for the Epilog models 8000, including specific safety and operational warnings contained therein, cosmetic damage sustained in use, and damage caused by unauthorized modifications of any equipment. All warranties to original purchasers are non-transferable. The registered owner must initiate warranty claims within the warranty period.

THE ABOVE AND FOREGOING IS THE ONLY WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED; INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, THAT ARE MADE BY EPILOG ON MODEL 8000. ANY WARRANTIES IMPLIED BY LAW ARE HEREBY EXPRESSLY DISCLAIMED.

No oral or written information or advice given by Epilog, its dealers, its distributors, agents, officers, or employees shall create a warranty or in any way increase the scope of this warranty. Neither Epilog nor anyone else who has been involved in the creation, production, or delivery of the Epilog Model 8000 shall be liable for any direct, indirect, consequential, or incidental damages, including but not limited to damages for loss of business profits, business interruption, loss of business information, adverse health impacts, fire, and the like, arising out of the use or inability to use these products.

Epilog Corporation provides no warranties whatsoever on any software used in connection with Epilog Model 8000.

APPENDIX B: MATERIAL SETTINGS

FiberMark Suggested Material Settings

Material	DPI/Freq.	20 watt	30 watt	50 watt
Aluminum (Anodized)				
Etching/Marking	600 DPI	Speed: 30 - 40% Power: 100% Frequency: 1% Focus: +.06 to +07	Speed: 40 - 50% Power: 100% Frequency: 1% Focus: +.06 to +07	Speed: 50 - 60% Power: 100% Frequency: 1% Focus: +.06 to +07
The contrast / brightness of marks achievable on the fiber laser are excellent and can often be much brighter than marks from a C02 laser. Taking the fiber laser out of focus by +.06" - .09" broadens the beam and produces a very bright mark on anodized coating. Lower frequency and higher power settings help offset the change in focal point. Different grades of anodized & core aluminum alloy will affect how the final marks look.				
Aluminum (Bare)				
Etching/Marking	600 DPI	Speed: 20 - 30% Power: 100% Frequency: 50 - 60% Focus: -.01 to +.01	Speed: 30 - 40% Power: 100% Frequency: 50 - 60% Focus: -.01 to +.01	Speed: 40 - 50% Power: 100% Frequency: 50 - 60% Focus: -.01 to +.01
Engraving aluminum will result in various shades of gray, not black. Fine tuning the settings can provide a bit more contrast but the range of applicable marks is very narrow. If the application calls for a black etch, consider using an oxidizer after engraving. Oxidizers are used most commonly if the aluminum has a protective coating (urethane, clear coat, clear anodized) covering the area that is not engraved. Deep metal engraving on aluminum can be done using multiple passes. Consider deep engraving and using a black epoxy/color fill. Although the marks on aluminum are not black like they are on steel, we have no difficulty getting 2D, UID barcodes to scan and verify.				
Brass				
Etching/Marking	600 DPI	Speed: 20 - 30% Power: 100% Frequency: 5 - 20% Focus: 0	Speed: 30 - 40% Power: 100% Frequency: 5 - 20% Focus: 0	Speed: 40 - 50% Power: 100% Frequency: 5 - 20% Focus: 0
Laserable Plastic				
Etching/Marking	600 DPI	Speed: 40 - 50% Power: 60-70% Frequency: 50% Focus: 0	Speed: 50 - 60% Power: 60-70% Frequency: 50% Focus: 0	Speed: 60 - 70% Power: 60-70% Frequency: 50% Focus: 0
Stainless Steel				
Annealing	600 DPI	Speed: 5-10% Power: 100% Frequency: 1% Focus: +.08 to +.110	Speed: 7-12% Power: 100% Frequency: 1% Focus: +.08 to +.110	Speed: 10 -15% Power: 100% Frequency: 1% Focus: +.08 to +.110
Etching/Marking	600 DPI	Speed: 20 - 30% Power: 100% Frequency: 1-5% Focus: -.01 to +.01	Speed: 30 - 40% Power: 100% Frequency: 1-5% Focus: -.01 to +.01	Speed: 40 - 50% Power: 100% Frequency: 1-5% Focus: -.01 to +.01
Polishing	600 DPI	Speed: 50 - 60% Power: 35 - 40% Frequency: 50 - 60% Focus: 0	Speed: 60 - 70% Power: 35-40% Frequency: 50 - 60% Focus: 0	Speed: 70 - 80% Power: 35 - 40% Frequency: 50 - 60% Focus: 0

FiberMark Suggested Material Settings

Material	DPI/Freq.	20 watt	30 watt	50 watt
Etching: Like our C02 counterparts, the slower the speed setting, the deeper the etching. However, many metal applications can be processed at higher speed settings in the range of 50-100%. Again, consider the marking requirements. If the only stipulation is permanency, you'll find the FiberMark can engrave a broad range of metals at higher speeds, regardless of laser wattage. Don't be afraid to turn up the juice! **Annealing:** To achieve an annealed mark, the focal point should be significantly away from zero. The unfocused, broader beam provides the heat to change the surface color without actually penetrating the metal. The focal point can be either closer to or away from zero. Focusing away from the material should be in the range of -.060" to- .090". Focusing closer to the material is generally in the range of +.070" to +.110". Both focusing methods will result in a dark black annealing of the metal. Focusing up typically results in a slight indentation of the metal. Multiple passes can darken the mark even more (no data to confirm whether multiple passes offer more permanency). **Polishing:** Some steel alloys are easier to polish than others. For best results, clean off the surface with alcohol prior to processing. Any leftover grease, oils or residue can affect how well the polished mark turns out. Polishing the metal where the final marks result in a bright white engraving requires finer tuning of settings, more so than the etched or annealed marks. Determine a base speed and frequency setting and adjust the power in small increments/decrements. If you are unable to get a white bright mark, increase the frequency setting and try again by adjusting only the power.				
Titanium				
Annealing	600 DPI	Speed: 5-10% Power: 100% Frequency: 1% Focus: +.08 to +.110	Speed: 7-12% Power: 100% Frequency: 1% Focus: +.08 to +.110	Speed: 11-15% Power: 100% Frequency: 1% Focus: +.08 to +.110
Etching/Marking	600 DPI	Speed: 20 - 30% Power: 100% Frequency: 1-5% Focus: -.01 to +.01	Speed: 30 - 40% Power: 100% Frequency: 1-5% Focus: -.01 to +.01"	Speed: 40 - 50% Power: 100% Frequency: 1-5% Focus: -.01 to +.01
Titanium and Ti alloys are highly amenable to marking at this wavelength. Similar to aluminum, a black mark from the etching process is difficult to achieve. Various shades of gray can be made, from very dark gray to light gray. Annealed marks can also be made on titanium materials using the same processing parameter described for stainless steel. Depending on the Ti alloy, marks of various colors can be achieved by changing the frequency values for 1% up to 100%. It is common to see red, blue, green, orange, yellows and purple marks, depending on the frequency selected.				
Plated Metals				

Etching/Marking	600 - 1200 DPI	Speed: 10-20%
		Power: 100%
		Frequency: 1-5%
		Focus: -.09 to -.100"
		      +.09 to .100"
			Speed: 20-30%
			Power: 100%
			Frequency: 1-5%
			Focus: -.09 to -.100"
			      +.09 to .100"
				Speed: 30-40%
				Power: 100%
				Frequency: 1 - 5%
				Focus: -.09 to -.100"
				      +.09 to .100"

Metals are often plated to assist with conductivity, to provide a protective coating against rust and elements and for aesthetic purposes. Plating thickness will depend on application and purpose. Most of the plated metals processed through the applications lab are electronic components (to enhance conductivity) and various fittings (protection against environment & rust). The typical plating thickness varies from .001" up to .005". Our recommended settings for general metal engraving works well for ablating through the plating; exposing the base metal. Ablating the plating will also provide high contrast. Using an oxidizer will enhance the look. Our recommended settings for polishing of metals are a good starting point where ablating through the plating isn't an option. This is likely the most common plated metal application as exposing the raw metal underneath will break continuity and / or expose the bare metal to rust and other elements. Note that the contrast of polishing of plated metals won't be as consistent or contrasting as a direct ablation. Multiple passes will help and end results will vary based on the metal used for plating, thickness of plating & size of mark. Our recommended settings for annealing will often work for plated metals where the plating has a thicker wall and material used has high levels of carbon or metal oxides.				

FiberMark Suggested Material Settings

Material	DPI/Freq.	20 watt	30 watt	50 watt
Powder Coating				
Etching/Marking	600 DPI	Speed: 30 - 40% Power: 100% Frequency: 100% Focus: +.05 to .07"	Speed: 40 - 50% Power: 100% Frequency: 100% Focus: +.05 to .07"	Speed: 50 - 60% Power: 100% Frequency: 100% Focus: +.05 to .07"

Two to three passes are suggested (one pass to ablate the powder coating, 2nd or 3rd pass to polish up the metal underneath). A little less power, higher frequency and less focus adjustment will be required for the 2nd or 3rd pass, depending on the base metal. The idea is to ablate then polish. An alternative to running two or more passes is to run one pass and then use a common cleaner such as Simple Green or a citric-based cleaner with short, stiff bristle brush to scrub out the residual material remaining in the mark area. If using this technique, it may be necessary to raise or lower the marking table from around 0.07" to 0.10".

- **These are only guidelines:** Brightness or darkness of a mark is a matter of personal preference and can be very dependent of the type of material being marked. As such, there is no "correct" setting. Working with the four different fiber settings becomes fairly intuitive in a very short period of time for most users. If you have a material that is not listed, try to compare it to similar materials listed and use those settings as your starting point.

- **Speed Settings:** The speed setting scale of 1% to 100% is not linear – i.e. 100% speed will not be twice as fast as 50% speed. This non-linear scale is very useful in compensating for the different factors that affect engraving time.

- **Power Settings:** The power settings are linear – i.e. 50% power is half as much as 100% power.

- **General Metal Engraving / Base Settings:** In the world of metals the grade, type, hardness and chemical composition are endless. Metal alloys are engineered for specific applications and have their own strengths and weaknesses. With such an unlimited selection, we've yet to come across a metal which proved to be incompatible with the FiberMark. Metals can be engraved at just about any settings. Of course, there are many variables to consider for metal engraving. The lasers wattage, hardness of metal, desired mark (etch, polish, anneal) and the required time/contrast/depth will have to be considered when deciding on the final settings.

- **General Annealing Settings:** Producing an annealed mark is very dependent on the material being out of focus. Run the laser at slow speed and full power then adjust the focus while the machine is running until you achieve the annealed mark you need.

- **Test your material:** If you do not achieve the results you are looking for with the recommended settings, try resending the job and start by changing only one variable at a time. Changing only one variable at a time will help to determine the correct setting for your material.

- Laser settings can sometimes be confusing because many materials can be marked over such a broad range of settings. If you have difficulty in finding the correct setting you can send a sample to the Epilog Laser Applications lab. We will determine if the material can be marked and provide appropriate setting for your laser.

To print a copy of these settings to keep next to your laser, go to www.epiloglaser.com/material-settings.

Index

Symbols

A

B

C

D

E