



**OWNER'S MANUAL FOR EPILOG  
LEGEND 24EX AND 32EX MODEL 6000  
LEGEND TT MODEL 7000  
Revision C  
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# Introduction

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## *How to Use This Owner's Manual*

Thank you for purchasing an Epilog Legend Model 6000 L24EX or L32EX Laser System (Legend) or a Legend Table Top Model 7000 Laser System (TT). The Legend 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 Legend as soon as you read the first six sections. Then you can refer to topics in the remaining Sections, as you work.

### *Manual Conventions*

This owner's manual covers three laser models: Legend 32 EX, Legend 24 EX, and Legend 24 TT. Unless specifically noted, all functions are identical on all three models. Where instructions are unique for a particular model, a note is included in the margin.



Indicates Legend EX Model 6000EX Specific Information



Indicates Legend Table Top Model 7000 Specific Information

### *Structure of the Manual*

#### **Legend Setup**

Sections 1 through 6 explain how to uncrate and set up your Legend EX or TT, important safety information you need to know before you use it, the do's and don'ts of operating the Legend, configuring your computer to run the Legend

# *Introduction*

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print driver, configuring CorelDraw, and a brief user's guide to running your first job.

## **Legend Basic Operations**

Sections 7 through 10 explain basic Legend operations and maintenance and Using the Epilog Legend Print Driver

## **Advanced Operations**

Sections 11 through 13 explain advanced Legend operations, system options, and material suppliers.

## **Troubleshooting, Service and Specifications**

Sections 14 through 17 assist with problem troubleshooting, service information and list the Legend specifications.

## **APPENDIX A**

Epilog Legend Warranty Information.

## **APPENDIX B**

Setting Up a Network Connection

## **APPENDIX C**

Printing from AutoCAD

## **INDEX**

# Introduction

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## Icons Used in this Manual

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



Indicates Legend EX Model 6000EX Specific Information



Indicates Legend Table Top Model 7000 Specific Information



Sometimes the right perspective on a procedure is essential to success. This icon flags a Quick Note regarding the task at hand.



This Icon signifies places to look for additional information to assist with the topic currently being discussed.



This Icon highlights current contact information for receiving help.



This Icon signifies advice you can try out with your machine right away.



Running into trouble can be detrimental to your success so we've marked Warnings and Cautions with this Icon.

# *Introduction*

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*Manual*

# *Legend Setup*

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# Section 1: Getting Started

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## *In This Section*

- Unpacking Your L24ex, L32 Ex Machine Or TT Machine
  - Connecting The Computer
  - Connecting The Exhaust
  - Connecting The Electrical Power
  - Laser Cooling Requirements And Operating Temperatures
- 

## *Unpacking Your Machine*

You will need to do the following to use your machine:

- Remove it from the crate
- Connect your computer
- Connect the exhaust system
- Connect power
- Configure your computer

You may need a contractor to install the exhaust (all models) and the 208-240 volts (120 watt lasers only). This must be done ***PRIOR*** to the arrival of the Epilog installation technician.

## *Unpacking Your L24EX or L32EX Machine*



1. Cut and remove the strapping around the box and the plywood top. Remove the plywood top.
2. Cut the tape on the top of the box. Open the flaps and remove as much packing as you can. Please save this packing material. This includes the foam top supports and four wood and foam corner supports.
3. Remove eight (8) Phillips head screws (w/ large washers) located around the base of the corrugated box.
4. With a friend, lift the box up over the machine. PLEASE do not throw away the box, you may need it later. Remove the plastic bag over the machine.
5. On the pallet (the wooden platform the machine is sitting on) locate the edge that is secured with two screws. Loosen and remove the screws, and remove the wooden 2"x2".

# Section 1: Getting Started

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6. Under the machine (all the way under), locate the ramps. They will be wrapped in plastic. Remove them and place the metal hooks into the slots on the pallet. These ramps will allow you to roll the machine off the pallet. There is a left and a right ramp. The raised edges must be on the outside, not facing each other.
7. Locate the four foam blocks supporting the machine on the pallet. These blocks need to be pulled out. CAUTION is urged. These machines can weigh in excess of 400 lbs. With a friend or two, lift one side of the machine just high enough to remove two of the blocks. Do the same with the other side to remove the remaining two blocks.
8. With a friend helping, carefully roll the machine off the pallet and down the ramps. You may need to unlock the front casters before the machine will roll freely.
9. Locate the accessory kit in the open compartment at the bottom front of the engraver. Remove this box.
10. Open the main door to the engraver. Inside the cabinet, locate and remove two 5/8" diameter RED shipping locks. They are toward the front of the machine and on either side of the X carriage. Turn the screw locks counterclockwise to remove. Please save them. Also cut and remove the tie strap holding the lens carriage in place.

## Unpacking Your TT Machine



1. Cut and remove the strapping around the box and the plywood top. Remove the plywood top.
2. Open the flaps and remove as much packing as you can. Please save this packing material. This includes:
  - a) two foam top supports,
  - b) two foam bottom supports,
  - c) two empty cardboard box strengtheners one on the top and one on the bottom, and
  - d) Two filled cardboard boxes for strength, one on the front and one on the back.
3. PLEASE do not throw away the box, you may need it later.
4. Locate the two foam supports on the top of the machine and remove them.
5. Locate the accessory kits in front of and behind the machine. Remove them.
6. With a friend helping, carefully lift the machine out of the box.
7. Open the main door to the engraver. Inside the cabinet, locate and remove two 5/8" diameter RED shipping locks. They are toward the front of the machine and on either side of the X carriage. Turn the screw locks counterclockwise to remove. Please save them. Also cut and remove the tie strap holding the lens carriage in place.

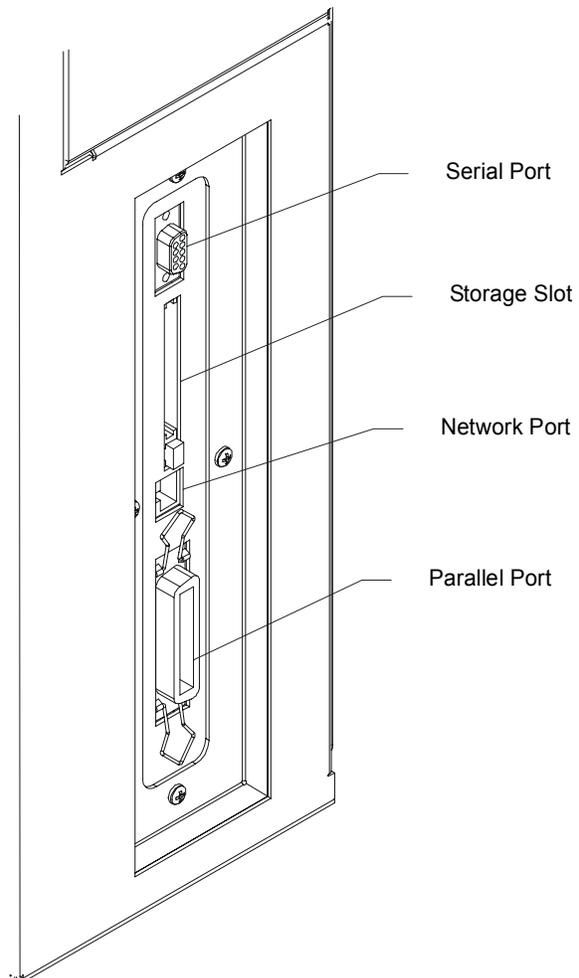
# Section 1: Getting Started

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## Connecting the Computer

The Legend systems were designed to be used with Microsoft Windows XP or 2000 operating systems. One advantage of Microsoft operating systems is that they handle network connections very efficiently with exceptionally easy setup. The best way to connect your Legend is through the Ethernet network port. The network port provides the fastest transfer speeds and the most reliable data transmission, especially over long distances. The parallel port can also be used, but it is recommended that it be used as a secondary connection. Both the Network connection and the parallel connection can be hooked up at the same time.

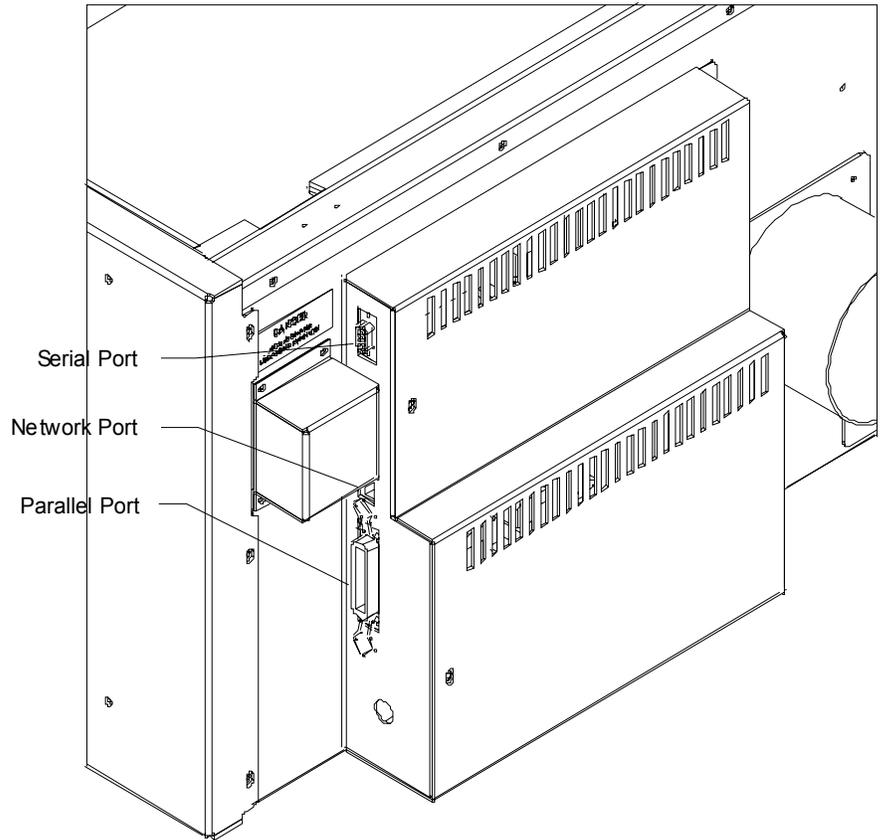
The data port connections are on the right side of the machine, towards the rear. This drawing shows the location of all the ports on the Legend EX systems. The drawing on the next page shows the location of all ports on the Legend TT systems. Some features may be optional or not available on your machine.



# Section 1: Getting Started



**Ethernet Network Port:** The Legend uses a 10BaseT style connection and a network crossover cable is included in the accessories kit that came with your laser. The port is located on the right side of the machine, near the rear. The network parameters can be set at the Legend, and details for doing so are in Section 4, “Configuring Your Computer – Print Driver Installation”.



**Parallel Port:** The connection point on the Legend is on the right side of the machine, near the rear. The connector is recessed in a small rectangular cutout. Mate the larger end of the printer cable to the Legend. The connector can be connected only one way. Close the wire retainer clips around the ends of the cable.

## *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. You should never operate your laser system without a properly working exhaust. Prior to the arrival of the Epilog installation technician, 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 twenty feet from the Legend. You should provide a rigid, smooth duct from the blower to the vicinity of the Legend. The Legend systems require 400 CFM at 6” of static pressure. Remember to put the blower switch for the Legend EX lasers in an obvious and accessible place so it can be routinely switched

# Section 1: Getting Started

on prior to using the engraver. Please connect the exhaust blower to the Legend EX as shown below and to the Legend TT as shown on the following pages.

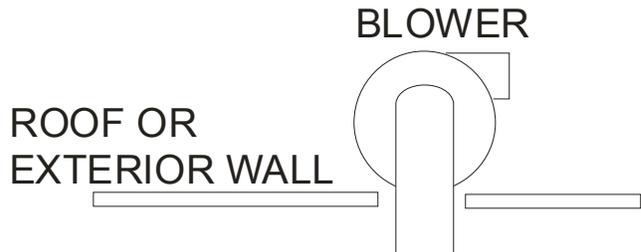
In addition to evacuating the laser cavity, the exhaust blower on the TT laser system provides the cooling air for the laser tube. When the exhaust blower is operating, it pulls air across the cooling fins of the TT. This air flow across the fins is critical for keeping the laser tube cool. When a job is running, the laser tube heats up and will overheat if there is not an exhaust blower pulling enough air over the laser to keep it cool. Never operate your TT laser system without the exhaust blower working properly.

See the following sections – Connecting Electrical Power and Laser Cooling Requirements - for additional information about how to hook up your TT exhaust to keep your TT laser cool.

## Legend EX Exhaust Blower Connections

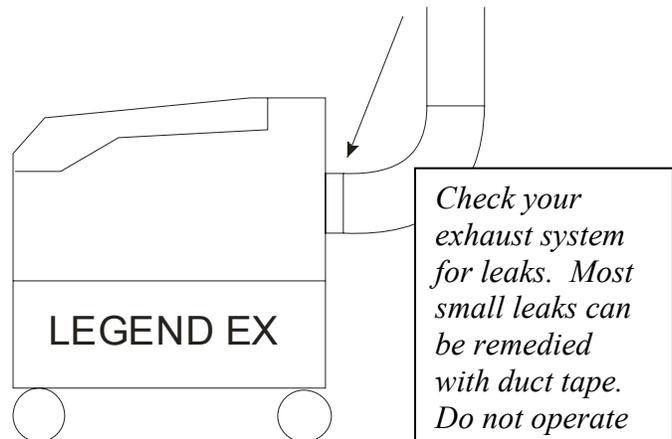


- Locate the exhaust port connector on the rear of the machine. The port is a 6" diameter tube for the L32EX and a 4" diameter tube for the L24EX and the Legend TT.
- Slip the 6" or 4" flex hose over the port, and secure with a hose clamp.



The outlet port on the **Legend 32EX** is a 6" diameter port.

The outlet port on the **Legend 24 EX** is a 4" diameter port.

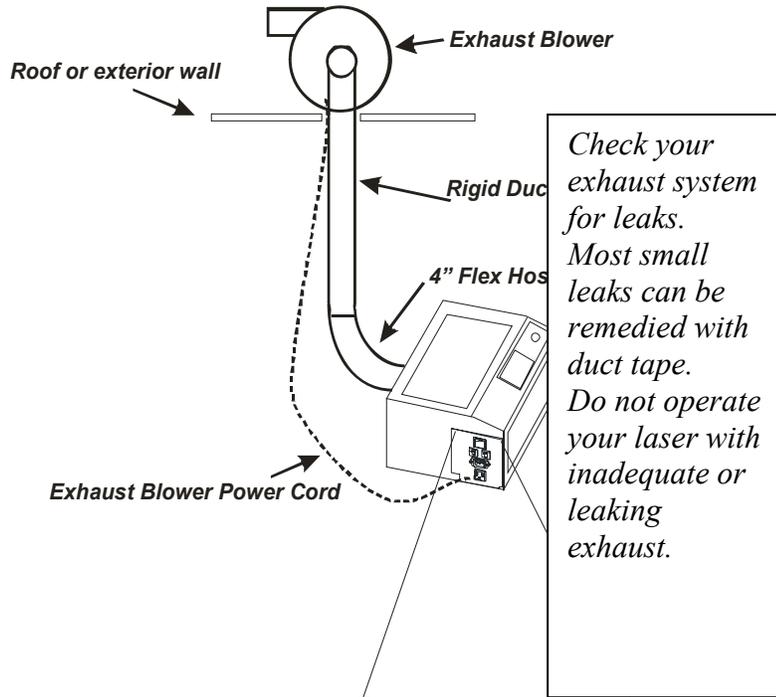


*Check your exhaust system for leaks. Most small leaks can be remedied with duct tape. Do not operate your laser with inadequate or leaking exhaust.*

# Section 1: Getting Started



This diagram shows the preferred method for connecting the exhaust blower to the



TT. The TT allows you to plug your exhaust blower directly into the switched power outlet that is located on the left side of the cabinet. When your exhaust blower is turned on and plugged into this switched outlet the exhaust blower is automatically turned on when a job starts, and automatically turned off 10 seconds after the job is complete.

**Input power from wall plug (Epilog supplies the power cord in your accessories kit).**

**Switched outlet. Plug the power cord from the exhaust blower into this outlet. The output voltage at this outlet is the same as the input voltage from your wall plug. Do not plug a 110 volt exhaust blower into a TT that is plugged in to a 220 volt wall outlet!!**

It is not mandatory that you plug your exhaust blower into the switched outlet on the TT – it's just the easiest, most convenient way of ensuring that your exhaust is always running when your TT is running.

If your exhaust is not plugged into the switched outlet, make certain that you turn on the exhaust whenever you operate your TT.

**Never run a job on a Legend TT unless the exhaust blower is hooked up and operating properly!**

# Section 1: Getting Started

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## Connecting Electrical Power

What voltage should be supplied to operate a Legend laser?

All Legend laser systems have an auto-switching power supply that automatically detects the incoming voltage and automatically switches itself to operate at that voltage. The Legend power supply will automatically operate properly at any single-phase voltage between 100 and 240 VAC and will also automatically compensate for either 50 or 60 Hz. Epilog supplies the appropriate power cord for all of our equipment.



**Legend TT – 35, 40 and 45 watt systems:** These systems all operate on standard 110 or 220 voltage at either 50 or 60 hertz. No matter where you are in the world you can plug these lower wattage systems into a standard wall outlet. The TT will determine your incoming voltage and automatically switch to operate correctly. It is recommended that a dedicated 15 amp circuit be used if available, but it is not required.



**Legend EX 30, 35, 40, 45 and 60 watt systems:** These systems all operate on standard 110 or 220 voltages at either 50 or 60 hertz. No matter where you are in the world you can plug these lower wattage systems into a standard wall outlet. The Legend will determine your incoming voltage and automatically switch to operate correctly. It is recommended that a dedicated 15 amp circuit be used if available, but it is not required.



**Legend EX 75 watt systems:** For most applications the **Legend 75 watt** can also operate on standard 110, single-phase voltage. Under some operating conditions that require the laser to be constantly on at high power (such as vector only cutting applications at high power) it may be necessary to use 220 volts as the standard operating voltage. There are many factors that influence whether the 75 watt Legend needs 110 or 220 volts: the stability of the electrical supply, the actual voltage of the electricity being supplied to the system, and other environmental factors can all contribute to determining the best voltage for a 75 watt laser. If the 75 watt laser is being used mostly for raster applications and the electrical supply is clean and stable, standard 110 voltages on a 15 amp circuit is perfectly acceptable. If, on the other hand, the application is mostly heavy-duty cutting, or if the electrical power supply is unstable, then 220/240 volts should be used.



**Legend EX 120 watt systems:** The **Legend EX 120 watt** laser system will only operate on 220 volt, single phase electricity.

# Section 1: Getting Started

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The 220 volt cord that is supplied with the 120 watt laser has a NEMA L6-15R plug (HUBBELL 4560 or equivalent). This is one of the most widely used 220 volt plug styles within the United States and is known to all electricians and electrical hardware suppliers.

## *Summary of Recommended Voltage:*

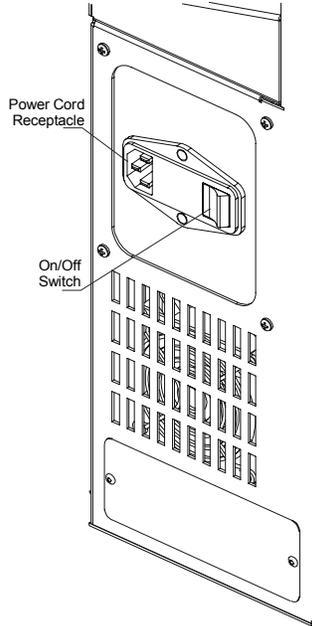
<b>LASER WATTAGE</b>	<b>THE US AND OTHER COUNTRIES WHERE 110 IS THE STANDARD ELECTRICAL VOLTAGE.</b>	<b>COUNTRIES WHERE 220 IS THE STANDARD ELECTRICAL VOLTAGE.</b>
30,35,40,45,60	110 volts	220 volts
75	110 volts or 220 for heavy-duty applications.	220 volts
120	220 volts	220 volts

The location of the power cord receptacle of the Legend is shown in the drawing below, and is located on the left side of the machine near the back.

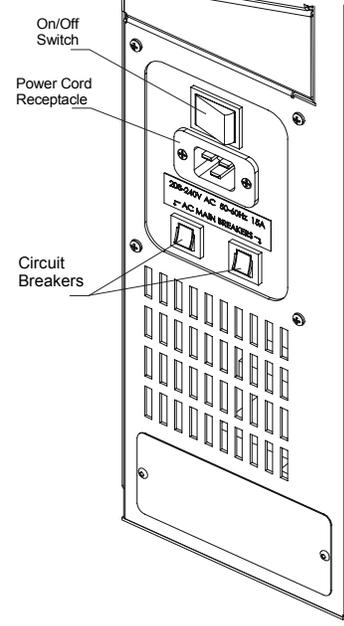
- Locate the power cord in the accessory kit. The end with the recessed terminals connects to the Legend. Locate the power entry receptacle next to the “Power” label on the left side of the machine. Insert the power cord firmly into the receptacle.
- Plug the machine into your wall power outlet, and turn the machine on. The power switch is next to where the power cord connects to the Legend. Wait several moments for the machine to beep and the carriage to move towards the upper left corner home position. A diagram showing the location of the On/Off Switch and Power Cord Receptacle for the EX and TT machines are located on the following pages.

# Section 1: Getting Started

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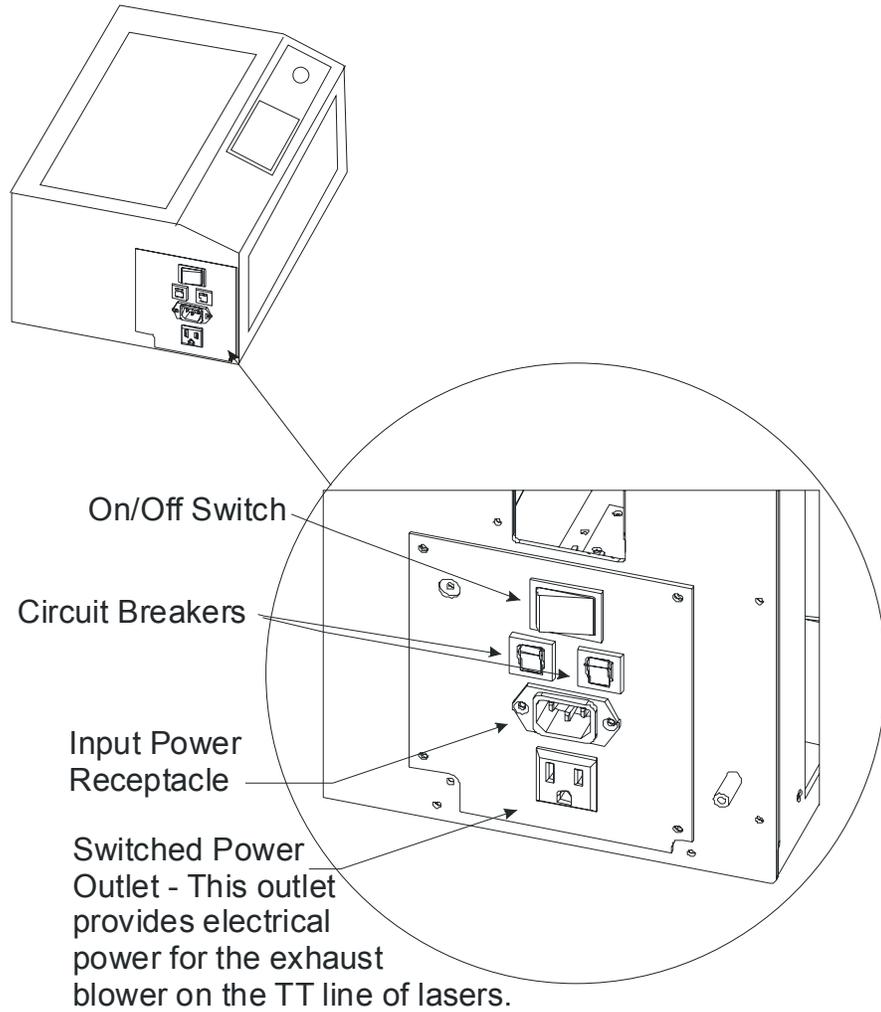
UNDER 50 WATTS



50 WATTS AND ABOVE

# Section 1: Getting Started

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# Section 1: Getting Started

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## *Laser Cooling Requirements and Operating Temperatures*

All Epilog Legend EX models use air-cooled laser tubes. Laser technology is such that the laser tubes generate a lot of excess heat and the tubes must be cooled in order for them to operate correctly. There are cooling fans and air vents that are located at the back of the Legend EX machines that are dedicated to cooling the laser tubes, and on high wattage systems, the lasers RF power supply. These cooling fans and vents 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.

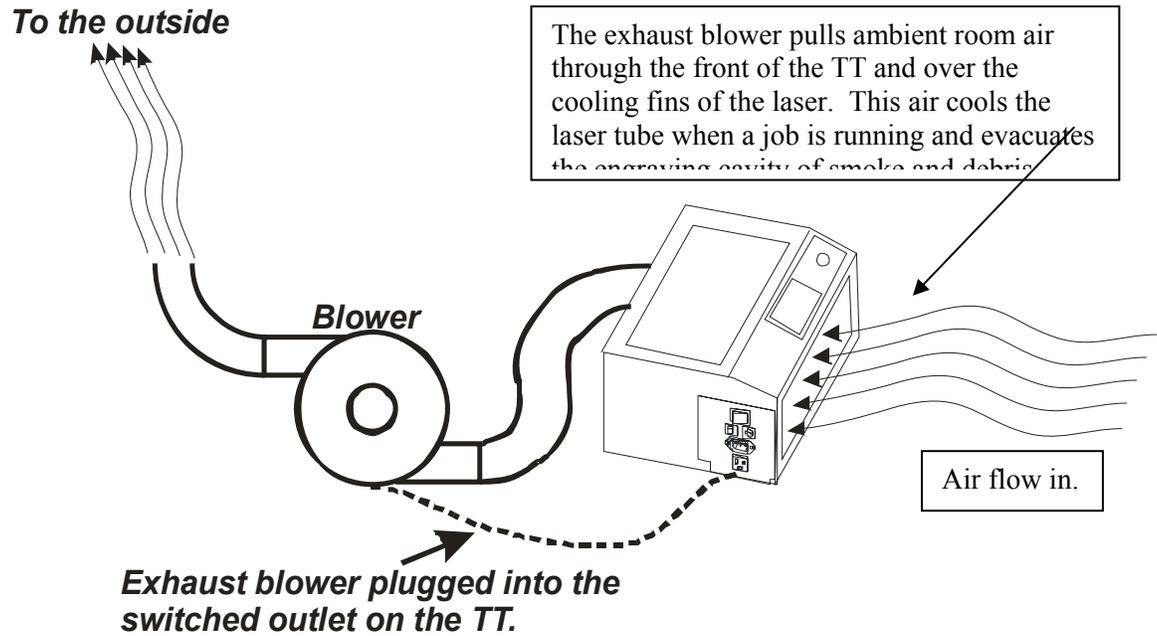
Ambient air temperature where the laser system is operating should not exceed 90 degrees F (32 C). Operating in an environment where the ambient air temperature is above 90 degrees F (32 C) will void the Epilog warranty.

As outlined in the two prior sections – Connecting Electrical Power and Connecting the Exhaust – the Legend TT is equipped with a switched exhaust outlet. This switched outlet allows you to plug your exhaust blower into the TT. In addition to evacuating the laser cavity, the exhaust blower on the TT laser system provides the cooling air for the laser tube. When the exhaust blower is operating, it pulls air across the cooling fins of the TT. This air flow across the fins is critical for keeping the laser tube cool. When a job is running, the laser heats up and will overheat if there is not a functioning exhaust blower pulling enough air over the laser to keep it cool.

# Section 1: Getting Started

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Never run a job on a Legend TT unless the exhaust blower is hooked up and operating properly!



# Section 2: Safety

---

## *In This Section*

- Laser Safety
  - Electrical Safety
  - Fire Safety
  - Safety Features And Regulatory Compliance
- 

## *Laser Safety*

The Epilog Legend Models 6000 and 7000 Laser Systems are Class 3R laser products, as defined in International Standard IEC 60825-1.

The Epilog Legend Models 6000 and 7000 comply 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 output of the embedded high-power CO<sub>2</sub> engraving laser is fully contained. The product's cabinet has interlocked doors, and no special precautions are necessary to operate the high-power laser safely. However, the visible output beam of the product's Laser Diode 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 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.

## Section 2: Safety

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The operator of the Legend Model EX 6000 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 and window interlocks.
- **DO NOT** view directly into the beam of the Laser Diode Pointer.
- **DO NOT** operate the Laser Diode 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 Model 6000 Laser System be 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

## Section 2: Safety

---

### *ELECTRICAL SAFETY*

The AC input power to the Epilog Legend Model 6000 Laser System is potentially lethal and is fully contained within the cabinet.



- **DO NOT** open any of the access panels on the rear of the machine 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 electrical connections to the system while the unit is turned on.

### *FIRE SAFETY*

Laser cutting and engraving systems represent a significant fire hazard. Most engraving materials are inherently combustible, and while the objective of most cutting and engraving operations is to vaporize material without burning, it is easy to ignite a flame. Usually this is a simple “flare” of burning gases, issuing from the focused spot on the work piece, which follows the moving spot and which extinguishes itself as soon as the laser beam is modulated off. But should the work piece actually be set on fire, the fire must be extinguished by the operator at once, or the machine will be seriously damaged or destroyed!



- **DO NOT** operate the machine in the presence of unnecessary combustible materials, explosives, or volatile solvents such as acetone, alcohol, or gasoline.
- **DO NOT** let the machine operate unattended, especially when performing slow cutting operations on easily combustible materials such as paper or acrylic plastic. Again, if a fire starts, it can destroy the machine!
- **ALWAYS** keep a properly-maintained and inspected fire extinguisher on hand. Epilog recommends a carbon dioxide (CO<sub>2</sub>) or Halon® fire extinguisher. We do not recommend dry-chemical fire extinguishers, because they discharge a corrosive powder which will severely damage the machine's electrical and mechanical components.

## Section 2: Safety

---

# SAFETY FEATURES AND REGULATORY COMPLIANCE

Epilog has incorporated specific safety features into the Legend Models 6000 and 7000 Laser Systems in order to meet the requirements of 21 CFR 1040 and the International Standard IEC 60825-1.

- A safety enclosure (cabinet) which fully encloses the engraving laser and its beam path.
- Dual redundant interlock systems which turn off the engraving laser when either the cabinet door or window is opened.
- A visible emission indication when the Laser Diode Pointer is operating. There is an LED indicator on the machine's front panel.

21 CFR 1040 and IEC 60825-1 require that certification, identification, and warning labels be placed on laser products. Reproductions of labels on the Legend Models 6000 and 7000 Laser System follow, with their locations specified:

1. Certification/Identification Label. This engraved plate is located on the left-hand side of the machine's cabinet, below the power inlet connector. The example shown is for the 6000/35 product having a 32 inch by 20 inch engraving area.

Epilog Corporation  
500 Corporate Circle, Suite L  
Golden, CO 80401 USA

Model Number: 6000 Laser System  
Serial Number: 6035-0422863220EX  
Date of Manufacture: October 2004

### Class 3R 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

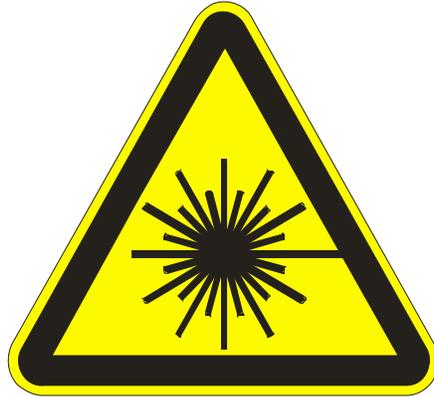


Mass:  
220 kg max

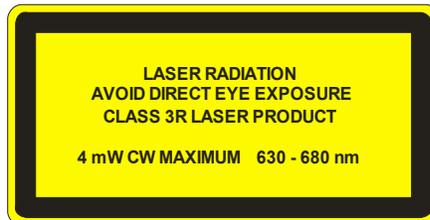
## Section 2: Safety

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- Warning Label. This label is located on the left-hand side of the machine's cabinet, beside the Certification/Identification Label.



- Explanatory Label. This label is located directly below the Warning Label above, on the left-hand side of the cabinet.



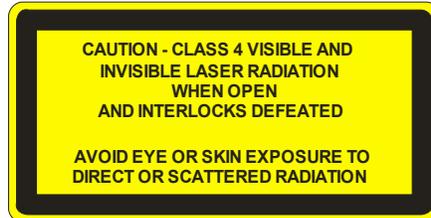
- Non-interlocked Protective Housing Safety Labels (2). One is located on the steering mirror cover inside the laser bay at the rear of the cabinet, and the other is under the cover so that it is visible when the cover has been removed.



## Section 2: Safety

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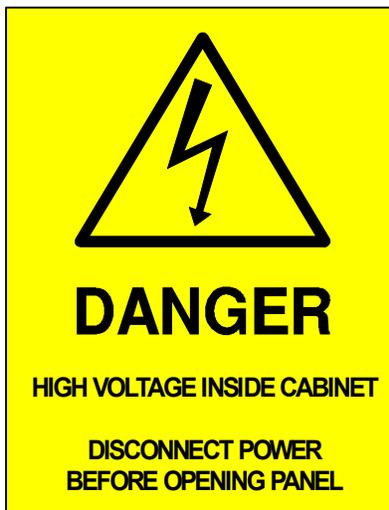
5. Defeatably-interlocked Protective Housing Safety Label. This label is located on the right side of the machine's cabinet, below the access door. A special fixture is required to defeat the interlocks on the Model 6000 product.



6. Aperture Safety Label. This label is located inside the machine's cabinet, at the right rear, above the aperture through which the engraving laser and Laser Diode Pointer beams enter the cabinet.

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

7. Electrical Safety Label. This label is located on the power supply access panel on the rear of the cabinet.



## Section 2: Safety

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8. Fire Safety Label. This label is located on the top of the laser bay cover, at the rear of the cabinet.



## *Section 2: Safety*

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# Section 3: Dos and Don'ts

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## *In This Section*

- Operating Dos and Don'ts
- 

## ***DON'T!***



***DON'T*** operate the machine without a properly operating vent to the outside! 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.

***DON'T*** engrave or cut 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 cutting PVC or Vinyl.***

***DON'T*** operate your machine unattended. 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.

***DON'T*** engrave or cut acrylic material unattended. This is a popular material to laser however its fumes are extremely flammable and cause flare up in your machine. Always watch carefully when using this material.

***DON'T*** operate with any of the covers or enclosures removed, and never modify the enclosure. The laser beam is invisible!

## ***DO***



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 Section 9 “Engraving Machine Maintenance” of this manual for specifics.

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# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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## *In This Section*

- Printer Installation
  - Network Printing
  - Parallel Printing
  - USB Printing
- 

Epilog provides a custom print driver for use with Windows XP or 2000. The driver is included in the accessories kit on a CD-ROM. The Legend print driver is the software that allows your computer to talk to your Legend laser system. In order for your computer to talk to your Legend system, you will need to make a cable connection from the computer to the Legend. There are three basic ways that you can connect your new Legend to your computer:

**Ethernet Connection.** There are several different ways of configuring your computer to use the Ethernet connection:

- You can make a direct connection from your computer to your Legend using a crossover cable (this is the only method that will be described in detail).
- You can connect the Legend to your computer and your Local Area Network without using a hub.
- You can connect the Legend to your computer and your Local Area Network using a hub.

**Parallel Connection** – Parallel cables over 10 feet in length should not be used due to the increased potential for data transmission errors.

**USB to Parallel converter cable** (available at your local computer store).

Epilog suggests that you use a crossover cable to create a direct connection from your computer to your Legend. The crossover cable has the advantage of providing faster transfer speeds, and much higher reliability than a parallel cable,

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# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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especially over long distances. The maximum length parallel cable you should use is 10 feet. The crossover cable can be run several hundred feet without loss of data.

The instructions below are written around Windows XP, but they are virtually identical for Windows 2000.

## *Network Printing - Crossover Cable to Ethernet Connection*

There are three easy steps involved in setting up the laser and computer system to operate through an Ethernet connection:

1. Setting up the Legend.
2. Setting up the computers TCP/IP. The following instructions work only for a direct connection from the computer to the Legend engraver using a Crossover cable. This procedure does not work with a hub or a server.
3. Print Driver Installation

### *Hardware Requirements*

- A 10Base-T or 10/100Base T Ethernet network card installed in your computer.
- A crossover network cable connecting the network card to the Legend.
- Warning! - The crossover cable looks exactly like a standard straight-through network cable, but they have different purposes for making network connections. Normally, the crossover cable should only be used when connecting the Legend directly to your computer. Ask your network administrator for assistance if you are unsure of which type of cable you have. It is a good idea to place a tag or label on the cable indicating if it is a crossover cable or straight-through cable.



# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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## Laser Setup

1. From the Legend's LED menu: **OPTIONS | NETWORKING** and set the display to the following:

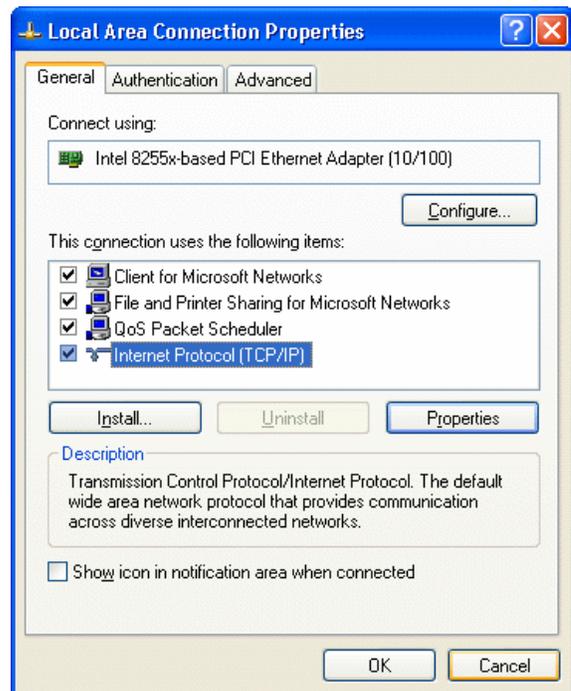
IP Address	192 168 3 4	(The IP Address can be almost any number)
Subnet Mask	255 255 255 0	
Gateway Address	0 0 0 0	

2. Press **ENTER** on the keypad
3. Press **OPTIONS | SAVE SETTINGS** and press **ENTER** on the keypad
4. Reboot the Legend: **SERVICE | REBOOT**

## Computer TPC/IP Setup

Settings on the computer running XP/2000: If at any point in the following process, if the computer suggests rebooting, do it and then continue.

1. From the Start menu at the bottom of your screen select **START | CONTROL PANEL | NETWORK CONNECTIONS**
2. Double click on **LOCAL AREA CONNECTION**. The following window will appear.
3. Highlight **INTERNET PROTOCOL (TCP/IP)**. As shown on the right.
4. Then click on the **PROPERTIES** button.



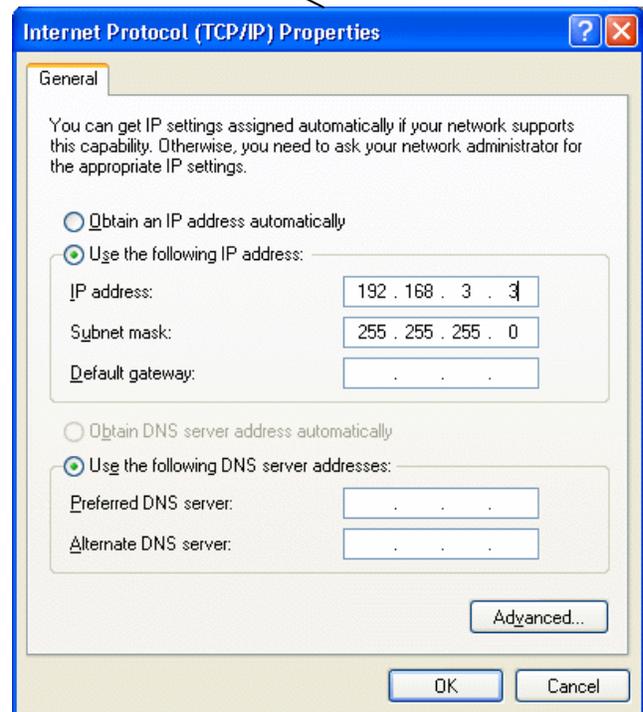
# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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5. The following window will appear. Select Use the following IP address radio button.
6. Type in the following (leave everything else blank on this page)

IP Address            192 168 3 3  
Subnet Mask        255 255 255 0  
Gateway Address    0 0 0 0

7. (This setting is not an error --the last digit of the IP address in this window must be different than the IP address set in the Legend. All other numbers must be the same)
8. Click the **OK** button
9. Click another **OK** button.



# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

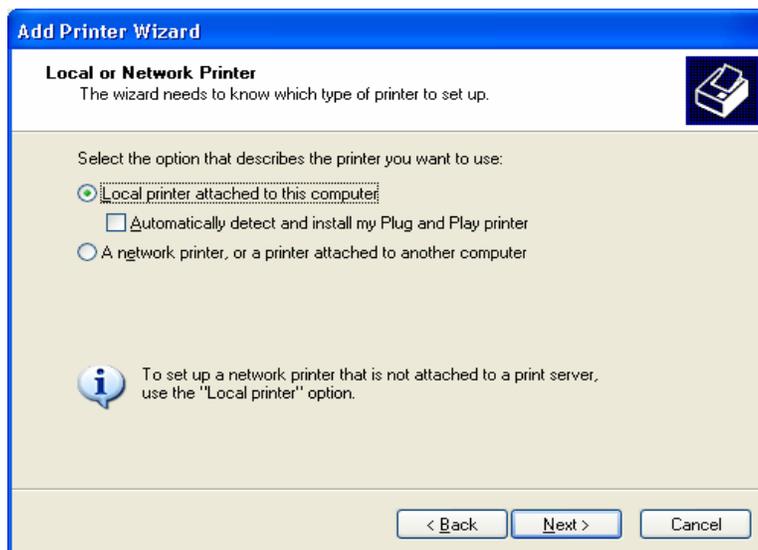
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## Print Driver Installation

1. Click the **START** button in the lower left hand corner of your computer screen.
2. Click on **CONTROL PANEL**, which is usually located about half way up on the right side of the window.
3. Click on the **PRINTERS AND FAXES ICON**.
4. Click on **ADD PRINTER**. The following windows will appear.



Click the **NEXT** button to continue



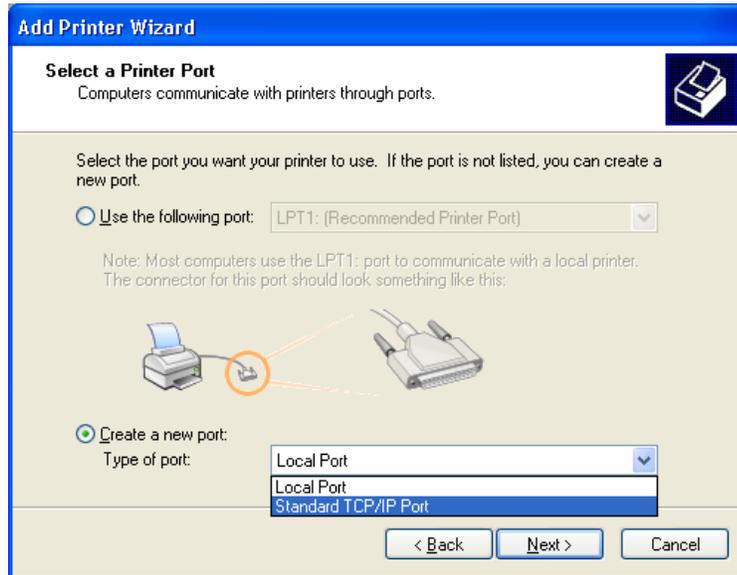
Select **LOCAL PRINTER ATTACHED TO THIS COMPUTER**

Deselect **AUTOMATICALLY DETECT AND INSTALL**

Click on **NEXT** to continue.

# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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To install the driver onto an Ethernet connection, select **CREATE A NEW PORT:**

Under the Type of port: Use the scroll arrow and select **STANDARD TCP/IP PORT**

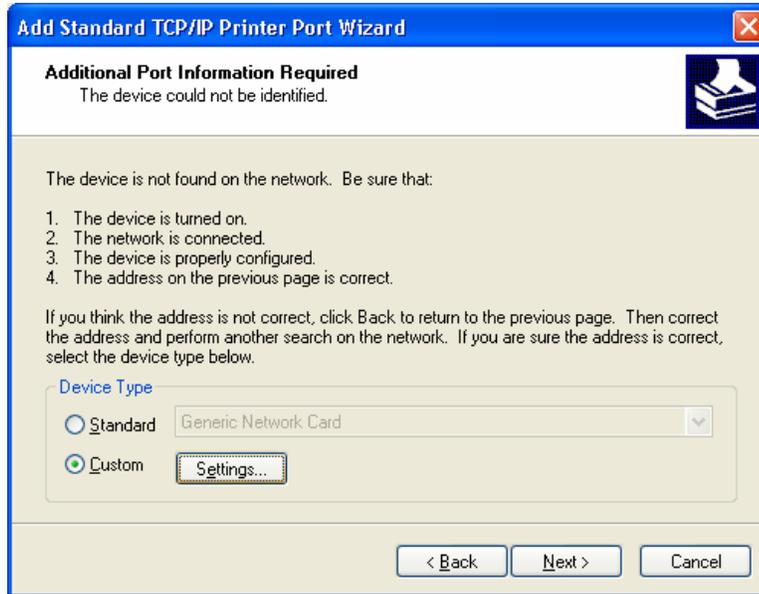
Click **NEXT** to continue.



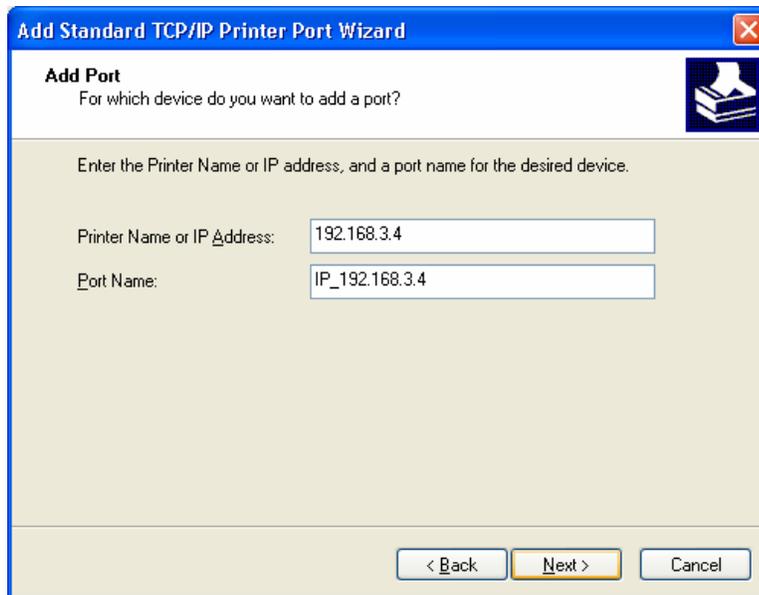
Click **NEXT** to continue.

# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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Click *CUSTOM*, and then click *SETTINGS...*

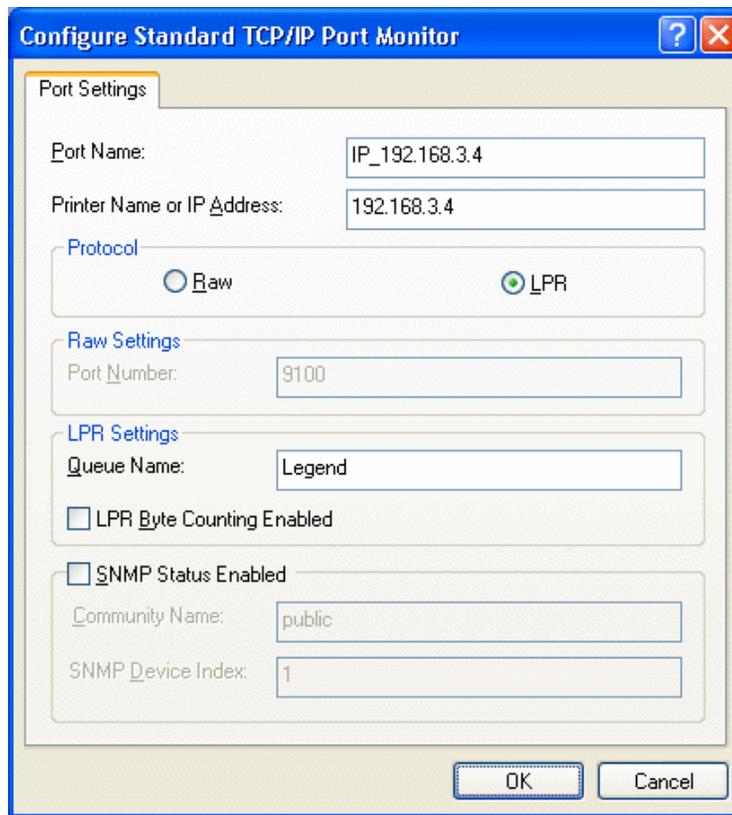


Enter the IP address.

This IP address must be different than the IP Address that you set in the TCP/IP settings above.

This IP Address must match the IP Address that you set in the Legend under *OPTIONS | NETWORKING*.

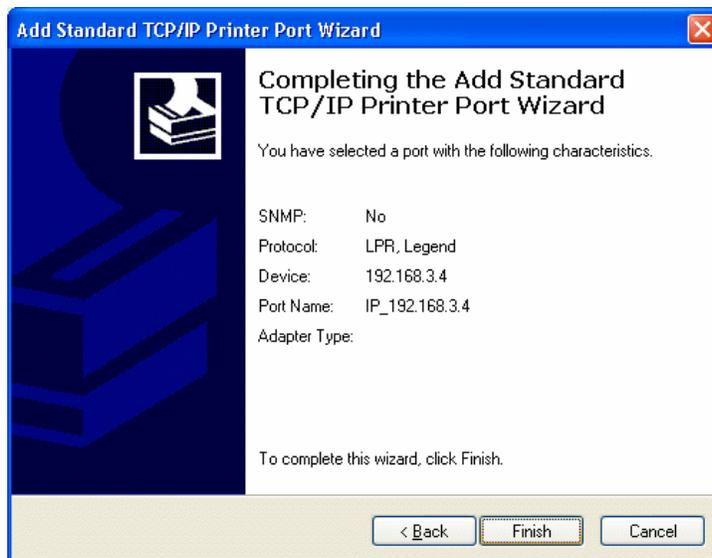
# Section 4: Connecting And Configuring Your Computer – Print Driver Installation



Set Protocol to **LPR**. This is a very important step. Your download time will be greatly increased if LPR is not selected.

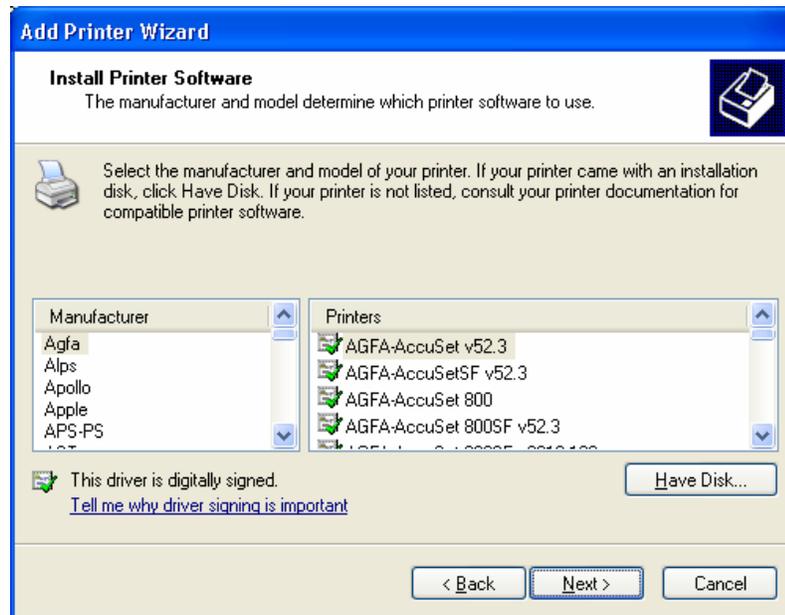
Type “**Legend**” in the Queue Name box.

It is important that you use an upper case “**L**”.



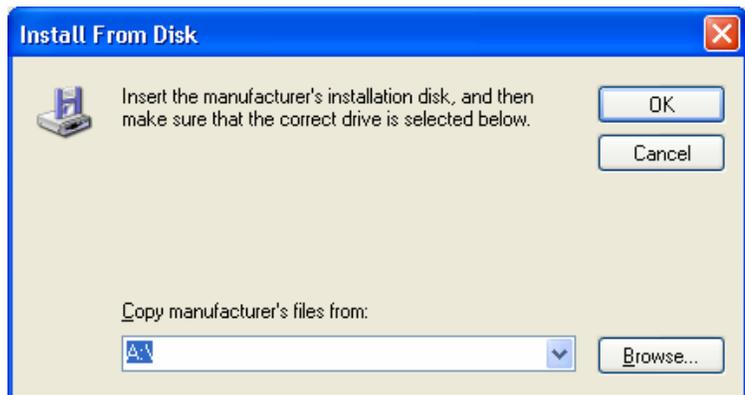
Click **FINISH** to continue.

# Section 4: Connecting And Configuring Your Computer – Print Driver Installation



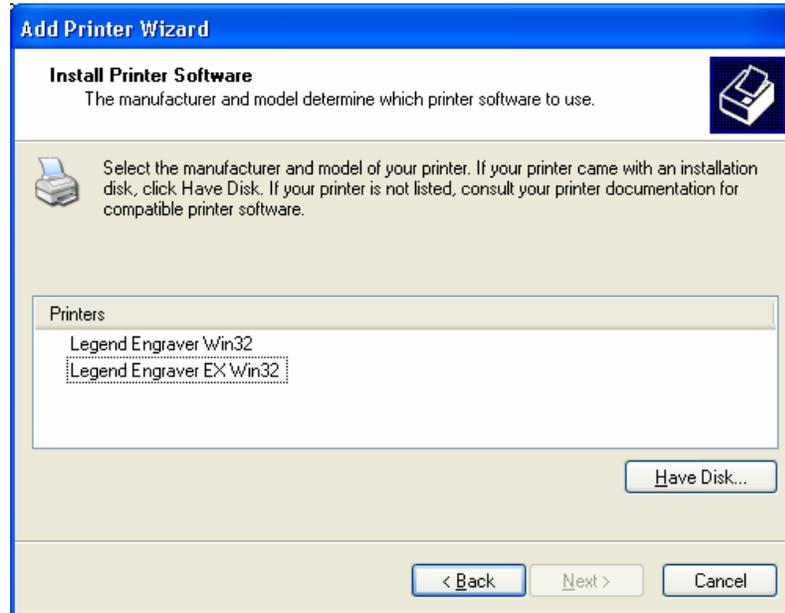
Click **HAVE DISK...**

Make sure the Legend EX CD-ROM is in the computer's drive. Click Browse and select the CD Rom Drive then click **OK**.



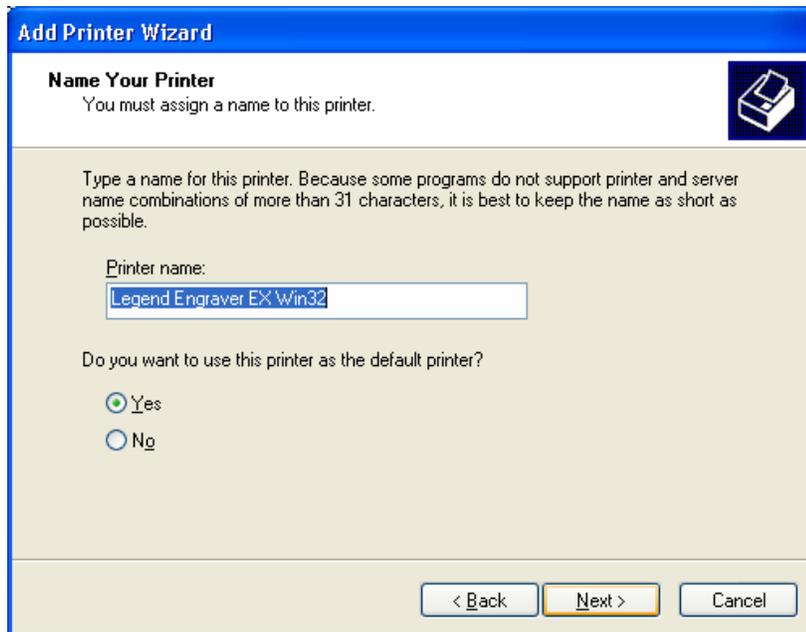
# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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Select “*Legend Engraver EX Win32*” driver.

Select *NEXT* to continue.



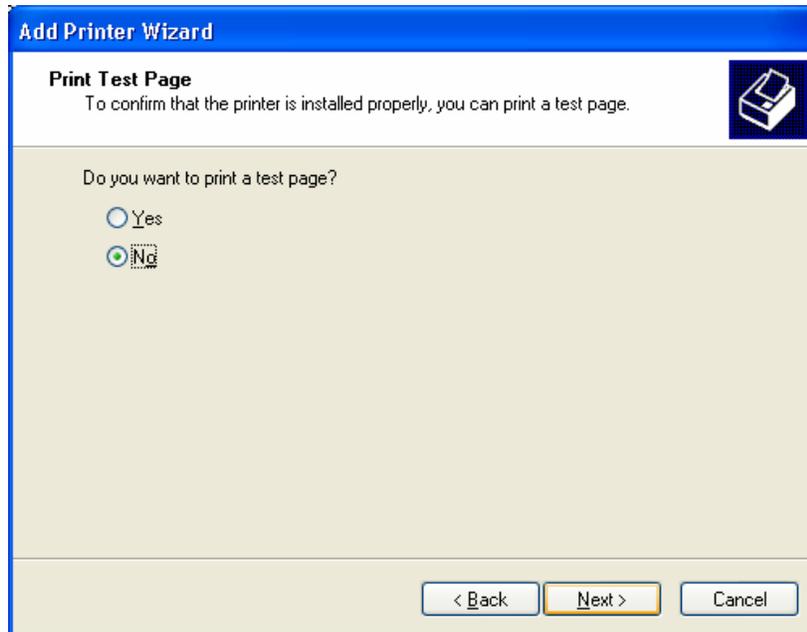
Provide your printer a name.

Determine if you want it to be your default.

Click *NEXT* to continue.

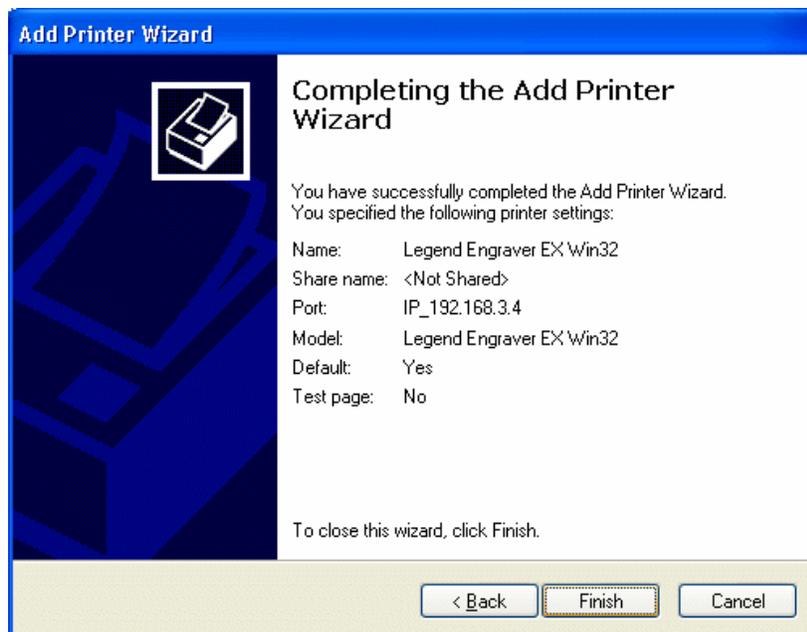
# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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Do not print a test page.

Click **NEXT** to continue.



Click **FINISH** to continue.

## Section 4: Connecting And Configuring Your Computer – Print Driver Installation

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While the Legend EX print driver has not been tested by Microsoft, continuing will not impair or destabilize your system.

Click **CONTINUE ANYWAY** to continue.

That's it! Your printer driver is installed on your computer and you can now print to your Legend EX laser system.

# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

---

## Parallel Printing

### Installation

1. Click the **START** button in the lower left hand corner of your computer screen.
2. Click on **CONTROL PANEL** which is usually located about half way up on the right side of the window.
3. Click on the **PRINTERS AND FAXES** Icon.
4. Click on **ADD PRINTER**.
5. Follow Steps 1-3 above in the “Add Printer Wizard” instructions for adding the Legend EX driver to your computers LPT (parallel) port. In step three above select “**USE THE FOLLOWING PORT**” LPT1 (Recommended Printer Port) instead of “Create a New Port”.
6. Skip Steps 4, 5, 6, 7, and 8 above when installing a parallel port.
7. Follow Steps 9 to 13 to complete the parallel port installation of the driver.

## USB Printing

If you wish to use your computers USB connection for printing, you will need a USB to Parallel converter cable. These can be purchased at your local computer supplier. The USB to parallel cable has a USB connector on the end that is connected to your computer. The other end is a parallel connector that is connected to the Legend.

### Installation

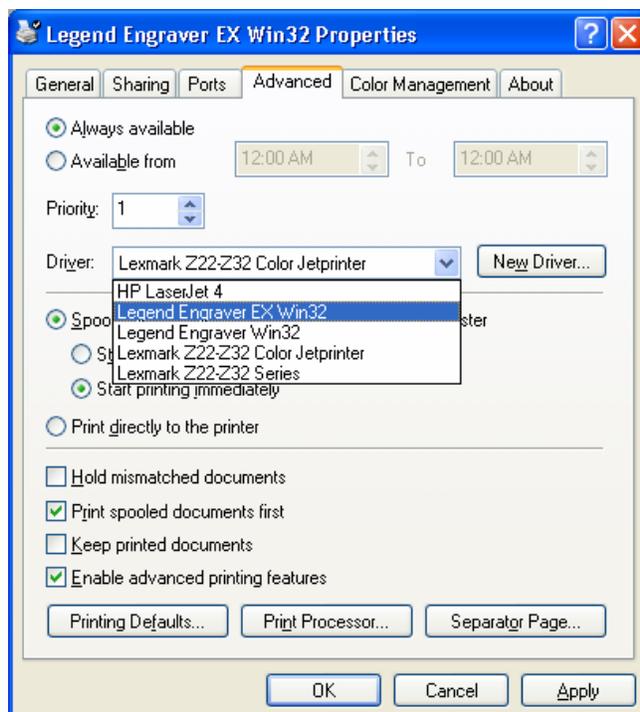
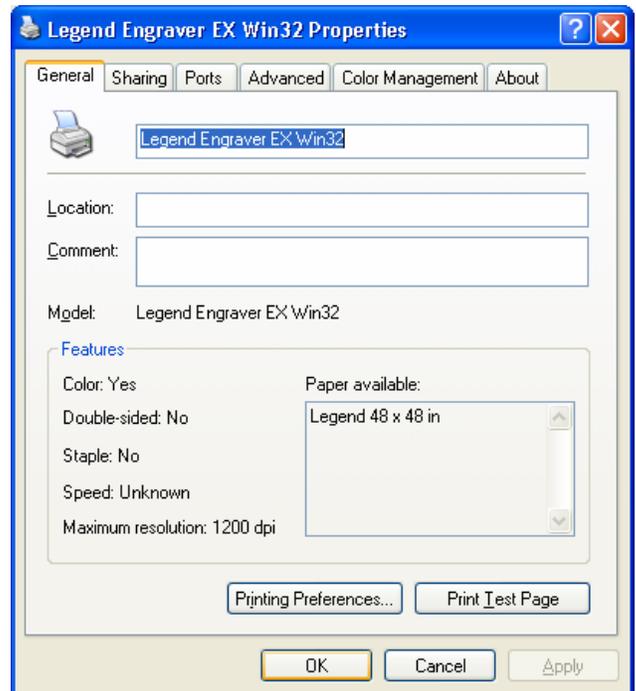


**NOTE** – Most people find it easier to install the driver before they plug the USB to Parallel cable into the computer. The instructions below assume the following order of operations:

- Install the Legend EX driver to LPT1
  - Connect the USB to Parallel cable to your computer and the Legend EX.
  - Configure the USB port.
1. Install the Legend EX print driver to LPT1:

# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

- a) Follow the instructions above for installing the Legend EX print driver to the parallel port.
2. Connect the USB to Parallel cable to your computer and the Legend EX.
3. Configure USB Port.
  - a) After the driver is installed to the parallel port and the cable is installed, click the **START** button in the lower left hand corner of your computer screen.
  - b) Click on **CONTROL PANEL**.
  - c) Click on the **PRINTERS AND FAXES ICON**.
  - d) Highlight (single click) the Legend Engraver EX Win32 driver icon.
  - e) Right click the highlighted icon.
  - f) Scroll down to Properties and click once. The following screen appears:
    - 1)



Click on the **ADVANCED** tab.

Go to the **DRIVERS** box and select the Legend Engraver EX WIN32 driver.

Click **APPLY**.

# Section 4: Connecting And Configuring Your Computer – Print Driver Installation

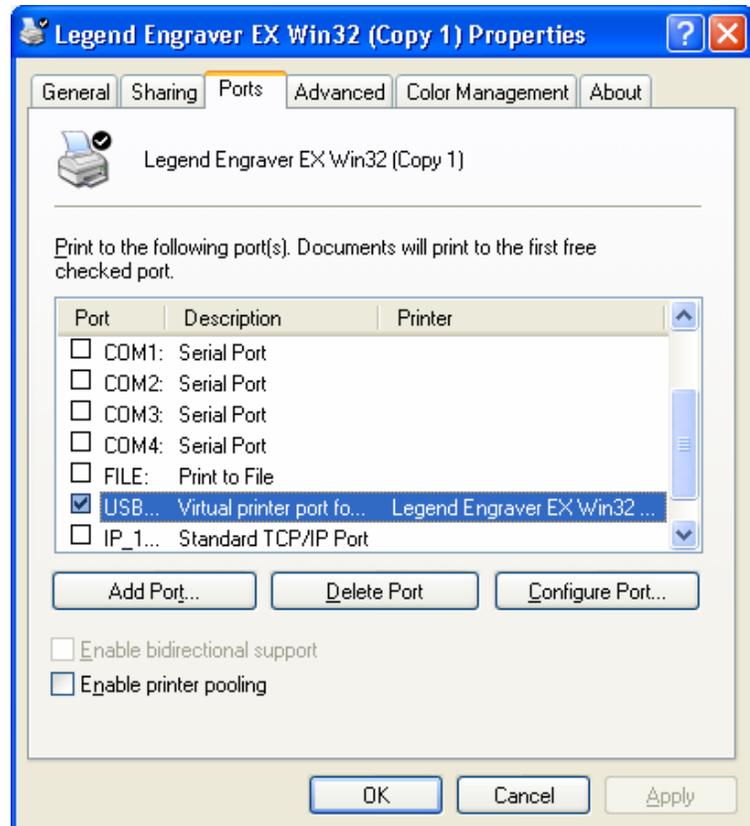
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Click on the **PORTS** tab.

Use the slider bar to access the “**USB001 Virtual printer port for USB**”

Make sure there is a checkmark in the box next to “**USB001**”

Click on **OK**.



You're now setup to print to the USB port.

***Section 4: Connecting And Configuring Your  
Computer – Print Driver Installation***

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# Section 5: Configuring CorelDraw

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## *In This Section*

- Print Settings within CorelDraw 10
  - Color Mapping
  - Installing and Using the WIN XP/2000 EX Print Driver with Corel 9
- 

Many Legend users use Corel 9 or Corel Essentials as their drawing software package. Corel 9 and Corel Essentials are essentially the same software, with only very minor differences between the two. You will limit the number of printing problems and get the most out of your laser if you make the following settings changes in CorelDraw 9 and Corel Essentials.

## *Print Settings within Corel 9 or Corel Essentials*

1. Open CorelDRAW
2. Place something on the page or open a file. Print preview in step 4 will not be available if the page in Corel is blank.
3. Click on pull down menu **FILE**
4. Select **PRINT PREVIEW**
5. Click on pull down menu **SETTINGS**
6. Select **PRINTING PREFERENCES**
7. Select **DRIVER COMPATIBILITY** from the tree
8. Select the “**Legend Engraver EX Win32**” as the printer
9. Under settings specific to this driver, uncheck all of the boxes next to the settings below:
  - All text as graphics
  - Use software clipping for fills
  - Output bitmaps in 64 chunks
  - Send beziers and paths to driver
  - Send bands to driver
  - Use color profile for composite

## Section 5: Configuring CorelDraw

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- Click **OK** so that the settings are saved.
10. Close out of print preview and all settings should now be saved.

### *Print Settings within CorelDraw 10*

#### Print Setting for Corel 10 for XP Driver

1. Open Corel 10
2. Place something on the page or open a file. Print preview in step 4 will not be available if the page in Corel is blank.
3. Click on the pull down menu **FILE**
4. Select **PRINT PREVIEW**
5. Click on pull down menu **SETTINGS**
6. Select **PRINTING PREFERENCES**
7. Select **DRIVER COMPATIBILITY** from the tree
8. Select the “**Legend Engraver EX Win32**” as the printer
9. Under settings specific to this driver, uncheck in the box next to the setting below:
  - All text as graphics
  - Use software clipping for fills
  - Output bitmaps in 64 chunks
  - Send beziers and paths to driver
  - Send bands to driver
10. Click **OK** so that the settings are saved for that driver.
11. Close out of print preview and all settings should now be saved.

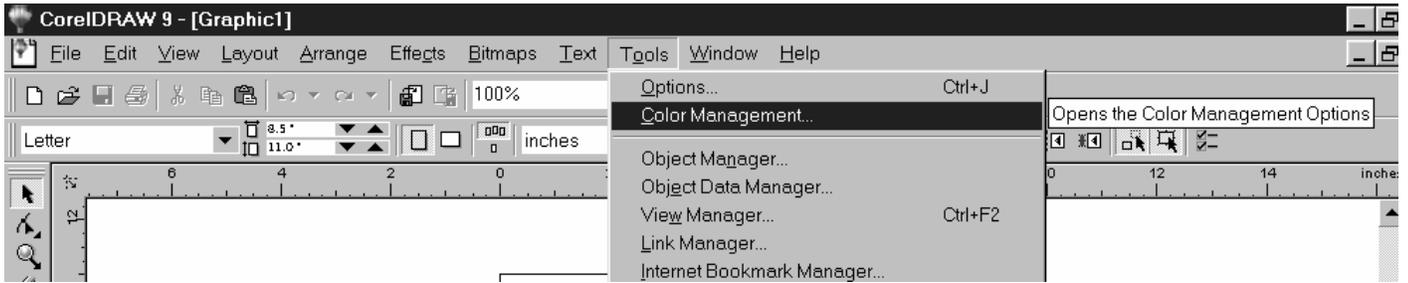
### *Color Mapping*

There is one setting that needs to be set within CorelDRAW 9 in order for the Vector Color Mapping feature to work properly.

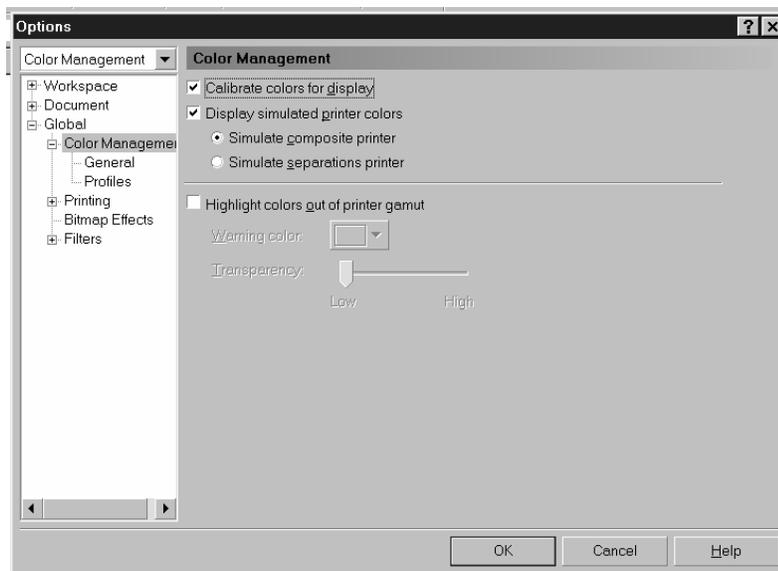
#### *Corel 9 Setup for Corel Color Mapping*

1. Click on the **TOOLS** menu on the Corel menu bar.
2. Click on **COLOR MANAGEMENT**.

# Section 5: Configuring CorelDraw



The Color Management fly out defaults to the following:

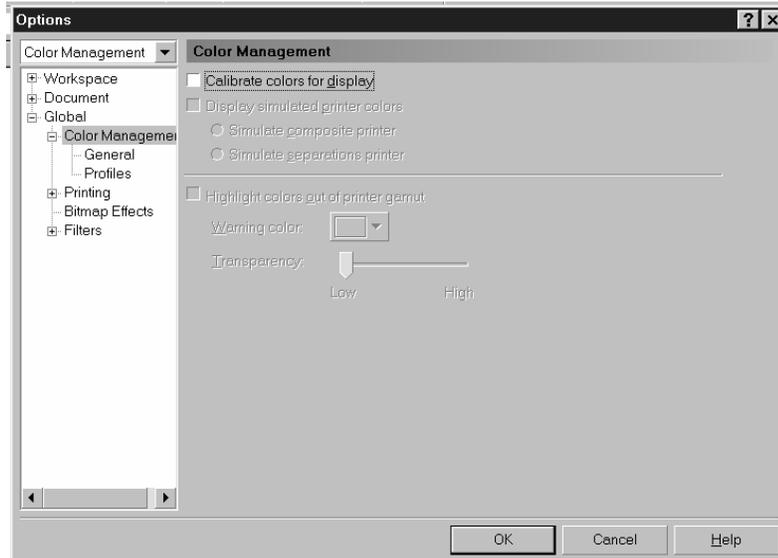


3. Deselect “*Calibrate colors for display*”.

## Section 5: Configuring CorelDraw

---

Once “*Calibrate colors for display*” is deselected the Color Management fly out will look like the following:



4. Click **OK** and that's it. With “*Calibrate colors for display*” deselected you will be able to Color Map vectors in Corel 9.

## *Installing and Using the Win Xp/2000 Ex Print Driver with Corel 9*

There is a possibility that installing the Legend print driver will cause raster engraving errors when you print from Corel 9. Depending on how Corel 9 was installed on your computer determines if the error will appear. A “*Typical*” install of Corel 9 may cause the error depending on the version of Corel that was installed. If you performed a “*Custom*” install, it is unlikely that you will see the error. There is file that the “*Typical*” installation does not install onto your computer that is automatically installed when a “*Custom*” install is performed.

You **MUST** reinstall Corel 9 if you have raster engraving errors when printing from the Win XP/2000 driver or upgrade to Corel 10 or 11 .

The image below shows the raster engraving error that you will see. The error is a series of dots that extend to the edge of the page that you are engraving.

## Section 5: Configuring CorelDraw

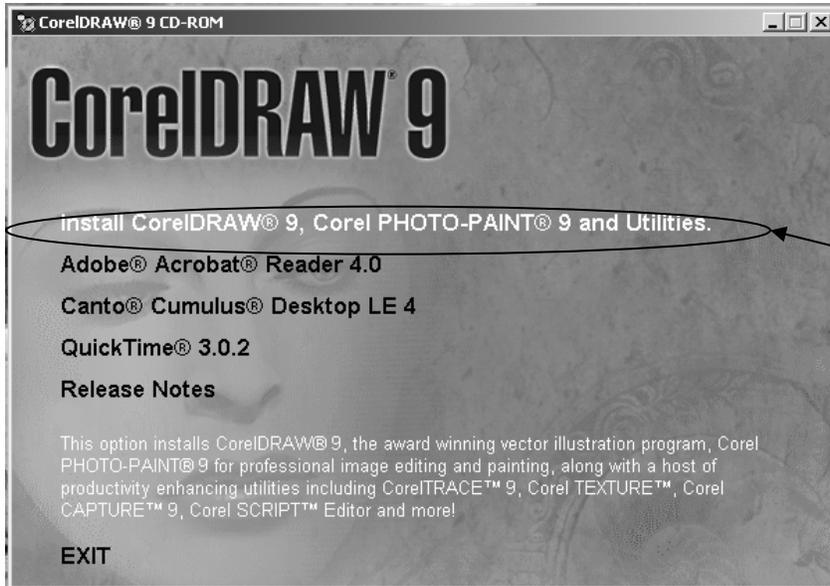
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# Laser

### *To reinstall CorelDRAW 9 onto your computer*

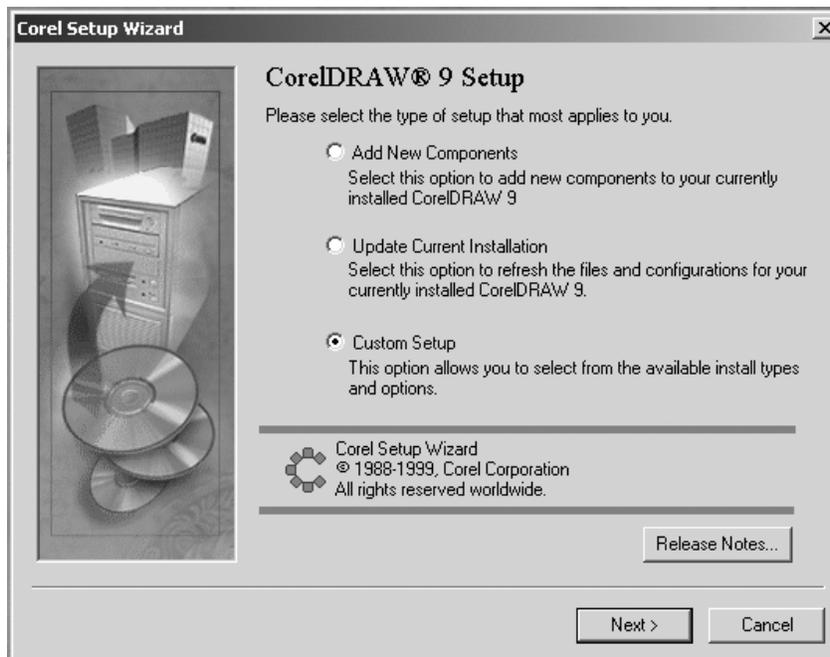
1. Insert the CorelDRAW 9 Disk 1 into the CD Drive on your computer. The Autorun feature should open the CorelDRAW 9 Installation Program automatically. If autorun is not enabled:
  - a) Click the **START** button in the lower left hand corner of your computer screen.
  - b) Click on **RUN**.
  - c) Click on **BROWSE**
  - d) Select your CD ROM Drive, then Click on the file "**Intro.exe**"
  - e) Click on **OPEN** then Click on **OK**

# Section 5: Configuring CorelDraw



The following windows will appear.

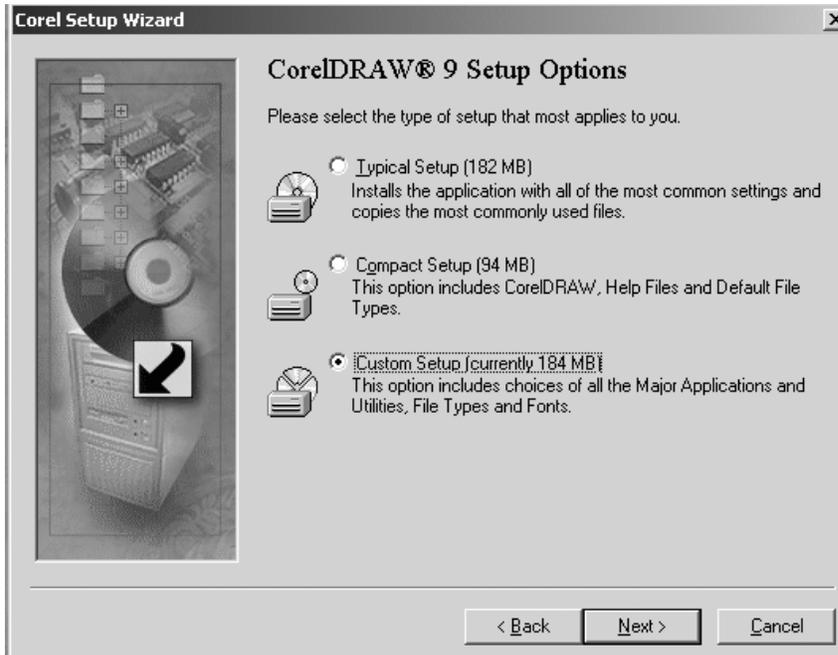
Point and Click the “*Install CorelDRAW 9, Corel PHOTO-PAINT 9 and Utilities selection.*”



Select *CUSTOM SETUP.*

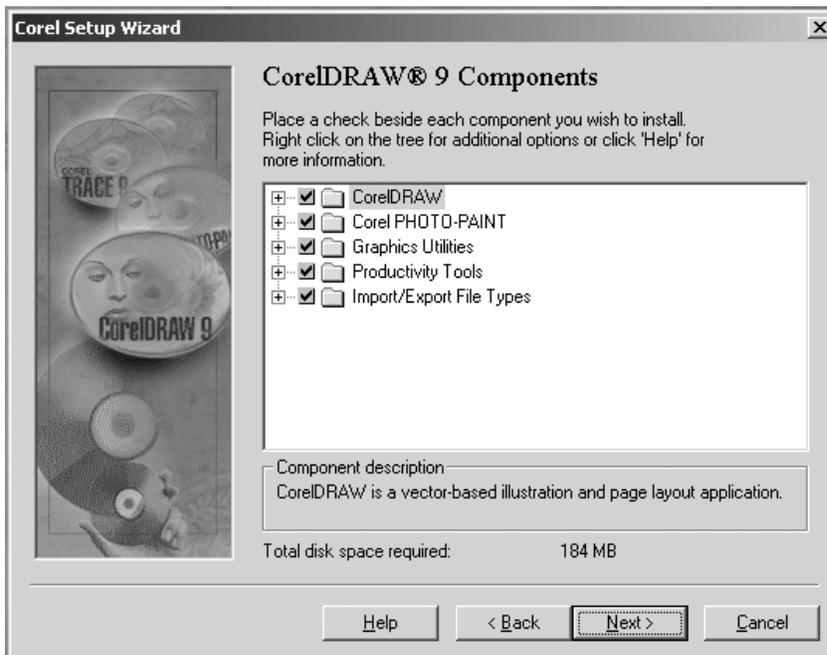
Then Click *NEXT*

# Section 5: Configuring CorelDraw



Select “*Custom Setup (currently 184 MB)*”

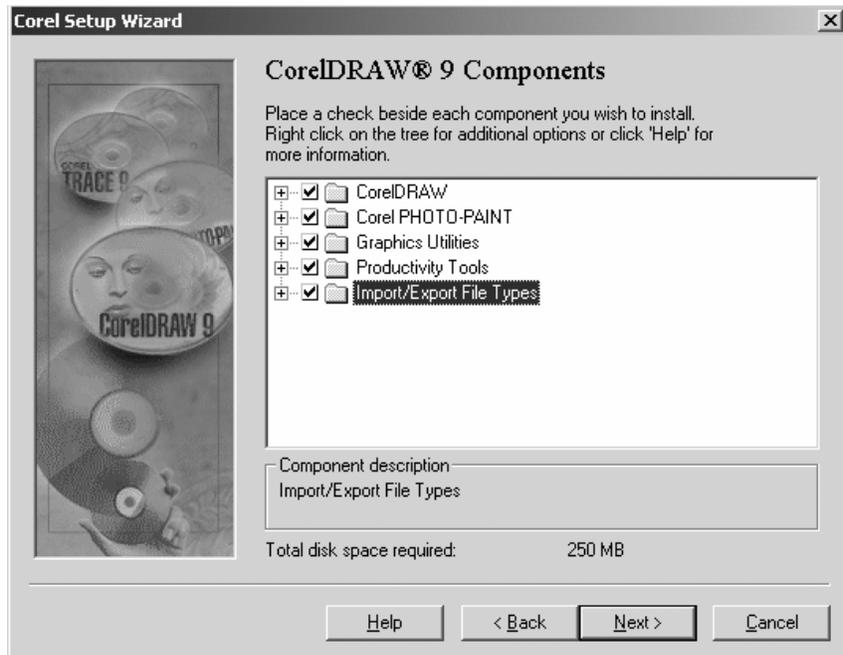
Then Click *NEXT*



This window will appear. All of the items look like they are checked; however, the *check mark is in a shaded square*. These *need to be checked again*. To recheck each item point and click on each check mark until all checks are in white squares as shown in the following window.

## Section 5: Configuring CorelDraw

---



When all five items are checked correctly as shown,

Click **NEXT**.

This window is the most critical piece of reinstalling Corel 9. Continue working through the Corel Setup Wizard until the finish. Once these selections have been made, you finish the rest of the setup to your liking without affecting the lasers performance.

# Section 6: Using Your Legend System Quick Setup

---

## *In This Section*

- Artwork Setup
  - Job Setup
- 

Your Legend EX system is ready to use once you have followed the steps in Sections 1 – 5. To get started quickly and run a sample piece of material on your new Legend, the following is a very quick setup guide to describe the general steps for running a first job. A detailed set of instructions for each step of the process follows this quick setup guide:

1. Set up a simple piece of artwork in your software program (i.e. CorelDRAW).
2. Turn on the power to your Legend and wait for a “Beep” to note the machine is ready.
3. Turn on your exhaust.
4. Place your sample material on the table in the upper left corner (make sure the table is low enough to accommodate the material).
5. Manually focus (or set Auto-Focus to “**YES**” when you print from the Epilog print driver).
6. Close the door.
7. Go to **FILE | PRINT**. Make sure your Printer Destination is the “**Legend EX**” and go to preferences and set the Speed, Power, etc, then “**PRINT**” the page to your Legend.
8. Select **JOBS** on the Legend LCD Display Panel.
  - a) Press **ENTER** to show the jobs that are in the Legend print Queue.
  - b) Use the scroll arrows to highlight the job you want to print. Press **ENTER** to select it.
  - c) Press **ENTER** one more time to run the job you have highlighted.
9. **Alternate Printing Method** – If you want the job to start immediately upon reception by the laser, press the **GO** button on the Legend keyboard **before** printing the job. This step will allow you to bypass selecting the job from the **JOBS** menu.

# Section 6: Using Your Legend System Quick Setup

## Artwork Setup

Create your job in the graphics software of your choice, (for example – CorelDraw). There are two different modes of operation for the laser and the way you setup your artwork will determine if you raster engrave or vector cut:

Raster engraving can best be described as very high resolution dot matrix "printing." 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, or line drawings. Use your imagination and creativity.

### Raster Engraving



**Note:** *thin outlines in clip-art may vector cut rather than raster if thin enough. If you only want to raster make sure you select Raster mode in the Legend print driver.*

Different from raster engraving, vector cutting is a continuous path that follows the outline, or profile, of an image. Vector cutting is normally used to cut completely through materials such as wood, acrylic, paper, etc. It can also be used for quick marking of characters and geometric patterns. You can vector cut by setting objects and text to be unfilled and drawn with a 0.001-inch outline. The thin outline will produce a vector cut. When vectoring, cover your engraving table with either a piece of sheet metal or a Vector Grid to protect the table from laser marking. For more information on vectoring read "Section 7, Using the Legend Print Driver" of this manual.

### Vector Cutting



“LEGEND” – Vector Cut on

# Section 6: Using Your Legend System Quick Setup

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## Job Setup

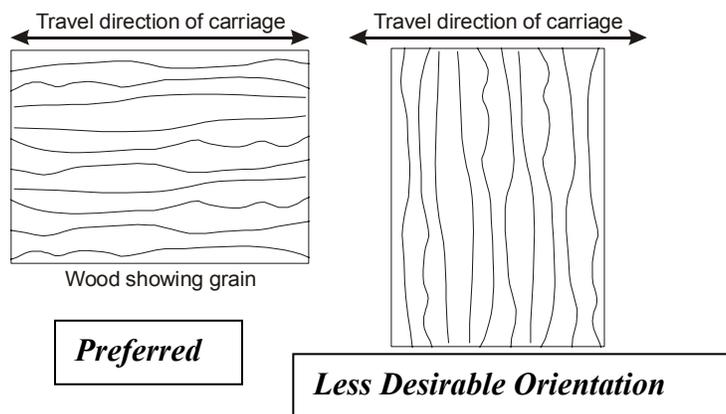
Your Legend laser system has a prime reference point that is in the upper left corner of the laser table. This is the 0,0 (zero, zero), or “Home” position. All artwork and material placement is referenced from here. Keep this 0,0 point in mind when measuring and setting up your work.

### Artwork Orientation

Landscape or Portrait – Normally a job will engrave faster if it is run in landscape mode. You may want to setup your artwork in portrait mode and rotate both the artwork and your page 90 degrees before printing to the Legend.

### Material Orientation

Some materials such as wood or plastics with a grain (brushed look) will look nicer when engraved if the grain of the material runs parallel with the X-stroke of the carriage. The orientation of material without a grain pattern is usually not important.



# Section 6: Using Your Legend System Quick Setup

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## *Piece and Page Size*

Many users like to create their artwork on a page size in Corel 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 Print Driver 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 print driver every time they print something new. They prefer to use a page size that matches the table size (32 x20 (812 x 508 mm) for instance) 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 you can hold it in place with a variety of materials such as masking tape, PlayDoh, magnets, etc. Creating jigs is also an excellent method of holding materials that are high volume, or high value. Engraving or cutting a jig to match an unusual shape is very easy to do.

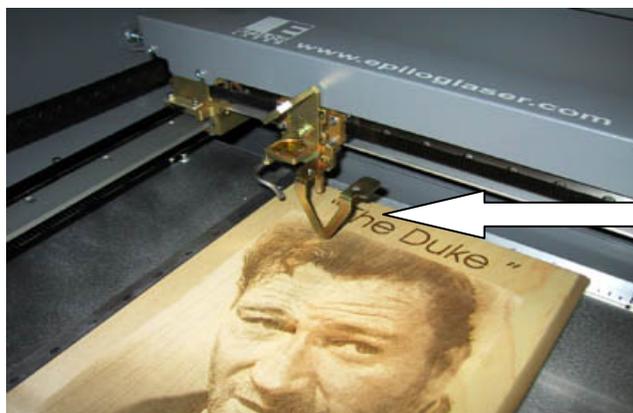
## Section 6: Using Your Legend System Quick Setup

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### *Focus on your material*

#### Manual Focus

A “V” shaped metal focus gauge is provided to determine the correct distance from the work piece to the focus lens. The focus gauge is included in the accessory kit. Load your material onto the table. If it is thick enough to run into either the focus gauge or the air assist tube, press the **STOP** button before focusing. Pressing the **STOP** button will allow you to lower your table using the **JOG/SHUTTLE KNOB** without moving the head from the park position. Place the focus gauge on the lens carriage.



Manual Focus Gauge



***CAUTION!*** – ***Lower the table before manually focusing.*** When the laser system is idle, the carriage is “parked” in the back of the upper left corner. While this park position facilitates easy material placement, it does not allow the focus gage to touch the work piece. Pressing the **FOCUS** key on the Legend keyboard will automatically move the carriage forward an inch (254 mm) and to the right two inches (508 mm) to locate it in the manual focus position. If you have placed anything in the upper left corner of the table that is taller than the bottom of the carriage, the carriage may collide with the piece when it attempts to move to the manual focus position. Take the material out of the laser and lower the table to a point where the material will clear the bottom of the carriage when you put it back in to manually focus.

# Section 6: Using Your Legend System Quick Setup

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Turning the jog/shuttle knob raises or lowers the table to move your work piece closer to, or further from, the fixed focus lens. The table should be raised just to the point where the manual focus gauge touches the work piece. Remove the gauge when you are done focusing.

Pressing the Reset button twice will move the carriage back to its park position and restore the control knob to the menu. You can begin engraving from either the park position or the manual focus position. The position of the carriage will not affect the position of your artwork.

If the item has a taper, pick an intermediate point between the highest and lowest points being engraved. 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 1/8th of an inch (3 mm), the image will begin to look “fuzzy” or out of focus.

## Auto Focus

Most users prefer to use the Legend’s Auto Focus capability for focusing.

Set the Auto Focus on your computer in the print properties window of the Legend print driver: “Yes” will enable the auto focus, “No” will disable auto focus. When a job is started and auto focus has been enabled the carriage will move from its park position to the point of first engraving or cutting. Because the carriage moves to the start point before anything else happens, it is necessary to have enough clearance between the bottom of the carriage and the top of the work piece so the work piece and the carriage do not collide. Once the carriage is in position, the table will automatically move up until the auto focus plunger is activated. The table will then move down until it is the correct distance from the focus lens. As soon as the focus position has been set, engraving or cutting will begin immediately.

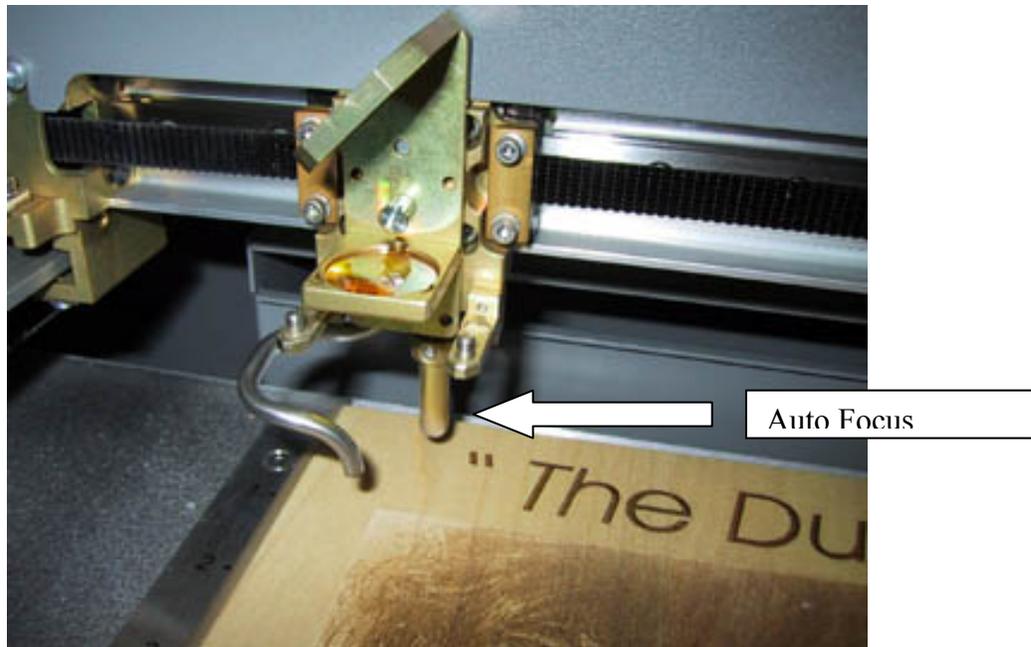


*Note: Please be careful when auto focusing on irregularly shaped items. The auto focus plunger must clear all edges of the work piece in this situation also.*

## Section 6: Using Your Legend System Quick Setup

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Your Legend EX Auto Focus system works automatically with any of the three standard lenses (1.5, 2.0 and 2.5) without the need for user compensation.



## ***Section 6: Using Your Legend System Quick Setup***

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*Manual*

***Basic Operations and  
Maintenance***

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# Section 7: Using the Epilog Legend Print Driver

## *In This Section*

- General
- Vector
- Raster
- More Options
- Changing Print Driver Defaults

The Epilog Legend EX print driver allows you to control the laser's functions from your computer. The Legend EX print driver is found on the driver CD in your accessories box. This is the driver for both engraving and cutting materials.

The "Legend Engraver" print driver setup window is shown below.

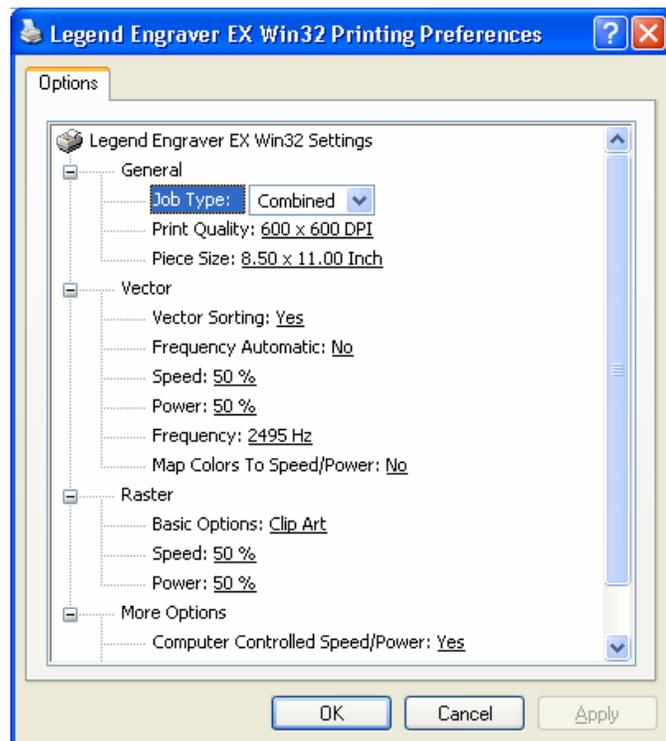
## *General*

### *Job Type*

Job type allows you to designate whether you want to engrave in Raster Mode, cut in Vector mode or perform both operations in a single setup in Combined mode.

### *Raster*

Raster mode is used for marking or engraving materials. Typical uses would be reproducing



## Section 7: Using the Epilog Legend Print Driver

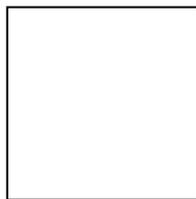
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clipart, scanned images, photos, text and graphic images. The Raster Speed and Raster Power boxes will be enabled when you have selected Raster under Job Type. Set the Speed and Power boxes to the appropriate settings for the material that you are engraving. Guidelines for recommended Speed and Power are given in Section 10 of this manual.

### Vector

Vector mode is normally used to cut or make a thin line drawing. You can use vector mode to cut through acrylic or wood, mat board, plastic, cork, paper, etc. The Vector Speed, Power and Frequency bars will be enabled when you have selected Vector under Job Type. Set the Speed and Power boxes to the appropriate settings for the material that you are cutting. Speed and Power recommendations for various materials are located in Section 10 of this manual. Frequency sets the pulsing interval. If you set it to a very low value (less than 100), the laser will turn on and off using discrete pulses to produce a perforated edge as opposed to an edge cut completely through. Higher settings (above 2500) are useful for cutting materials such as acrylic where you want to melt the edge of the material.

When using vector mode, it is necessary to design your job to give the intended result. Objects and text should be unfilled and drawn with the thinnest possible outline (other than zero), as shown below. A .001 inch (.025 mm) is recommended.



**VECTOR**

CORRECT SETUP



**VECTOR**

INCORRECT SETUP

# Section 7: Using the Epilog Legend Print Driver

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## Combined

- “Combined” mode is used when you want to incorporate both Raster and Vector functions in the same job setup. When you are in Combined mode, all Raster operations will be performed first, with the Vector operations second.



*Note on Vectors: If you are in Vector or Combined mode, all thin lines of .007 inch (.175 mm) will be vector cut! This can be disconcerting, because even if the lines are not visible in your artwork they will still cut. Usually, this happens when incorporating a clipart image that has hidden lines that are not readily apparent.*

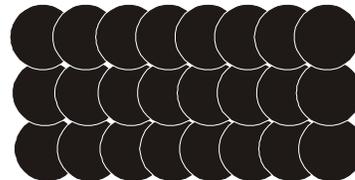
## Print Quality

Resolution is a measure of the image quality that can be achieved with a laser engraver. 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. The higher the resolution, the finer the detail that can be achieved. The Legend line of laser systems can engrave at resolutions ranging from 75 to 1200 DPI. 300 DPI is normally a minimum for production work. 400 DPI will produce excellent results and 600 or 1200 DPI should be used when exceptional quality is required. The greater the number of lines per inch, the greater the engraving time required.

Speed and Power settings are dependent on resolution setting. For example, there is greater overlap of each raster line at 600 DPI than there is at 300 DPI. The additional overlap at 600 DPI has the effect of lasering over more of each line twice. This means that on material like wood, you will notice a greater depth of engraving at 600 DPI than you will at 300 DPI if you use the same Speed and Power settings. The Speed and Power recommendations in Section 10 take this into account for different DPI settings.



*600 DPI*



*300 DPI*

# **Section 7: Using the Epilog Legend Print Driver**

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## *Piece Size*

Many users like to create their artwork on a page size in Corel 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, set the Piece Size dimensions 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 every time they print something new. They prefer to use a page size that matches the table size (32 x20 (812 x 508 mm) for example) 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.

Generally, jobs will print faster given a smaller page size, even if the size of the image is the same. To edit the Piece Size click on the underlined numbers to the right side of "PIECE SIZE:"

## *Vector*

### *Vector Sorting*

A "YES" in the vector sorting box will reorder the sequence of vector cuts. If sorting is enabled, vectors will cut from the inside out. As an example, if you have a small circle surrounded by a large circle, the small circle will cut first. If sorting is disabled, the vectors will cut in the order in which they are presented, which with most software applications will mean in the order they were drawn. This definition applies to vector only jobs.

# **Section 7: Using the Epilog Legend Print Driver**

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## *Frequency Automatic*

The laser frequency, or “pulsing”, can be manually set or set to “Frequency Automatic”. When “Frequency Automatic” is set to “Yes”, the engraver’s software will automatically adjust the pulsing of the laser to a value of 5000. If “Frequency Automatic” is set to “No” you can control the pulsing of the laser in the “Frequency” box. Suggested frequencies are included in the tables showing suggested Speed and Power settings. The frequency range is 1 to 5000. Setting the frequency at a low value (50 to 100) will produce a perforation. Midrange values are use to reduce over burn when cutting, and high values are often used when more heat is desired to melt the sides when cutting acrylic

## *Speed*

Set the speed from your computer from 1 to 100%. The slower the speed, the deeper the cut.

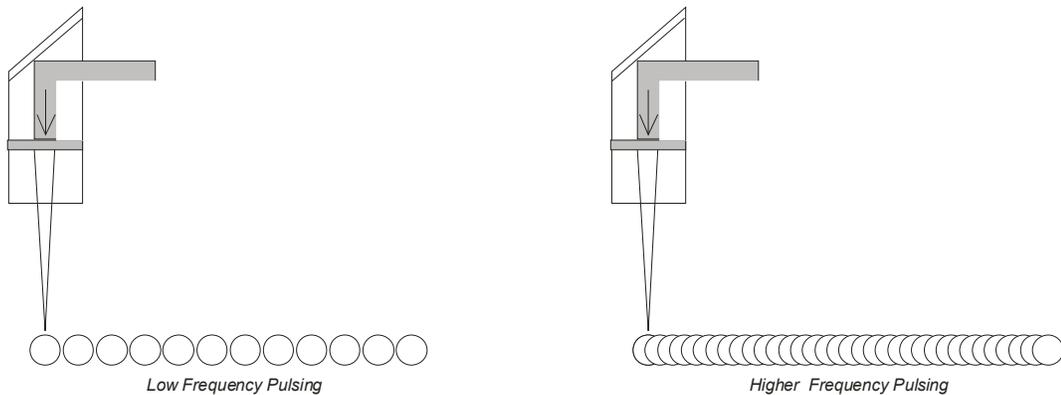
## *Power*

Set the power from your computer from 0 to 100%. The higher the power, the deeper the cut.

# Section 7: Using the Epilog Legend Print Driver

## Frequency

Set Frequency in the print driver from 10 to 5000. The frequency is the number of laser pulses that the laser fires in vector cutting mode. A lower frequency number will have the effect of less heat applied to the material being cut. Lower frequency rates are helpful for products like wood where charring is evident at higher frequencies. High frequencies are useful on material like acrylic where a large amount of heat is desirable to melt, or “flame polish”, the edges.



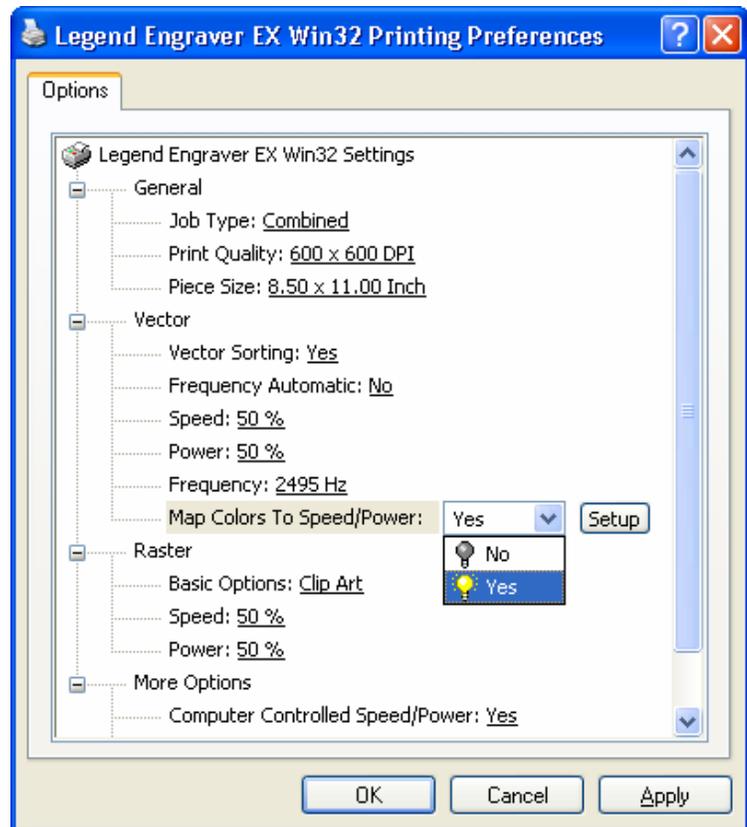
# Section 7: Using the Epilog Legend Print Driver

## Map Colors To Speed/Power

The Legend EX has the capability to assign multiple Speed and Power settings within a single job by using different colors within your drawing package. Color Mapping applies only to the vector objects in a design. This is useful in a variety of ways. The Color Mapping feature allows you to control the sequence or order of objects to be vector cut. You can also use Color Mapping to set one Speed and Power level for marking and another Speed and Power level for cutting.

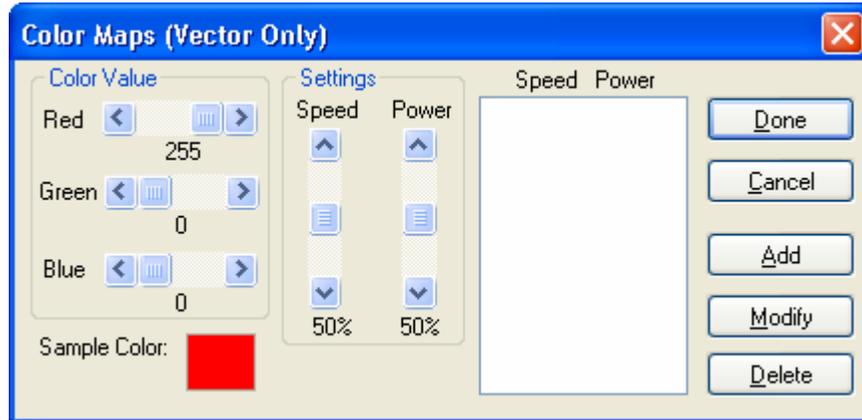
Set up an image in your drawing package with different color outlines to utilize the Color Map feature.

From the Print window expand the Vector option if it is condensed, then click Yes, and then the Setup button to access MAP COLORS TO SPEED/POWER.



# Section 7: Using the Epilog Legend Print Driver

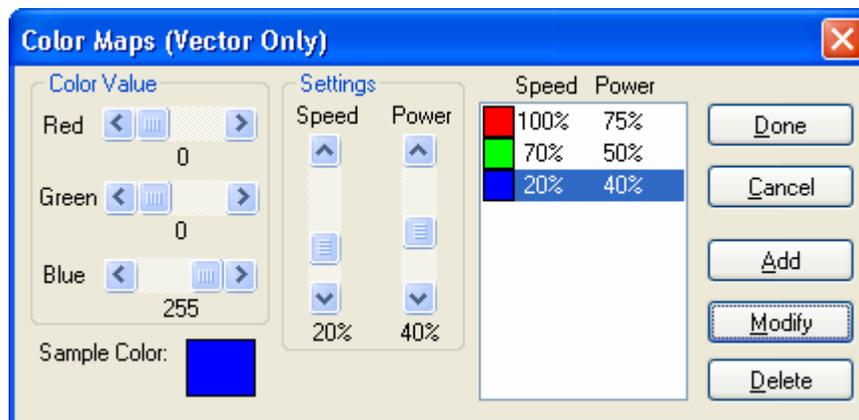
The Color Maps window will open with the color Red as the default.



## Color Value

These sliders define a color. The driver uses an RGB (Red Green Blue) value to define a color. Use the slider bars to produce the color values you want. A value of 255 Blue with 0 Green and 0 Red is shown. This is plain old blue.

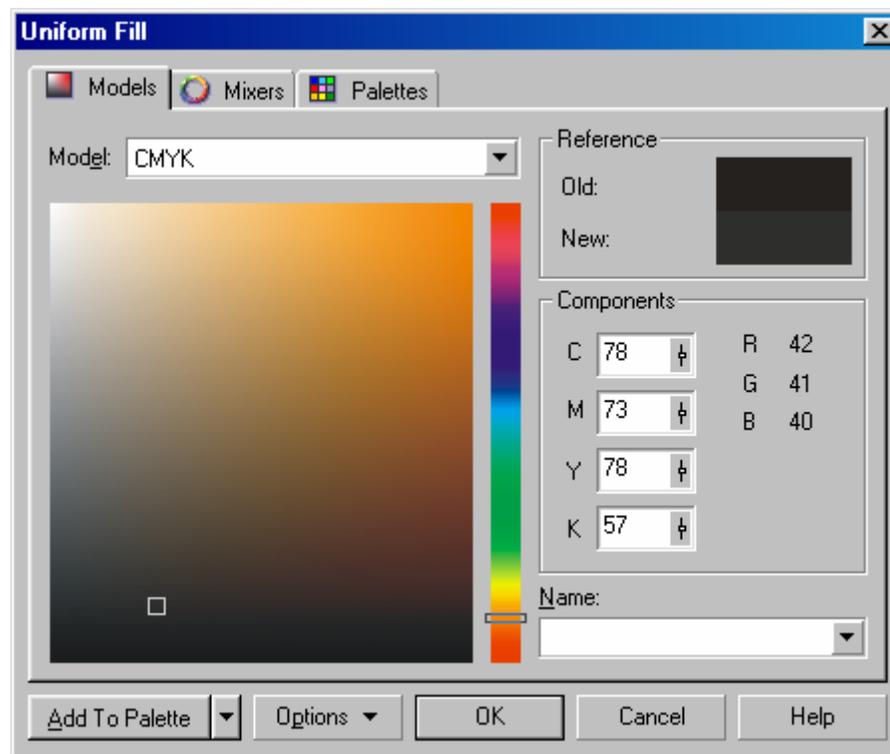
Each combination of the three-color values is unique and can be used to set a power and speed value. Once you add a color to the Speed Power box the colors will cut in sequence from top to bottom (in the example below Red will cut first, Green second, and Blue third). While it is rare that more than two colors are used for color mapping, the driver will process as many as 16 different combinations.



# Section 7: Using the Epilog Legend Print Driver



*An Important Note about Colors: Your drawing program may use a CMYK palette to define colors. The Epilog Color Map driver will automatically convert the six primary colors – Red, Green, Blue, Cyan, Magenta and Yellow from CMYK to RGB values. If you want to use a CMYK color other than the six primary colors, you will need to determine what the equivalent RGB color value is and convert that color manually. To determine an RGB equivalent in CorelDraw, select your CMYK object and then click on the Fill Tool (the little paint can icon towards the bottom of your tool icons). When the fly out comes up, click on the first icon, which is the Uniform Fill Icon. The following window appears displaying four numbers designating the CMYK value (78,73,78,57) and three numbers designating the equivalent RGB value (42, 41, 40). Use the RGB numbers (42,41,40) in the Epilog print driver. For simplicity, keep in mind that it is highly unlikely that you will ever need any colors other than the six primary colors.*



## Settings

Set the speed and power values for the color you have created. Adjust the sliders to the values that you want and click on the ADD button. You should see the color you entered with the speed and power show up in the list of colors on the

## ***Section 7: Using the Epilog Legend Print Driver***

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right. Please be careful not to add the same color to the list twice. Each setting must have a different color. If you want to change the speed and power for a color that is already in the list, just click on the entry you want to change. Now move the speed and power controls to the new values and click on the MODIFY button. If you have made a mistake, click on the entry you want to remove and then click on the DELETE button.

### ***Done***

When you are finished, click on the DONE button and you will go back to the previous screen. If you do not want the changes you have made to apply, click on the CANCEL button and all changes revert to their previous settings.

## ***Raster***

### ***Raster Type: Basic / Stamp***

Basic is the default and should be used for all engraving other than stamps. If STAMP is selected, other stamp options will become available to obtain the stamp results you require. These additional stamp options are listed below under STAMP OPTIONS.

### ***Basic Options: Clipart / Photograph***

Clipart is the default and can be used for all images including photos. In general, clipart mode is usually used for artwork created in a drawing program like Corel DRAW. Photograph mode is designed specifically for artwork that has been imported from a scanner or digital camera where subtle shades of light and dark are important. The Photograph mode applies a subtle dithering pattern to the graphics being engraved. Experiment with both to determine which choice is best for different effects.

### ***Speed***

Set the speed from your computer from 1 to 100%. The slower the speed, the deeper the engraving.

# Section 7: Using the Epilog Legend Print Driver

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## *Power*

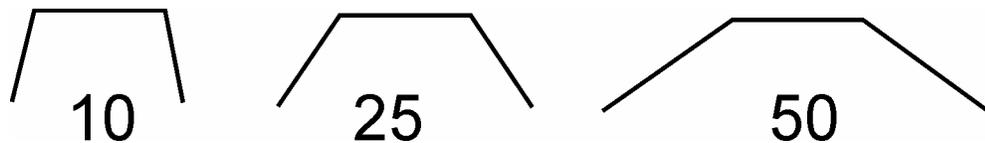
Set the power from your computer from 1 to 100%. The higher the power, the deeper the engraving.

## *Stamp Options*

Stamp Options control the settings for the Shoulders and Widening of the characters you are engraving in stamp mode. Shoulders and Widening are explained in the diagrams below.

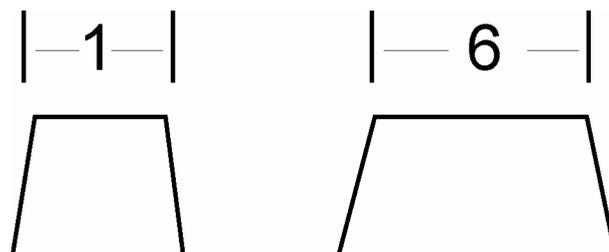
### Shoulders

The shoulders setting in the print driver adjusts the angle of the shoulders of your characters. A higher shoulder number provides a wider angle and more support for the characters. The following drawing shows a side view of a character with the shoulders set to 10, 25 and 50. Many users feel the default setting of 25 is ideal.



### Widening

The widening setting in the print driver adjusts the character weight. A higher Widening number provides a bolder character. The following drawing shows the difference in characters when their widening set to 1 or 6. Many users feel the default setting of 1 is ideal. Widening will not affect the angle of the shoulders.



# Section 7: Using the Epilog Legend Print Driver

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*Additional stamp setup and guidelines are explained in Section 11, Material Engraving Techniques of this Manual.*

## More Options

### Computer Controlled Speed/Power

When this box has a “Yes” in it, the Speed and Power settings are controlled from the computer. If this box has a “No” in it, the Legend will use the settings on the LCD control panel of the engraver as set from the “Setup” menu heading.

### Auto Focus

A “Yes” will enable the auto focus, “No” will disable auto focus.



*Note: “Important note about Auto Focus!” When a job is started and auto focus has been enabled the carriage will move to the first point of engraving (or cutting) then the table will automatically move up until the auto focus plunger is activated. If the first point of engraving is in the middle of the table, the carriage will move to that point before focusing!! The auto focus plunger must clear all edges of the work piece before focusing or it may cause damage.*

Please be careful when auto focusing on irregularly shaped items.

### Configuration

The “Configuration” box allows you to save all of your laser settings in the “Legend Engraver EX Win32 Printing Preferences” window as a custom setup. First, select the desired settings (Speed, Power, Piece Size, etc) for a particular job in the Printing Preferences setup window. Next, to save these settings and identify them with a name, click the cursor in the Configuration box, then select “Save As...” The “Save As...” box will bring up the “Save Configuration Data

## Section 7: Using the Epilog Legend Print Driver

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File As"... window. The Configuration can now be saved to any folder you designate on the computers hard drive. There is no limit to the number of files that can be saved. To retrieve a Configuration, click on the "Load" button in the "Configuration" box and go to the file where you saved the original configuration. The Configuration feature uses the standard Windows file structure to save the Configuration. This allows you to name and save the laser configurations wherever you want to on your computer. We suggest that you create a dedicated file folder to hold all Configurations files.

### *Changing Print Driver Defaults*

All of the print driver default settings can be modified to suit your engraving needs.

1. Go to ***START | CONTROL PANEL | PRINTERS***
2. Right mouse click on the ***LEGEND EX ENGRAVER***
3. Click on ***PROPERTIES***
4. Click on ***PRINTING PREFERENCES***
5. Change any of the settings. These changes will become the default settings for your print driver.
6. Click ***OKAY*** and close out all open windows.

***Section 7: Using the Epilog Legend Print  
Driver***

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# Section 8: Using the Epilog Legend Systems

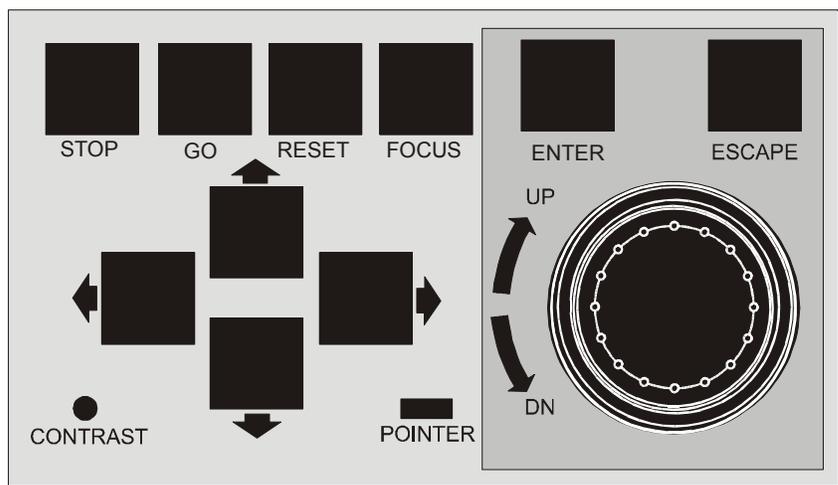
## *In This Section*

- Keyboard Commands
- Legend LCD Menu Headings
- Liquid Crystal Display (LCD)
- Lenses
- Loading Your Work
- Operation
- Job Storage
- Single Job Mode
- Multiple Job Mode

As you start to use your new Epilog Legend EX or TT, you will notice that the Keyboard Commands, and Liquid Crystal Display are helpful tools for operating your laser. These Legend components make the Legend Laser Systems extremely user friendly. The functions and uses of these items as well as loading your work and other operations are described in detail below.

## *Keyboard Commands*

The Keyboard is found on the front top of the machine. The keyboard on the Legend is drawn above.



# Section 8: Using the Epilog Legend Systems

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## *Job/Shuttle (Round Knob)*

The *Jog/Shuttle* is used to raise and lower the table, as well as to change settings like speed and power. The keys and menus are used to specify what the *Jog/Shuttle* will do. These functions are described in detail later in this Section. The rate of change caused by the inner ring depends on how fast you spin it. The direction depends on whether you spin it clockwise or counterclockwise. The outer ring rate depends on the angle of the ring. The farther you turn it, the faster the change (up to the limit).

## *Stop*

This key serves two purposes. 1) While engraving, this key will stop the carriage, and turn off the laser beam. While cutting, pressing this key will tell the machine to stop at the end of the line it is currently cutting or at the next node location. Once the Legend has stopped, you can open the door to examine your engraving. By closing the door and pressing the **GO** button, the Legend will start engraving at the point where it stopped. As long as you did not disturb the work piece, it will continue engraving or cutting without loss of registration. 2) Pressing this key before manually focusing will allow you to lower the engraving table without moving the head out of the park position.

## *Go*

This key serves two purposes. 1) Use this key to continue a job that has been stopped. If the machine has been stopped mid-job it will resume where it left off. 2) Pressing this key before a job is printed puts the Legend into “Ready” mode and will allow the job to start immediately without accessing the “Jobs” menu.

## *Reset*

This key is used to reset the carriage to home position. **RESET** does not erase a design/job from memory. Resetting the Legend will send the carriage back to home position and allow you to repeat the same design/job or begin a new one. The “**STOP**” key should always be used to stop the job before pressing the “**RESET**” key.

## Section 8: Using the Epilog Legend Systems

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### *Focus*

Pressing the **FOCUS** key and then turning the **Jog/Shuttle** knob raises or lowers the table to move your work piece closer to, or further from, the fixed focus lens. A metal focus gauge is provided to determine the correct distance from the work piece to the focus lens. The focus gauge is included in the accessory kit. The work piece should be raised just to the point where the gauge touches your work piece. Remove the gauge when you are done focusing. Press **ENTER** when you are done focusing. That will restore the control knob to the menu. If your piece is tall enough to run into either the focus gauge or the air assist tube, press the **STOP** key before pressing the **FOCUS** key. This will allow the table to be lowered without moving the head from the park position and running over your piece.

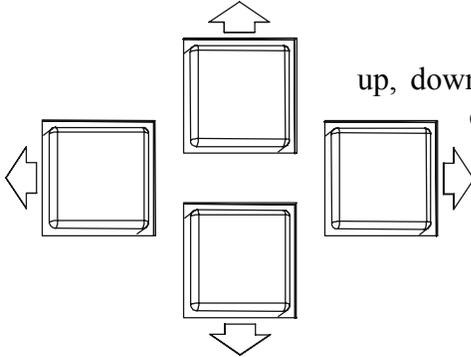
### *Enter and Escape (Menu Controls)*

The Legend has direct keys for the most commonly used functions. Others must be accessed through a menu. Across the top of the Liquid Crystal Display (LCD) are the menu headings. Push the left and right arrow keys and you will see the “active” heading scroll from left to right by means of highlighting. When the one you are interested in is highlighted, press the **ENTER** key. That will cause the chosen menu heading to drop down, much like the menus on a personal computer. Press the up and down arrow keys and the highlighted sub-heading will scroll up and down. Again, when the one you want is highlighted press **ENTER**. You can either select one from a list of choices, or enter a numeric quantity by turning the **Jog/Shuttle** knob (like speed or power). You can back up one level in the menu by pressing the **ESCAPE** key. **All the choices shown below may not be available on your machine, as they involve optional features or equipment.**

## Section 8: Using the Epilog Legend Systems

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### *Arrows*



The arrow keys are used to move through the menu selections up, down, right, or left. The arrow keys are also used to move the carriage when you are in the “Service”, “Move X/Move Y” mode.

### *Contrast*

This adjustment is located on the Keyboard panel. The display is a Liquid Crystal Display (LCD), and for best viewing the contrast may need to be adjusted lighter or darker. Insert a small, flat blade screwdriver into the slot just below the surface of the keyboard, and rotate the adjuster to get the best display contrast for your work environment.

### *Pointer*

This is simply a visible reminder that the Laser Diode Pointer (Red Dot Pointer) is turned on. This Laser Diode Pointer (Red Dot Pointer) is much like the hand held laser pointers, and has a bright red beam. When this is turned on, **DO NOT** place your head inside the engraving area, as you may look into the beam. For additional information, read Section 2 “Safety” contained in this manual.

# Section 8: Using the Epilog Legend Systems

## Legend LCD Menu Headings

LCD Graphic Display					
Setup	Jobs	Options	Cutting	Mapping	Service
Speed	Job 1 (File Name)	Auto Focus	Frequency	Reserved for Future Use	Move X/Y
Turn Knob to Numeric Value (01 - 100)	Run	Turn Knob to Select Yes/No	Turn Knob to Numeric Value (01 - 5000)		Turn Knob to Move
Power	Run/Override	Air Assist	Smoothing		Home
Turn Knob to Numeric Value (01 - 100)	Press Enter	Raster	Turn Knob to Select Yes/No		Select to Go Back to Home Position
Diode Pointer	View	Vector			Calibrate
Turn Knob to Select Yes/No	Press Enter to View Job	Turn Knob to Select Yes/No			X Home
	Delete	Installed Options			Displays Numeric Value of Home
	Press Enter to Delete Job	Preset Report Only			Y Home
	Job 2 (File Name)	Not User Selectab			Displays Numeric Value of Home
	Same as Job 1 As Memory Space Allows	Rotary			X Rotary Home
		Displays Yes/No			Displays Numeric Value of Rotary Home
		Air Assist			Y Rotary Home
		Displays Yes/No			Displays Numeric Value of Rotary Home
		Auto Focus			Auto Focus
		Displays Yes/No			Turn Knob to Numeric Value (-120 - 200)
		Double Head			Laser Match
		Displays Yes/No			Turn Knob to Numeric Value (01-10)
					Acceleration Compensation
					Turn Knob to Numeric Value (01-10)
					Ramp Compensation
					Turn Knob to Numeric Value (...-2,-1,0,+1,+2...)
					Disable Axis
					Press Enter to Disable
					Reboot
					Press Enter to Reboot

## Section 8: Using the Epilog Legend Systems

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### Liquid Crystal Display (LCD)

The Legend EX is equipped with a 320 x 240 pixel LCD graphic display. This is shown above located just to the left of the keyboard commands. The menu choices are listed across the top of the display, much like that of your personal computer. The bottom of the display shows the current machine status, along with job information. The center section is used for drop down menus and for displaying images.

In the event of an error, there will be a flashing bar just above the status bar that will give an error message.



The LCD menu headings and settings are discussed in the following sections.

### Setup

The “**Setup**” menu allows you to manually set the systems Speed and Power. It also provides the On/Off function for the red dot pointer on the machine. The Speed/Power settings in this menu command will be over-ridden if the job was sent with “**Computer Controlled Speed/Power**” selected in the print driver.

#### Speed

To set the “**SPEED**”, turn the “**JOG/SHUTTLE KNOB**” to the desired numeric value. The choices range from 0.1 to 100. The lowest number will allow your machine to move very slowly and the highest will set the machine to run at its fastest.

#### Power

To set the “**POWER**”, turn the “**JOG/SHUTTLE KNOB**” to the desired numeric value. The choices range from 1.0 to 100. A lower number reduces the depth of cut. A higher number increases depth of cut.

# Section 8: Using the Epilog Legend Systems

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## Diode Pointer

The Diode Pointer setting allows for manually turning **ON** or **OFF** the Laser Diode Pointer (Red Dot Pointer). This visible output beam is much like the hand held laser pointers, and has a bright red beam. This beam allows the operator to visually note where the laser is engraving or cutting. 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. For additional information, read Section 2, "Safety" contained in this manual. Use the diode pointer in conjunction with the Move X/Move Y coordinates to locate a given position on the engraving table.

## Jobs

This is the main access for starting jobs that are stored in the Legend. The Legend has the capability to store multiple jobs in memory. If there are jobs in the Legend memory, select the **JOBS** menu heading and press the **ENTER** key. The list of valid jobs in memory will drop down. Highlight the one you want, and press, **ENTER**. This will give you the drop down list of options **RUN**, **RUN/OVERRIDE**, **VIEW**, or **DELETE**. Highlight the option you want by using the **ARROWS** to scroll down through the list. Pressing **ENTER** will initiate that function... An explanation of drop down items and operations are listed below.

### Run

The machine will begin processing the job that you have selected.

### Run/Override

This selection allows you to override the computer controlled Speed and Power settings that were sent with the job from your computer. To use this selection:

7. Change the appropriate parameters (Speed/Power) in the **SETUP** menu.
8. Highlight the job that you want to run from the **JOBS** menu,
9. Press the **RUN/OVERRIDE** option. The job will run with the manual settings that you have selected.

### View

The LCD will display a facsimile of the job that you have selected. This feature does not operate in vector mode if **SMOOTHING** is enabled, or in rubber stamp mode.

# Section 8: Using the Epilog Legend Systems

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## Delete

Selecting **DELETE** will permanently remove that job from memory. You cannot delete a job if it is currently running. You cannot retrieve a job that has been deleted.

You can load jobs at any time. All jobs will appear in the order that they were printed with the most current job received at the top of the list. For additional information on the Legend's memory, read Section 14, Memory Configuration contained in this manual.

## Options

The **OPTIONS** menu allows you to enable/disable all installed options. Highlight the **OPTIONS** menu, and then press **ENTER**.

### Auto Focus

Use the down arrow key to highlight **AUTO FOCUS** and press **ENTER**. This selection indicates if the machine was sent from the factory with Auto Focus installed. Changing from Yes to No has no affect on Auto Focus operation. To activate or deactivate Auto Focus, you must select/deselect the Auto Focus command in the print driver.

### Air Assist

Use the down arrow key to highlight **AIR ASSIST** and press **ENTER**. This option enables the Air Assist to be automatically turned On/Off during Raster engraving or Vector cutting functions.

**Raster:** Turn the **JOG/SHUTTLE KNOB** to Select **YES** or **NO**. Selecting **YES** will turn on the Air Assist **ON** during raster mode and **NO** will turn it OFF. Next arrow down to **VECTOR**

**Vector:** Turn the **JOG/SHUTTLE KNOB** to Select **YES** or **NO**. Selecting **YES** will turn on the Air Assist **ON** during vector mode and **NO** will turn it OFF. Then press **ENTER**.

The air assist option allows for deeper engraving and cutting than would otherwise be possible. The compressed air assists in pushing away materials that might combust at the point of engraving. **Never leave your laser unattended while engraving or cutting.** Some materials are extremely flammable and burning cannot be extinguished even with the Air Assist at full flow. Generally, compressed air at 20

## Section 8: Using the Epilog Legend Systems

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PSI is adequate. Do not use gas other than air when using the Air Assist option. Never use Oxygen with the Air Assist option.

### Installed Options

This selection lists the installed options.

**Rotary:** The “ROTARY” option allows you to mark or engrave cylindrical objects. This menu item designates either installed by displaying *YES* or not installed by displaying *NO*.

**Air Assist:** The “AIR ASSIST” option allows for deeper engraving and cutting than would otherwise be possible. This menu item designates either installed by displaying *YES* or not installed by displaying *NO*.

**Auto Focus:** The “AUTO FOCUS” system on the Legend uses a magnetically activated plunger to determine the proper distance from the work piece to the focus lens. This menu item designates either installed by displaying *YES* or not installed by displaying *NO*.

**Double Head:** The “DOUBLE HEAD” option allows you to mark or cut one job onto two pieces of material at the same time with a split laser beam. This menu item designates either installed by displaying *YES* or not installed by displaying *NO*.

**Language:** The Legend machine’s LCD display can be set to display different languages. To change or set the *LANGUAGE* using the *ARROWS* to highlight *LANGUAGE* under the *OPTIONS* menu heading. Press *ENTER* then use the *ARROWS* to highlight the preferred language and press *ENTER*.

**Networking:** The Legend can be connected to your computer using a standard 10Base-T Ethernet card. Set all network addresses in this selection. Refer to the “Network Connections” section (Section 4) in this manual to establish network capabilities.

**Save Settings:** *SAVE SETTINGS* allows you to permanently save laser parameters that you have made using the LCD menu commands. Changes that are not saved with the *SAVE SETTINGS* command will return to their original default position upon power down.

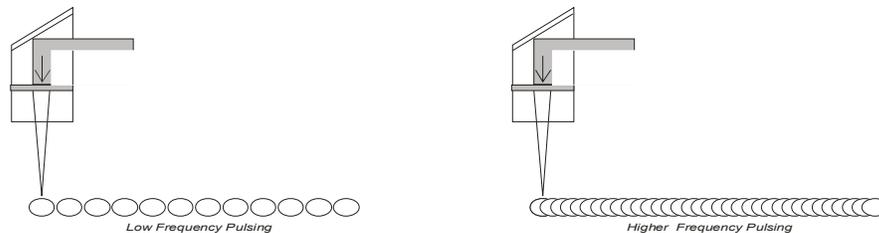
# Section 8: Using the Epilog Legend Systems

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## Cutting

### Frequency

This control allows direct setting of the pulsing of the laser in *Vector Mode*. The control allows setting from ten hertz to five thousand hertz. The lower frequencies are normally used for perforating an edge when you do not want to completely separate the cutout from the background. Most materials will show some difference in edge appearance as the frequency is changed, and this is a mostly a matter of personal preference. Recommended frequency settings for different materials are list in the Recommended Speed and Power Setting section of this manual.



### Smoothing

The smoothing control can be enabled or disabled by setting the control to *YES* or *NO*. This control only has an effect in vector mode. If your work is mostly straight lines with very little in the way of curves (text is normally mostly curves) your machine will process jobs faster with smoothing turned off (set to *NO*). Otherwise, smoothing should be enabled (set to *YES*). Curves cut faster as well as being significantly better finished with smoothing on.

## Mapping

These features are enabled for specialized applications and with limited technical support.

# Section 8: Using the Epilog Legend Systems

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## Service

### Move X/Y

“**MOVE X/Y**” allows you to move the carriage to locate a point on the engraving/cutting surface. When you are in the Move X/Y mode, the X and Y coordinates are displayed on the LCD and increment/decrement as the carriage moves. Using the red dot pointer in conjunction with the Move X/Y command provides a visual indicator to complement the numeric readout on the LCD.

1. In the **SERVICE** menu highlight **MOVE X/Y**. Press **ENTER**. You are now able to move the X and/or Y-axis using the **ARROW** keys to move the carriage left, right, front or back. Press **ENTER** and the current location of the carriage becomes the new home position.
2. To restore original home, under **SERVICE** highlight **RESTORE HOME**, and press **ENTER**.
3. **Restore Home:** To restore original home, under **SERVICE** highlight **RESTORE HOME**, and press **ENTER**.

### Calibrate

The **CALIBRATE** menu allows you to set or change a number of the machine’s operating parameters.

**X-Home:** This function calibrates the home position of the machine relative to the left table guide. This parameter is set at the factory and normally does not need to be changed. This function allows you to change home without moving the table guide. The Home position counter provides a relative position and has a numeric range from 0 (zero) to -700. If you need to adjust the home position, do the following:

1. Open CorelDraw or other drawing package and draw a square box on the page so that the upper left corner of the box is positioned one inch down and one inch to the right of the upper left corner of the page. Place a flat piece of material into the upper left corner of the Legend, being sure that it rests firmly against the left and top table guides. Print the box to the Legend and run the job. Use a ruler to measure the location of the box on your scrap piece.
2. Adjust the X Home counter, press the **ENTER** key, and print the box to the Legend again.
3. Repeat this procedure if necessary for fine-tuning.
4. Incrementing the X Home counter will shift the position of the engraved box to your left by .001 inch.
5. Decrementing the X Home counter will shift the position of the engraved box to your right by .001 inch.

## Section 8: Using the Epilog Legend Systems

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6. Once home is properly set, go to **OPTIONS** on the LCD panel then **SAVE SETTINGS** to permanently save the new home settings. Failure to save the settings will result in the laser returning to the default settings the next time that you power down the Legend.

**Y-Home:** This function calibrates the home position of the machine relative to the top table guide and has a numeric range from 200 to -200. Refer to the X Home procedure above to set the Y Home position.

1. Incrementing the Y Home counter will shift the position of the engraved box up towards the table guide by .001 inch.
2. Decrementing the Y Home counter will shift the position of the engraved box down away from the table guide by .001 inch.

**X Rotary Home:** Sets the X home position when the Rotary Attachment is installed and has a range from 200 to -700.

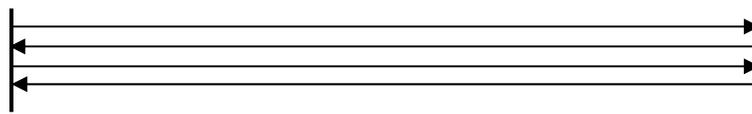
**Y Rotary Home:** Sets the Y home position when the Rotary Attachment is installed and has a range from 200 to -200.

**Auto Focus Adjust:** This adjustment feature allows the user to set the height of the auto focus so that the table focuses either above or below the factory set nominal position. The adjustment range is from -120 to +200. Setting the adjustment at -120 will move the table closer to the focus lens. Setting the adjustment to +200 will move the table further from the focus lens. It is usually best to focus below nominal (in the +200 direction). If the auto focus moves the material up too closely to the carriage, there is a possibility that the carriage or the material could be inadvertently damaged. This feature is useful on materials like acrylic where focusing a 1/16th to a 1/8th of an inch below nominal produces a smoother engraving background.

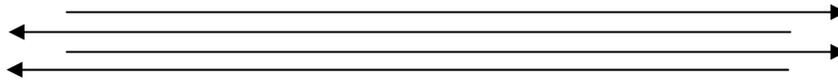
**Laser Match:** “**LASER MATCH**” provides a horizontal adjustment that properly aligns the left to right registration of engraved lines. **LASER MATCH** is used for all raster engraving modes except Stamps. **Laser Match is factory set and should not normally need to be field adjusted!** It has a setting range of -10 to 10. This setting is determined visually and a setting of 7 is typical, except on the 120 watt laser which is usually set to 9. If Laser Match is changed, go to **OPTIONS** on the LCD panel then **SAVE SETTINGS** to permanently save the new settings. Failure to save the changes settings will result in the laser returning to the default settings the next time that you power down the Legend.

## Section 8: Using the Epilog Legend Systems

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Raster lines that display the correct Laser Match.



Raster lines with an incorrect Laser Match may display ragged looking vertical edges, a slight double image, or a bolder than expected appearance.

**Stamp Match:** *STAMP MATCH* provides the same function as Laser Match but is used exclusively for the Stamp mode. *STAMP MATCH* has a setting range of 0 to 50 and is factory set and should not normally need to be adjusted. A setting of 50 is standard. Once Stamp Match is properly set, go to ***OPTIONS*** on the LCD panel then ***SAVE SETTINGS*** to permanently save the new settings. Failure to ***SAVE SETTINGS*** will result in the laser returning to the default settings the next time that you power down the Legend.

**Acceleration Compensation:** “ACCELERATION COMPENSATION” is a speed control and controls how quickly the carriage changes direction in the raster mode. It does not change the actual speed that the carriage is traveling; it only changes the turn around time. The acceleration counter has a numeric range from 1 (one) to 10. The higher the number (10), the faster the carriage turns around, which results in faster job processing times. Depending on the type of image that you are producing, the Acceleration Compensation can be adjusted to provide the best combination of quality and speed. Fine details or demanding graphics should be run using the factory settings. Large block lettering or less demanding images can be run at values of 9 or 10 to increase production speeds.



**Note:** *This parameter is set at the factory at a setting of 5 and normally does not need to be changed.*

This adjustment can be made *on the fly* while the Legend is engraving.

## Section 8: Using the Epilog Legend Systems

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1. Select **SERVICE**, then **CALIBRATE**, then **ACCELERATION COMPENSATION**.
2. Using the **JOG SHUTTLE KNOB**, change the setting, then press the **ENTER** key. The acceleration will change immediately and stay at the new value until you reboot or power down your Legend.
3. If you wish to save your settings go to **OPTIONS** on the LCD panel then **SAVE SETTINGS** to permanently save the new settings.
4. Failure to **SAVE SETTINGS** will result in the laser returning to the default settings the next time that you power down the Legend.

While this feature can affect engraving times, it is not the recommended method of adjusting engraving speed. Normally you would adjust the engraving speed either from the print driver or from the **SETUP** menu on the LCD.

**Ramp Compensation:** “RAMP COMPENSATION” controls the distance of overshoot that the carriage has when it gets to the end of each engraving line. The Ramp Compensation counter has a numeric range from 1 (one) to 10. The higher the number (10), the greater the distance that the carriage will over-shoot. Higher numbers will increase the amount of time that it takes to complete a job. Depending on the type of image that you are producing, the **RAMP COMPENSATION** can be adjusted to provide the best combination of quality and speed. Fine details or demanding graphics should be run using the factory settings. Large block lettering or less demanding images can be run at values of 1 or 2 to increase production speeds. **Note: This parameter is set at the factory at a setting of 5 and normally does not need to be changed.**



This adjustment can not be made on the fly. It can only be changed before a job is sent to the laser.

1. Select **SERVICE**, then **CALIBRATE**, then **RAMP COMPENSATION**.
2. Using the **JOG SHUTTLE KNOB**, change the setting, then press the **ENTER** key.
3. If you wish to save your settings go to **OPTIONS** on the LCD panel then **SAVE SETTINGS** to permanently save the new settings.
4. Failure to **SAVE SETTINGS** will result in the laser returning to the default settings the next time that you power down the Legend.

**Edge:** This is a diagnostic function for technical support. It should not be changed.

# Section 8: Using the Epilog Legend Systems

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## Disable Axes

This feature allows you to disable the electrical current to the X and Y-axis motors. Disabling the current allows you to move the carriage freely by hand to any point on the engraving/cutting surface. Disabling the axes provides a means to quickly focus on an uneven surface in either standard engraving mode or it is particularly helpful for focusing when using the Rotary Attachment.

1. In the **SERVICE** menu highlight **DISABLE AXES**. Press **ENTER**. You are now able to move the carriage freely without any resistance from the motors.
2. Pressing **REBOOT** is the only way to re-enable the axes.

## Reboot

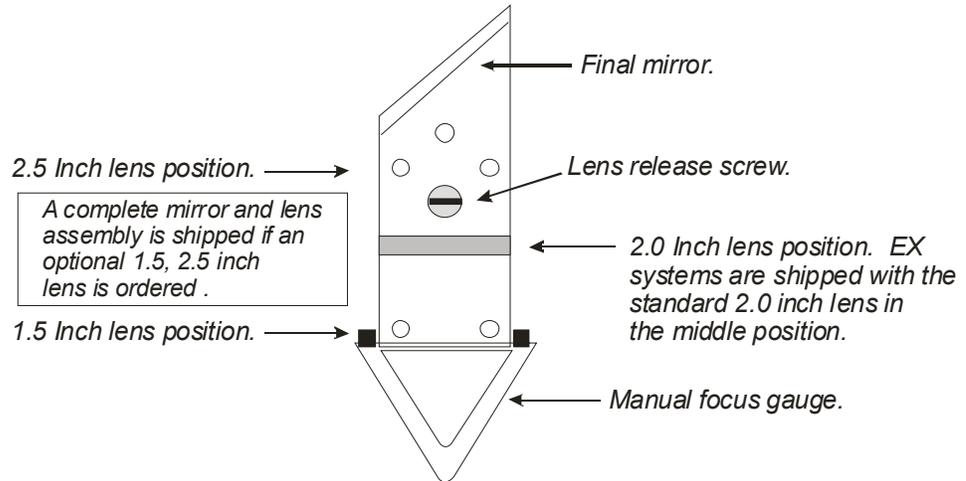
This feature reboots the Legend. All settings that have not been saved and all jobs in memory will be lost when you reboot. Use this command to reboot the Legend after you have used the **DISABLE AXES** command.

## Lenses

A 2.0 inch lens is supplied as standard equipment on all Legend EX and TT systems. The 2.0 inch lens is a very good general purpose lens that will fit the needs of most engraving and cutting applications. There are three optional lenses available for the EX line of lasers (these lenses are not available for the TT) to provide maximum versatility for all of your engraving and cutting needs. The spot size of the laser beam can be changed by installing a different lens assembly. A small spot size (achieved with a 1.5 inch lens) is used for higher resolution engraving to achieve finer engraving detail. A larger spot size (2.5 inch lens) can be used for lower resolution engraving and is also used for vector cutting. The 4.0 inch lens is used for specialized engraving applications and is a popular choice for cutting thick acrylic.

# Section 8: Using the Epilog Legend Systems

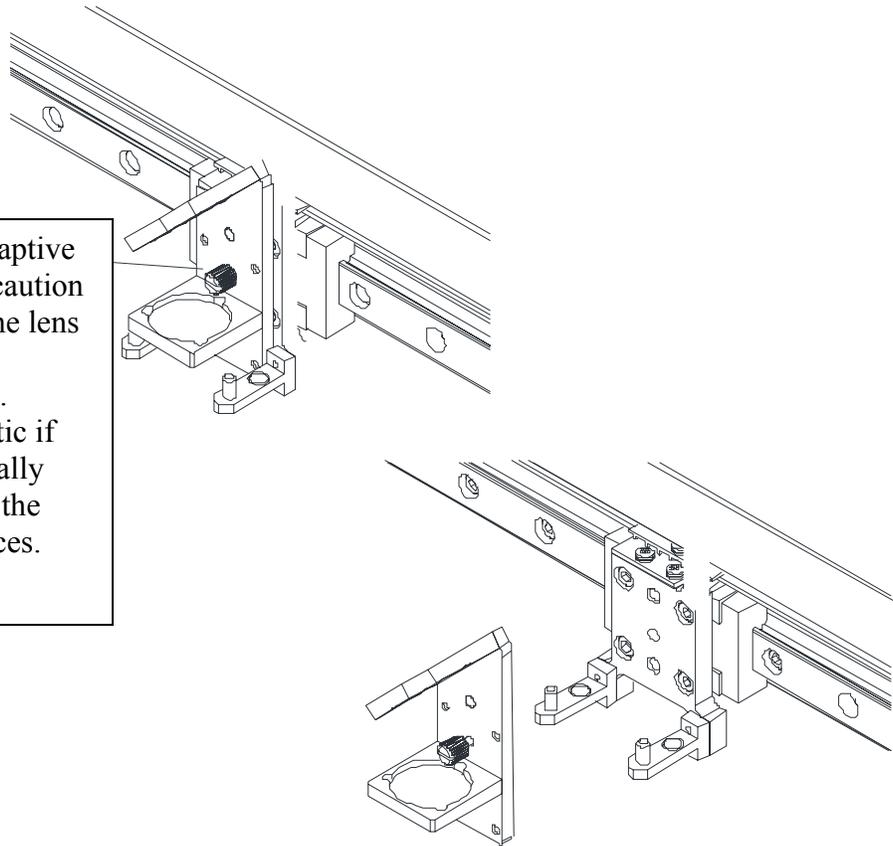
*Legend EX Lens Assembly*



The illustration below shows how to remove a Legend EX lens assembly.



Loosen the captive screw. Use caution and handle the lens by the metal housing only. Clean the optic if you accidentally touch any of the optical surfaces.



# Section 8: Using the Epilog Legend Systems

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## *Loading Your Work*

The home position of the engraving field is at the upper left corner of the table. Place your work piece in the upper left corner, pressed firmly against the metal stops along the top and left edges.

## *Operation*

When you first receive your laser, load a practice piece, set the focus and close the door. Turn on the exhaust fan. Now go into your drawing program (CorelDraw, etc.) and set the page size to the dimensions of the practice piece you have loaded. Then enter your name in half-inch text anywhere on the page. Once you have the image ready to engrave, print to the machine through the Legend print driver using the standard print command. Your drawing program should give you the opportunity to do a print setup, where you can set the Resolution, speed and power.

REMEMBER THE STEPS:

1. Insert the item to be engraved.
2. Focus (or enable auto focus).
3. Close the door.
4. Confirm the exhaust is on.
5. Select "**JOBS**" on the Legend LCD Display Panel.
6. Press "**ENTER**" to show the jobs that are in the Legend print Queue.
7. Use the scroll arrows to highlight the job you want to print. Press "**ENTER**".
8. Press "**ENTER**" one more time to run the job you have highlighted.

## *Job Storage*

The Legend has the capability to store multiple jobs in memory. The machine will save any and all jobs sent until there is no free memory left. At that point, the oldest job will be deleted automatically to make room for new jobs. To avoid losing the oldest job, you can manually delete other jobs in memory.

## Section 8: Using the Epilog Legend Systems

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### *Single Job Mode*

If you press the "**GO**" key on the keyboard, you are telling the Legend that a job will be coming from the host computer. To verify the state of the machine, look at the Status bar across the bottom of the display. The display should indicate, "Ready". The Legend will wait until the job arrives, and then run it. The name of the job will show up at the bottom of the status bar.

### *Multiple Job Mode*

If there are jobs in memory, select the "**JOBS**" menu heading and press the "**ENTER**" key. The list of valid jobs in memory will drop down. Select the one you want, and press, "**ENTER**". This will give you the options of Run, Run Override, View, or Delete. Select the one you want and press, "**ENTER**". If you select Run, the machine will begin processing that job. Press View to view the job on the display panel. Delete will remove that job from memory. You cannot delete a job if it is currently running.

You can load jobs at any time. If the machine is doing another job, it will save anything sent during that job for later.

# Section 9: Speed and Power Recommendations

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## *In This Section*

- Engraving Speed
  - Engraving Power
  - Recommendations
  - Multiple Passes
  - Speed and Power Recommendation Tables
- 

## *Engraving Speed*

The true measure of an engraver's speed is how long it takes for you to finish a job. This is a combination of a laser's acceleration and its maximum engraving speed. By optimizing the interplay of motors, bearings and electronics, the Legend EX produces 120 inches per second engraving speed while the Legend TT produces 80 inches per second engraving speed. State-of-the-art optimization software eliminates white space both horizontally and vertically, increasing laser on-time rates, which further enhance overall throughput.

## *Engraving Power*

This is the amount of laser power that is applied to the material surface. At a given speed, higher power will produce deeper cutting or engraving. Adjustable in 1% increments, the power can be controlled either from your computer or from the control panel on the engraver. Power can also equate to speed. A 120 watt laser can travel significantly faster than a 25 watt laser and achieve the same depth of cut into wood without a subsequent loss in quality. This means you can produce more products faster. A 120 watt laser will also cut through thicker materials than either a 25 or 50 watt laser. The Legend EX line offers power levels from 30 to 120 watts and the Legend TT line offers power levels from 35 to 45 watts.

# Section 9: Speed and Power Recommendations

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## *Recommendations*

The Legend EX and Legend TT Speed and Power guidelines are included on the following pages. Please remember that these are only guidelines. Depth of cut is a matter of personal preference. As such, there is no “correct” setting. Depth will increase if the power is increased, or if the speed is decreased. If you do not achieve the results you are looking for with the following recommended settings, try resending the job and start by changing only the **Power** setting. If this does not provide the desired results, revert back to the recommended Settings and change the **Speed** settings. Changing only one variable at a time will help to determine the correct setting for your material. It is easiest to change the speed or power variable in 10% increments when you are experimenting. This will save time and allow you to refine your settings later in 1 or 2% increments.

Because there are many factors that influence the time it takes to engrave or cut a given image, the Speed settings were designed to be reference numbers only. Also, because different lasers operate at different speeds a speed setting of 25% on one model may not equate to 25% speed on another model. 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, but using speed to predict a jobs engraving time is not practical.

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

Working with the Speed and Power settings becomes fairly intuitive in a very short period of time for most users. Use the guidelines in this manual and if you have a material that is not listed, try to compare its hardness and feel to some of the materials listed and use the settings of a similar material as your starting point for Speed and Power settings.

## *Multiple Passes*

Some materials look better if you make more than one pass. For example, some colors – like blue – are very aggressive and tend to leave a shadow on some substrates. It is often easier to make one pass at the recommended speed and power setting, and then make another pass at the same speed, but with a greatly reduced

## ***Section 9: Speed and Power Recommendations***

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power setting to achieve the desired results. If the material is not moved between passes the alignment of the second pass should be identical to the first pass.

Vector cutting may also require multiple passes. If you find that you cannot cut completely through a material or if you are melting a material in a single pass, try making two or even three passes instead of just one. Some materials are not laser compatible, but can be cut anyway if a gentle touch is used. Some users like to refocus between passes, but this is a matter of personal preference. Multiple passes may also allow you to cut through thicker materials than the laser is rated for.

## Section 9: Speed and Power Recommendations

### 30/35 Watt - Table Top Only



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
<b>Wood</b> Cherry – Alder - Walnut	20/100	25/100	30/100	1/8” – 30/100/5000 1/4” – 5/100/5000 (multiple passes may allow cutting of thicker materials)
<b>Acrylic</b>	100/70	100/60	100/50	1/8” – 10/100/4500 1/4” – 4/100/4500 (multiple passes may allow cutting of thicker materials)
<b>Anodized Aluminum</b>	100/100	100/80	100/60	N/A
<b>Brass-Painted</b>	100/55	100/45	100/35	N/A
<b>Marbleized Painted Brass</b>	100/65	100/55	100/45	N/A
<b>Corian Or Avonite</b>	20//00	25/90	30/100	1/8” – 20/100/5000
<b>Delrin Seals</b>	100/80	100/70	100/60	50/100/1000
<b>Glass</b>	40/100	55/100	75/100	N/A
<b>Laserable Plastic</b>	100-80	100/60	100/40	40/40/500
<b>Leather</b>	100/80	100/70	100/60	1/8” - 50/50/500
<b>Marble</b>	20/100	30/100	40/100	N/A
<b>Mat board</b>	100/65	100/45	100/30	30/50/500
<b>Melamine</b>	45/100	60/100	85/100	N/A
<b>Stainless Steel With Cerdec Coating</b>	30/100	40/100	50/100	N/A

## Section 9: Speed and Power Recommendations

### 40/45 Watt - Table Top Only



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
<b>Wood Cherry – Alder - Walnut</b>	25/100	30/100	35/100	1/8" – 25/100/5000 1/4" – 8/100/5000 3/8" – 4/100/5000 (two passes may produce better results)
<b>Acrylic</b>	100/60	100/50	100/40	1/8" – 15/100/5000 1/4" – 6/100/5000 3/8" – 3/100/5000 (two passes may produce better results)
<b>Anodized Aluminum</b>	100/60	100/50	100/40	N/A
<b>Brass-Painted</b>	100/45	100/35	100/25	N/A
<b>Marbleized Painted Brass</b>	100/55	100/45	100/35	N/A
<b>Corian Or Avonite</b>	25/100	30/100	35//100	1/8" – 20/100/5000
<b>Delrin Seals</b>	100/60	100/50	100/40	50/100/1000
<b>Glass</b>	50/100	65/100	85/100	N/A
<b>Laserable Plastic</b>	100-80	100/60	100/40	40/40/500
<b>Leather</b>	100/70	100/60	100/50	1/8" - 50/50/500
<b>Marble</b>	30/100	40/100	50/100	N/A
<b>Mat board</b>	100/65	100/45	100/30	30/30/500
<b>Melamine</b>	45/100	60/100	85/100	N/A
<b>Stainless Steel With Cerdec Coating</b>	40/100	50/100	60/100	N/A

## Section 9: Speed and Power Recommendations

### 30/35 Watt - Legend EX



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
Wood Cherry – Alder - Walnut	20/100	25/100	30/100	1/8" – 30/100/5000 1/4" – 5/100/5000
Acrylic	100/80	100/70	100/60	1/8" – 10/100/5000 1/4" – 4/100/5000
Anodized Aluminum	100/80	100/70	100/60	N/A
Brass-Painted	100/60	100/50	100/40	N/A
Marbleized Painted Brass	100/70	100/60	100/50	N/A
Corian Or Avonite	20/100	25/100	30//100	1/8" – 20/100/5000
Delrin Seals	100/80	100/60	100/50	20/100/1000
Flexibrass	100/35	100/30	100/20	90/15/1000
Glass	40/100	55/100	75/100	N/A
Laserable Plastic	100/80	100/60	100/40	40/40/500
Laserable Tile	20/100	30/100	40/100	N/A
Leather	100/90	100/80	100/70	1/8" - 50/75/500
Marble	40/100	60/100	80/100	N/A
Mat board	100/65	100/45	100/30	30/30/500
Melamine	45/100	60/100	85/100	N/A
Stainless Steel With Cerdec Coating	30/100	40/100	50/100	N/A

## Section 9: Speed and Power Recommendations

### 40/45 Watt - Legend EX



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
<b>Wood</b> Cherry – Alder - Walnut	25/100	30/100	35/100	1/8” – 25/100/5000 1/4” – 8/100/5000 3/8” – 4/100/5000
<b>Acrylic</b>	100/70	100/60	100/50	1/8” – 15/100/5000 1/4” – 6/100/5000 3/8” – 3/100/5000
<b>Anodized Aluminum</b>	100/70	100/60	100/50	N/A
<b>Brass-Painted</b>	100/55	100/45	100/35	N/A
<b>Marbleized Painted Brass</b>	100/65	100/55	100/45	N/A
<b>Corian Or Avonite</b>	25/100	30/90	35/100	1/8” – 30/100/5000
<b>Delrin Seals</b>	100/60	100/50	100/40	50/70/1000
<b>Glass</b>	50/100	65/100	85/100	N/A
<b>Lasable Plastic</b>	100/70	100/50	100/30	40/30/500
<b>Leather</b>	100/80	100/70	100/60	1/8” - 50/40/500
<b>Marble</b>	60/100	80/100	100/100	N/A
<b>Mat board</b>	100/55	100/40	100/25	40/30/500
<b>Melamine</b>	55/100	70/100	90/100	N/A
<b>Stainless Steel With Cerdec Coating</b>	40/100	50/100	60/100	N/A

## Section 9: Speed and Power Recommendations

### 60 Watt – Legend EX



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
Wood Cherry – Alder - Walnut	50/100	60/100	70/100	1/8" – 50/70/5000 1/4" – 20/100/5000 3/8" TO 1/2" – 10/100/5000
Acrylic	100/60	100/50	100/40	1/8" – 35/100/5000 1/4" – 20/100/5000 3/8" TO 1/2" – 7/100/5000
Anodized Aluminum	100/60	100/50	100/40	N/A
Brass-Painted	100/50	100/40	100/30	N/A
Marbleized Painted Brass	100/60	100/50	100/40	N/A
Corian Or Avonite	50/100	60/90	70/100	1/8" – 30/100/5000
Delrin Seals	100/55	100/45	100/35	50/75/1000
Glass	60/100	70/100	90/100	N/A
Laserable Plastic	100/60	100/50	100/40	40/30/500
Leather	100/70	100/60	100/50	1/8" - 50/40/500
Marble	100/100	100/85	100/75	N/A
Mat board	100/45	100/35	100/25	30/25/500
Melamine	60/100	70/100	90/100	N/A
Stainless Steel With Cerdec Coating	60/100	70/100	80/100	N/A

## Section 9: Speed and Power Recommendations

### 75 Watt - Legend EX



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
Wood Cherry – Alder - Walnut	65/100	75/100	85/100	1/8" – 50/70/5000 1/4" – 20/80/5000 3/8" TO 1/2" – 6/100/5000
Acrylic	100/50	100/40	100/30	1/8" – 25/100/5000 1/4" – 15/100/5000 3/8" TO 1/2" – 6/100/5000
Anodized Aluminum	100/50	100/40	100/30	N/A
Brass-Painted	100/40	100/30	100/20	N/A
Marbleized Painted Brass	100/55	100/45	100/35	N/A
Corian Or Avonite	65/100	75/100	85/100	1/8" – 30/100/5000
Delrin Seals	100/50	100/40	100/30	50/75/1000
Glass	75/100	100/100	100/80	N/A
Laserable Plastic	100/35	100/25	100/20	40/20/500
Leather	100/60	100/50	100/40	1/8" - 50/30/500
Marble	100/85	100/75	100/65	N/A
Mat board	100/50	100/40	100/20	30/20/500
Melamine	75/100	85/100	100/100	N/A
Stainless Steel With Cerdec Coating	80/100	100/100	100/80	N/A

# Section 9: Speed and Power Recommendations

## 120 Watt - Legend EX



	300 DPI RASTER ENGRAVING	400 DPI RASTER ENGRAVING	600 DPI RASTER ENGRAVING	VECTOR CUTTING
	SPEED/POWER	SPEED/POWER	SPEED/POWER	SPEED/POWER/FREQUENCY
<b>Wood</b> Cherry – Alder - Walnut	75/100	85/100	100/100	1/8" – 50/50/2500 1/4" – 50/75/2500 3/8" TO 1/2" – 10/100/5000
<b>Acrylic</b>	100/30	100/25	100/20	1/8" – 30/70/5000 1/4" – 20/100/5000 3/8" TO 1/2" – 10/100/5000
<b>Anodized Aluminum</b>	100/40	100/30	100/20	N/A
<b>Brass-Painted</b>	100/25	100/20	100/15	N/A
<b>Marbleized Painted Brass</b>	100/45	100/35	100/25	N/A
<b>Corian Or Avonite</b>	100/70	100/60	100/50	1/8" – 40/100/5000
<b>Delrin Seals</b>	100/40	100/35	100/30	50/20/1000
<b>Glass</b>	100/100	100/80	100/60	N/A
<b>Laserable Plastic</b>	100/25	100/20	100/15	50/15/500
<b>Leather</b>	100/40	100/35	100/30	1/8" – 60/30/500
<b>Marble</b>	100/65	100/55	100/45	N/A
<b>Mat board</b>	100/25	100/20	100/15	50/15/500
<b>Melamine</b>	100/85	100/75	100/65	N/A
<b>Stainless Steel With Cerdec Coating</b>	100/100	100/80	100/60	N/A

# Section 10: Material Engraving Techniques

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## *In This Section*

- Acrylic
  - Anodized Aluminum
  - Brass – Painted
  - Glass
  - Notary Seals – Delrin
  - Plastic
  - Rubber Stamps
  - Wood
- 



The Legend Laser system is very versatile. It can mark and cut many different materials. Following is information regarding some of the materials the Legend will mark and cut. Check the Epilog website [www.epiloglaser.com](http://www.epiloglaser.com) periodically for new laser applications, tips, and techniques to use with your Legend. For specific information regarding materials not mentioned below, please contact your local Epilog representative for information.

## *Acrylic*

### *Acrylic Background*

Next to wood, acrylic is the most popular material to use with laser systems. It engraves and cuts very easily, comes in a wide variety of shapes and sizes, and can be relatively inexpensive.

Acrylic comes in two forms, Cast and Extruded. Cast Acrylic is used for almost all engraving purposes because the frost produced when lasered provides a nice white contrast against the clear material. Extruded acrylic remains clear when engraved and does not produce an adequate contrast.

# Section 10: Material Engraving Techniques

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Extruded acrylic on the other hand is ideal if you are only going to vector cut. Extruded is less expensive than cast and also has a lower melting point that produces an almost flame finished edge when cut with the Legend.

## *Acrylic Engraving Techniques*

Most acrylic is engraved on the backside to produce a look through effect from the front surface. Remove the back protective cover layer before engraving. Leave the top protective cover layer on so that it remains intact to prevent scratching while handling the acrylic.

Since you are engraving the backside of the acrylic, you will need to reverse or mirror your artwork before sending the job to the Legend.

Engrave the acrylic at a high speed and low power. A small amount of power is all it takes to mark acrylic and high power levels tend to distort the acrylic when engraving.

There are a large number of acrylic products that are painted on one side to add color to the clear acrylic piece. You can engrave directly through the paint into the acrylic for a very nice presentation effect. Leave the speed the same as if you are engraving clear acrylic and turn up the power about 10% to get cleanly through the paint. Applying too much power to the paint will melt it and cause distortion.

## *Acrylic Vector Cutting Techniques*

Acrylic is one of the most popular cutting materials available. It comes in a variety of colors and thickness. Laser cutting produces very nice edge quality without the need for polishing or secondary clean up.

Use a Vector Grid to elevate the acrylic before cutting. Air Assist will greatly reduce flaming when cutting acrylic and should always be used for this material.

Vectoring acrylic is similar to vectoring other materials. First, experiment to determine the correct speed and power setting. Cutting acrylic is usually best achieved with relatively slow speed and relatively high power. This combination allows the laser beam to melt the edges of the acrylic and produce an almost flame polished edge. Acrylics generally require only a single pass to cut, but thicker acrylics may need two passes.

# Section 10: Material Engraving Techniques

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As with engraving, it is sometimes necessary to mask and dampen the acrylic before cutting.

**Warning!** Never leave your Legend unattended when vector cutting acrylic! Acrylic is very flammable.

## *Anodized Aluminum*

Anodized aluminum comes in a variety of colors and can usually be easily engraved with a CO2 laser. Black anodized aluminum is great to work with because it turns white when lasered. Black anodize provides the best contrast of all of the colors of anodized aluminum. Some colors of anodize – red for instance – will not turn completely white when laser engraved. Red anodize will produce a light pink color. Performing a second pass can see some improvement but usually a slight shadow of color will remain.

Engrave anodized aluminum at high speeds and low powers for crisp, clean images. Too much power applied to the anodize will distort the engraving and tends to over-burn the image.

**Warning!** Metals are reflective, and using full power will potentially cause damage to the machine.

## *Brass - Painted*

### *Brass Background*

Un-coated brass cannot be laser engraved. In order to engrave brass with a laser you need to use brass that has some sort of coating – typically paint. The laser removes the paint and exposes the brass substrate. There are three basic types of engraving brass available to engravers but they are not all compatible with the laser.

By far, the most popular laser brass is actually brass-coated steel. First, a steel substrate is coated with a thin layer of brass. Next, the brass is polished to a reflective finish and a coat of lacquer is applied to the brass – Victory's LaserBrite™ product has a lacquer finish. Finally, a paint coating is applied on top of the lacquer for the finished product. When laser engraving brass-coated steel, you are removing only the paint and exposing the polished brass coating that is protected by the lacquer.

# Section 10: Material Engraving Techniques

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The lacquer prevents the brass from oxidizing and the bright reflective surface will stay bright for years.

Some manufacturers also sell painted brass that is solid brass, not brass coated steel. If the brass is polished before the paint is applied you will have a nice reflective engraved surface. If the brass is not polished, the result will be a dull, tarnished brass that will require a secondary polishing process after laser engraving. This is time consuming and most engravers do not want to spend the time and effort necessary to turn this into an acceptable product.



***Note - Always ask before lasering painted brass if you don't know what the substrate is!***

If you are unsure if the piece that you have is brass-coated steel or brass, you can test the material with a magnet. A magnet will stick readily to brass-coated steel, but since solid brass is not magnetic, a magnet will fall helplessly away from solid brass.

## *Brass Engraving Techniques*

Engrave painted brass at high speed and low power. It takes very little power to remove the paint coating and too much power will melt the paint and distort the image. If you are producing engraving that appears to be “fat” or has a balloon appearance to it, you are probably using too much power. Reducing the power will bring back the nice sharp images that are normally produced with painted brass.



***Note - Use caution when trying to engrave brass coated pens. Many pens have a very hard epoxy paint that is completely unacceptable for CO2 laser engraving. You should only use pens that you have experimented with or that are specifically designed for CO2 laser engraving. Be aware that there are many pens that can be laser engraved with a YAG laser but these pens are usually not compatible with the CO2 laser that you are using.***

Some pens are “almost” CO2 laser engraveable. If you engrave through the paint and there is a slight shadow remaining, try to clean the engraved area with EverBrite™ or lacquer thinner. Depending on the paint, there is a good chance that the shadow will disappear and an excellent engraving result achieved.

Use caution when trying to engrave blue painted brass. Blue paints contain very aggressive pigments that penetrate the metal surface and it can be extremely difficult to remove all of the blue color, but again, try EverBrite or lacquer thinner to remove the shadow.

# Section 10: Material Engraving Techniques

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## Glass

### *Glass Background*

When a laser strikes glass it fractures the surface but it will not engrave deeply or remove material. The fracturing of the glass surface will produce a frosted appearance but can cause roughness and chipping depending on the type of glass being engraved. While the frosted appearance is desired the roughness and chipping are not. Below, we explain how to eliminate the roughness and produce a very smooth frosted finish.

The composition and quality of glass varies widely and you cannot always predict the effect that you will achieve. It is always best to experiment with an unfamiliar glass source. Generally speaking, flat glass tends to have a very consistent hardness throughout, and the engraved areas do not tend to have lighter and darker areas. Bottles on the other hand, tend to have soft and hard spots that will cause the engraved area to appear lightly frosted in one area and heavily frosted in another. Engraving at medium speed and high power will somewhat compensate for this, as will two or more engraving passes.

While the laser beam itself is very hot, the heat does not build up easily and it should not prevent you from engraving onto full bottles of wine, champagne or other filled glass bottles. Laser engraving filled bottles is a very popular method of creating custom presentations for special occasions. The laser will not damage the liquid inside the bottle, and as long as you are not completely engraving away a large section of bottle you have very little chance of breaking the bottle.

### *Glass Engraving Techniques*

To produce a smooth frosted finish, follow this procedure:

- Using your finger or a paper towel, apply a thin coat of liquid dish soap – any kind will do – over the area to be engraved.
- Cut a piece of newspaper or paper towel a little larger than the area to be engraved. Completely soak the paper with water then wring out the excess water.
- Apply the paper to the glass and smooth out the paper so that there are no wrinkles.
- Place the glass into the engraver and laser through the paper while it is still wet.
- Remove the glass, discard the remaining paper, and clean the glass.
- If necessary, gently polish the glass with a ScotchBrite pad.

# Section 10: Material Engraving Techniques

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*Note - You need to be especially careful when laser engraving leaded crystal. The lead in the crystal expands at a different rate than the crystal does and this can cause cracking and breakage of the crystal. Using a lower power setting can help this problem, but we always recommend having a spare in case of breakage.*

## *Combining Laser Engraving with Sandblasting*

Combining the best of both processes, you can use your laser to engrave the artwork then use sandblasting to provide a deep etch into glass. Using the laser to create the artwork mask is an ideal process for one-of-a-kind custom pieces as well as large production runs. This eliminates the photo process usually associated with sandblast mask.

- Apply an adhesive backed mask material to the glass that you are going to engrave.
- Laser completely through the mask and into the glass.
- Remove the glass from the engraver and sandblast to the desired depth.
- You now have a sandblasted glass presentation with the detail of laser engraving!

## *Notary Seals - Delrin*

### *Notary Seals Engraving Techniques*

Notary seals can be easily manufactured using 1/16-inch thick delrin plastic. A seal consists of two pieces - a male die and a female die, both shown below. The male die consists of white lettering on a black background and the female die is an inverted and mirrored image of the male. Inverting and mirroring are easily accomplished in most graphics software packages. Simply duplicate the male die, then invert the black and white colors and then mirror the image.

The male image should be produced without the use of outlines around the text or graphics. Add a .007 to .010 inch outline to the text and graphics of the female die. This outline creates a large enough void between the male and female dies to emboss paper without tearing.

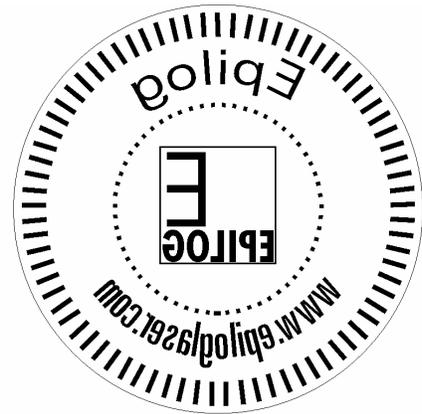
## Section 10: Material Engraving Techniques

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Apply a .001 outline around the seal to define the outside edge of the seal. Use the combined Engraving/Vector mode to first engrave the seal and then cut out the seal.



Male  
Artwork



Female  
Artwork

## Plastic

### *Plastic Background*

Engraving plastics have changed greatly in the past few years. Before lasers, plastic manufacturers designed plastic for rotary engraving systems. A rotary engraving system uses a mechanical spinning bit to remove material. Therefore the depth of the top layer or “cap sheet” was designed to make it easy to rotary engrave. Cap sheet thickness was approximately .010 inches thick and laser engraving was nearly impossible because by the time you applied enough power to get through the cap sheet the laser melted and deformed the plastic.

Plastic manufacturers have developed a broad range of plastics that have thinner cap sheets that are .002 to .003 inches thick that provide much better engraving and cutting characteristics. These plastics are commonly referred to as Micro Laminates; Micro surfaced, or simply laser engravable plastics. These plastics are generally very easy to engrave with a laser since they all have similar characteristics.

Because there is such a broad range of plastics it is necessary to experiment to determine if a particular type of plastic is laser compatible. Different color plastics,

# Section 10: Material Engraving Techniques

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even if they are from the same manufacturer will have unique speed and power settings. Use the guidelines in this manual as a starting point when determining the correct speed and power settings. If you do not get acceptable initial results with the recommended speed and power settings start experimenting by first changing only the power setting. If adjusting the power setting does not work, start over and adjust only the speed setting. Once you have acceptable results, record those settings for that particular plastic so that you do not have to repeat the experimentation process.

## *Plastic Engraving Techniques*

Always remove the clear protective cover layer before engraving.

Once you have the correct speed and power settings you can improve your engraving results even more by taking the focus lens out of focus (lower the table) by about 1/16 of an inch. This technique enlarges the focus beam a little bit and provides more beam overlap on each pass of the laser. The greater overlap produces a smoother engraved surface on the plastic and eliminates the grooves that you sometimes see when engraving plastic.

With some plastics it is best to engrave using two passes. The first pass cuts through the cap layer and the second pass cleans away the residue that some plastics leave behind.

Another technique that can be useful is to mask the plastic before engraving with transfer or masking tape. This will prevent a buildup of residue on the plastic surface. Misting the transfer tape with water will reduce heat buildup and melting on sensitive plastics.

## *Plastic Vector Cutting Techniques*

Use a Vector Grid to elevate the plastic before cutting. Air Assist will greatly reduce flaming when cutting plastic.

Vectoring plastics is similar to vectoring other materials. First, experiment to determine if the plastic can be cut with the laser. Plastics that are up to 1/16 inch thick can usually be cut in a single pass. Thicker plastics may need two passes.

As with engraving, it is sometimes necessary to mask and dampen the plastic before cutting. Even masking and wetting both front and backsides of the plastic is desirable on sensitive plastics that have very low melting points.

# Section 10: Material Engraving Techniques

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**Warning!** Never leave your Legend unattended when vector cutting plastics! Plastic can be very flammable.

Do not engrave PVC (Polyvinyl Chloride). PVC will destroy the optics and mechanics of your Legend. Cutting or engraving PVC will void your warranty.

## *Rubber Stamps*

### *Engraving Rubber Stamps with the Epilog WINDOWS XP/2000 Driver Version 6.01*

The Epilog Driver Version 6.01 includes settings for producing rubber stamps. Unique stamp attributes are controlled from the driver including, Speed and Power settings, Shoulders, Widening, and more.

Processing rubber stamp files requires a computer that has adequate processing power and memory capabilities. The faster your computer, and the more memory it has, the faster your computer will process the stamp file. Individual stamps will be processed quickly on almost any computer, but if you are producing large numbers of stamps in a single setup you will want to have a computer that, at a minimum, meets Epilog's recommended computer specifications.

### *Installing the Rubber Stamp Driver*

**IMPORTANT NOTICE:** The stamp driver is included as part of the standard driver that is found in Section 4 of your Legend manual. If you have an old version of a Legend driver on your computer, you must remove it, reboot your computer and then install this new driver. All of your old Configurations setting will be lost when you install this new driver. Please make copies of your old Configuration settings if you need to save them.

### *Creating Your Layout for Stamps*

A stamp job consists of six basic features: The first three features are created when setting up your artwork. The next two, Shoulders and Widening, are settings found in the print driver and are specific to rubber stamps. The last setting only needs to be changed from its default setting of 50 if you need to make minor adjustments to

# Section 10: Material Engraving Techniques

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improve image quality. The last setting is on the Legend Control Panel under *SERVICE | CALIBRATE | STAMP MATCH*.

## Text and Graphics

Set up your artwork in Corel so that your computer image looks like the image that you want to stamp. Areas to be stamped should be black, with the area to be removed white. Any kind of text and/or graphics can be used. Scanned images, clipart, etc are all acceptable graphics for use in stamps. Raster Speed & Power settings determine the depth of engraving. “MIRROR” your design in your graphics software package such as CorelDraw before printing.

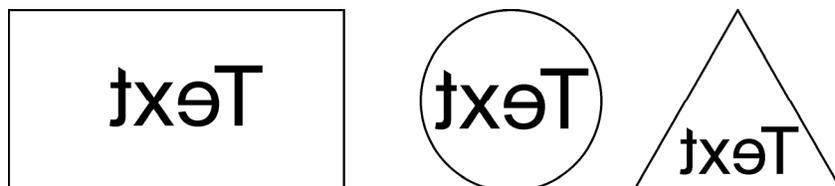
## Vector Cut Line

Any object within the fence with a line weight of .001 (0.025 mm) to .007 inches (0.175 mm) will be vector cut when in Combined Mode. This is a handy feature that allows the laser to cut out the stamp instead of using scissors to cut out the stamp after the stamp has been engraved. Vector Speed & Power settings determine the depth of the vector cut. Setting the Frequency below 100 provides a perforation. The perforation keeps the Stamp attached to the rubber sheet and makes cleaning easy while allowing the user to easily remove the stamp from the sheet when it is ready for mounting.

## Fence

Draw your fence. The fence defines the outer boundaries of the area to be engraved. The fence must be .001 inch (.025 mm) thick. The fence can be any closed polygon or ellipse. Rectangles, circles, ovals, etc are all acceptable fences. Multiple stamps, with multiple cut lines can be placed within a single fence. There can only be one fence on the page that is sent to the engraver. Multiple fences will cause unpredictable behavior. The following drawings show acceptable and unacceptable fences for engraving stamps.

### Acceptable Fences: Closed Polygons

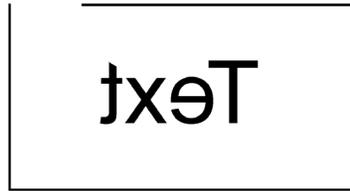


Fences must be a line weight of .001 inch (0.025 mm).

## Section 10: Material Engraving Techniques

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Unacceptable Fences: Open Polygons

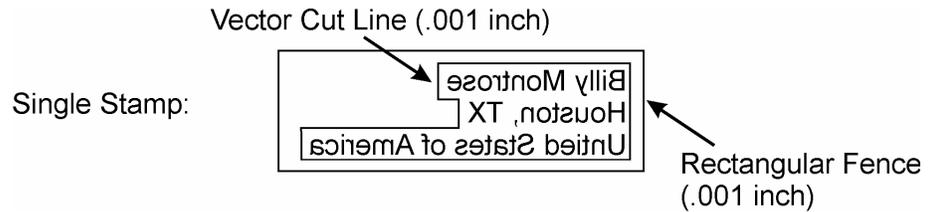


# Section 10: Material Engraving Techniques

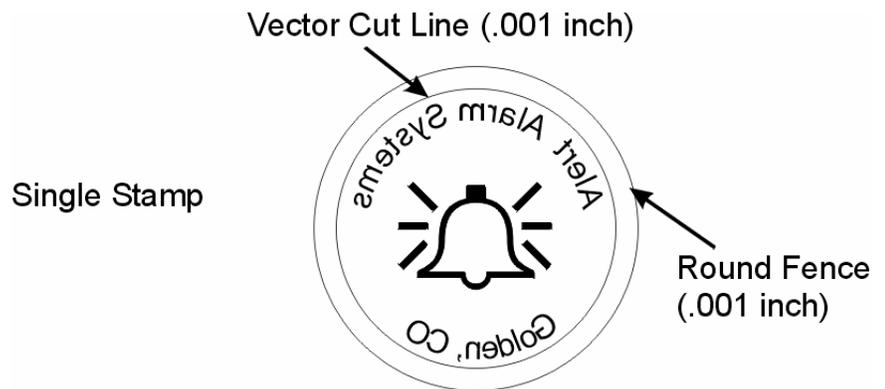
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## RUBBER STAMP CORRECT SETUP USING COMBINED MODE

### CORRECT EXAMPLE #1



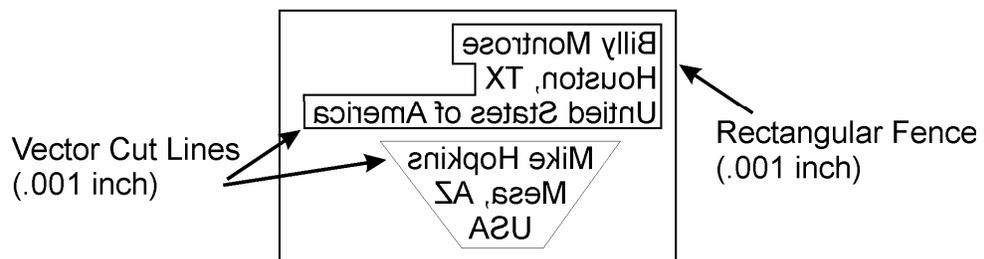
### CORRECT EXAMPLE #2



### CORRECT EXAMPLE #3

Use only one fence to surround all stamps on the page.

Multiple Stamps:



## RUBBER STAMP INCORRECT SETUP USING COMBINED MODE

# Section 10: Material Engraving Techniques

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## INCORRECT EXAMPLE #1

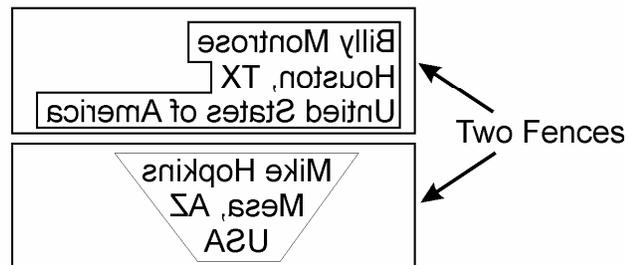
### **Single Stamps:**

Billy Montrose  
Houston, TX  
United States of America

**(No Fence, No Cut Line, Text Only):**

## INCORRECT EXAMPLE #2

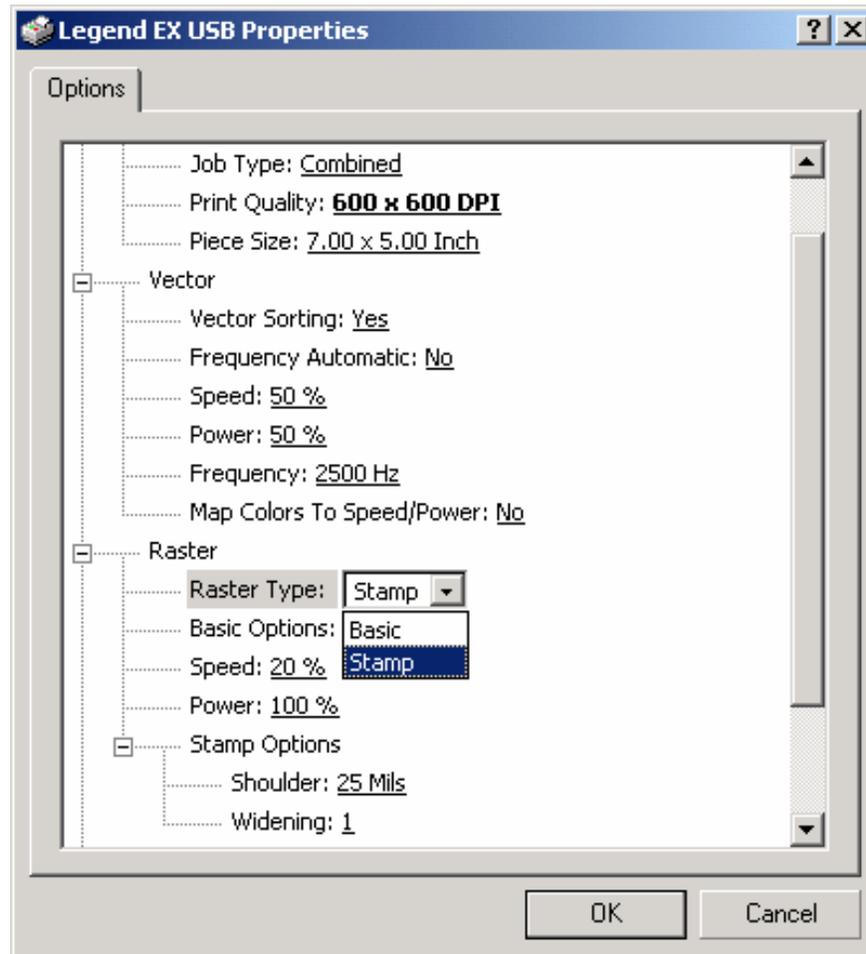
### **Multiple Stamps:**



After you have successfully setup your artwork, print your design by selecting FILE/PRINT. Choose the Epilog Driver printer. Next click on the PROPERTIES button and the following print driver window will appear.

# Section 10: Material Engraving Techniques

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## Print Driver Settings

Within the print driver there are a few settings that need to be considered when printing and cutting stamps.

### Job Type

You can choose COMBINED Mode, VECTOR Mode or RASTER Mode. Combined Mode is shown above.

# Section 10: Material Engraving Techniques

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**Combined:** Combined mode is used to engrave and cut out stamps that do not contain any vector lines except the cut line.

**Vector:** Vector mode is not normally used for printing stamps.

**Raster:** Raster mode is selected when you only want to engrave a stamp (no vector cutting), or if your artwork contains thin lines (.001-.007) that you want to be engraved, but not cut. Clipart often has these thin lines that may be hidden.

## Vector

The Vector Speed, Power and Frequency settings found under Vector in the print driver are the settings used to cut completely through the rubber stamp material. Vector settings will cut the .001" vector cut line as drawn in your artwork. Any hidden vector line in your artwork will also be vector cut.

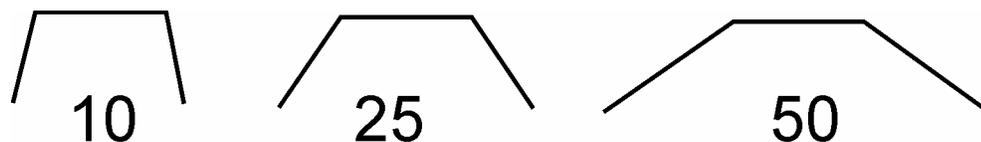
## Raster

Raster Type - Under Raster Type select Stamp. Set raster Speed and Power. Stamp mode is shown selected in the drawing shown above

## Stamp Options

Under Raster settings, Stamp Options control the settings for the Shoulders and Widening of the characters you are engraving in stamp mode. Shoulders and Widening are explained in the diagrams below.

**Shoulders:** The shoulders setting in the print driver adjusts the angle of the shoulders of your characters. A higher shoulder number provides a wider angle and more support for the characters. The following drawing shows a side view of a character with the shoulders set to 10, 25 and 50. Many users feel the default setting of 25 is ideal.

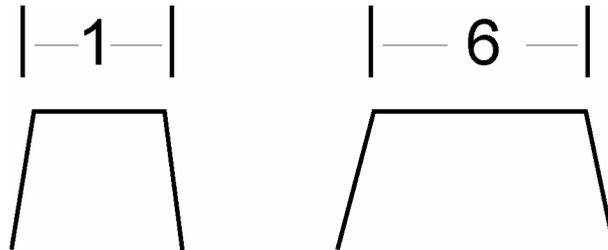


**Widening:** The widening setting in the print driver adjusts the character weight. A higher Widening number provides a bolder character. The following drawing shows

## Section 10: Material Engraving Techniques

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a side view of the difference in characters when their widening set to 1 or 6. Many users feel the default setting of 1 is ideal.



**Stamp Match:** The last setting that you *may* need to make is on the Legend control panel under **Service | Calibrate | Stamp Match**. The Stamp Match setting is defaulted to 50 which is ideal for most stamp applications. If you notice that there is a little jaggedness at the edges of your stamp letters, adjust the Stamp Match by one or two digits (either up to 51 or 52, or down to 49 or 48 etc). This feature fine tunes the left to right alignment of each raster line and should straighten out any rough edges that may appear.

# Section 10: Material Engraving Techniques

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## Wood

- Solid Wood
- Manufactured Wood Products
- Engraving
- Vector Cutting
- Cleaning
- Color Filling

### *Solid Wood*

Wood is by far the most laser friendly material available. It can be engraved or cut very easily. When engraved, lighter colored woods like cherry or maple produce very nice contrast where the laser burns away the wood. This high visual contrast is what makes lighter woods so popular when combined with an Epilog Legend. There are many types of other wood products that are designed for use with the laser and many more that are waiting to be discovered by you.

Every type of wood has its own characteristics. Some wood is denser than other wood, with the denser, harder woods requiring more laser power to cut or engrave. Epilog recommends that when working with wood other than the ones listed in this section that you investigate the engraving and cutting characteristics before committing to use. There are woodworking shops in nearly every large city that will have a wealth of information on nearly all woods. If you have access to the Internet, search on wood to see what you find.

The most common woods used with the Legend are Cherry, Walnut, Maple, Alder, & Oak. These woods are considered hard woods, and have grains that work well with lasers.

Grain can vary greatly in density. Cherry, Alder, Walnut & Maple all have fairly little veins of grain in them, while Oak has medium to large veins in it. For example: If a large box was engraved into a piece of Cherry and a piece of Oak, the box engraved into the Cherry would have a very uniform appearance, the area engraved or the background would be smooth with little variation in height. The Oak on the other hand would vary greatly in height and have a very non-uniform appearance.

Legends can engrave in very fine detail. The spot size ranges from .003" (0.08mm) to .008" (0.02 mm) of an inch in diameter, and, if there are large variations in the material that one is engraving into it will greatly affect the quality of the finished

# Section 10: Material Engraving Techniques

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piece. Therefore the majority of laser users will stick with Cherry, Alder, Walnut or Maple.

The differences between Cherry and Alder are little. The grain, color and densities are nearly identical. The color of these two woods is a light red. We recommend stains that are clear allowing the natural color to show through. Alder isn't quite as expensive as Cherry and it is a little more readily available. Walnut is a dark brown in color and has a greater density than either Cherry or Alder. Maple is light blonde in color and has a density that is even greater than Walnut. It is important to mention the density, because it will take a little more laser power to cut and to engrave to the same depth in woods that have greater densities.

## *Manufactured Wood Products*

### **Plywood**

Standard building grade plywood is a material that usually does not produce an acceptable result when engraved. It is also a very difficult material to cut. Plywood is constructed of layers of wood glued together. Since the grain of the wood chips in the plywood run in different directions it is difficult to obtain a consistent depth when engraving. Air bubbles within the plywood cause problems because they severely disrupt the laser beam when cutting. Because of the air bubbles and other factors it is virtually impossible to cut cleanly through plywood.

There are specialty plywood products that can be found in hobby shops or specialty wood stores that will engrave and cut much nicer than standard plywood products purchased through your local lumber supplier.

## *Wood Engraving Techniques*

To create a quality image on wood, contrast and depth are desired. The higher the power levels, the higher the contrast and depth will be.

**Speed and Power Settings** - Wood is a great material to laser engrave because it discolors when engraved and the depth of engraving is greater than most materials. The downside is that it takes a lot of power to deeply engrave wood at high speeds. Most wood can be engraved using full power no matter whether you are using a 25-watt laser or a 120-watt laser. Depending on the wattage of your laser, the best approach is to set the laser power at 100% and adjust the speed to obtain the desired depth.

# Section 10: Material Engraving Techniques

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**Resolution Settings** – Wood is a very easy material to work with and you can produce very nice detail with as little as 300 DPI engraving. 600 DPI engraving into wood produces fabulous results.

**Grey Scales** – Grey scales look wonderful when engraved into wood. The reason for this is that the wood will react much differently to each level of gray scale, providing amazing contrast. Experiment! Take a piece of clipart and ungroup it and change the colors so that they range from a dark color like red, to a light color like yellow, then engrave it. This will create a shading effect that is almost 3-D in its appearance.

## *Wood Vector Cutting Techniques*

Legends are ideal for cutting through solid wood material. The thickness of the wood that you can cut varies with the wattage of the laser and the hardness of the wood, but in general you can cut approximately ¼ inch ( 3mm) wood with a 25-watt laser and up to ½ inch ( 6 mm) wood with a 120-watt laser.

As with any application there are techniques that will greatly enhance the success of your vectoring of any material. When cutting wood of any thickness, Epilog recommends the use of a Vector Grid and Air Assist options. The Vector Grid raises the wood off of the solid metal engraving table and supports the wood on an aluminum grid. The grid greatly reduces backside burning of the wood and also provides ventilation that allows the fumes and smoke to be exhausted to the rear of the engraving cabinet.

Air assist greatly reduces flaming that may occur if too much laser power is applied to the wood piece being cut.

Depending on the type of wood being vector cut, it is sometimes advantageous to apply a cover of masking or transfer tape to the surface before cutting. The masking tape will reduce residue buildup on the top surface of the wood surrounding the cut line.

**Warning:** Wood is a combustible material. Never leave your Legend unattended while vector cutting any material.

## *Wood Cleaning Techniques*

When laser engraving or cutting wood, resin in the wood comes to the surface, mixes with the smoke and is deposited as a residue. If the wood has a coating of

# Section 10: Material Engraving Techniques

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polyurethane or lacquer the coating protects the surface of the wood from the resin/smoke damage. You can remove the resin from coated materials with a wet chamois or a sponge with a web cover. Some people like to use 409, Windex or other mild cleaning product, but water works well and is usually the most readily available wetting agent. The chamois that Epilog recommends has a sponge in the middle of it, and is available in the automotive car wash section of many Target stores or many automotive supply shops.

If the wood is not coated with polyurethane, the resin and smoke will stain the surface and you will need to sand the surface to remove the resin.

Never use a paper towel to clean the wood surface. The paper towel will shred and it is impossible to get the shredded fibers out of the engraved recesses of the wood. Most wood products that are designed for laser engraving will have a polyurethane coating so that they are very easy to clean.

## *Wood Color Filling Techniques*

Color filling engraved areas of wood adds either greater contrast or a splash of color to your wood presentation. Normally, color filling is not required for lighter colored wood materials such as maple or cherry, but walnut can often benefit from adding a black color fill to provide more contrast. You will need to take some precautions when color filling wood, because if you are not careful, the liquid color fill material will absorb into the grain of the wood on the surface of the plaque where it is not wanted.

The best way to add a black color fill is shown below:

1. Apply a thin coat of Johnson's Paste Wax to the surface of the wood before you engrave it.
2. Engrave through the paste wax into the wood. Do not wipe off excess paste or residue after engraving.
3. Fill the engraved voids with Turtlewax "Color Core" black liquid car polish. The car polish will absorb into the engraved wood grain, but will not absorb into the wood grain that is covered with paste wax.
4. Wrap a paper towel around a block of material that has a flat surface. Rub the flat surfaced paper towel over the surface of the wood to clean off the excess car polish and paste wax. The flat surface prevents the paper towel from getting into the engraved recesses.

You can follow the procedure above to add different colors to wood, but instead of car polish, use water based acrylic paint (the kind in the tubes works great!)



*Manual*

# *Advanced Operations*

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INTENTIONALLY LEFT BLANK**

# Section 11: Standard and Optional Machine Features

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## *In This Section*

- Auto Focus
  - Air Assist
  - Rotary Attachment
  - Double Head
  - Optional Lenses
  - Vector Grid
- 

The Legend Laser system is very versatile. Features that are either included with the Legend or sold separately make the Legend a high performance tool. Following is information regarding operation of these features. For specific information regarding options not mentioned below, please contact your local Epilog representative.

Features included with the L24EX, L32EX, and TT Systems:

- Auto Focus
- Air Assist
- Red Dot Pointer

Optional Features that can be purchased with the L24EX, L32EX and TT Systems include:

- Rotary Attachment
- Vector Grid™
- Air Assist Pump and
- Laser Starter Kit

# ***Section 11: Standard and Optional Machine Features***

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Optional Features that are Machine Specific include:

- Additional Optical Lenses in 1.5, 2.5 and 4.0 inch configurations (Available for the L24EX and L32EX ONLY)
- Double Head (L32EX Only) (Only available with original order, not a field upgradeable option)
- TT Floor Stand (Available for the TT Only)

These items can be purchased with your original order or, unless noted otherwise, at any time after the purchase of your laser system.

## ***Auto Focus***

Take the guesswork out of setup and save time on every job with Epilog's advanced auto focus feature on the Legend. Quick, accurate, and easy to use, the Legend's auto focus uses the latest in plunger and magnetic technology.

It works on any solid surface, including transparent materials such as glass and acrylic. It also works with the rotary attachment and our standard three lenses. Focus is determined at the first point of engraving or cutting to ensure precise focus, even on uneven surfaces.

Auto focus is standard equipment on all Legend systems. The auto focus uses a plunger that is attached to the carriage to determine correct focus position. When auto-focus is activated, the engraving table holding the work-piece moves up until the work-piece comes into contact with the plunger and pushes the plunger up. The plunger activates a magnetic sensor and tells the table to move down until the work-piece is in precise focal position. The motor that moves the table up and down is equipped with an encoder that tells the motor exactly how far to move the table down after the magnetic sensor is activated.

Instructions to use the Auto Focus are outlined below.

1. Set the Auto Focus on your computer in the print properties window of the Legend print driver: “yes will enable the auto focus, “No” will disable auto focus. When a job is started and auto focus has been enabled the table will automatically move up until the auto focus plunger is activated. The table will then move down until it is the correct distance from the focus lens. Please be

# Section 11: Standard and Optional Machine Features

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careful when auto focusing on irregularly shaped items. The auto focus plunger must clear all edges of the work piece or you may cause damage.

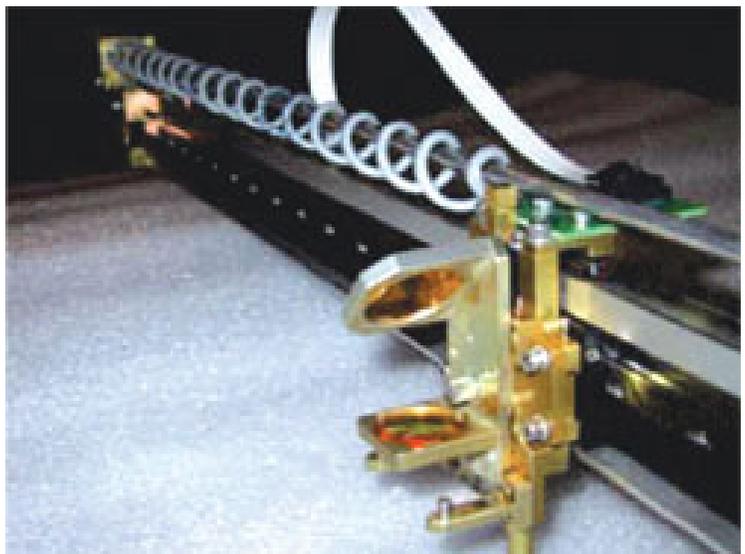
2. Set the Auto Focus on the Legend on the LCD Display panel. See Section 8 "USING THE EPILOG LEGEND SYSTEM" of this manual for step-by-step instructions.
3. Turn on the exhaust fan.
4. Close the door and press the GO key.
5. Layout your Artwork in your drawing program.

## *Air Assist*

For tough jobs with deep cutting, the air assist allows you to speed production time, while enhancing the quality of your final output. The Legend Air Assist directs a constant stream of compressed air across the material surface at the point of burn.

Directing the compressed air both down and back towards the exhaust vent, the air assist removes the heat and combustible gases from the work surface. The constant air stream helps reduce charring and scorching associated with materials, such as wood, rubber, and acrylic. Computer controlled, you can assign the air assist to be turned on/off while raster engraving or vector cutting.

This photo at the right shows the air assist assembly on a Legend EX. The air-assist enters



# ***Section 11: Standard and Optional Machine Features***

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the engraving cavity on the left hand side of the machine and the tube is coiled around a shaft. The shaft keeps the tubing from interfering with any of the mechanics and allows the tubing to expand and contract as the head moves from left to right. On the Legend EX, we have included the air assist assembly (pump optional) as a standard part of the machine.

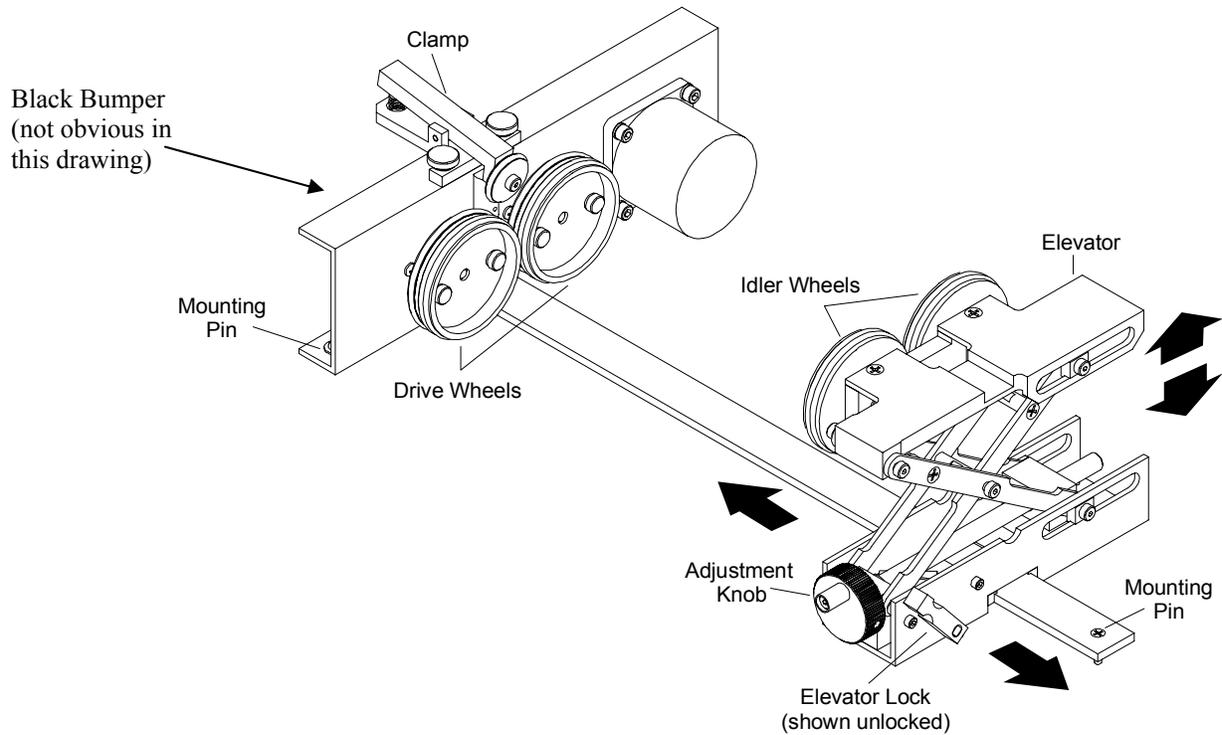
## ***Rotary Attachment***

The rotary option allows you to mark, engrave or cut cylindrical objects. The Rotary Attachment works in both raster and vector modes.

### ***Installation***

1. Lower the engraving table to its lowest point.
2. Turn off the power to the engraver.
3. Set the rotary attachment onto the engraving table so that the three pins in the bottom of the rotary attachment slide into the three corresponding holes in the table. Ensure the bottom of the attachment is flush to the engraving table at all three of the mounting pin positions.

# Section 11: Standard and Optional Machine Features



4. There is a motor on the rotary attachment with a plug on the end. Plug the rotary into the mating connector located at the front, left inside corner of the cabinet (see photos on following pages). This connector is keyed and will only fit if inserted properly.

The Legend 32 EX Rotary connection (shown in photo) is located in the front left inside of the chassis.



The 24 EX connector (not shown in this photo) is located in the same general area as the 32 EX, but is under the shelf.

Make sure the table is lowered and the Legend EX is turned off before plugging the Rotary Attachment into this white connector. It is a

# Section 11: Standard and Optional Machine Features

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keyed connector and will only fit one way.



The Rotary connector for the TT is located at the front of the machine towards the left hand side.

Make sure the table is lowered and the Legend is turned off before plugging the Rotary Attachment into this white connector. It is a keyed connector and will only fit one way.



5. The rotary attachment is now installed! Turn the power on.
6. The engraver knows 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.

## *Rotary Setup*

The rotary attachment works in either raster or vector mode, and the setup is the same for both. The part to be engraved should rest between the two sets of wheels. The wheels on the left are the driving wheels, which spin the cylinder to be engraved. The wheels on the right are for support. They can be raised or lowered to get the work surface to be engraved level with the table. They can also be moved from left to right to adjust to the length of the part being engraved. The area being engraved must be level for the part to engrave correctly.

## ***Section 11: Standard and Optional Machine Features***

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Load your part with the smaller diameter on the right. Use the elevator to elevate your work so that it is horizontal. Insure the part is positioned so that the left end is close to, but not touching, the black bumper. Using the clamp to hold the glass in place is optional. Some odd shaped glasses rotate better if they are clamped to the drive wheels, but most glasses and other cylindrical objects do not require clamping. The glass in the photo below does not require the use of the clamp.

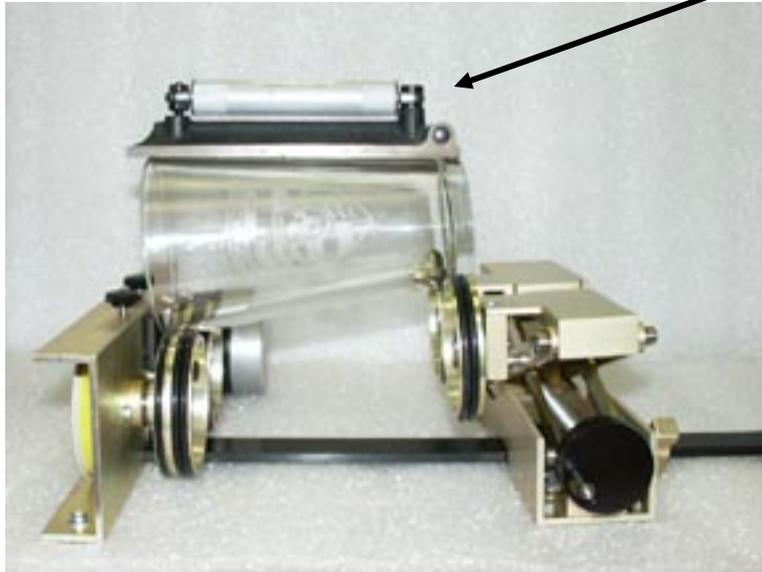


Use the elevator on the rotary attachment to raise the right side of the object being engraved so that its engraving surface is horizontal.

## ***Section 11: Standard and Optional Machine Features***

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Some users like to use a level to insure the glass is horizontal. The level shown below is a little large! A small inexpensive level will work just fine.



## ***Section 11: Standard and Optional Machine Features***

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The photo below shows a typical setup for something other than a glass. The larger diameter is on the left side of the rotary attachment and the right side of the flashlight has been elevated so that it is resting horizontally.



Correct Setup

The photo below shows the same flashlight at a severe angle to horizontal. If the flashlight (or other cylindrical object) is not horizontal the laser beam will lose focus as the carriage head moves across the flashlight, causing the engraving quality on the right hand side to suffer dramatically.



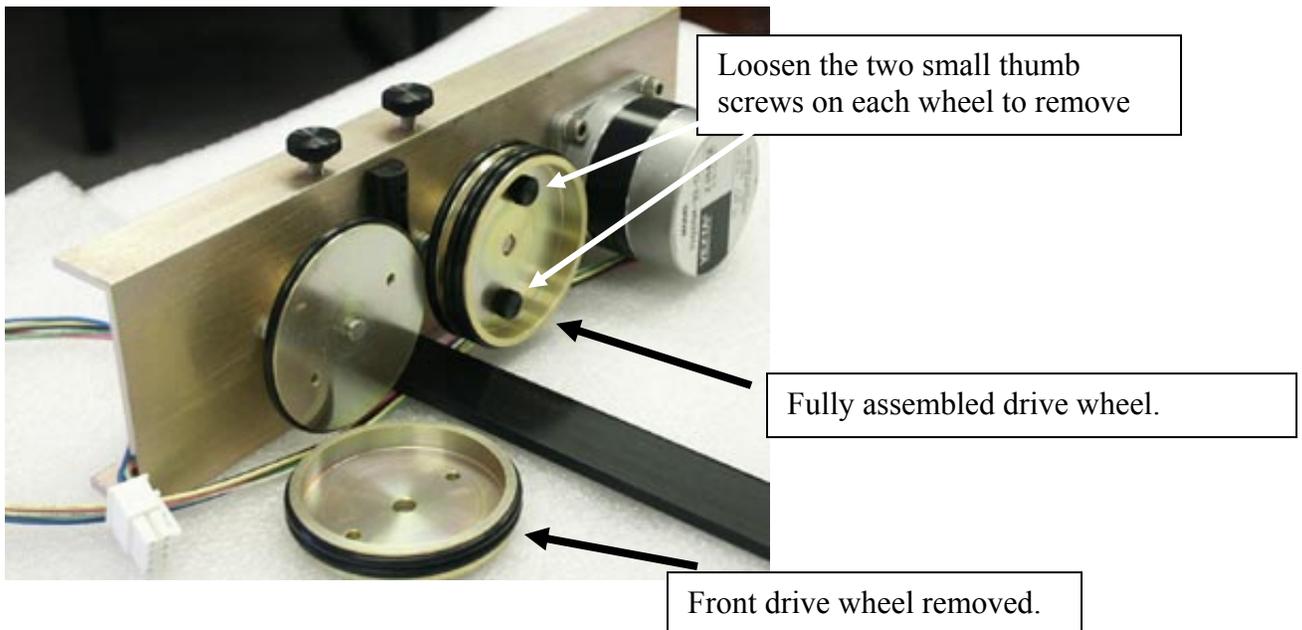
Incorrect Setup

# Section 11: Standard and Optional Machine Features

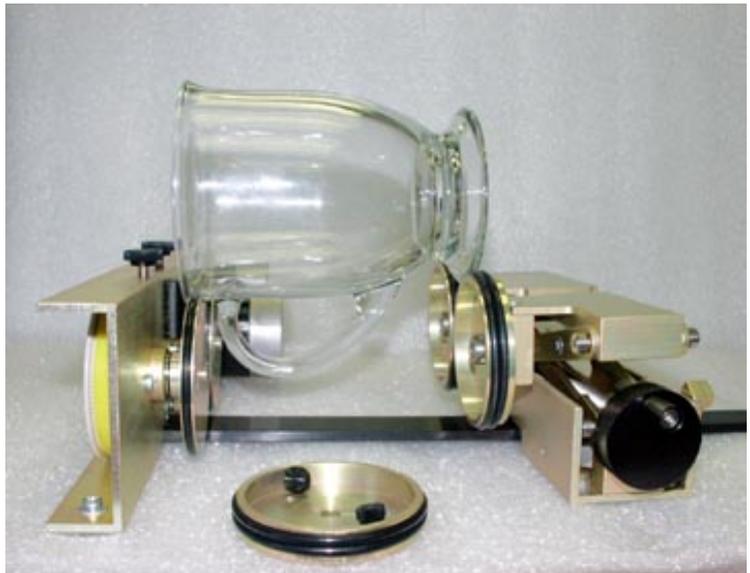
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## Mugs With Handles

The drive wheels are each two piece assemblies with three o-rings when fully assembled. Removing the front part of the drive wheels enables the user to accommodate a wide variety of mugs with handles. Not all mugs with handles require the front drive wheels to be removed.



The photo below shows a mug with a handle properly positioned on the rotary attachment, with the removable portion of the drive wheel shown in the foreground.



# Section 11: Standard and Optional Machine Features

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## Artwork Layout

Because the Rotary Attachment automatically compensates for the diameter of the glass, 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 rotary setup easy.

Page size is not overly important, but the following descriptions will give you a good starting point. Many people set the page to roughly match the size of the piece to be engraved because this helps to visualize artwork placement.



***Note: The artwork in the following examples does not fill up much of the Corel page that you are printing from. You can normally get by with using small pages for most artwork because the entire page is only necessary when you are lasering all the way around the cylinder (360 degrees) and/or if you are lasering from the top to the bottom of the cylinder.***



For the width (x-direction) of your page, lay the glass flat and orient it as it will rest on the rotary attachment. For this glass, the width of the page will be six inches (152 mm).

# Section 11: Standard and Optional Machine Features

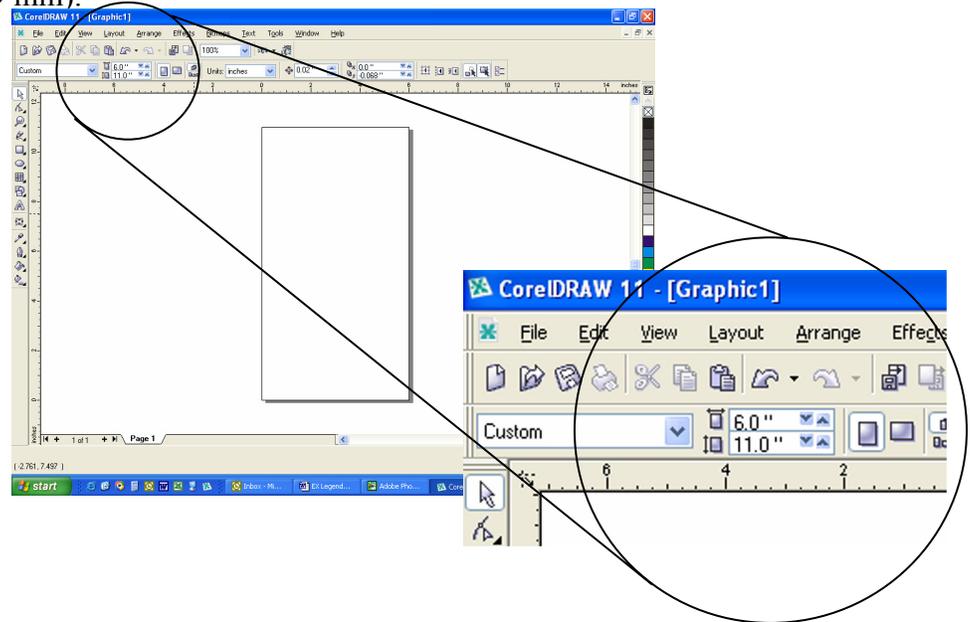
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For the height (y-direction) of your page, use a flexible tape and measure the circumference of the glass at its largest diameter.

For this glass, the height of your page will be 11 inches (279 mm).

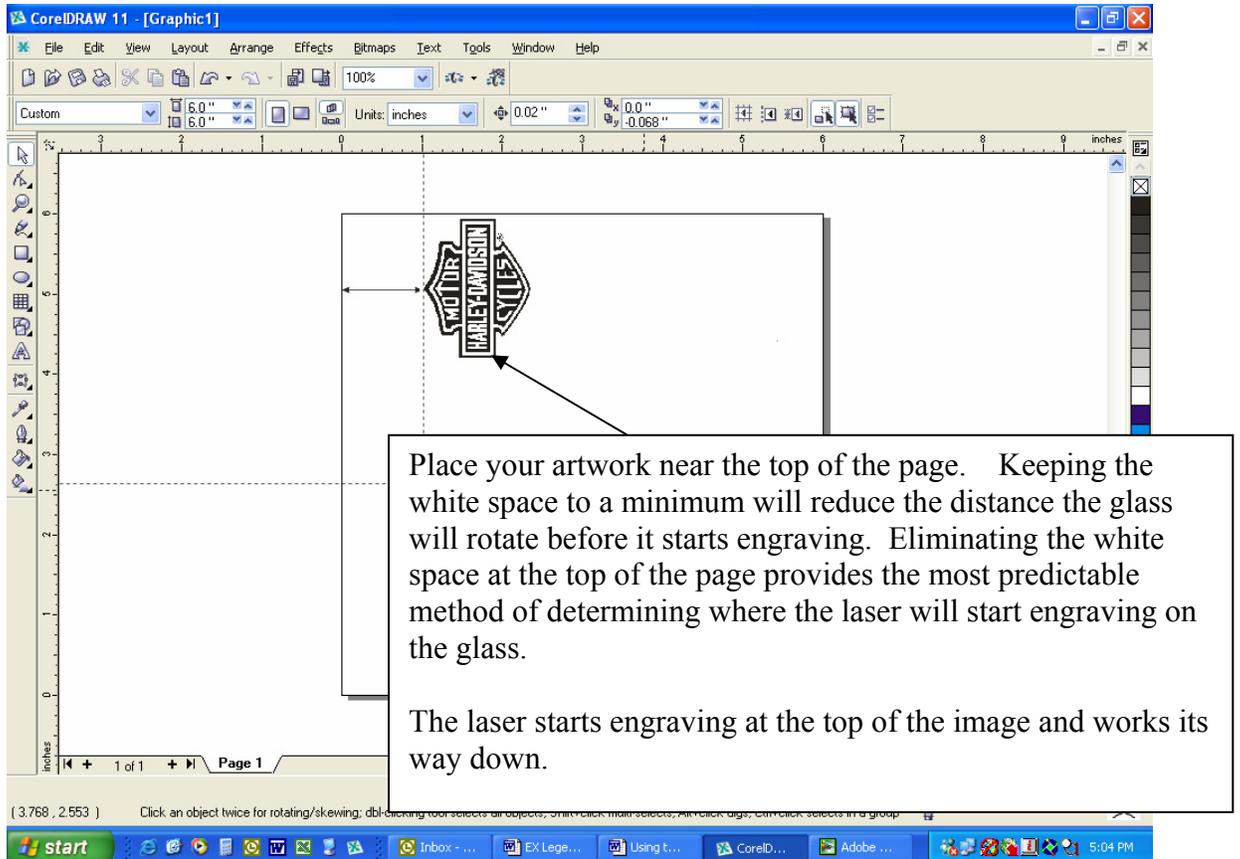


For the glass used in the prior picture, set up your page size to 6 x 11 inches (152 x 279 mm).



# Section 11: Standard and Optional Machine Features

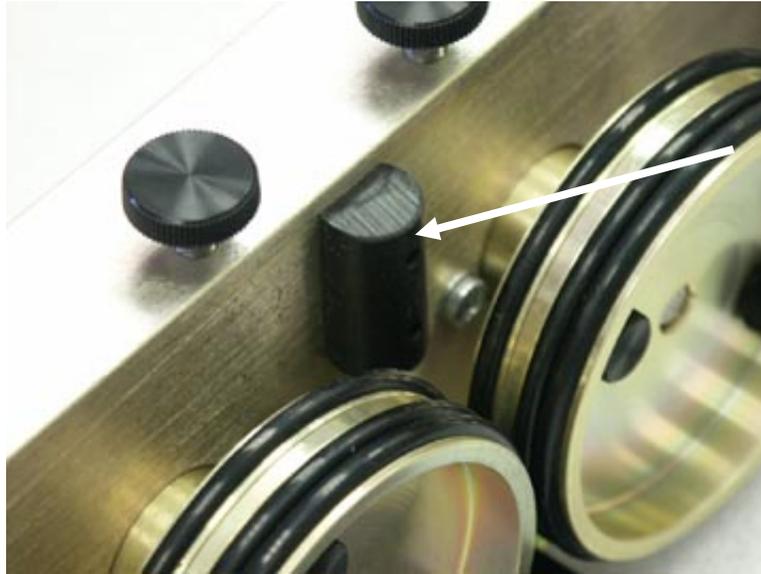
Place your artwork close to the top edge of the page layout. When the job starts the engraving process, the first thing to happen is for the rotary attachment to rotate through any white space that is between the top of your page and the top of your artwork. Once it has rotated through the white space it will begin to laser your artwork.



## ***Section 11: Standard and Optional Machine Features***

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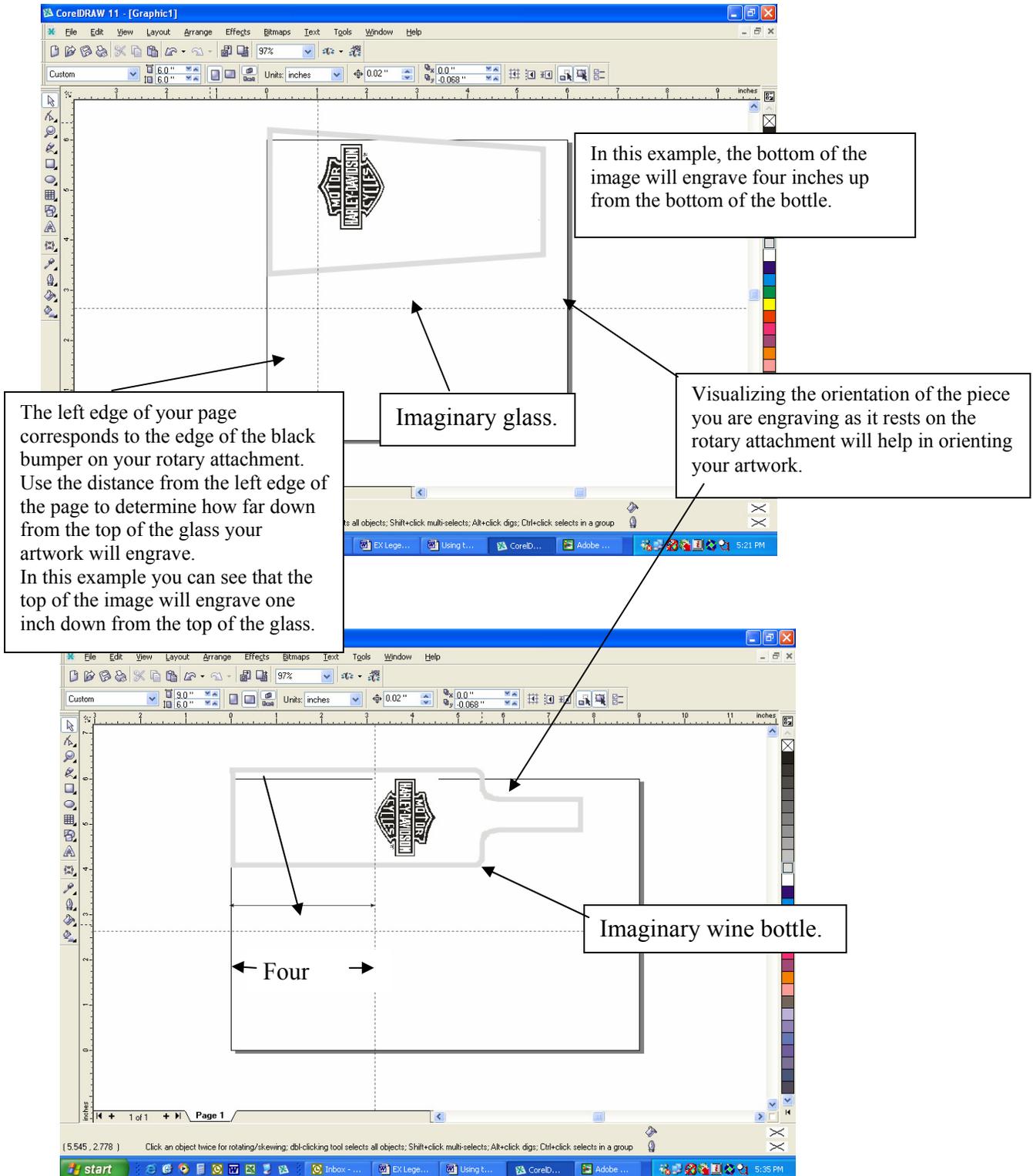
The edge of the black bumper on your rotary attachment corresponds to the left edge of your page in CorelDraw.



Set your glass on the rotary attachment so that it is close to this bumper, but not touching it. The glass may not be able to rotate freely if it is rubbing against the bumper

Because the “top” of a cylinder can be at either end of the rotary attachment, it is useful to visualize the orientation of the cylinder when it’s being engraved.

# Section 11: Standard and Optional Machine Features



# Section 11: Standard and Optional Machine Features

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If placement of your artwork is critical, many users place a couple layers of masking tape onto the area of the glass to be engraved and practice at high speed and low power to mark only the tape.

## *Focus with the Rotary*

**Auto Focus** – The auto focus feature works with the rotary attachment. ***Before using auto focus***, use the rotary attachments elevator to bring the top surface of the glass to horizontal. With your glass properly positioned on the rotary attachment, lower the table until the top surface of the glass is below the auto-focus plunger, then, auto focus as normal.

**Manual focus** – With the glass horizontal and in proper position on the rotary attachment, lower the table until the glass is below the auto focus plunger. Place the manual focus gauge on the lens carriage and press the focus button. Spin the knob to move the table up so that the manual focus gage just touches the glass. If the glass has a taper, pick an intermediate point between the highest and lowest points being engraved. Remove the gauge. Print the job with auto focus set to “No” in the print driver.

## *Rotary Removal*

1. Open the door.
2. Turn off the power to the Legend.
3. Depress the release tab on the rotary connector (front left inside corner) and unplug the connector.
4. Remove the rotary attachment.

# Section 11: Standard and Optional Machine Features

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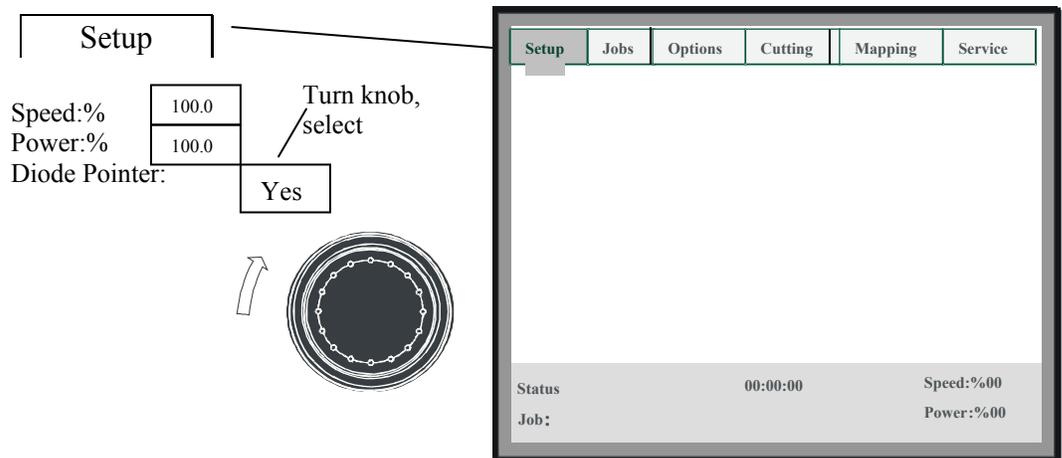
## Rotary Attachment – Home Position Adjustment

Use the following procedure to ensure the Home position is set correctly. Home position for all Rotary Attachments are factory set and does not normally need to be changed, but this procedure provides a quick method of changing the Home position if you desire.

Step 1 - Install the Rotary Attachment and turn the laser on.

Step 2 – Red Diode Pointer

Use the red dot pointer to determine the correct Home position. To turn the red dot pointer on, scroll to **SETUP** on your LCD Display, then press the **ENTER** button on the keypad. Scroll to **DIODE POINTER** and turn the control knob to **YES**, then press **ENTER**.

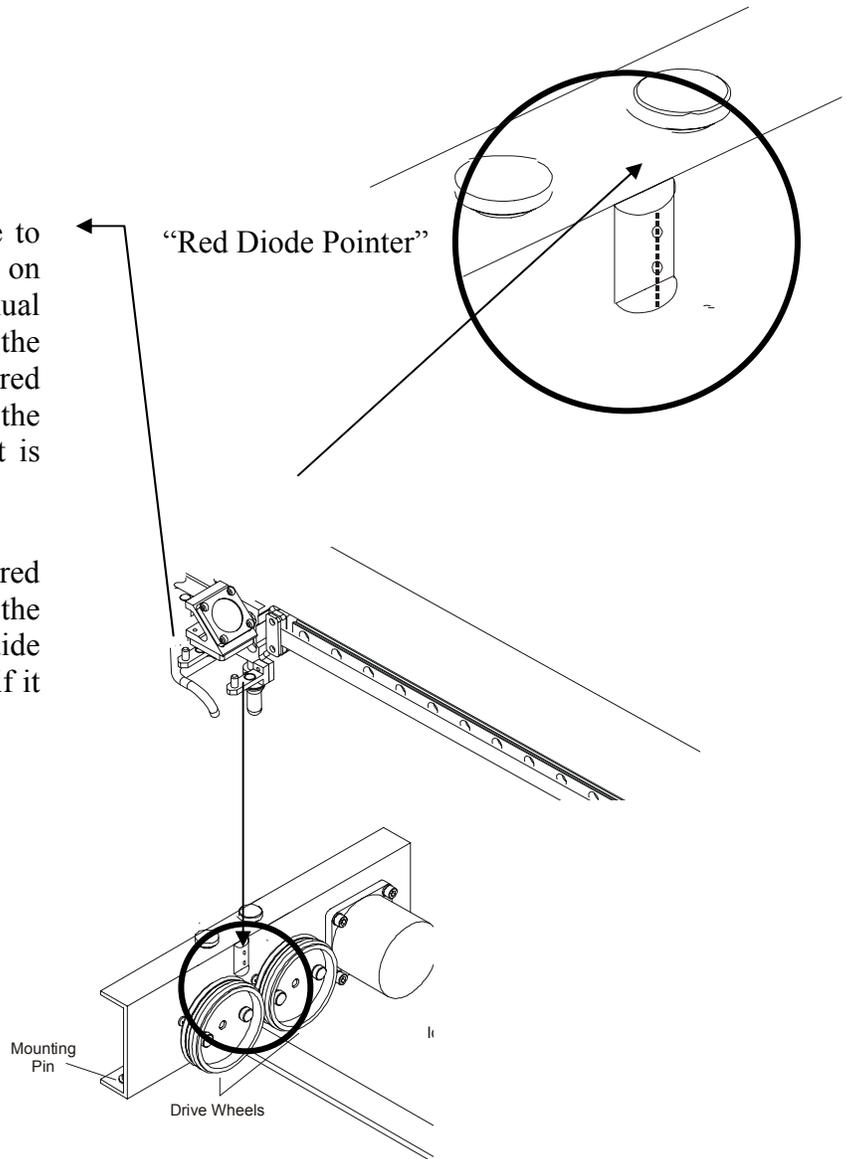


# Section 11: Standard and Optional Machine Features

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The red diode beam should be close to the center edge of the black bumper on the rotary attachment. Use manual focus if you need to raise or lower the table to produce a fine point with the red diode. If the red dot is close to the center of the bumper, no adjustment is necessary.

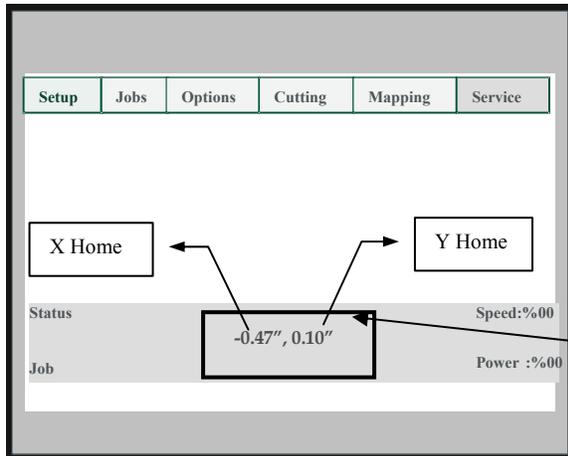
Most applications do not require the red dot to be exactly at the center of the bumper. The following steps will guide you in adjusting your home position if it is grossly out of position.



# Section 11: Standard and Optional Machine Features

## Step 3– Adjustment of your X Home Position

Leaving your Diode Pointer on, press the right arrow key on the Legend control panel and scroll to the **SERVICE** option, press **ENTER**.



Service
Move X/Y
Move Y Beam
Calibrate
Disable Axes
Reboot

Using your down arrow key, select **MOVE X/Y**. Press **ENTER**.

Once you have selected **MOVE X/Y**, you will see your X/Y coordinates located in the center lower screen of your display.

### Setting your X Home Position:

Using the left and right arrow keys on the LCD Display Panel, move the X carriage so the red dot pointer moves to the edge of the black bumper.



**Note:** *Because of the curvature of the rotary, you may have to set your Y Rotary Home Position first.*

Once you have moved the red dot to the center point, record the numbers that are located in the lower center of your display (see above diagram).

# Section 11: Standard and Optional Machine Features

## Step 4 – Changing FACTORY Settings

On the LCD panel highlight **SERVICE**, press the **ENTER** key to display the options:

Scroll to **CALIBRATE**. Press **ENTER**

Move X/Y
Move Y Beam
Calibrate
Disable Axes
Reboot

Scroll down to **X ROTARY HOME**.

X Home:	<input type="text"/>
Y Home:	<input type="text"/>
X Rotary Home:	<input type="text"/>
Y Rotary Home:	<input type="text"/>
Auto Focus Adjust:	<input type="text"/>
Laser Match:	<input type="text"/>
Stamp Match:	<input type="text"/>
Acceleration Compensation:	<input type="text"/>
Ramp. Compensation:	<input type="text"/>
Edge:	<input type="text"/>

By turning the round knob on the LCD panel, you can adjust the coordinates of “X” Home position. You may enter coordinates from + 200 to – 700. Decrementing this number will have the affect of moving the red dot to the left, while increasing the number will move the red dot to the right.



**Note – The numbers in the Rotary Home boxes are not in decimals like the X-coordinate values you obtained in Step 3 above. An X-coordinate value of -0.47 requires a setting of -470 in the X- Rotary Home**

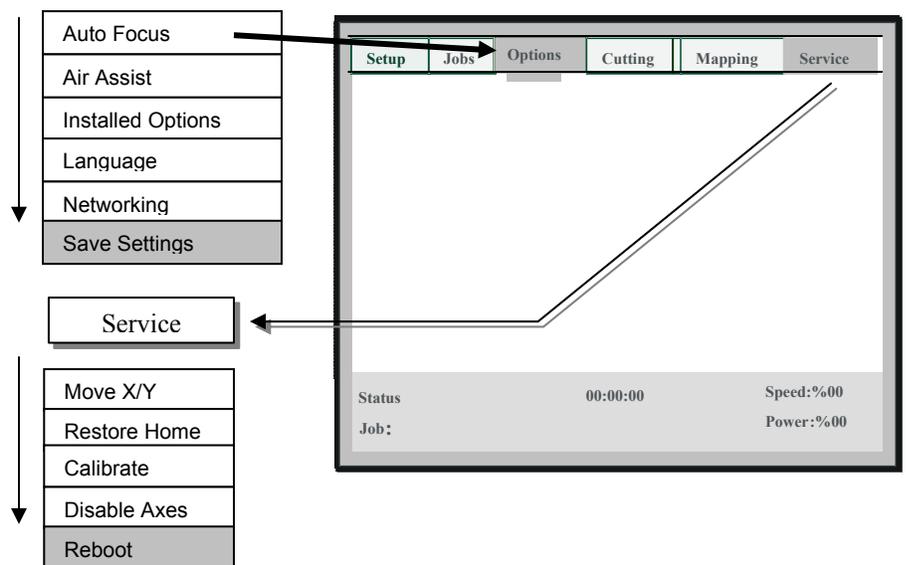
# Section 11: Standard and Optional Machine Features

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## Step 5 – Save Your Settings

After changing the X Rotary Home setting, scroll to the **OPTIONS** menu and press **ENTER**.

Scroll to **SAVE SETTINGS**. Press **ENTER**. You have now saved your X Rotary Home changes.



After you **SAVE SETTINGS** return to the Service menu, press **ENTER** and scroll down to **REBOOT** and press **ENTER**.

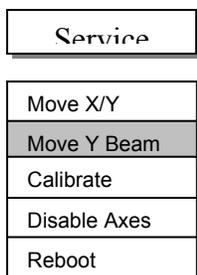
# Section 11: Standard and Optional Machine Features

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## Step 6 – Adjustment of your Y Home Position

With your Diode Pointer on, press the right arrow key on your LCD Display panel and scroll to the **SERVICE** menu and press **ENTER**.

This will display a drop down list of 5 options, using your down arrow key, select **MOVE Y BEAM**. Press **ENTER**.



Once **MOVE Y BEAM** has been selected, you will now be able to move the Y position of the I-beam with your up and down arrow keys on your LCD Display.

## Step 7 – Calibration Settings

Referencing Steps 3 – 5 above, follow the same guidelines with the exception of selecting your Y Rotary Home Position.

X Rotary Home:       Using the down arrow key, scroll down to **Y ROTARY HOME**.  
Y Rotary Home:

By turning the round knob on the LCD panel, you can adjust the coordinates of “Y” Home position. You may enter coordinates from +200 to a – 200. Decrementing this number will move the carriage towards the front the machine, while increasing the number will move the carriage towards the back of the machine.

**REPEAT STEP 5 – SAVE YOUR SETTINGS**

# Section 11: Standard and Optional Machine Features

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## Double Head

### Installation



Locate the components for the Double head option.

Connecting strut

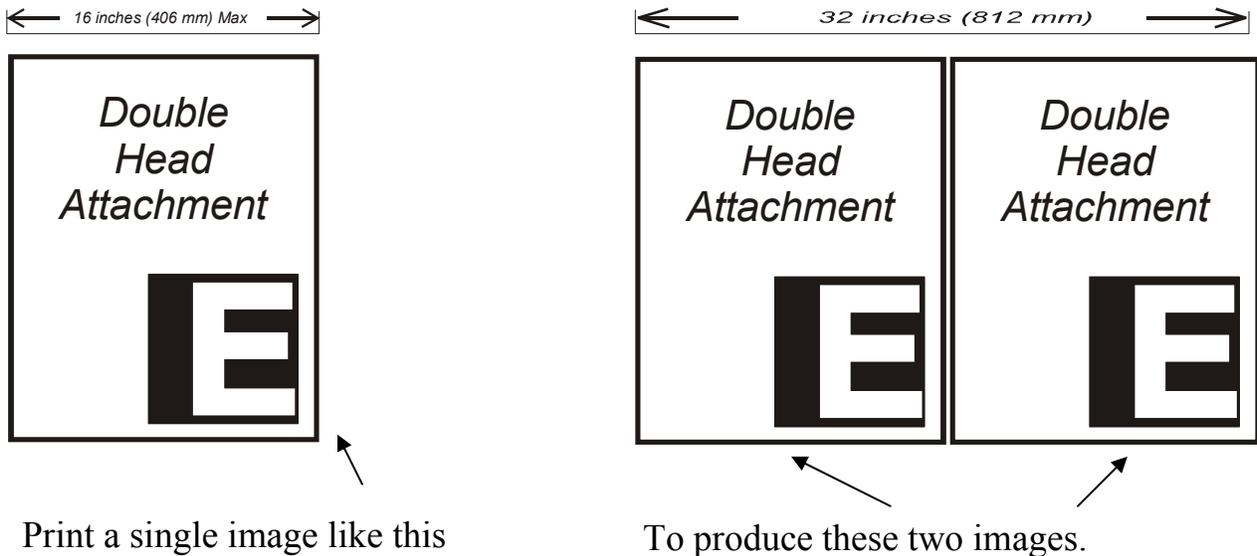
1. Beam Splitter/Lens Assembly
2. With the machine off, open the door and slowly pull the “X” beam assembly to the front of the machine to where it is a comfortable reach.
3. Move the secondary bearing block away from its “Park” position towards the middle of the X-beam. Put the beam splitter/lens assembly up against the second bearing block using the locating pins as guides and tighten the slotted holding screw.
4. Space the primary and secondary heads about 16 inches (406 mm) apart, and place the connecting strut between the heads. Align the thumbscrews in the end of the strut with the holes on the carriages, and tighten the thumbscrews.
5. When you are finished using the Double Head, turn the machine off, disconnect the strut and remove the beam splitter/lens assembly. “Park” the bearing block at the far right side of the bearing rail.

# Section 11: Standard and Optional Machine Features

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## Artwork Layout

Lay out your work on a maximum page size of 16" (406 mm) wide and 20" (508 mm) tall. If you try to go beyond 16" (406 mm) width the machine will give an error and stop. Remember, the machine will take care of the duplication automatically.



Prepare your artwork as though you were making only a single piece.

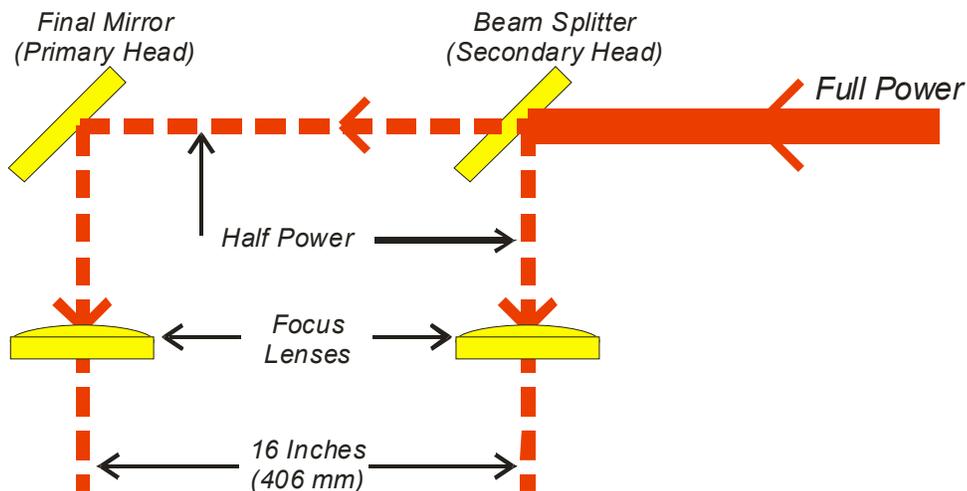
If you ordered the double head and are not using it, the area available as a single head is 30 x 20 inches (762 x 508 mm). Please keep the second head in a safe place so it stays clean. See the diagrams on the following page for correct installation of the double head.

# Section 11: Standard and Optional Machine Features

---

## Laser Power

The Double Head splits the laser beam in half after the laser beam leaves the laser tube. The beam goes through a transmissive optic that is located on the beam splitter/lens assembly. Half of the beam is directed down through the first focus lens and the other half of the beam is allowed to pass through the transmissive optic to the primary head. This system of splitting the beam in half also splits the power in half. When the double head is installed, each head is putting out half the power of a single head. Keep this in mind when you are using the double head. Depending on your application, you may need to compensate for the change of power by reducing the speed.



Not all applications are going to be ideally suited for the Double Head attachment. For example, very demanding materials that are very sensitive to slight variations in power may not be a good use of the Double Head attachment. While the double head splits the laser power very evenly, there may be some materials and/or environmental factors (like optics that need cleaning) that contribute to an uneven split. Standard materials like wood, acrylic, most coated metals, etc will probably never show the effects of a split that is less than perfect, but if you have a material that is extremely sensitive, remove the Double Head attachment and use the single head for this application.

## ***Section 11: Standard and Optional Machine Features***

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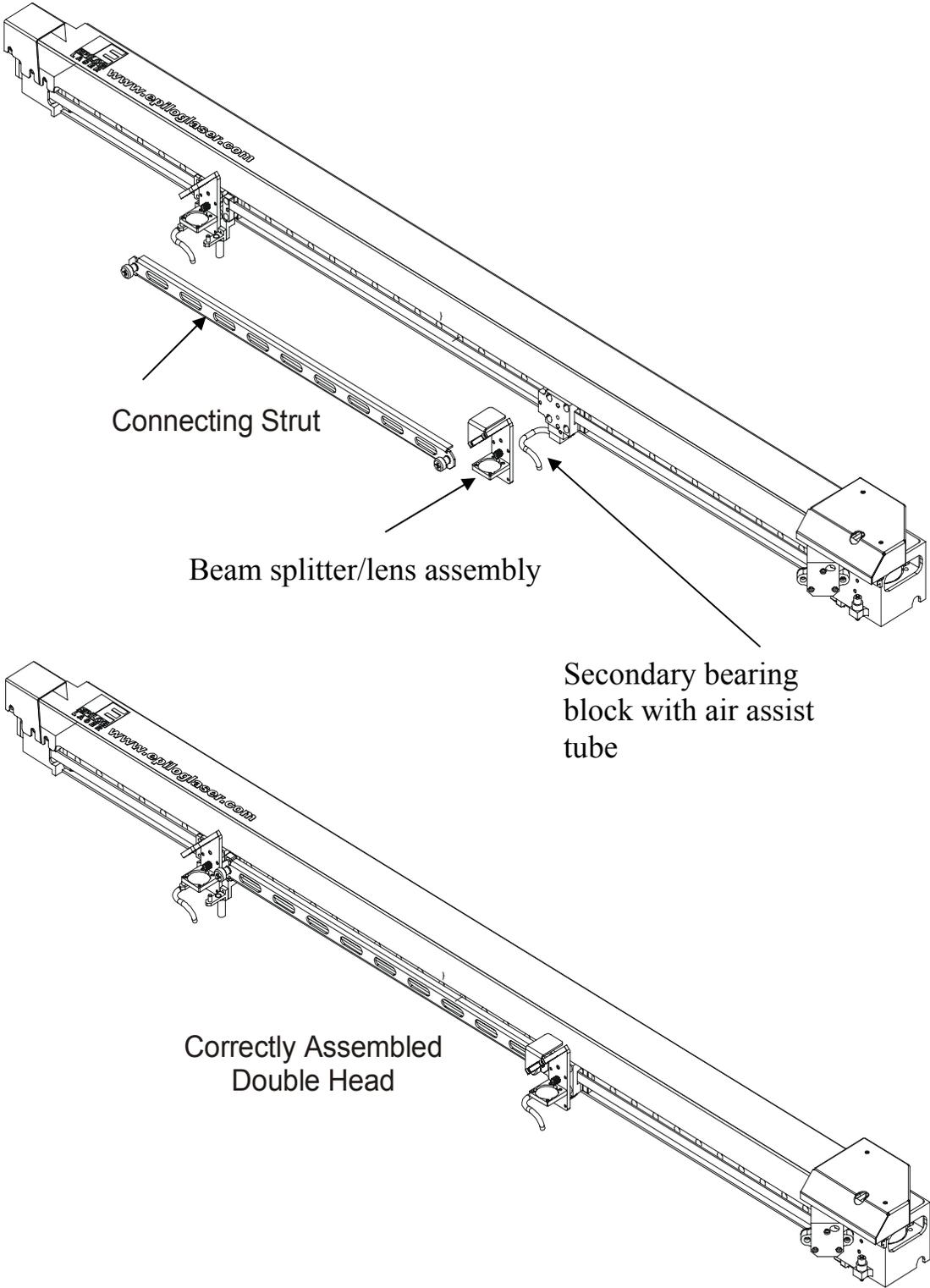
Park position for the secondary bearing block. The beam splitter/focus lens assembly has been removed.

With the double head option installed, the secondary head bearing block reduces the maximum stroke for single head mode to 30.5 inches (774 mm). The full 32 inches (812 mm) of stroke cannot be used if the double head attachment is installed as an option.



# Section 11: Standard and Optional Machine Features

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# Section 11: Standard and Optional Machine Features

## Optional Lenses

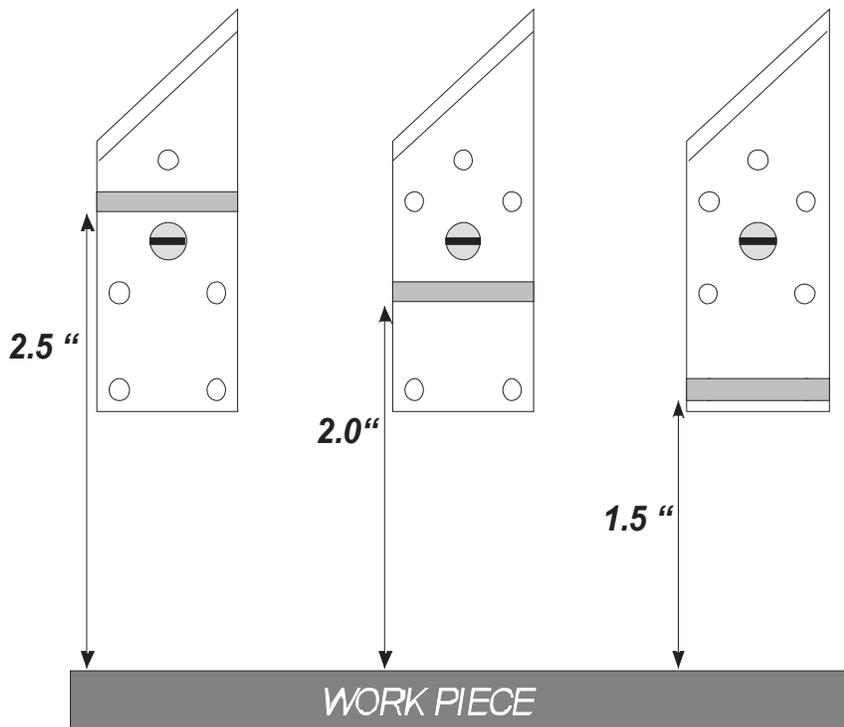


Optional lenses are available for EX systems only in 1.5, 2.5, and 4.0 inch focal lengths. Optional lenses are not available for TT models.

### Spot Size, Focus Length, and Depth of Field

A 2.0 inch lens is supplied as standard equipment on all Legend EX and TT systems. The 2.0 inch lens is a very good general purpose lens that will fit the needs of most engraving and cutting applications. There are three optional lenses available for the EX line of lasers to provide maximum versatility for all of your engraving and cutting needs. The spot size of the laser beam can be changed by installing a different lens assembly. A small spot size (achieved with a 1.5 inch lens) is used for higher resolution engraving to achieve finer engraving detail. A larger spot size (2.5 inch lens) can be used for lower resolution engraving and is also used for vector cutting. The 4.0 inch lens is used for specialized engraving applications and is a popular choice for cutting thick acrylic.

This diagram shows the vertical positioning of the 2.5, 2.0 and 1.5 inch lenses (Legend EX only). It illustrates why auto-focus and a single manual focus gauge work with all three lenses.

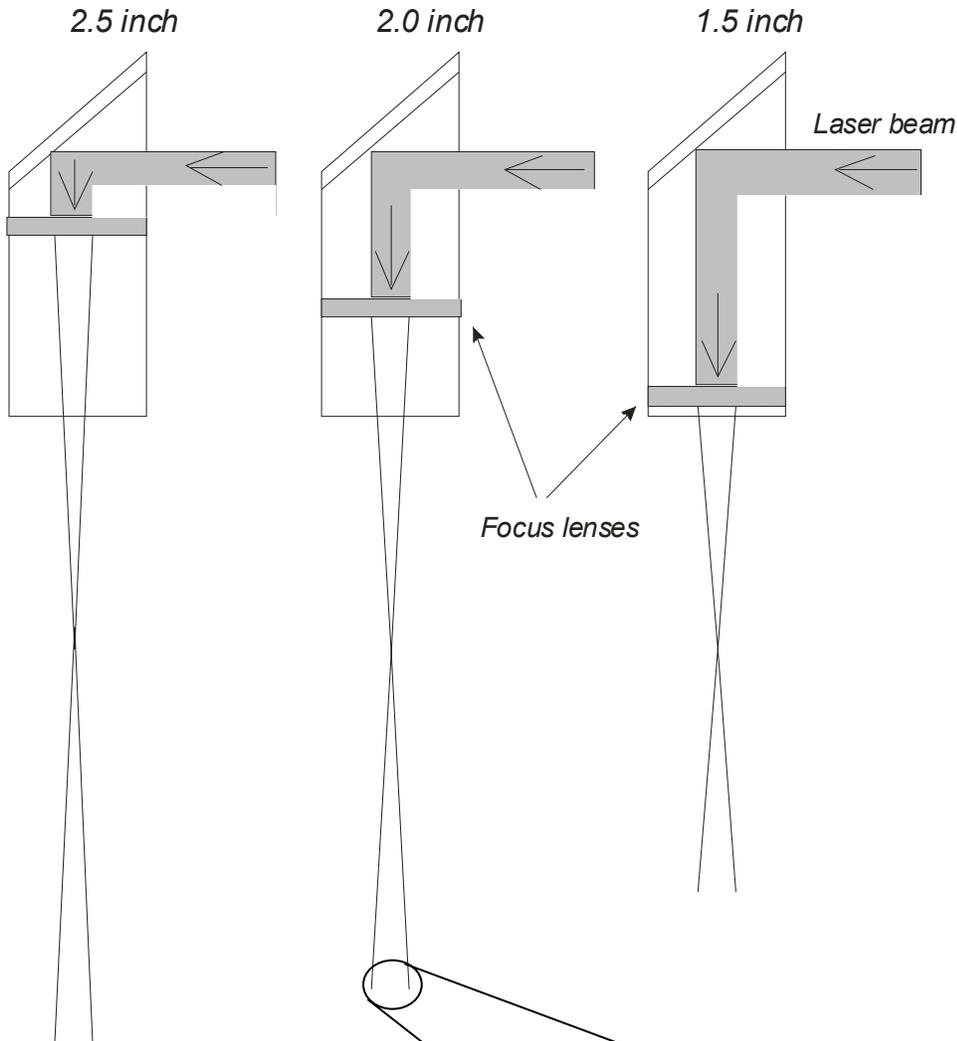


Instead of changing the length of the manual focus gauge, or supplying a different gauge with each lens, we place the different lenses at their appropriate height relative to the work piece.

This setup allows the auto focus to work automatically with all three lenses without user input.

Please Note: Simply moving the 2.0 inch lens (or any other lens) to a different position on the lens assembly does not change the optical characteristics of that lens. You must change the entire lens assembly.

# Section 11: Standard and Optional Machine Features

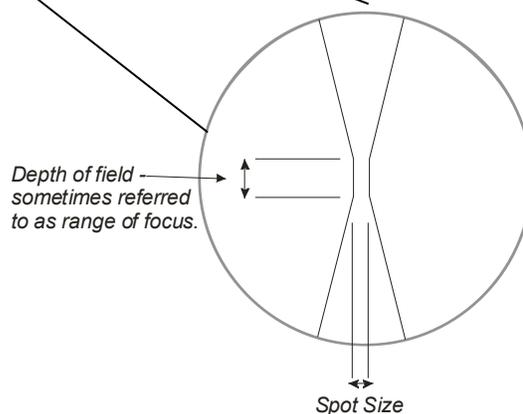


This diagram at left shows the laser beam as it passes through the focus lens and how it tapers to its optimum focus point. After it reaches its optimum focus point, the beam begins to expand again.

The diagram below shows an exaggerated view of the laser beam at its optimum focus point. This is the point where the beam achieves its smallest diameter. Notice that the beam stays at its optimum point for a short distance. This distance is known as the depth of field.

Each focus lens produces a different spot size and a different depth of field distance.

These differences are show in the table below along with recommended uses for the different focus lenses.



# Section 11: Standard and Optional Machine Features

Focus Length	1.5 inch	2.0 inch	2.5 inch	4.0 Inch
Spot Size	.003" (high resolution)	.005" (standard resolution)	.007" (low resolution)	.010"
Depth of Field	small + / - .075"	medium + / - .100"	larger + / - .125"	large + / - .187"
Best Application	600 to 1200 DPI - very fine detailed engraving.	300 to 600 DPI - general engraving and cutting	300 DPI or less - general engraving, acrylic cutting.	300 DPI or less in deep cavities - acrylic cutting.



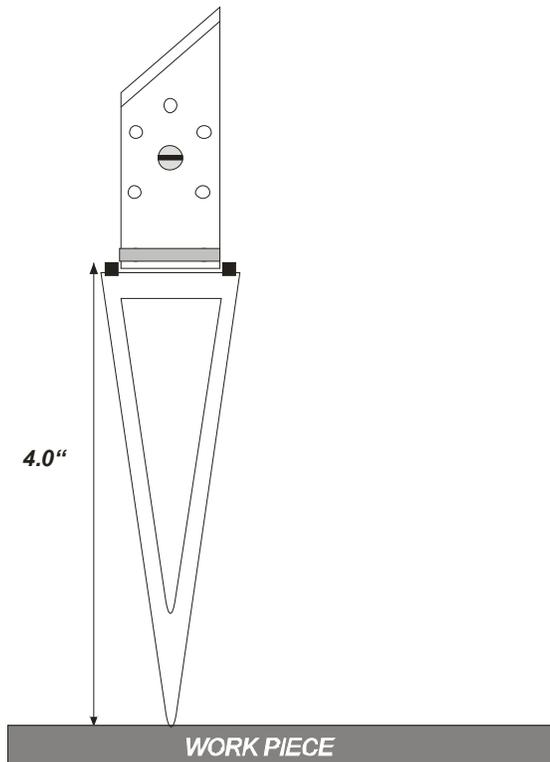
*Note: There is a little bit of overlap in the uses of the different lenses. The 2.0 inch lens is a very good general purpose lens and is well suited for most applications. The optional lenses are more suited to specific applications where the work being done is of a more specialized nature.*

In addition to the three standard lenses pictured above (available for the EX models only), Epilog also offers a 4.0 inch lens for the EX models. The 4.0 inch lens is a very specialized lens that is usually reserved for cutting thicker acrylic. Many users feel that the greater depth of field that the 4.0 inch lens provides enhances the look of the sides of the acrylic. The 4.0 inch lens is also used for engraving applications where the engraving is being done at the bottom of a deep cavity, like the bottom of a bowl or on the inside of a shadow box that has tall sides.

# Section 11: Standard and Optional Machine Features

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The 4.0 inch lens is gray and is mounted in the bottom slot of the standard lens assembly and comes with a dedicated focus lens.



Auto focus must be deactivated when using the 4.0 inch lens

# Section 11: Standard and Optional Machine Features

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## Vector Grid

The Vector Grid, shown below, is the ideal tool for vector cutting. The Vector Grid reduces backside burning by lifting the material off the table and supporting it on a black aluminum honeycomb grid.

A precise cut and crisp edges are achieved when the laser beam passes cleanly through the material into the air space created below. Flow-through ventilation below the work piece prevents buildup of smoke and vapor, which are drawn directly into the exhaust outlet. In addition to providing better edge quality, the vector table keeps your laser clean by trapping the resins and debris associated with cutting materials such as wood or acrylic.

*Note: When using the Vector Grid, make sure your material is in place prior to focusing.*



# Section 12: Engraving Machine Maintenance

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## *In This Section*

- Cleaning
  - Laser Tube
  - Auto Focus Plunger
- 

## *Cleaning - Important!*

The single most important thing that you can do to keep your Legend 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 virtually no maintenance required for your Legend if you KEEP IT CLEAN!

## *Exhaust*

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 of the lens carriage, inspect the exhaust system. Check for loose or broken pipe/hose connections, or obstructions. Many blowers are belt driven, and the belts will wear with time.

## *Bearings*

The bearing system on the Legend should be cleaned about once a week depending on use. Use a soft cloth and some alcohol or similar mild solvent. Using the drawing on the next page, clean each of the bearing tracks as shown. A cotton swab is perfect for cleaning out the inside of the grooved tracks. About once every three months, you should lubricate the bearings. Using the lubricant Syringe from your accessory kit, apply a thin bead of grease on the bearings shown in the diagram on the next page. Each bearing has two grease points. The grease should go down inside the small groove on each side of the bearing.

## ***Section 12: Engraving Machine Maintenance***

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After cleaning the 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.

### ***Optics***

About once a week, you will need to clean the optics (mirrors and lenses) of your Legend. If smoke, resin, or other contaminants are allowed to accumulate too heavily, they will reduce the available laser power and may cause damage. See the diagram on the next page for the location of all the optics.

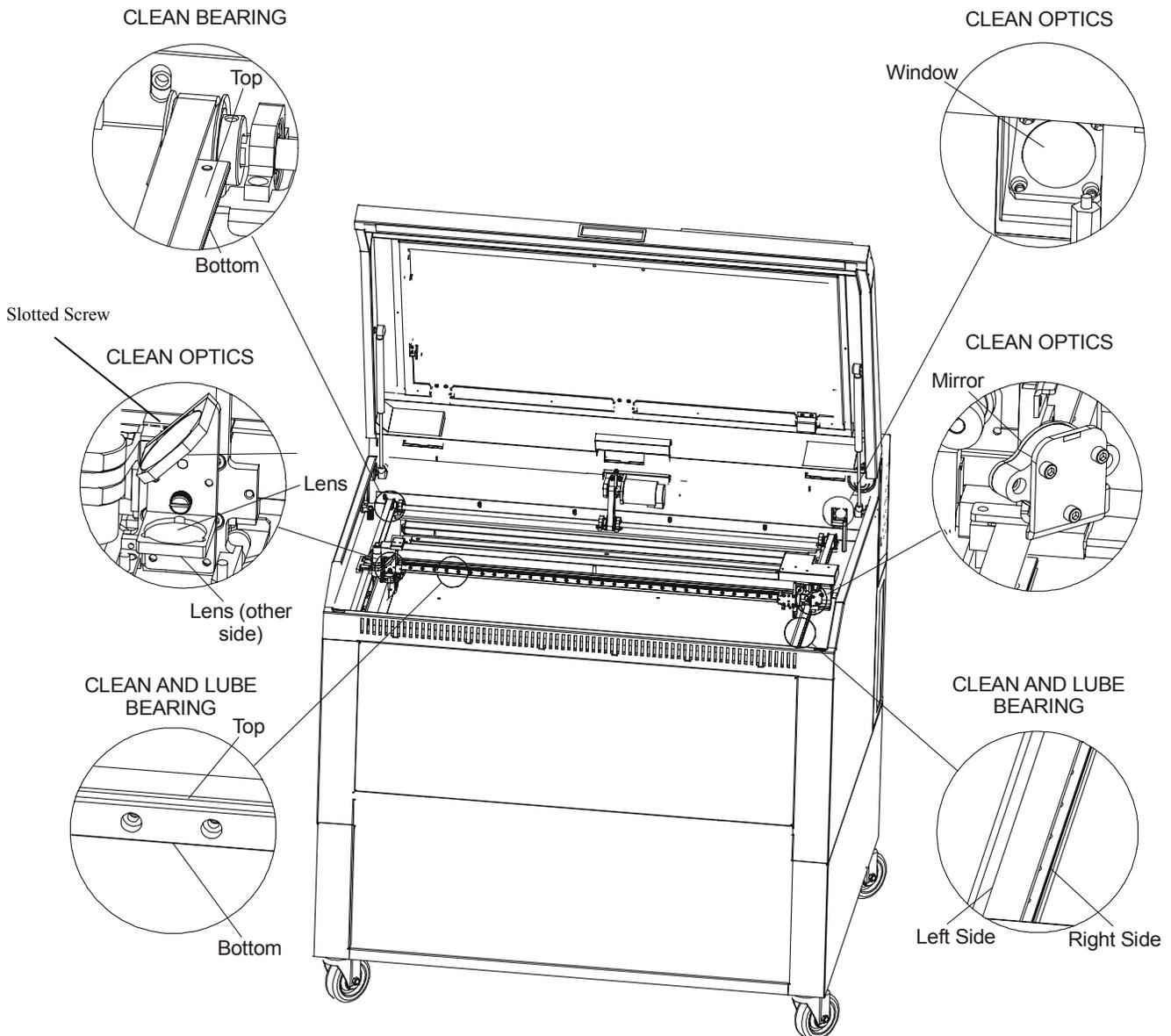
# Section 12: Engraving Machine Maintenance

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 easily removed from the machine for cleaning, however, many users feel it is not necessary to do so. To remove the assembly, loosen the large slotted screw in the center. Following are both the Legend EX and Legend TT cleaning diagrams.



## LEGEND EX Cleaning and Lubrication

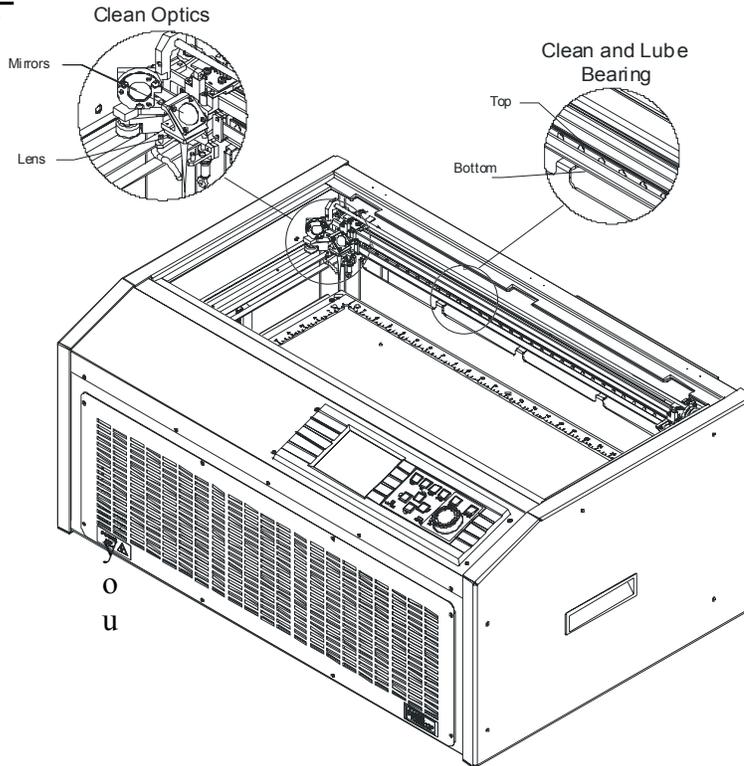
### CLEANING AND LUBRICATION



# Section 12: Engraving Machine Maintenance

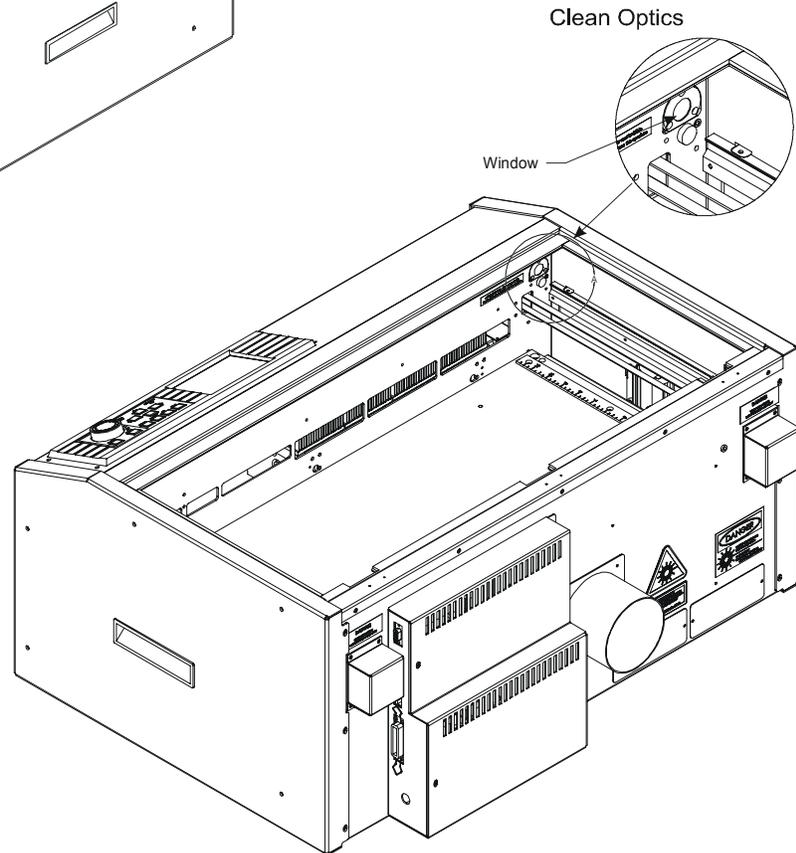


## LEGEND TT Cleaning and Lubrication



To clean the optics use a high-quality cotton swab or lens paper moistened with the optics cleaner supplied in the accessory kit. Please read the label on the bottle carefully. Rubbing alcohol should be used only to remove fingerprints. If you run out of the cleaner supplied by Epilog, acetone can be used as a temporary measure, but should not be used for regular cleaning as it contains impurities which can contaminate the optics. If

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you run out of solvent, pure ethyl (grain) alcohol such "Golden Grain" and "Everclear" are highly recommended because of their pure nature and because they are readily available at most liquor stores.

Wet the swab or lens paper

## Section 12: Engraving Machine Maintenance

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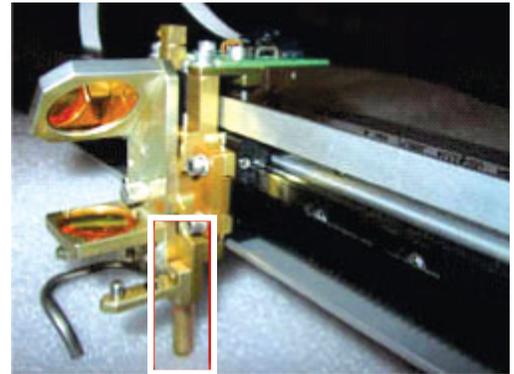
thoroughly with the solvent, and then blot it against a piece of cotton so that it is no longer soaking-wet. Then gently move the swab or paper across the optic, until the optic is free of visible contamination. Avoid any hard "scrubbing" of the surface, especially while there are visible particles on 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, and allow the optics to dry before you operate your engraver.

### *Laser Tube*

The laser tube used in the Legend does have a maximum service life. Depending on your particular usage, the tube should be good for a very long time. The tubes can be refurbished and are available on an exchange basis. Contact Epilog Technical Support for details.

### *Auto Focus Plunger*

The auto focus plunger, as shown at the right, is mounted at the back of the carriage that holds the focus lens. It is about a quarter inch in diameter, and about two inches long. The bottom shaft needs to be periodically cleaned for accurate focusing. Use a cotton rag and some mild household cleaner (Windex, 409 or isopropyl alcohol). Gently wipe the plunger until it is clean.



***Section 12: Engraving Machine Maintenance***

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# Section 13: Material Suppliers

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## *In This Section*

- Laser Engravable Products
- Acrylic
- Laser Engravable Coated Metals
- Pressboard Plaques – Melamine
- Walnut Plaques & Specialty Wood Products
- Corian or Fountain Head – Synthetic Marble
- Engravable Plastics
- Flat Glass
- Pen and Pencil Sets
- Cermark Metal Coating
- Color Fill Materials
- Tapes and Foils



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The following list contains supplier information for materials typically used with your legend machine.

### ***LASER ENGRAVABLE PRODUCTS***

#### **LaserBits, Inc.**

1734 West Williams Drive - Suite 10

Phoenix, Arizona 85027 U.S.A.

Phone: 623-879-0005

Fax: 623-879-5149

Laserbits.com

### ***ACRYLIC***

#### **Acrylic Idea Factory**

6669-C Peachtree Industrial Blvd.

Norcross, GA 30092

Phone: 800-543-9253

Fax: (770) 447-1113

# Section 13: Material Suppliers

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## *LASER ENGRAVABLE COATED METALS*

### **Identification Plates, Inc.**

1555 High Point Drive  
Mesquite, TX 75149-9009  
Phone: 800-395-2570  
Fax: (972) 216-1555

### **Victory**

1820 N. Major Avenue  
Chicago, IL 60639  
Phone: 800-327-5578  
Fax: (773) 637-7799

### **JDS**

2704 W. Third Street  
Sioux Falls, SD 57104  
Phone: 605-339-4010  
Toll Free: 1-800-843-8853  
Fax: 605-339-1467  
Email: sales@jdsindustries.com

### **R. S. Owens & Co.**

5535 North Lynch Avenue  
Chicago, IL 60630  
Phone: 800-282-6200

## *PRESSBOARD PLAQUES - MELAMINE*

### **JDS**

2704 W. Third Street  
Sioux Falls, SD 57104  
Phone: 605-339-4010  
Toll Free: 1-800-843-8853  
Fax: 605-339-1467  
Email: sales@jdsindustries.com

## **Section 13: Material Suppliers**

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### **PDU**

11077 E. Rush Street  
South El Monte, CA 91733-3546  
Phone: 626-442-7711  
Toll Free: 1-800-800-7711  
Fax: 626-442-1814

### ***WALNUT PLAQUES & SPECIALTY WOOD PRODUCTS***

#### **Colorado Heirloom**

333 E. 4th Street  
Loveland, CO 80537  
Phone: (970) 667-4222  
Fax: (970) 667-8880

#### **Kentucky Woodcrafts Co.**

P.O. Box 220  
McKee Industrial Park  
McKee, KY 40447  
Phone: 800-354-0196  
Fax: (606) 287-8047

#### **Lee's Wood Products**

31 Smithers Street  
P.O. Box 159  
Rocky Mount, VA 24151  
Phone: 800-552-5337  
Fax: (540) 483-4645

#### **Stanton Manufacturing**

Lake Road 54-15  
Lake Ozark, MO 65049  
573-365-2441

# Section 13: Material Suppliers

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## *CORIAN OR FOUNTAINHEAD - SYNTHETIC MARBLE*

### **Johnson Plastics**

9240 Grand Avenue South  
Minneapolis, MN 55420-3604  
Phone: 800-869-7800  
Fax: (612) 888-4997

## *ENGRAVABLE PLASTICS*

### **Innovative Plastics Inc.**

P.O. Box 7065  
Algonquin, IL 60102  
Phone: (815) 477-0778  
Fax: (815) 477-1210

### **Johnson Plastics**

9240 Grand Avenue South  
Minneapolis, MN 55420-3604  
Phone: 800-869-7800 - Customer Service  
Fax: (612) 888-4997

### **Rowmark**

2040 Industrial Drive  
Findlay, OH 45839  
Phone: 419-425-8974  
Toll Free: 1-800-243-3339  
Fax: 419-425-0501

## *FLAT GLASS*

### **Gold Coast Graphics**

15841 Graham Street  
Huntington Beach, CA 92649  
888-733-0061

## **Section 13: Material Suppliers**

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### ***PEN & PENCIL SETS***

**IMARK Pen Co.**  
3008 Pleasant Valley Lane  
Arlington, TX 76015  
Phone: (817) 465-6681  
Fax: (817) 465-7411

### ***CERMARK METAL COATING***

**CerMark Material**  
FERRO Corporation  
1-800-245-4951

### ***COLOR FILL MATERIALS***

**Smoke-Wood**  
1-800-248-2352  
Fax: 541-437-1080  
Email: [smokewd@eoni.com](mailto:smokewd@eoni.com)  
[www.smoke-wood.com](http://www.smoke-wood.com)

### ***TAPES AND FOILS***

**Innotech of Wisconsin**  
1760 State Street  
Racine, WI 53408-5546  
1-800-776-7194  
FAX: 414-637-7103  
[tape@exepc.com](mailto:tape@exepc.com)

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*Manual*

***Troubleshooting,  
Service and  
Specifications***

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# Section 14: In Case of Difficulty

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## *In This Section*

- Contacting Technical Support
  - Avoiding Common Print Problems
- 

## *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 during the hours of 6 a.m. and 6 p.m. Mountain Time.



Technical Support (303) 215-9171

Technical Support online:

[www.epiloglaser.com/service.htm](http://www.epiloglaser.com/service.htm)

When contacting the Epilog technical support department, please be ready to supply the technician with the Serial Number of the machine you are referencing. The machine serial number can be found on the Certification/Identification Label. This engraved plate is located on the left-hand side of the machine's cabinet, by the power inlet connector. The example shown below is for the Model 6000 35-watt product

Epilog Corporation  
500 Corporate Circle, Suite L  
Golden, CO 80401 USA

Model Number: 6000 Laser System  
Serial Number: 6035-0422863220EX  
Date of Manufacture: October 2004

### **Class 3R 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](mailto:info@ce-marking.nl)



Mass:  
220 kg max

## Section 14: In Case of Difficulty

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### Avoiding Common Print Problems

Printing problems are normally related to stopping, resetting or trying to repeat a job before the computer has been allowed enough time to transmit the entire job. If you do interrupt a job while it is being transmitted (printed) to the Legend engraver, there is a good chance that the remaining data is still somewhere between the computer and the engraver, unless you take precautions to clear the print queue. To avoid most common print problems, **ALWAYS** double click on the Legend printer icon (under settings, printers) to check for partial jobs, if you interrupt a job in progress. They can then be canceled or deleted from the computer. **ALWAYS** reset the Legend before starting another print job.

**Problem: Engraver will not vector.**

*Solution:*

1. Please verify that the print driver is set to “**vector**” or “**combined**”.
2. Verify that your artwork is correct for vectoring.
3. Scanned images will not vector.
4. Filled or solid images will not vector (outlines only).
5. If you are using Corel 3.0 or Corel 5.0, verify that line width is .007 or less.
6. If you are using Corel 6.0 or Corel 7.0, the line width is DPI dependent.
7. If you are vectoring at 600 DPI, then your line width must be .001.
8. If you are vectoring at 300 DPI, then your line width must be .003.

**Problem: Engraver beeps and displays “IDLE” but no engraving took place.**

*Solution:*

1. Please verify that the page size in your drawing program is the same as the piece size in the print driver. If you are still experiencing the same problem, you will need to go into Windows Setup and verify page size. Click on **Start** move up to **Setting** and click on **Printers**. Highlight proper printer then click on **File** | **Properties** | **Details** | **Setup**. Verify the page size there and change if needed. Assure that the “Measurement System” in Windows is set to “U.S.” To accomplish this click on **Start** | **Control Panel** | **Regional Settings** | **Number**.
2. Verify that your artwork is as you intended. Some programs have a “wire frame” preview that won’t remind you that you are using white letters on a white background.

# Section 14: In Case of Difficulty

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**Problem: Will not print text or text does not print correctly.**

*Solution:*

- Some operations with Text in some versions of CorelDraw require the text to be converted to curves. This command is located in the “*Arrange*” pull down menu.

**Problem: Engraving appears weak.**

*Solution:*

1. All mirrors and lenses need to be cleaned and inspected for damage. See Section 12 of this manual for cleaning instructions. If you are unsure of the location of all of the mirrors on your engraver, please contact Technical Support at (303) 215-9171.
2. Verify that the lens is in correct focus.
3. Verify correct speed and power settings for the type of material that you are engraving.



**Problem: No laser beam but the engraver appears to be running normally.**

*Solution:*

1. Verify focus is set properly.
2. Verify power and speed settings are appropriate.
3. Verify the Door is closed tightly.
4. Verify the Exhaust Fan in *ON*. (TT)

**Problem: Scanned images will not print or will not print correctly.**

*Solution:*

1. If you are using Corel 3.0 or 5.0, do not rotate your image. Rotate the artwork before you scan it.
2. If you are using Corel 5.0, verify that it is version G1.
3. To do this click on *Help* in Corel 5.0 then click on *About CorelDraw*. If it is not revision G1, then contact Corel for the free upgrade. Be prepared to supply Corel with your software serial number.
4. If you are using Corel 6.0 or 7.0, there are three settings in Corel that require the proper setting. Put some type of design on your screen, a basic square will do. Then follow the instructions below.
5. Click on: *File | Print | Options*
6. Then on the *Options* page
7. Then under *Special Settings* you will find the choice of *Options* and *Setting*.
8. First find the option *Bitmap Printing*
9. Set it to *Output Entire Bitmap*
10. Then find the option *Driver Banding*

## Section 14: In Case of Difficulty

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11. Set it to *Send Bands to Driver*
12. Then find the option *Text Output Method*
13. Set it to *All Text as Graphics*
14. Verify that Corel 6.0 is version .176; follow the instructions above for verification and updates.

### **Problem: Inadequate Exhaust.**

#### *Solution:*

1. The closer the blower is to the machine the better exhaust you will receive.
2. If you are using flex hose, do not bundle up the excess. Stretch out the flex hose, cut it to desired length and use only what you need.
3. Clean your exhaust system on a regular basis including engraver and blower. Use a bottlebrush and a vacuum on the areas where the exhaust buildup accumulates.

### **Problem: Engraver will not power up. Nothing transpires when engraver is turned on.**

#### *Solution:*

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

### **Problem: Poor engraving quality.**

#### *Solution:*

1. If you feel you are not getting the depth that you once were, this is probably a maintenance issue. See the maintenance section of the manual (Section 12) for instructions on cleaning the optics. If you are not sure of the location of all of your mirrors, contact Epilog technical support at Technical Support at (303) 215-9171.
2. If you are experiencing a blurry or erratic image, check to make sure you are in focus and all optics are clean.



## Section 14: In Case of Difficulty

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3. If you are experiencing a double image problem or any other quality issue, it is best to run a sample of what the machine is doing and send it to:

Technical Support Department  
Epilog Laser Corporation  
500 Corporate Circle, Suite L  
Golden, CO 80401



Phone: (303) 215-9171  
Fax: (303) 277-9669

4. Please include a letter stating the configuration of your machine along with speed and power settings of the sample you ran and any other pertinent information.

### **Problem: Image at the wrong location on the work piece.**

#### *Solution:*

1. Verify that the page size in Corel does not exceed the maximum engravable area of the machine.
2. Verify that the page size in Corel matches the piece size in
3. Print Setup. If you have a page size of 2"X3" and a piece size in Print Setup of 24 X 18", then it will place the 2 X 3" in the center of the 24 X 18" area.
4. If you see that the image is constantly off in one direction, you will need to reset the "home position" on the machine. Please call technical support for instructions.

### **Problem: LCD display is malfunctioning.**

#### *Solution:*

1. Verify that the engraver is still engraving. If the engraver is still operating, shut the engraver off and verify the ribbon cable is connected to the LCD display on the backside of the display. If the ribbon cable is properly connected, then contact Epilog for further assistance.

## Section 14: In Case of Difficulty

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**Problem: Fan Malfunction.**

*Solution:*

1. Verify that there is nothing obstructing the rotation of the fan.
2. Verify the fan is clean. Using a vacuum should clean the fan adequately.
3. Verify the connector is still connected.
4. If need be contact Epilog for replacement.

**Problem: Table will not move.**

*Solution:*

1. Verify that there is nothing obstructing the travel of the table.
2. Attempt to focus manually by pushing the Focus button and turn the round knob.
3. If you are still experiencing problems, contact Epilog Technical Support.

**Problem: Auto focus is out of focus or will not operate properly.**

*Solution:*

- Clean the bottom surface of the focus block. This cover should be cleaned with Window cleaner or water. Do not use acetone or alcohol.

**Problem: Position Error displayed on LCD front console.**

*Solution:*

- If you receive a Position Error on your display, the engraver is informing you that it has lost its correct positioning. Power off engraver and verify there is nothing obstructing the travel of the carriage both left-to-right and front-to-back. With the engraver shut off, move the carriage with your hand in all directions. The carriage should travel quite freely. With the engraver on, the carriage should resist you trying to move it. It will still move if you force it (please do not) but it will resist. Turn the engraver back on. Notify Technical Support if you are in need of further assistance.

**Problem: Extreme right side of graphic is missing.**

*Solution:*

- Check the printer driver by going into "Printer Setup".
- Make sure you have the Epilog Legend print driver selected.

## Section 14: In Case of Difficulty

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**Problem:** Table does not maintain a consistent level with the carriage. A symptom of this problem is that the depth of engraving starts out uniform and correct, but then varies either on the right side or at the bottom.

*Solution:*

- At the home position, put on your focus gauge and manually raise the table (“Focus” key and rotate knob clockwise) to where it just touches the gauge. Shut off the machine and with your hand, move the carriage to each of the other three corners of the table. The focus gauge should just touch each of the corners as it did in the starting (home) position. If there is a variance, the table needs to be adjusted. Contact Epilog Technical support for the correct procedure.

## Section 14: In Case of Difficulty

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**Problem: Computer error or print error message (such as: “There was an error writing to LPT1...”) appears on your computer screen.**

*Solution:*

1. Verify that the Legend is READY (press the “GO” key).
2. Is the printer cable connected correctly? Review the hookup configuration.
3. If you have multiple LPT printer ports, make sure you are printing with the one connected to the engraver.
4. Always delete any print job that did not transmit properly. Do not leave part of the design waiting for transmission. Sending another job with one waiting in the print queue will complicate matters. Reboot the Legend to clear all print jobs.
5. Any other error reported to your computer screen is going to be an internal computer error. There is either a problem with the computer's hardware and/or software. Contact a reputable computer representative for assistance.

**Problem: Raster engraving errors when you print from Corel 9. The error is a series of dots that extend to the edge of the page that you are engraving.**

*Solution:*

- Refer to “Section 5 – Configuring CorelDraw”, of this manual for solution under subheading “Installing and using the WIN XP/2000 Color Mapping print driver with Corel 9”

# Section 15: Servicing the Legend

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## *In This Section*

- Service Module Location Diagram Legend 24 & 32 EX
  - Service Module Location Diagram #1 Legend TT
  - Service Module Location Diagram #2 Legend TT
  - Controller
  - Power Supply
  - Laser Module and RF Module Legend EX
  - Keyboard/Display
  - X-Beam
- 

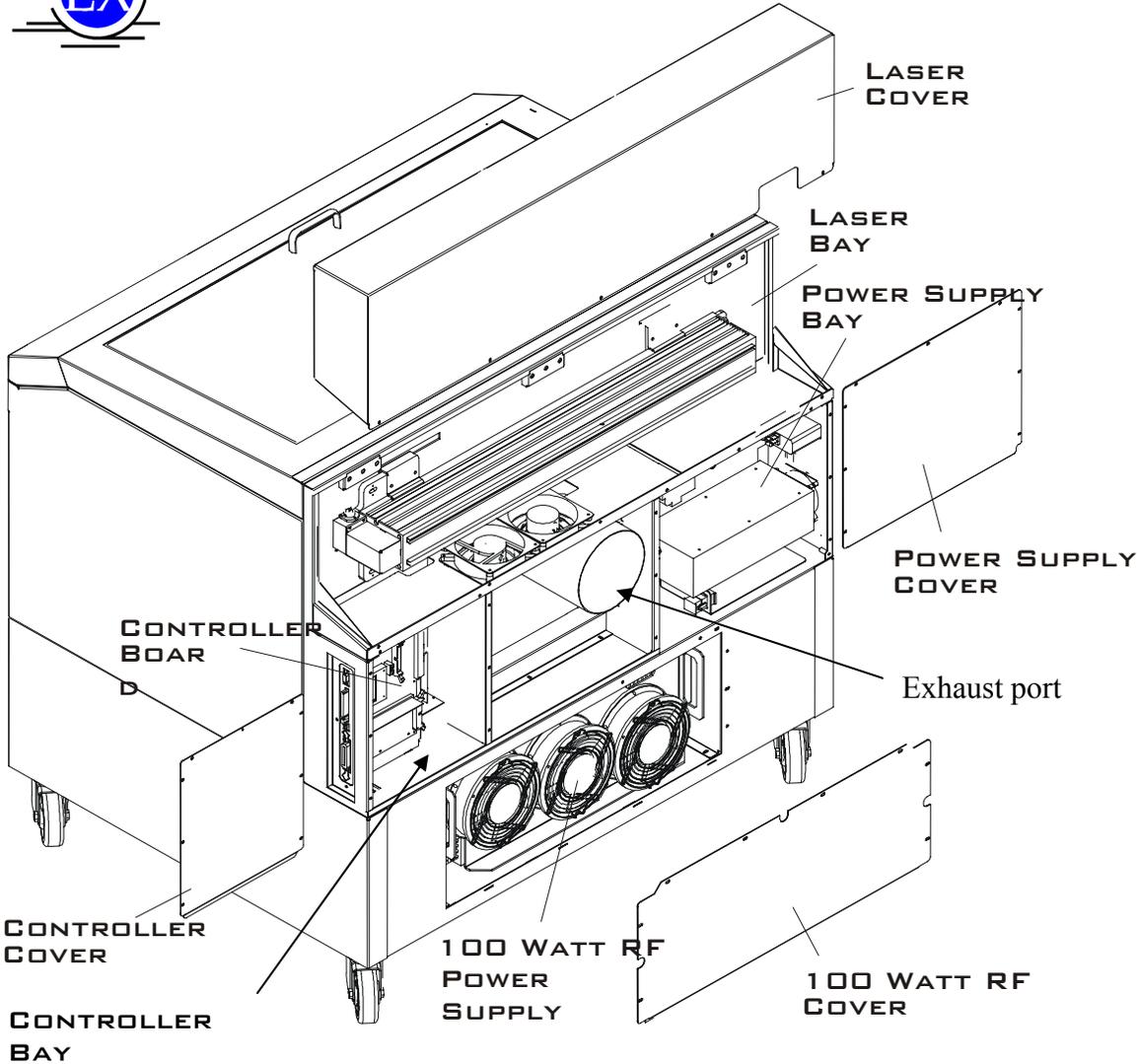
The Legend has been designed so that the owner of the equipment can do most servicing. Most of the major components are modular, and can be replaced with a Phillips head screwdriver or Allen wrench.



**WARNING!** Any servicing of the equipment should be done with the power cord disconnected from the machine. **Injury or death may occur if you attempt to service the machine with power connected.** The machine must be unplugged from the wall socket providing electrical power. See the Diagram on the next page for the location of the modular assemblies.

# Section 15: Servicing the Legend

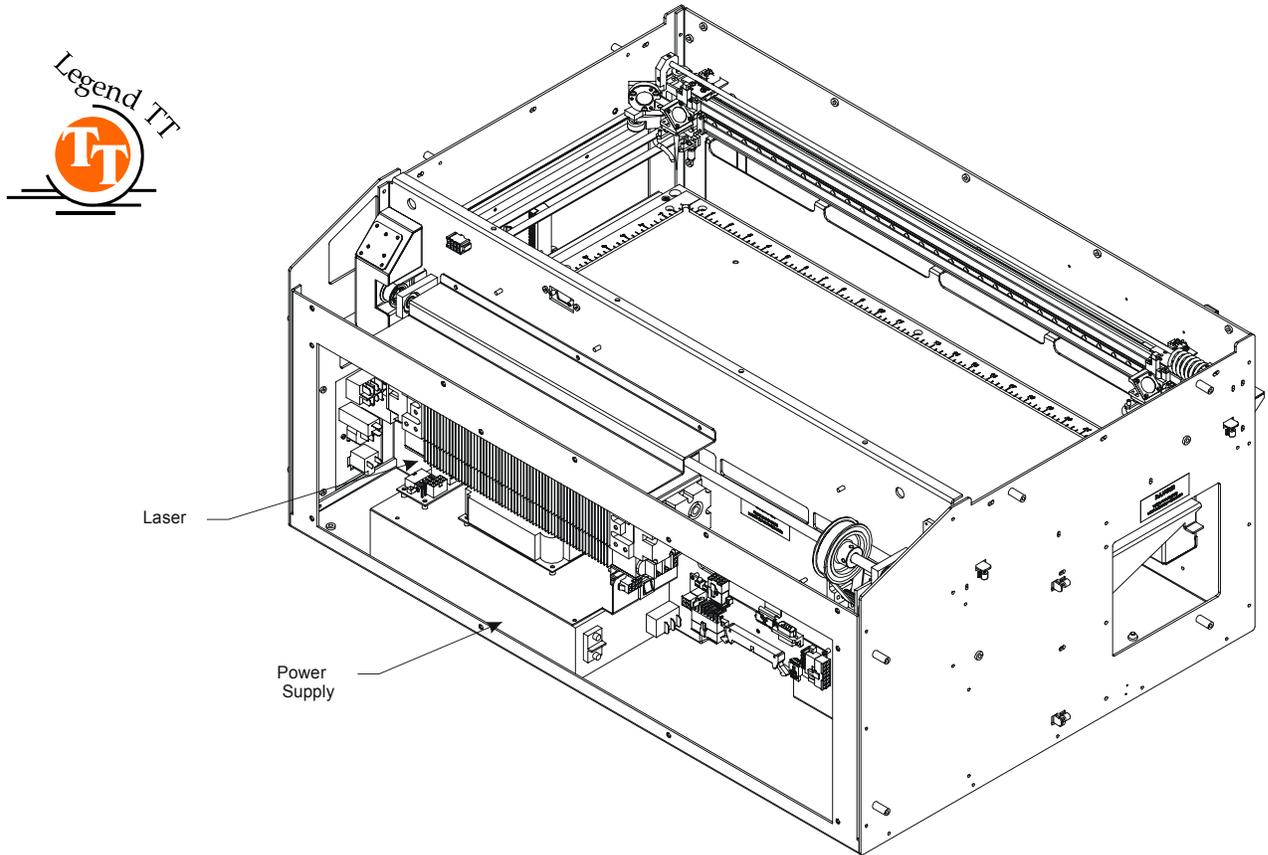
## Service Module Location Diagram Legend 24 & 32 EX



# Section 15: Servicing the Legend

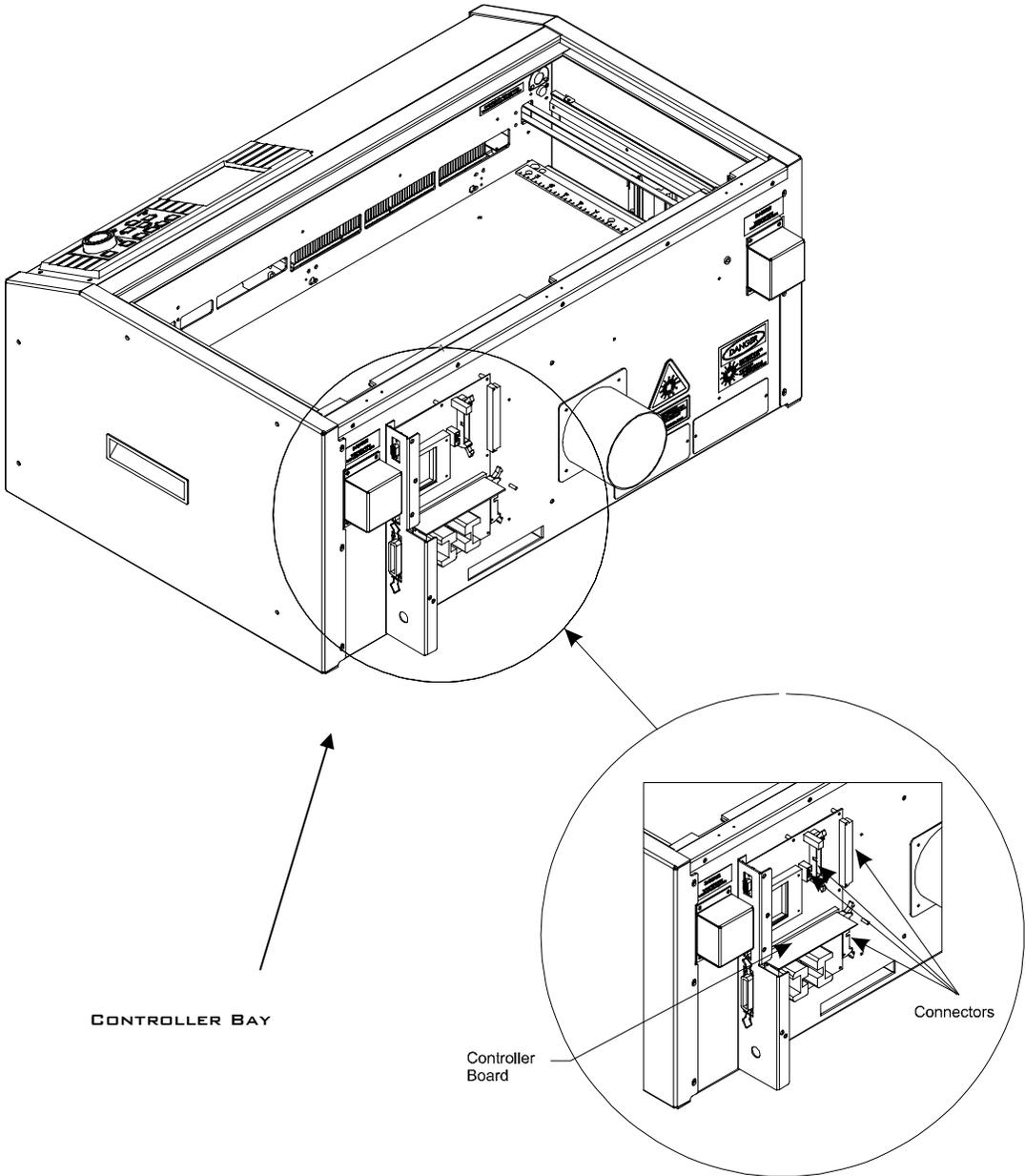
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## Service Module Location Diagram #1 Legend TT



# Section 15: Servicing the Legend

## Service Module Location Diagram #2 Legend TT



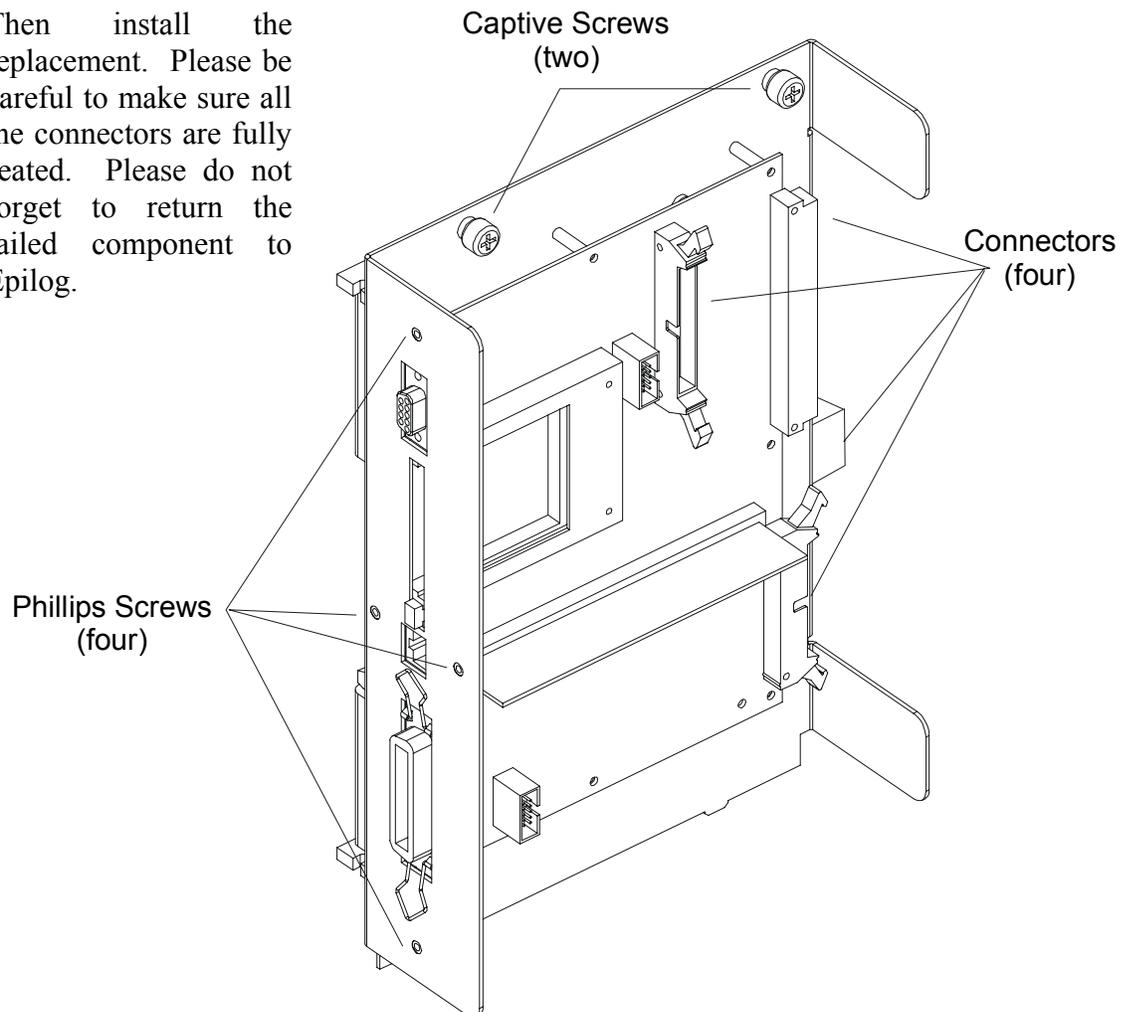
# Section 15: Servicing the Legend

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## Controller

The controller (part #LM1) is located on the Legend EX machines in the controller bay, and is the main electronic component module for the Legend; see the “SERVICE MODULE LOCATION DIAGRAM LEGEND 24 and 32 EX” shown in a diagram. On the Legend TT, this is in the back of the machine, and is the main electronic component module for the Legend; see the “SERVICE MODULE LOCATION DIAGRAM #2 LEGEND TT” shown on previous page. To remove and/or service this module, first turn the machine off and unplug the power cord from the machine or from the wall. Demate the four connectors shown in the diagram below. Then remove the screws shown in the diagram. The captive screws are inside the machine, and the four Phillips screws are on the outside. The assembly can now be lifted up and out of the machine.

Then install the replacement. Please be careful to make sure all the connectors are fully seated. Please do not forget to return the failed component to Epilog.

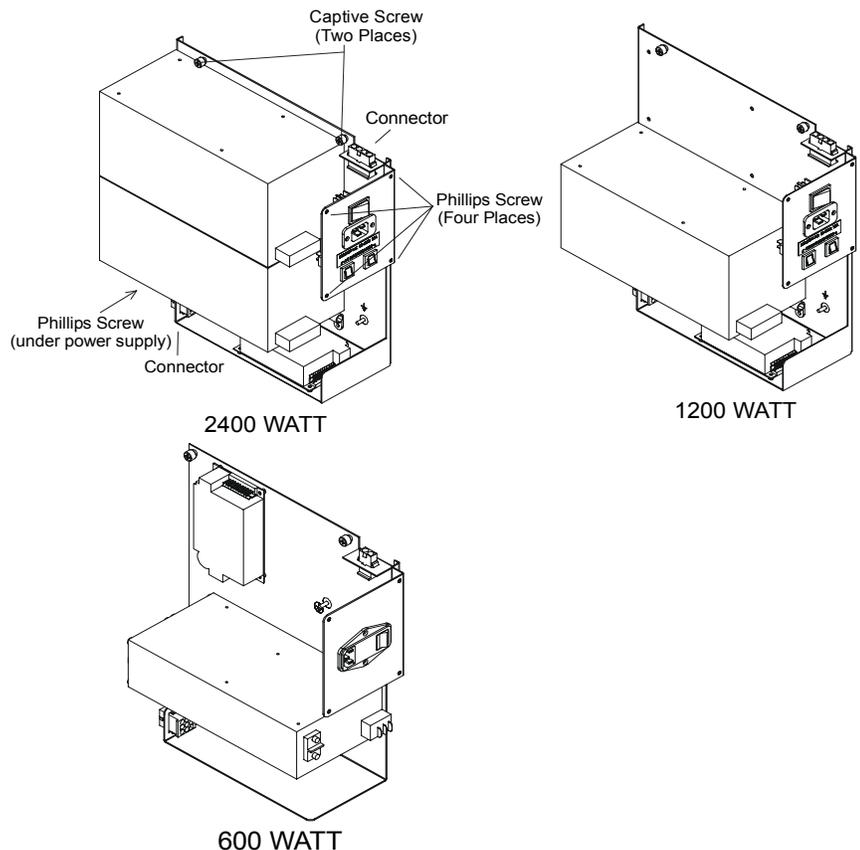


# Section 15: Servicing the Legend

## Power Supply

The power supply (part #LM2-600/2-1200/2-2400) is located in the power supply bay; see “SERVICE MODULE LOCATION DIAGRAM” shown previously in this Section. To remove and/or service this module, first turn the machine off and unplug the power cord from the machine or from the wall. There are three versions of the power module. They have different capacities. Standing at the rear of the machine, remove the plate on the lower right corner. It is held in place with Phillips head screws. Also remove the laser cover, which is the cover across the top of the cabinet, see “SERVICE MODULE LOCATION DIAGRAM” shown previously in this Section. The laser cover has a connector that must be demated. Press on the tab to release it.

The instructions for removing the power modules for the Legend EX Models are included below. For TT information, please contact technical support. To remove the power module, loosen and remove the four Phillips head screws on the outside of the machine shown in the drawing below. Demate the two connectors shown in the drawing. Then loosen the two captive screws across the top of the module. Remove one final screw located above and to the left of the bottom connector. The power module can now be removed. Slide it towards the center of the machine and lift it clear. Then install the replacement. Please remember to return the failed component to Epilog.



## Section 15: Servicing the Legend

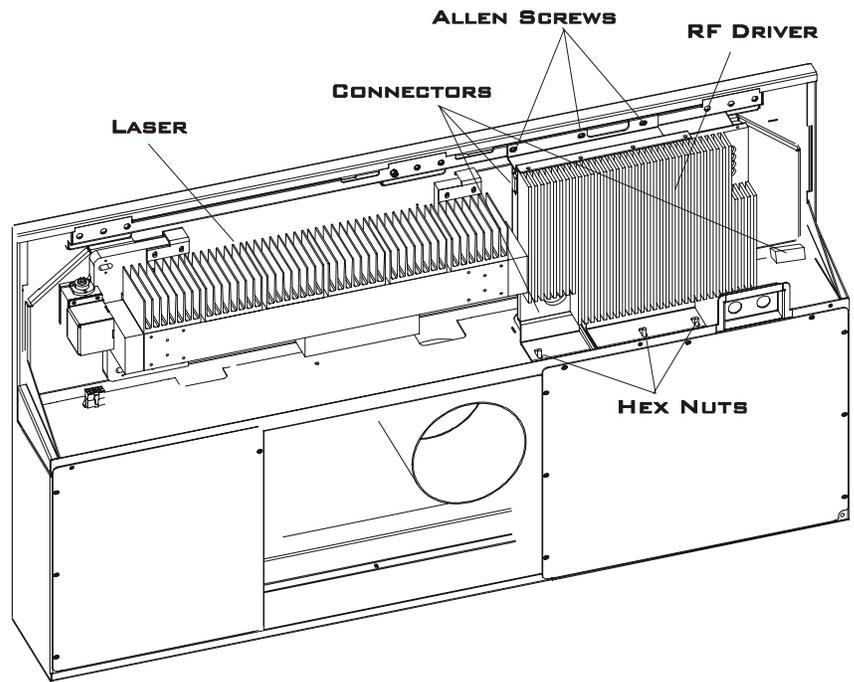
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### *Laser Module & RF Module Legend EX*

For information regarding the TT machine, please contact Technical Support. The laser module for the Legend EX is located in the laser bay; see “SERVICE MODULE LOCATION DIAGRAM” shown previously in this Section. To remove and/or service this module, turn the machine off and unplug the power cord from the machine. Remove the laser cover. The cover is secured with four or five Phillips head screws along the lower edge of the cover. Once the cover is free, there is a connector under the cover that you will need to disconnect before you can set the cover aside. The laser on your machine will resemble the one shown in the drawing below. There are differences in appearance depending on the wattage of your laser that do not effect servicing. First remove the electrical connectors, then the three Allen head screws shown in the drawings. Once the screws are free, lift the laser off the hangers and it should pull free (except for the RF connection, which should be unscrewed at this time).

#### Separate Laser Tube and RF Module

Some laser systems use lasers with separate RF drivers. This is done for performance reasons to keep the heat generated by the RF away from the laser itself.



## ***Section 15: Servicing the Legend***

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The RF driver for some lasers is located to the right of the laser, under the laser cover. To service the RF, remove the laser cover. The cover is held in place with four or five Phillips head screws. The RF is held in place by three or four Allen head screws on the top, and three or four hex nuts on the bottom as shown in the following diagram. You will also need to demate the power, control and RF connectors shown in the drawing.

### ***Keyboard/Display***

The keyboard/display module for the Legend (part #LM5) is located on the cover of the Legend. To remove/service this module, first turn the machine off and unplug the power cord from the machine or from the wall. Open the large door. Remove the four nuts holding the metal cover over the keyboard/display. Remove the cover. The keyboard is now loose, and should be supported with a free hand. On the right edge of the keyboard there is a flat ribbon cable. Push the "ears" on the connector away from each other, and the connector should back out far enough to be easily removed. The keyboard will now slide off the four mounting posts. Installation is the reverse of removal.

### ***X Beam***

The X beam module for the Legend is located inside the Legend cabinet. To remove/service this module, first, if you have not already done so, turn the machine off and unplug the power cord from the machine or from the wall. Open the large door, and gently pull the beam forward until it is a comfortable reach. Loosen the Phillips head screw on the left of the beam, and the two captive screws on the right of the beam. The captive screws have a Phillips head, and are taller than "normal" screws. Disconnect the white flat cable from the right end of the beam. There is a small tab on the top center of the connector that needs to be depressed to allow the cable to be removed. The clamp, holding the cable down, needs to be removed as well. Installation of the new beam is the reverse of the removal. Please be careful of the mirror mount on the right side of the beam. The mirror is pre-aligned, and alignment will be lost if you bump it hard enough.

When installing the new beam, please start all three captive screws carefully prior to tightening any of them.

# Section 16: Upgrading the Operational Firmware

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## *In This Section*

- Upgrading Your Legend Using Flashmaster Software
  - Installing Flashmaster onto Your Computer
  - Installing New Legend Firmware onto Your Computer
  - Installing New Firmware from Your Computer to your Legend
- 

## *Upgrading Your Legend Using Flashmaster Software*

Your Legend EX system is capable of having its operation firmware upgraded through the parallel port or Ethernet network connection. To accomplish this Epilog uses a software application called FlashMaster to transfer a new version of firmware from your computer to your Legend EX. Legend EX users can use this feature to periodically update their Legend EX when new features become available or when enhancements to existing firmware is released. FlashMaster allows the user to incorporate these features into their own machines at their own convenience.

Legend EX firmware upgrades are available for at any time by downloading the firmware file from the Epilog web site - [www.epiloglaser.com/downloads\\_extt.htm](http://www.epiloglaser.com/downloads_extt.htm) or via e-mail.

*Upgrading your Legend for the first time is a three-step process:*

1. Install FlashMaster onto your computer – FlashMaster is the program that allows you to download the upgrades from your computer to your Legend and can be downloaded from the Epilog web site [www.epiloglaser.com/legendfirmware.htm](http://www.epiloglaser.com/legendfirmware.htm).

*Note: If you already have FlashMaster installed on your computer you can skip step one.*



## **Section 16: Upgrading the Operational Firmware**

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2. Install new Legend firmware onto your computer – The new Legend firmware is supplied as a compressed file that needs to be extracted (decompressed) after you have downloaded it from the Epilog web site.
3. Install the new firmware from your computer to your Legend – You will use FlashMaster to download the new firmware to your Legend.

### ***Installing Flashmaster onto Your Computer***

#### ***From Diskette***

Use Windows Explorer or the Run command to start the FlashMaster Setup.exe program from the disk labeled FlashMaster. Move through the install dialogs to completion and then FlashMaster is ready to use. You can keep FlashMaster on your computer for future use.

#### ***Via Email***

Download all of the FlashMaster files to a single 3.5” diskette. Label and save this diskette for your files. Install from diskette as per the instructions above.

### ***Installing New Legend Firmware Onto Your Computer***

#### ***From Diskette***

Use Windows Explorer or the Run command to access the Legend firmware upgrade file. Select the Legendxxx.exe file (where xxx is the release number) that is found on the Legend diskette. Click on “Unzip” to extract the file. By default, the archive is extracted to the users default temporary directory – normally C:\Windows\Temp. Once the firmware upgrade file is extracted, continue on to step three to install the new firmware release onto your Legend laser.

# Section 16: Upgrading the Operational Firmware

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## Via Email

Download the firmware upgrade file to a standard 3.5" diskette. Install from diskette as per the instructions above.

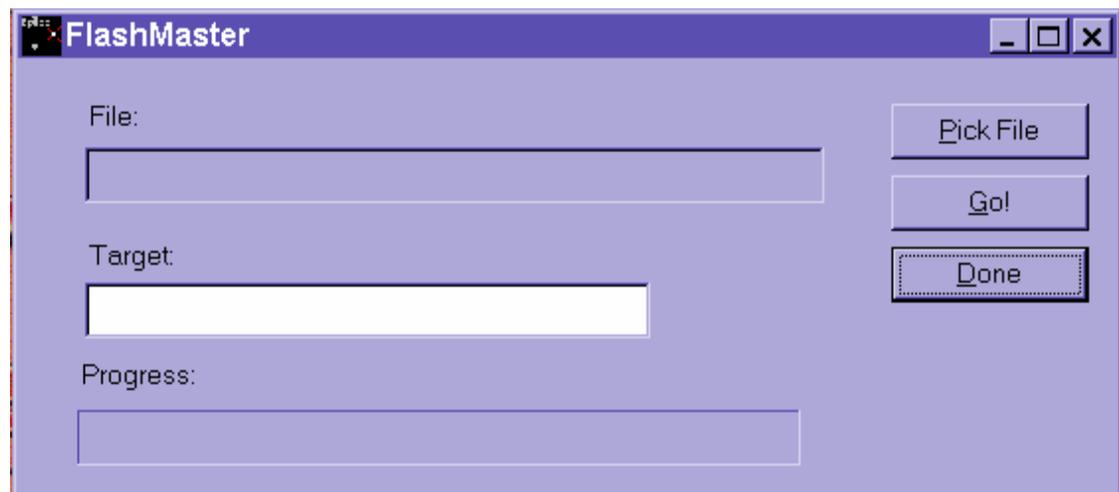


*Note: It is extremely important that you unzip the Legendxxx.exe file before trying to upgrade. The Unzip process will convert the Legend1.40.xx.xx.exe file into a Legend1.40.xx.xx.hex file. Use only the file with the .hex extension to upgrade your Legend.*

## Installing New Firmware From Your Computer to Your Legend

Prior to starting FlashMaster, the user should ensure that the Legend is turned on and that it is connected to the computer by either the parallel port or network cable.

FlashMaster is started by selecting the Start/Programs/Epilog/FlashMaster menu item from the taskbar in Windows XP/2000. Once started, FlashMaster appears:

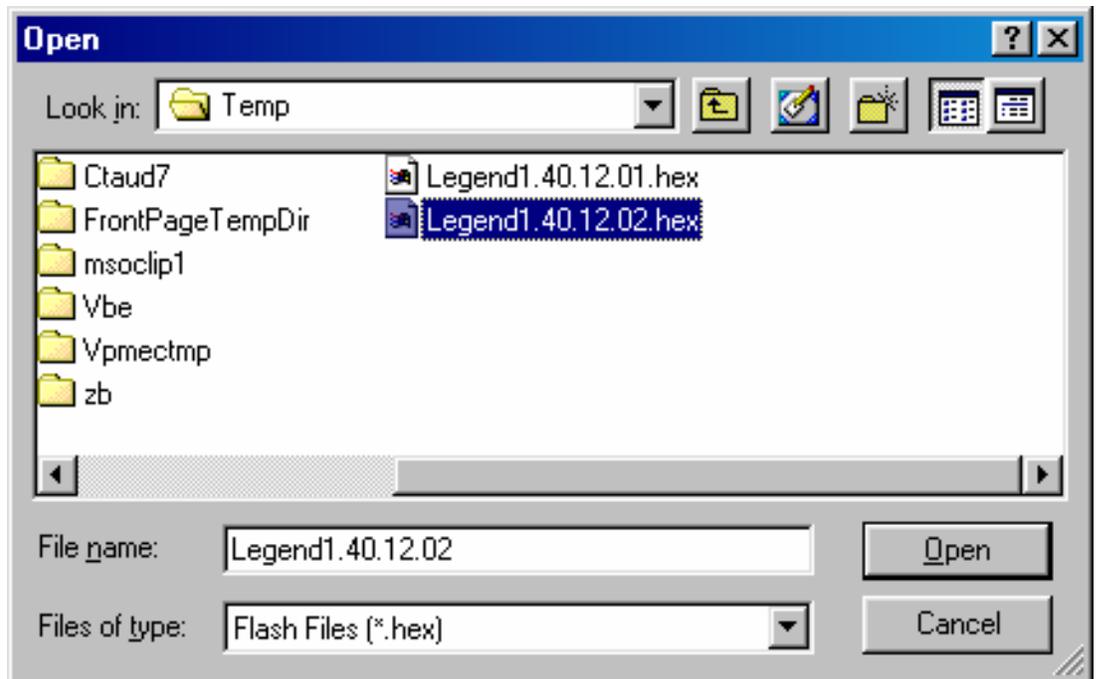


Click "Pick File".

## Section 16: Upgrading the Operational Firmware

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Navigate through the “Open” window to the C:\Windows\Temp folder. The file that was extracted in step 2 above will be listed in this directory as a Legend1.40.xx.xx.hex file.



Highlight the appropriate Legend 1.40.xx.xx.hex file then click the “Open” button.

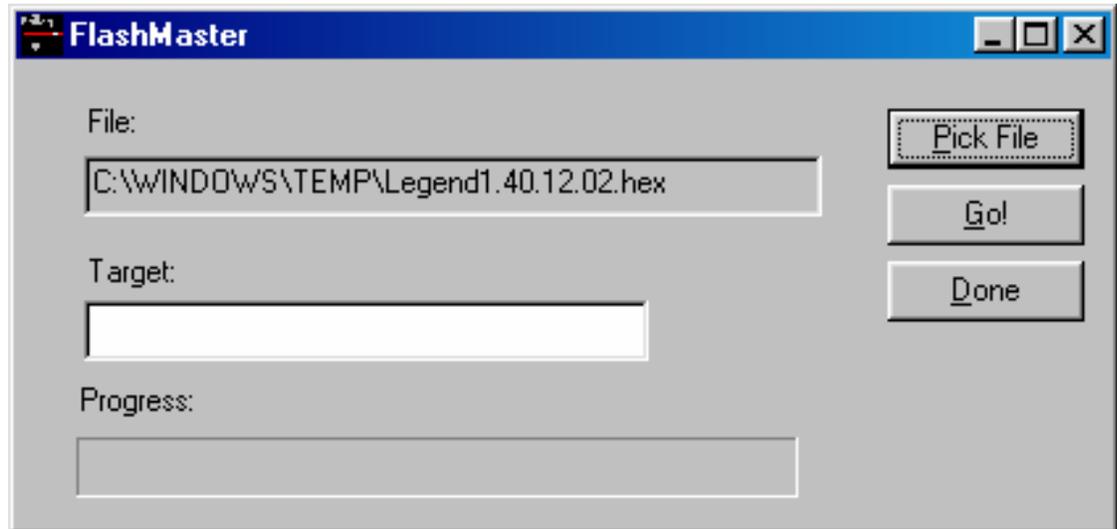


*Note - It is extremely important that you choose the proper file with a .hex extension. Sending the wrong file to your Legend will render the upgrade unsuccessful.*

## Section 16: Upgrading the Operational Firmware

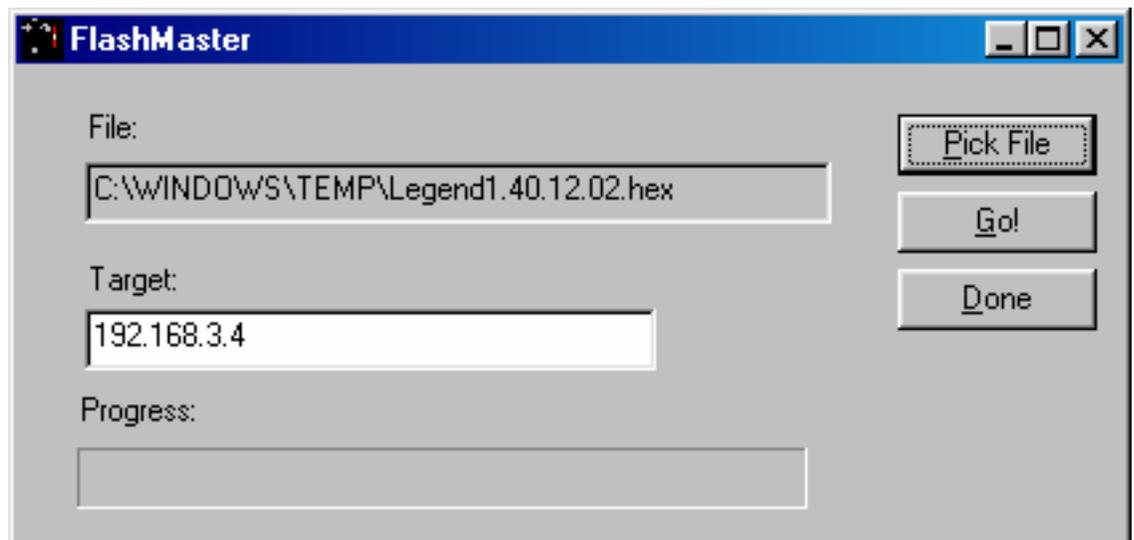
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The file will appear in FlashMaster:



If the user is using the LPT1 parallel port, they may just press 'Go' at this point. If the user is using another parallel port, they should enter it into the 'Target' field. 'LPT2:' and 'LPT3:' are both examples. The colon at the end of the port name is required.

If the user wishes to program the Legend over the network, the TCP/IP address of the Legend in the 'Target' field. Once the target is set, the 'Go' button can be pressed.



## Section 16: Upgrading the Operational Firmware

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Sending the update to the Legend over the parallel port takes about 4-5 minutes. The computer and the Legend should not be disturbed during this time. On a Windows XP/2000 computer, the progress field will only indicate progress in sending to the spooler, which then in turn, sends to the Legend. When using a network to program the Legend, the progress indicator always shows actual progress, regardless of operating system. Sending over the network takes about 2-3 minutes, depending on network traffic. If the power fails or some other problem disconnects the computer from the Legend during the file sending operation, it can be re-tried, once the problem is corrected. If there is a sending problem, there will be an error indicator on the Legend front panel saying: "***Programming Receive Failure, please retry***". If this is observed, reboot both the host computer (PC) and the Legend and try again. Once the file has been completely received by the Legend, it will begin the act of re-programming itself with the upgrade version of its firmware.

The front panel will say: "***Programming Machine DO NOT DISTURB***"

**DO NOT POWER DOWN THE LEGEND DURING THIS TIME.** If you lose power, or purposefully power down the Legend during this time, your controller board in the Legend will be ruined, and will have to be replaced. This operation will take about 90 seconds.

After programming is complete this message will appear: "***Programming Complete, please reboot***".



***Important Note: When you reboot, it is important that you turn the machine off at the main power On/Off switch instead of rebooting from the control panel. This ensures that the new version of the***

# Section 17: Specifications

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## *In This Section*

- Legend 24EX Specifications
  - Legend 32EX Specifications
  - Legend TT Specifications
- 

*The following pages list the machine specifications for our Legend Models 6000 and 7000.*

# Section 17: Specifications

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## Legend 24EX Specifications



<b>Maximum Engraving Area</b>	24" x 20" (609 x 508 mm)
<b>Maximum Material Thickness</b>	9" (228 mm)
<b>Table Size</b>	33" x 21" (838 x 533 mm)
<b>Laser Control Display Panel</b>	4" x 3" LCD displays job graphic, stored file names, speed, power, run time, and more. Drop down menus provide user control of all laser settings, calibration, and special features.
<b>Intelligent Memory Buffer</b>	Store unlimited files up to 32 MB. Rolling buffer allows files of any size (32 MB and larger) to be engraved.
<b>Operating Modes</b>	Optimized raster engraving, vector cutting, or combined raster/vector mode.
<b>Motion Control</b>	High speed, continuous loop, DC servomotors using linear encoding technology for precise positioning.
<b>Laser Source</b>	State-of-the-art, digitally controlled, air-cooled CO2 laser tubes are fully modular, permanently aligned, and field replaceable/upgradeable.
<b>Bearings</b>	Ground and polished steel NeverWear™ bearing system.
<b>Belts</b>	Advanced B-style doublewide Kevlar precision drive belts.
<b>Resolution</b>	User controlled choice of 150, 200, 300, 400, 600, or 1200 dpi.
<b>Speed/Power Control</b>	Computer or machine controlled Speed and Power in 1% increments to 100%. Vector color mapping links Speed and Power setting to any RGB color.
<b>Print Interface</b>	10 Base T Ethernet or Parallel connections. Compatible with Windows XP/2000.
<b>Standard Features</b>	Red Dot Pointer, Air Assist (pump optional), Auto Focus, 2" focus lens, relocatable home, flash upgrade electronics.
<b>Size/Weight</b>	38" wide x 32.5" deep x 40" high (965 x 826 x 1016 mm) 350 lbs (160 kg)
<b>Electrical Requirements</b>	Auto-switching power supply accommodates 110 to 240 volt, 50 or 60 Hz, single phase, 15 amp AC.
<b>Ventilation</b>	External exhaust to the outside required. Output diameter at machine is 4".
<b>Safety</b>	CDRH Class IIIa
<b>Max Ambient Room Air Temperature</b>	90 degrees F (32 C) Max

# Section 17: Specifications

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## Legend 32EX Specifications



<b>Maximum Engraving Area</b>	32" x 20" (812 x 508 mm)
<b>Maximum Material Thickness</b>	9" (228 mm)
<b>Table Size</b>	37" x 21" (940 x 533 mm)
<b>Laser Control Display Panel</b>	4" x 3" LCD displays job graphic, stored file names, speed, power, run time, and more. Drop down menus provide user control of all laser settings, calibration, and special features.
<b>Intelligent Memory Buffer</b>	Store unlimited files up to 32 MB. Rolling buffer allows files of any size (32 MB and larger) to be engraved.
<b>Operating Modes</b>	Optimized raster engraving, vector cutting, or combined raster/vector mode.
<b>Motion Control</b>	High speed, continuous loop, DC servomotors using linear encoding technology for precise positioning.
<b>Laser Source</b>	State-of-the-art, digitally controlled, air-cooled CO2 laser tubes are fully modular, permanently aligned, and field replaceable/upgradeable.
<b>Bearings</b>	Ground and polished steel NeverWear™ bearing system.
<b>Belts</b>	Advanced B-style doublewide Kevlar precision drive belts.
<b>Resolution</b>	User controlled choice of 150, 200, 300, 400, 600, or 1200 dpi.
<b>Speed/Power Control</b>	Computer or machine controlled Speed and Power in 1% increments to 100%. Vector color mapping links Speed and Power setting to any RGB color.
<b>Print Interface</b>	10 Base T Ethernet or Parallel connections. Compatible with Windows XP/2000.
<b>Standard Features</b>	Red Dot Pointer, Air Assist (pump optional), Auto Focus, 2" focus lens, relocatable home, flash upgrade electronics.
<b>Size/Weight</b>	42" wide x 32.5" deep x 42" high (1067 x 826 x 1067 mm) 375 lbs (172 kg) - 120 watt cabinet is 34.5" deep (876 mm)
<b>Electrical Requirements</b>	Auto-switching power supply accommodates 110 to 240 volt, 50 or 60 Hz, single phase, 15 amp AC.
<b>Exhaust Ventilation</b>	External exhaust to the outside required. Output diameter at machine is 6".
<b>Safety</b>	CDRH Class IIIa
<b>Max Ambient Room Air Temperature</b>	90 degrees F (32 C) Max

# Section 17: Specifications

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## Legend TT Specifications



<b>Maximum Engraving Area</b>	24" x 12"
<b>Maximum Material Thickness</b>	6"
<b>Table Size</b>	27.25" x 13.25"
<b>Laser Control Display Panel</b>	4" x 3" LCD displays job graphic, stored file names, speed, power, run time, and more. Drop down menus provide user control of all laser settings, calibration, and special features.
<b>Intelligent Memory Buffer</b>	Store unlimited files up to 32 MB. Rolling buffer allows files of any size (32 MB and larger) to be engraved.
<b>Operating Modes</b>	Optimized raster engraving, vector cutting, or combined raster/vector mode.
<b>Motion Control</b>	High speed, continuous loop, DC servomotors using linear encoding technology for precise positioning.
<b>Laser Source</b>	State-of-the-art, digitally controlled, air-cooled CO2 laser tubes are fully modular, permanently aligned, and field replaceable/upgradeable.
<b>Bearings</b>	Ground and polished steel NeverWear™ bearing system.
<b>Belts</b>	Advanced B-style Kevlar precision drive belts.
<b>Resolution</b>	User controlled choice of 150, 200, 300, 400, 600, or 1200 dpi.
<b>Speed/Power Control</b>	Computer or machine controlled Speed and Power in 1% increments to 100%. Vector color mapping links Speed and Power setting to any RGB color.
<b>Print Interface</b>	10 Base T Ethernet or Parallel connections. Compatible with Windows XP/2000.
<b>Standard Features</b>	Red Dot Pointer, Air Assist (pump optional), Auto Focus, 2" focus lens, relocatable home, flash upgrade electronics.
<b>Size/Weight</b>	32" wide x 24.5" deep x 15.75" high 100 lbs.
<b>Electrical Requirements</b>	Auto-switching power supply accommodates 110 to 240 volt, 50 or 60 Hz, single phase, 15 amp AC.
<b>Ventilation</b>	External exhaust to the outside required. Output diameter at machine is 4".
<b>Safety</b>	CDRH Class IIIa
<b>Max Ambient Room Air Temperature</b>	90 degrees F (32 C) Max

# Section 17: Specifications

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## *Compatibility*

The Epilog Legend has been designed as an “open architecture” product. The Legend will work with many popular graphics, engineering and specialty software products. To benefit from all the functionality that was built into the Legend, a Windows based PC is required. The print driver that is shipped with the Legend offers a host of unique features, and only works with Windows based operating systems (non-Macintosh).

## *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 11 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. As long as you don’t buy the cheapest computer you can find you should be fine. One thing to avoid is the Intel Celeron processor – while they are good processors, and will work with the laser, they don’t process graphics with the speed most laser users desire.

Read these recommendations and consider spending just a few dollars more for those components that will save you time and frustration.

### Operating System

Any Windows 2000 or XP operating system is recommended. All new Epilog lasers are designed to work with the latest Windows operating systems, and all of the versions of 2000 or XP (Home, Professional, etc) are compatible for use with your Epilog laser.

# Section 17: Specifications

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## RAM – Random Access Memory

512 MB is recommended. RAM is kind of like short-term memory. It's fast, readily available for the computer to access and makes time consuming tasks go much quicker if you have lots of it. Most users won't notice a difference if they add more than 512 MB to their system, but almost all users will notice the speed difference that 512 MB provides when compared to 256 MB (256 MB is kind of the next step down from 512 MB).

## CD-ROM /CD-RW

All new computers come with some sort of CD-ROM drive. Consider a computer with CD-RW (Read/Write) capability. Many graphic files are very large and will not fit on a floppy drive. Being able to copy a file to a CD-ROM is a big advantage for filing purposes and moving the file from one computer to another. CD-RW drives are becoming as indispensable today as floppy drives used to be.

DVD drives are more sophisticated versions of CD-ROMs with the advantage that they will read both CD's and DVD disks, but a standard DVD drive will not write to either CD or DVD disk. In order to write to DVD disk you will need to buy the latest technology and purchase a writeable DVD drive, and these are expensive and not necessary for most laser users.

## Floppy Drive

Many people still use floppy disks to save files, and move files around from computer to computer. If your customer gives you a floppy disk, you need to be able to use it, so don't buy a computer without a floppy drive!!! **Be aware!!!!** Many computer manufacturers today sell their systems without a floppy drive as standard equipment and you might not notice that it's missing until you get the computer. Floppy drives are a \$20.00 option that you probably can't live without. Make sure you order one with your new 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 either an AMD Athalon processor or an Intel Pentium IV processor (do not purchase a computer that is using an Intel Celeron processor – they're too slow for graphics applications). 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

# **Section 17: Specifications**

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technology also allows direct printing from the computer to the Legend. Epilog supplies a network Crossover cable with each laser system that allows one computer to print to a single Legend system.

## **20-30 GB Hard Drive**

This is the permanent memory in your computer. Many users feel that you can never have a large enough hard drive, but for most laser applications 20 or 30 GB's is going to be adequate for years of storage. Luckily, most computer manufacturers put at least 20 GB 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**

Corel 11 is the most recent version of Corel and is recommended. Other versions will work, especially Corel 10, but Corel 9 and below will have some incompatibility quirks when used with Windows 2000 or XP. Many other Windows software applications can also be used, although all software is different and may not be predictable, user friendly or functional; and, the technical support staff at Epilog may be less familiar with them and less able to help with questions. Consult with your Epilog distributor on software compatibility issues before committing. Epilog does not guarantee compatibility with any software.

Many laser users find a Raster-to-Vector conversion software package indispensable. Sometimes, users may have this capability if they are using a sign graphics software like CadLink, or if they have an H-P scanner that supports PrecisionScanPro (which unfortunately, HP recently discontinued). There are a number of 3rd party Raster-to-Vector conversion packages available in the engraving industry usually priced at about \$300 to \$400.

# Section 17: Specifications

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## *Other Computer Hardware Recommendations*

### *Scanner*

A flatbed scanner is another indispensable tool for generating custom artwork. Almost any flatbed scanner today is adequate for scanning artwork. Scanner technology has come so far in the last few years that even a \$100 scanner today is as good as a \$1,000 scanner of a few years ago. Hand held “mouse” scanners do not provide the necessary accuracy and should not be used.

### *Heavy Duty Surge Protector (UPS Unit)*

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, 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.

### *Summary*

Computer Recommendations  
Windows 2000 or XP (any version)  
512 MB RAM  
CD-ROM or CD/RW  
3.5” Floppy Drive  
2.0 GHz or faster Processor  
10/100 Network Interface Card  
20-30 GB Hard Drive - (Minimum)  
Corel 10, 11, or 12

# Section 17: Specifications

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## *About The Laser*

The Epilog Legend uses the latest in waveguide CO<sub>2</sub> (carbon dioxide) laser technology to provide a powerful tool that is simple and safe to setup and operate. The Legend can mark (engrave) and cut a variety of non-metallic materials.

The CO<sub>2</sub> laser beam itself is invisible. The beam is about half the diameter of a #2 pencil. Unfocused, it will just make an ugly burn, leaving lots of charred material behind. The focus lens gives the beam an hourglass shape. At the center point the energy density is concentrated, allowing the very precise and clean material removal that is characteristic of laser engraving. The center of the hourglass is the “focal point”.

The laser beam path is completely enclosed within the Legend. Please do not disassemble or modify any of the covers or windows on the machine. If at any time you notice that the laser operates with a door or window open, please contact Epilog technical support immediately.

The Legend has two basic operating methods. For cutting (vector), the laser is driven along a path and the laser is left on all the time. The path could be the outline of a letter or a geometric shape like a circle. The laser will cut entirely through the material, separating the part from the background. For marking (engraving), the laser is swept across the work from left to right, and the laser is turned on and off at the correct points to produce the first line of the image. Then the carriage advances one line and the process is repeated, eventually assembling a full image.

## Section 17: Specifications

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### *Federal Communications Commission (FCC) Notice*



*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 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 own expense.*

# APPENDIX A

## WARRANTY STATEMENT

Epilog Corporation warrants to the original purchaser of Legend Model 6000 L24EX and L32EX that these products 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 for Legend 24EX models and two (2) years from the original date of purchase for Legend 32EX models. Epilog Corporation warrants to the original purchaser of Legend TT Model 7000 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 for Legend TT model.

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 Legend models, 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 6000 L24EX and L32EX or Model 7000 TT. 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 6000 L24EX and L32EX or Epilog Model 7000 TT 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 6000 L24EX and L32EX or Epilog Model 7000 TT.

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# Appendix B

## Setting Up a Network Connection

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### *In This Section*

- One Computer Connected to One Legend
  - One Computer Connected to Multiple Legends using a Hub
  - More than One Computer Connected to One Legend
  - Multiple Computers and Multiple Legends
- 

The following diagrams illustrate some common methods of using the network connection to set up your computer(s) to your Legend laser system(s). There are a number of ways that a network can be set up. These instructions are designed to cover the common types of setups, but they are by no means the only ways that will work. Contact your network administrator to create a system that works for you.



**Note:** *The Legend network connection is easy to set up and provides the most robust data transfer. Setting up a single computer and a single laser system is as easy as setting up a paper printer.*

Our experience indicates that DSL and cable networks have difficulty in assigning additional IP Addresses for the Legend. If you are using a DSL or cable network it is best to simply add an additional Network Interface Card (NIC) to your computer and address the Legend from the secondary card. This is a very simple method of keeping Internet and networking capabilities running on a single computer.

Epilog cannot troubleshoot or diagnose your network system. If you are having network problems you **MUST** contact your network administrator.

# Setting Up a Network Connection

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Regardless of how many computers and laser systems are involved in your network, there are several common steps that need to be performed to setup a network connection.

1. Connect all cables and hardware (see diagrams throughout this procedure)
2. Set the computers TCP/IP network settings. To access, use the following path:
3. Start – Settings – Network Connections – right click Local Network Connection – Properties – Internet Protocol - Properties

*Example:*

## TCP/IP

IP address:

192 . 168 . 3 . 3

Subnet mask:

255 . 255 . 255 . 0

Default

N/A



4. Install the Print Driver address (port). See “Installing Print Driver” on page \_\_\_\_\_.

*Example:*

## Print Driver

IP address:

192 . 168 . 3 . 4



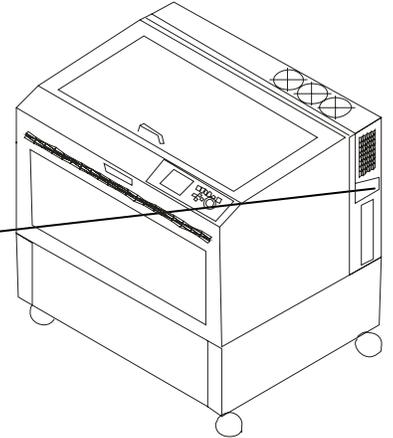
# Setting Up a Network Connection

---

5. Set the Legend network settings. On the Legend LCD panel select Options – Networking. After setting the Network settings, scroll to options – Save Settings.

Example:

	Legend EX/TT
IP address:	192 . 168 . 3 . 4
Subnet mask:	255 . 255 . 255 . 0
Default	0 . 0 . 0 . 0



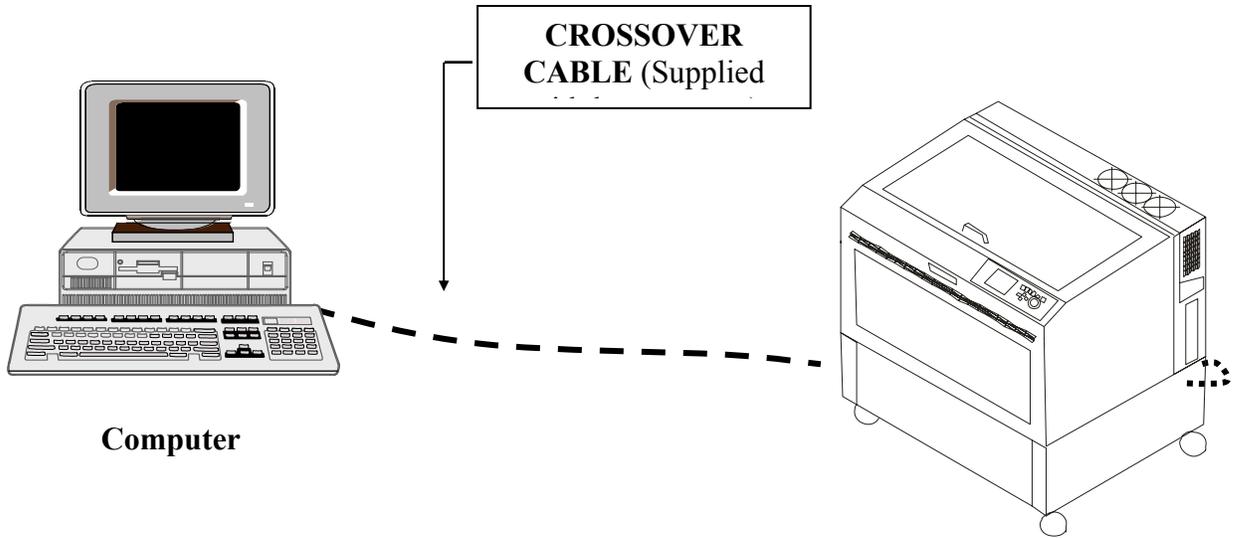
6. “Ping” the laser. This is an easy method of determining if the computer and the laser are “talking” to each other. Go to Start – Run – type cmd, then click OK. This will take you to a DOS command prompt. Type “ping 192.168.X.X” (do not include the quotes - the IP Address after “ping” must be the same as the IP Address that you have entered in the Legend). If you receive a “Request Timed Out”, the laser and the computer are not “talking”. If you receive a “Reply from 192.168.X.X” your computer is talking to your Legend.
7. Note – The following is a helpful hint for users setting up their network connections for the first time.
8. The last octet (the number in the square and circles above) in the TCP/IP Address will always be different than the IP Addresses assigned to the Print Driver and the Legend network settings.
9. Stated another way – The IP address for the Print driver and the Legend settings must be the same. These two must differ from the TCP/IP address.
10. In addition to your computer and laser settings, these procedures illustrate the cables and other hardware that may be required for common network setups.
11. Crossover cable
12. Standard CAT5 cable
13. Hub



# Setting Up a Network Connection

## ONE COMPUTER CONNECTED TO ONE LEGEND

This is the simplest method of setting up the network connection.



Computer

### TCP/IP

IP address:  
Subnet mask:  
Default Gateway:

192 . 168 . 3 . 3
255 . 255 . 255 . 0
N/A

### Print Driver

192 . 168 . 3 . 4
-------------------

### Legend EX/TT

192 . 168 . 3 . 4
255 . 255 . 255 . 0
0 . 0 . 0 . 0

# Setting Up a Network Connection

## ONE COMPUTER CONNECTED TO MULTIPLE LEGENDS USING A HUB

Install the Epilog Print Driver onto your computer once for each Legend. Assign a separate IP Address (port) to each driver to match each Legend.

### TCP/IP

IP address:

192 . 168 . 3 . 3

Subnet mask:

255 . 255 . 255 . 0

Default Gateway:

N/A

### Print Drivers

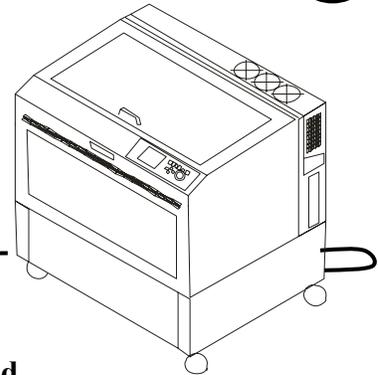
192 . 168 . 3 . 4

192 . 168 . 3 . 5

192 . 168 . 3 . 6

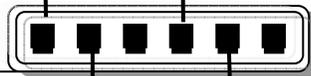


ALL CABLES ARE STANDARD CAT5



Computer

Hub



Legend

IP address:

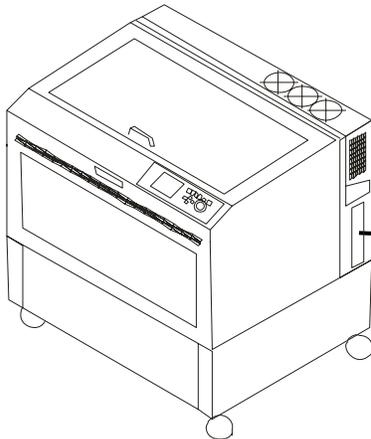
192 . 168 . 3 . 4

Subnet mask:

255 . 255 . 255 . 0

Gateway

0 . 0 . 0 . 0



IP Address:

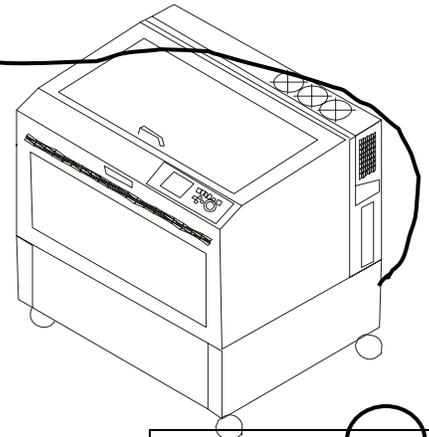
192 . 168 . 3 . 5

Subnet mask:

255 . 255 . 255 . 0

Gateway Address:

0 . 0 . 0 . 0



IP address:

192 . 168 . 3 . 6

Subnet mask:

255 . 255 . 255 . 0

Gateway address:

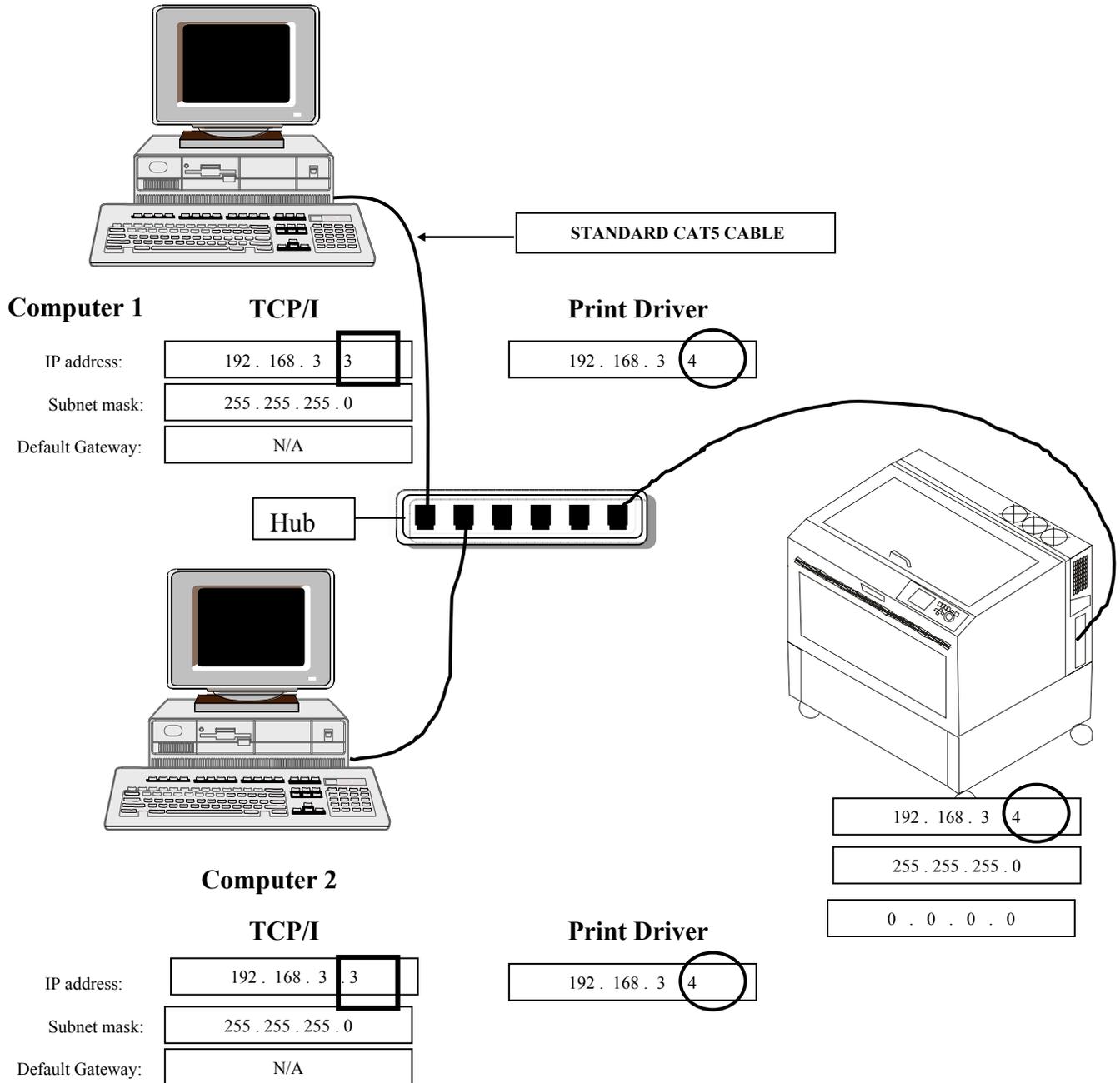
0 . 0 . 0 . 0

ALL CABLES ARE STANDARD CAT5

# Setting Up a Network Connection

## MORE THAN ONE COMPUTER CONNECTED TO ONE LEGEND

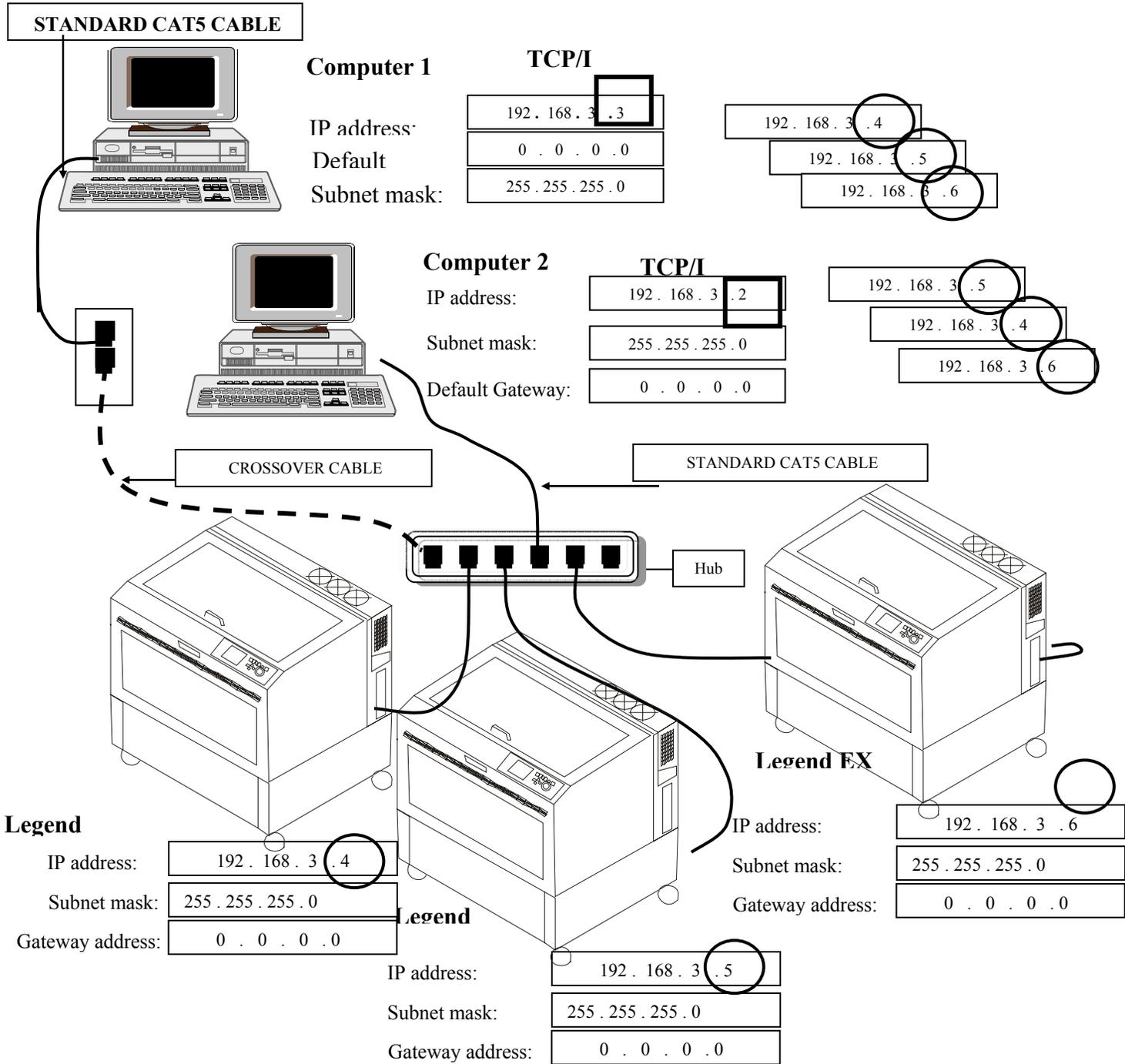
ON A SMALL "PEER-TO-PEER" NETWORK USING A HUB (IP Address is specified by user)



# Setting Up a Network Connection

## MULTIPLE COMPUTERS AND MULTIPLE LEGENDS

CONNECTED TO A SMALL "PEER-TO-PEER" NETWORK USING A HUB (IP Address is specified by user)



## *Setting Up a Network Connection*

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# Appendix C

## Printing From AutoCAD

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### *In This Section*

- Printing from AutoCAD
  - Printing from AutoCAD 14 with Windows XP or 2000
  - Printing from AutoCAD Versions 2000 and later from Windows XP/2000
- 

The following include instructions on Printing from AutoCAD Software.

AutoCAD is a very powerful software tool that is often used in conjunction with the laser for cutting 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 to the Epilog Legend EX/TT series of laser systems using AutoCAD 14, 2000, and 2000i. Versions of AutoCAD that are more recent than 2000i will also work if you follow the same general set of guidelines below. AutoCAD 13 and below are not compatible and you need a fair amount of patience if you are going to use AutoCAD 2000.

### **Printing/Plotting**

Sending jobs from AutoCAD to the Legend is heavily dependent on the print settings in the AutoCAD print 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 Legend laser provides a maximum table size of 32 x 20 inches and that the laser is a 2D cutting machine that usually cuts a single piece of material in any given job. While the Legend is capable of handling complex drawings, users may find that eliminating extraneous detail before “Printing” may make their Legend equipment more productive.

# **Appendix C**

## **Printing From AutoCAD**

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### **Order of Operation**

The Legend performs vector cuts in the order that they were created in AutoCAD. A drawing that was created in a random manner will cut in a random manner. The AutoCAD operator has exclusive control over which line is cut in which order. Understanding the order of operation can help immensely when trying to be as efficient as possible when cutting.

### **Color Mapping**

Creating objects of different colors in AutoCAD allows the user to take advantage of the Vector Color Mapping capabilities of the Legend EX print driver. Color mapping assigns different Speed and Power settings to an object based on its color, allowing you to both cut and mark in a single setup. For a detailed description of how Color Mapping works, refer to “Map Colors To Speed/Power” in the “USING THE EPILOG LEGEND PRINT DRIVER” section of this manual.

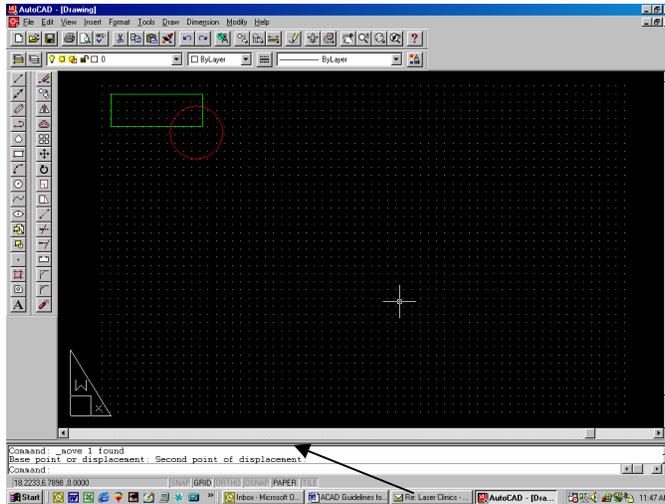
### **Model Space, Paper Space, and Precise Location**

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.

# Appendix C

## Printing From AutoCAD

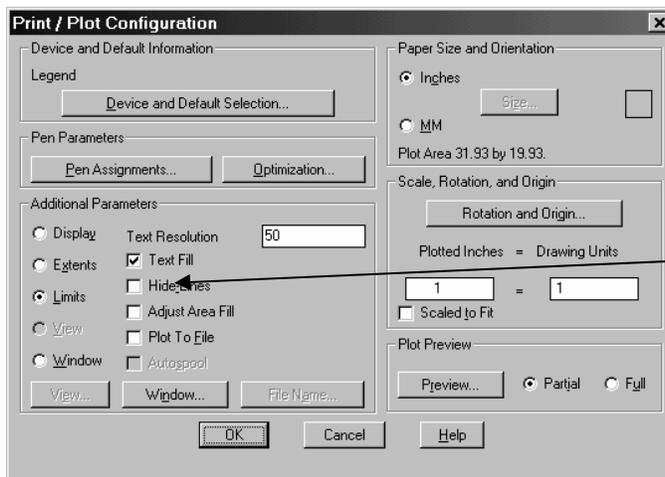
### PRINTING FROM AUTOCAD 14 WITH WINDOWS XP OR 2000



Start with a simple drawing.

The following instructions assume that your file has been created on a page size (Limits) that matches the bed size of your laser system. The following examples use a 32 x 20 inch (812 x 508 mm) page size.

**NOTE** - While there are several methods of printing from AutoCAD, the easiest method is to set your drawing to “Paper” mode before creating your file (double clicking on this box toggles between Paper and Model). It is more difficult to properly locate objects if you print from “**Model**” mode. For further information about printing from Model mode, proceed to “Printing From AutoCAD 2000 From Windows XP/2000”. Once your drawing is ready to print, click on **File | Print**.

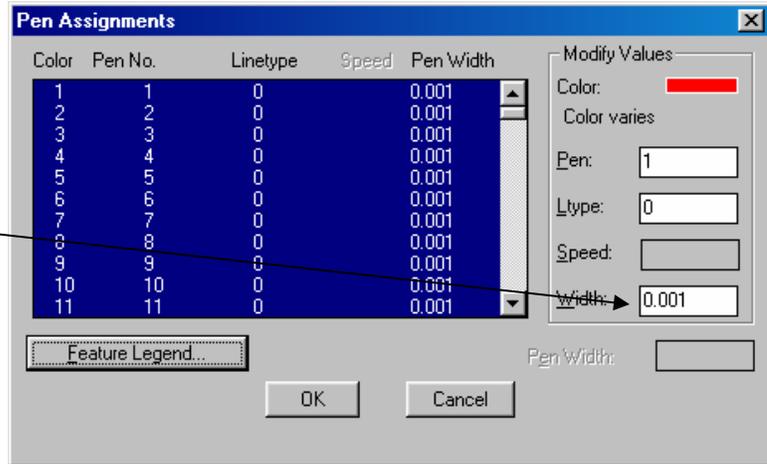


The Print/Plot Configuration window opens. Click on **Pen Assignments...**

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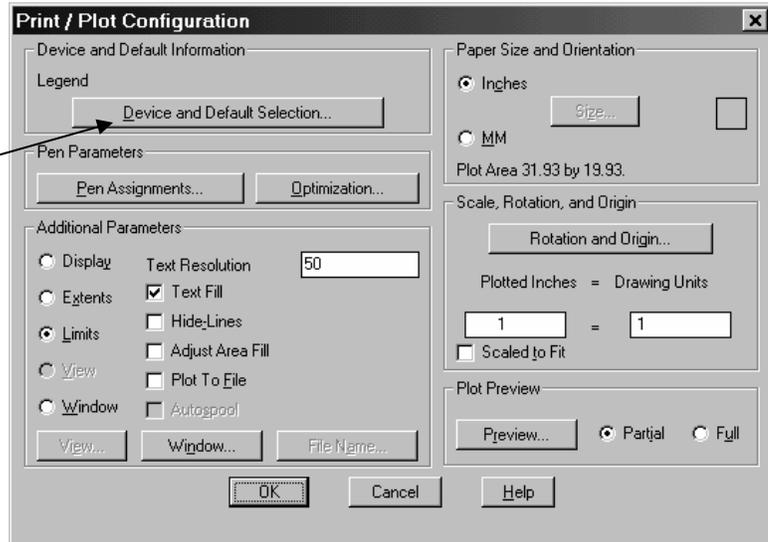
## Printing From AutoCAD

The Pen default setting is 0.010 inch. The first time that you print to the Legend you will need to set Pens 1-11 to 0.001 inch. Select pens 1-11 and change the **Width** value to 0.001. Click **OK**.



**Note** This is a very important step in the process of vector cutting from AutoCAD. A pen width of 0.010 will not provide a vector command to the Legend laser system and there will be no output from the laser.

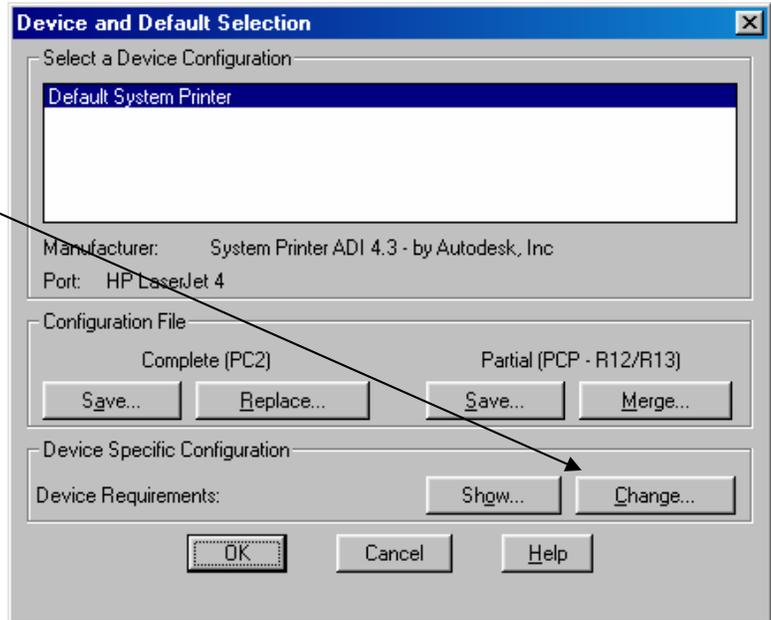
After returning to the **Print/Plot Configuration** window, click on the **Device and Default Selection** tab to begin accessing the Legend print driver.



# Appendix C

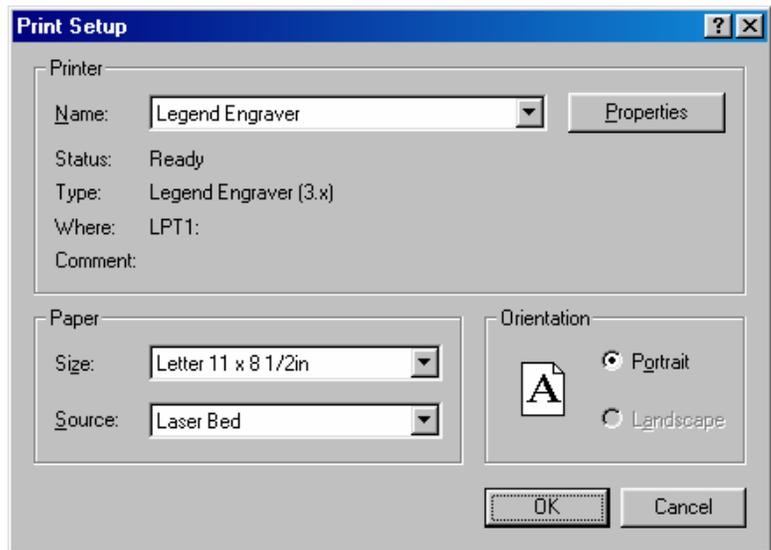
## Printing From AutoCAD

Click on the **Change** tab for the final step in accessing the print driver.



Select the Legend Engraver, then **Properties** to set the laser configurations (Speed, Power, Piece Size, etc).

Once your laser settings are set, click on **OK**, then **OK** again to return to the Print/Plot Configuration window.



# Appendix C

## Printing From AutoCAD

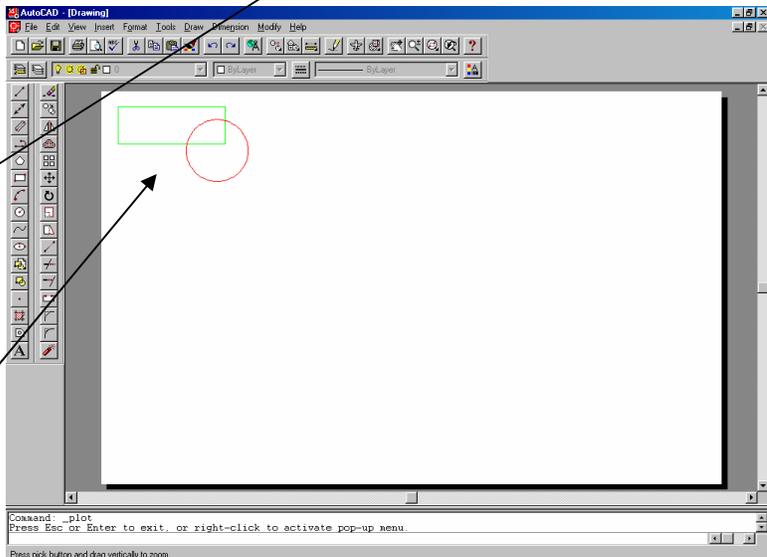
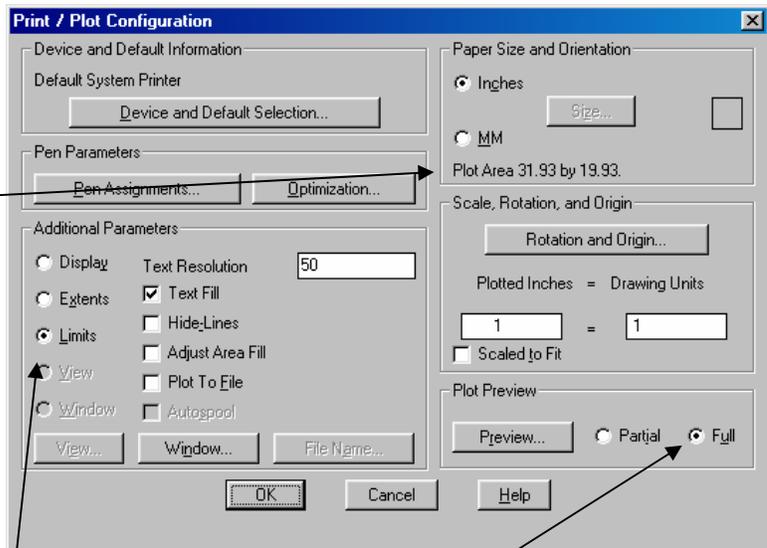
Once you are back to the **Print/Plot Configuration** window there are several choices available for printing.

Insure your **Plot Area** matches your Piece Size that was set in the print driver.

If you set your page size in AutoCAD and your Piece Size in the print driver to 32 x 20, AutoCAD will impose a 0.07 inch border around the page causing the actual print area to be displayed as 31.93 x 19.93. This 0.07-inch offset causes minor confusion, but AutoCAD does not provide a way around it.

Set **Additional Parameters** to **Limits**, then select **Full** and click on **Preview** to insure your image is properly placed. The image on the right is the Preview page.

If everything looks good, press the Enter key on your keyboard, then click **OK** and your job will print to the laser.



# Appendix C

## Printing From AutoCAD

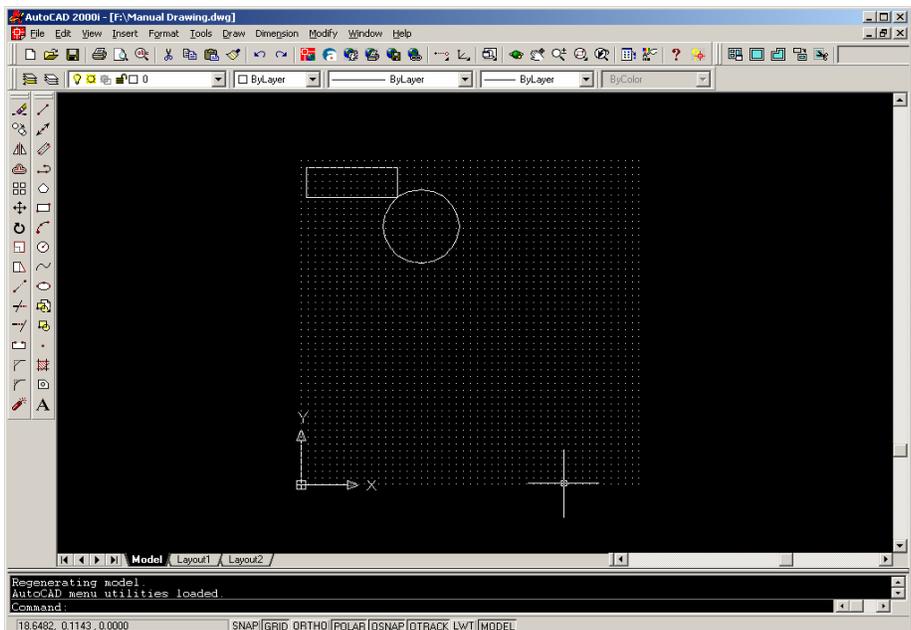
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### *PRINTING FROM AUTOCAD VERSIONS 2000 AND LATER FROM WINDOWS XP/2000*

The following steps are identical for AutoCAD versions 2000 and later. AutoCAD2000 imposes margins that are not predictable, but as long as a precise starting location (+/- .250 inch) is not important to you, AutoCAD 2000 will work well.

We have found that the best way to begin working with AutoCAD is to remove and reinstall your Legend EX print driver before starting with AutoCAD.

Because AutoCAD will not allow you to change some of the important configuration settings that are required, spending five minutes to remove and reinstall the driver may save you hours of frustration.



Start with a simple drawing.

Creating and printing from a square page (such as 32 x 32 or 24 x 24) is the most predictable way of printing from AutoCAD. Using a square page reduces the chances of AutoCAD rotating your artwork 90 degrees.

The other important setting that prevents your objects from rotating 90 degrees is in the Plot window. Make sure your Drawing Orientation is always in Portrait mode.

AutoCAD uses the lower left corner of the page as home position and Epilog uses the upper left as home position (0,0). Set up your artwork so that your objects are in the upper portion of the square page.

# Appendix C

## Printing From AutoCAD

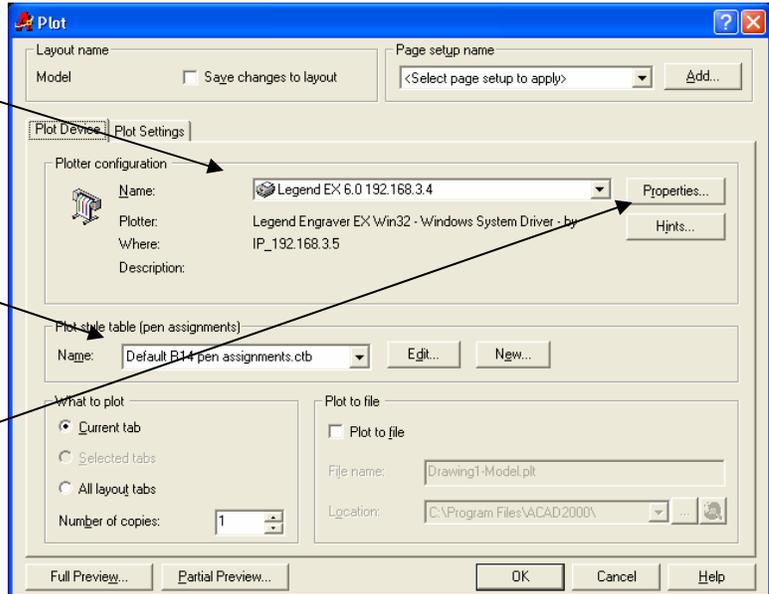
Once your drawing is ready to print, click on File | Plot.

Select the Legend driver for your Plotter Configuration

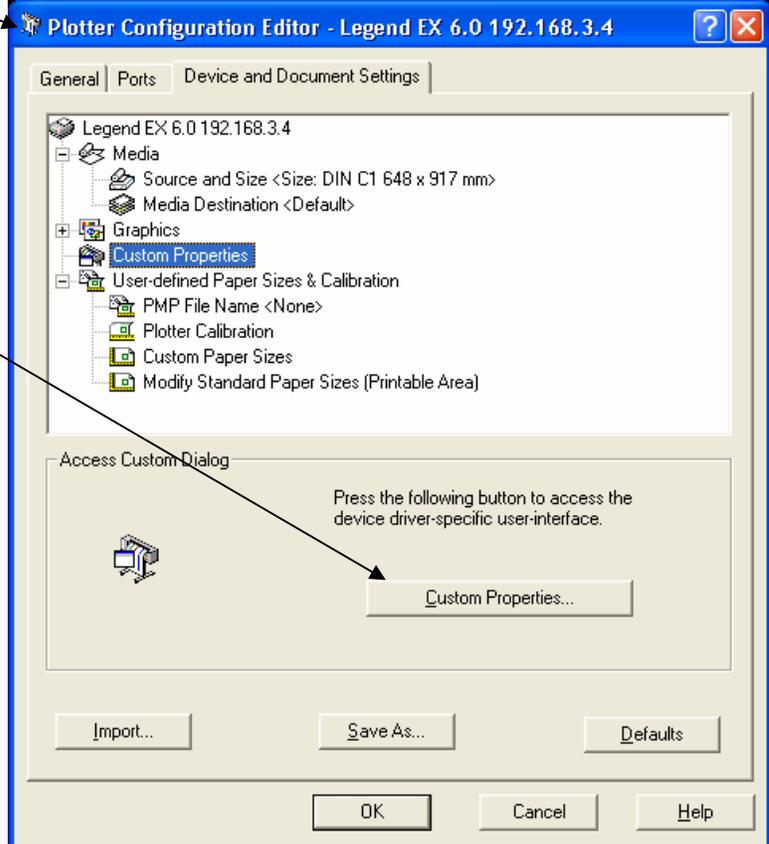
Insure your pens are set 0.001 inch. See "Printing from AutoCAD 14..." above for more information on setting pens widths.

Click on Properties to access the Legend custom print driver. The following window appears.

Then click on the "Custom Properties" box to access the print driver.



to



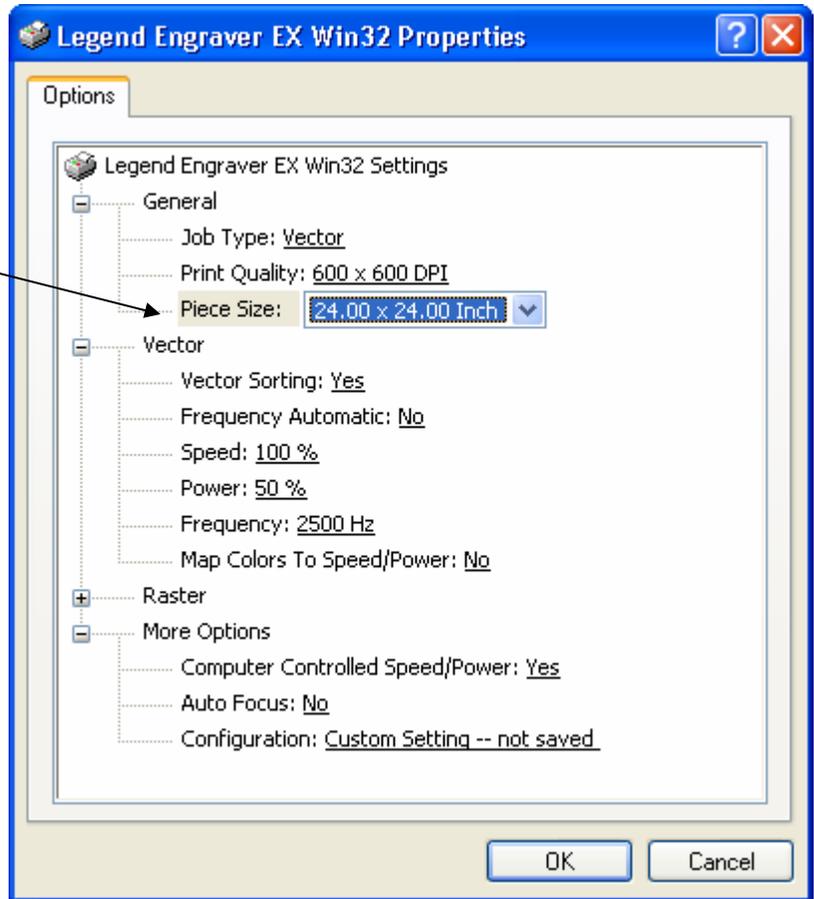
# Appendix C

## Printing From AutoCAD

Set your Piece Size to match your page size (in this case 24 x 24). You can also set this as the default setting in the Control Panel.

All of the Legend EX print capabilities are available for setting the laser parameters from this window.

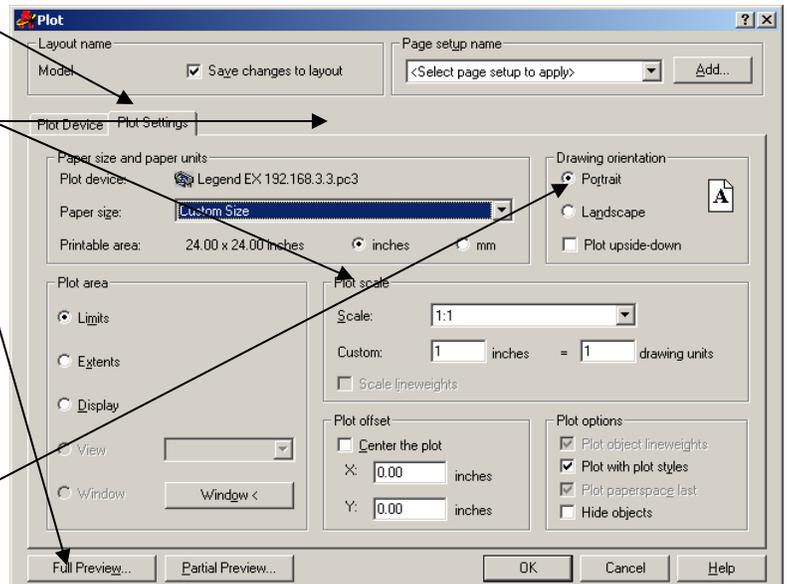
Once the appropriate laser parameters have been set, click on OK and return to the Plot window.



Go to the "Plot Settings" tab.

Set the appropriate "Plot Area" and "Plot Scale" parameters (usually "Limits" and 1:1 respectively) then click on "Full Preview" to insure your job will print the way that you want it to. Click on OK to send the job to the laser.

*It is very important that you set "Drawing Orientation" to "Portrait". Leaving it in Landscape mode may rotate your image 90 degrees.*



# INDEX

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