

Table of Contents

1. Working with Laser Engravers	1
Overview	1
Engraving Raster vs. Vector Graphics	1
Laser Engraver Setup	2
Installing a Driver for the Laser Engraver	2
Setting the Cutting Power and Speed for Pen Colors	2
Creating a Custom Swatch Table for the Laser Engraver	5
Designing for Laser Engraving	6
Sizing Page to Match Work Area Dimensions	6
Set the Origin to Match Your Engraver	6
Positioning the Design	7
Marking the Boundaries of the Substrate with a Guide	7
Fill and Stroke Settings	8
Font Handling	9
Sending Output to the Laser Engraver	11
Engraving a Job Using Multiple Passes	12
Appendix A: Notes on Laser Engravers.....	14
GCC, Inc.	14
Pen Colors	14
Focusing the Laser.....	14
Printing and Clearing Jobs	14
Xenotech, Inc.	14
Pen Colors	14
Universal Laser Systems, Inc.	15
Pen Colors	15
Index	17

Software License Agreement

Carefully read the following terms and conditions sign and return as accepting these terms and conditions.

This is a legal agreement between you, the end user (either an individual or an entity), and Scanvec Amiable, Inc. If you do not agree with the following, you should promptly return the package. Use of this program indicates your acceptance of the terms and conditions stated below.

The enclosed computer program "Software" is licensed, not sold, to you by Scanvec Amiable, Inc., for use on a non-exclusive, non-transferable basis, only under the following terms, and Scanvec Amiable, Inc., reserves any rights not expressly granted to you. You may not disclose to any third party any confidential information concerning the Software or Scanvec Amiable, Inc. or use such confidential information to the detriment of Scanvec Amiable, Inc...

1. License.

This software is protected by the United States Copyright Law and International Treaty Provisions. Therefore, you must treat the Software just as you would any other copyrighted material, such as a book. This license allows you to:

(a) Make one copy of the Software in machine readable form; provided that such a copy of the original may be used solely for backup purposes. As an express condition of this License, you must reproduce on each copy of the Scanvec Amiable, Inc., copyright notice and any other proprietary legends on the original copy supplied by Scanvec Amiable, Inc.

(b) Transfer the Software and all rights under this License to another party together with a copy of this License and all written materials accompanying the Software provided you give Scanvec Amiable, Inc., written notice of the transfer and the other party reads and agrees to accept the terms and conditions of this License.

(c) Use this Software on a single computer only, but may transfer it to another computer as long as it is used on only one computer at a time. "In Use" constitutes being loaded onto either temporary (i.e., RAM) or permanent memory (e.g., hard disk, CD-ROM or other storage device) of a computer.

2. Restrictions.

You may NOT distribute copies of the Software to others or electronically transfer the Software from one computer to another over a network. You may not de-compile, reverse engineer, disassemble or otherwise reduce the Software to a human perceivable form. You may not modify, adapt, transfer, rent, lease, loan, resell for profit, distribute, network or create derivative works based upon the software or any part thereof.

3. Termination.

This License is effective until terminated. This License will terminate immediately if you fail to comply with any of its provisions. Upon termination, you must return the Software, and all copies thereof, to Scanvec Amiable, Inc., and you may terminate this License at any time by doing so.

4. Export Law Assurances.

You agree that neither the Software nor any direct product thereof will be transferred or exported, directly or indirectly, into any country prohibited by the

United States Export Administration Act or any international export laws and the restrictions and regulations thereunder, nor will it be used for any purposes prohibited by the Act or laws.

5. Warranty Disclaimer, Limitation of Remedies and Damages.

In no event will Scanvec Amiable, Inc., be liable for any damages, including infringement, lost data, lost profits, cost of cover or other special, incidental, consequential or indirect damages arising from the use of the program however caused and on any theory of liability. This limitation will apply even if Scanvec Amiable, Inc., or an authorized dealer or distributor has been advised of the possibility of such damage. SCANVEC AMIABLE, Inc. MAKES NO WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO THE SOFTWARE, AND DISCLAIMS, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Scanvec Amiable, Inc., does not warrant any drivers for plotting, scanning or either devices. These drivers are provided for our customers as a service only, and were developed using information provided to us at the time by the equipment manufacturers.

Scanvec Amiable, Inc., is not responsible for any typographical errors in the software or in the documentation.

6. General.

If you are a U.S. Government end-user, this License of the Software conveys only "RESTRICTED RIGHTS," and its use, disclosure, and duplication are subject to Federal Acquisition Regulations, 52.227-7013(c)(1)(ii). This License will be construed under the laws of the State of Pennsylvania, except for that body of law dealing with conflicts of law, if obtained in the U.S., or the laws of jurisdiction where obtained, if obtained outside the U.S. If any provision of this License is held by a court of competent jurisdiction to be contrary to law, that provision of this License will remain in full force and effect.

© Copyright 2006 by Scanvec Amiable, Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopy, recording or otherwise, without the prior written permission of the publisher. Printed in the United States of America. The information in this manual is subject to change without notice and does not represent a commitment on the part of Scanvec Amiable, Inc.

Acrobat® Reader Copyright© 1987-2002 Adobe Systems Incorporated. All rights reserved. Adobe and Acrobat are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. PostScript® software Copyright© 1984-1998 Adobe Systems Incorporated. All rights reserved.

Flexi, FlexiFAMILY, FlexiSIGN-Pro, FlexiSIGN Plus, FlexiEXPERT, FlexiSIGN, FlexiLETTER, FlexiDESIGNER, FlexiCUT, FlexiENGRAVE, PhotoPRINT Server, PhotoPRINT, PhotoPRINT SE, EnRoute-Pro, EnRoute Plus, EnRoute, EnRoute-Machine Shop, and/or other Scanvec Amiable products referenced herein are either trademarks or registered trademarks of Scanvec Amiable, Inc. Illustrator is a registered trademark of Adobe Systems Incorporated. FreeHand is a registered trademark of Macromedia Corporation. CorelDRAW! is a trademark of Corel Systems Corporation. AppleTalk, ImageWriter, LaserWriter, and Macintosh are registered trademarks of Apple Computer, Inc. Windows is a registered trademark of Microsoft Corporation. The names of actual companies and products mentioned herein may be the trademarks and/or registered trademarks of their respective owners. Adobe® is a trademark of Adobe Systems

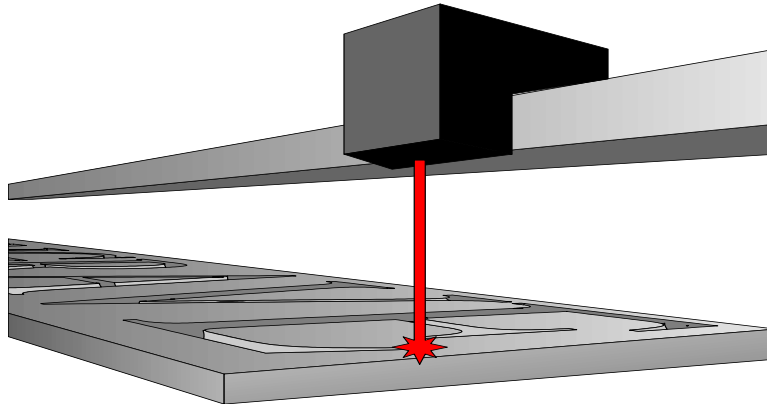
Incorporated or its subsidiaries and may be registered in certain jurisdictions.
PostScript® is a trademark of Adobe Systems Incorporated or its subsidiaries
and may be registered in certain jurisdictions.

Scanvec Amiable, Inc.
International Plaza Two, Suite 625
Philadelphia, PA 19113-1518

1. Working with Laser Engravers

Overview

A laser engraving tool uses a laser to engrave a design into an object by scanning across the surface of the object and vaporizing the material in its path.



Engraving Raster vs. Vector Graphics

Vector graphics define a picture as a set of mathematical points, lines, curves and shapes. Raster graphics define a picture as an array of dots called *pixels*.

Laser engravers treat vector graphics and raster images differently.

Engraving Raster Images

When cutting out a raster image, the laser engraver will make a series of horizontal cuts that engrave out the entire area covered by the image. Areas with different colors will be engraved to different depths.



Engraving Vector Graphics

Vector graphics are translated into a set of cutting paths that the laser will follow when engraving the design. Filled objects are rendered using the same technique as a raster image: a set of closely spaced horizontal cuts that carve out the entire area.

Laser Engraver Setup

There are three steps to setting up the software to work with a laser engraver:

1. Installing a driver for the laser engraver.
2. Setting the cutting power and speed associated with pen colors.
3. Creating a custom swatch table for the laser engraver.

Installing a Driver for the Laser Engraver

The driver for the laser engraver functions like a local printer driver.

To install the driver:

1. From the Windows Start menu, select **Settings** then **Printers**.
2. In the Printers window, click **Add Printer**.
3. In the Add Printer Wizard, click **Next**.
4. Select **Local Printer** and click **Next**.
5. Select your parallel port (usually **LPT1**) as the printer port and click **Next**.
6. Click **Have Disk** and select the appropriate driver from the **Drivers** directory on your Installation CD.
7. Select your laser engraver in the Printers list and click **Next**.
8. Under **Do you want your Windows-based programs to use this printer as the default printer?** select **No** and click **Next**.
9. Select **Do not share this printer** and click **Next**.
10. Under **Do you want to print a test page?** select **No** and click **Next**.
11. Click **Finish**.

Setting the Cutting Power and Speed for Pen Colors























Most laser engravers support an engraving mode in which the amount of power supplied to the laser and the speed at which the laser moves are determined by the pen color assigned to the path or pixel.

The power and speed settings for each color can be adjusted in the print options for the laser engraver. The colors in your design must exactly match the colors recognized by the driver.

















Each type of substrate will require a different combination of speed and power in order to make the most efficient cut. A slower-moving laser will make a deeper cut than a faster-moving laser, because it spends a longer amount of time at each point along the path. Increasing the laser power will also increase the cutting power.

With most substrate materials, there is an upper limit to how much you can cut with a single pass of the laser at a given speed. This is because the excess heat builds up in the area around the cut until it melts or deforms the substrate. The solution is to cut the design using multiple passes of the laser.

Each model of engraver will require unique settings for a given type of substrate because of differences in cutting speed and laser power.


Manufacturer	Color	R	G	B
Epilog	Up to 16 customized RGB colors			
GCC	 Black	0	0	0
	 Red	255	0	0
	 Green	0	255	0
	 Yellow	255	255	0
	 Blue	0	0	255
	 Magenta	255	0	255
	 Cyan	0	255	255
	 Light Red	255	128	128
	 Light Green	128	255	128
	 Light Yellow	255	255	128
	 Light Blue	128	128	255
	 Light Magenta	255	128	255
	 Light Cyan	128	255	255
	 Gray	128	128	128
	 Teal	0	128	128
	 Olive	128	128	0
Trotec	 Black	0	0	0
	 Red	255	0	0
	 Blue	0	0	255
	 Steel Blue	51	102	153
	 Light Blue	0	255	255
	 Light Green	0	255	0
	 Green	0	153	51
	 Dark Green	0	102	51
	 Tan	153	153	51
	 Light Brown	153	102	51

		Dark Brown	102	51	0
		Dark Purple	102	0	102
		Light Purple	153	0	204
		Magenta	255	0	255
		Orange	255	102	0
		Yellow	255	255	0
Universal Laser		Black	0	0	0
		Red	255	0	0
		Green	0	255	0
		Yellow	255	255	0
		Blue	0	0	255
		Magenta	255	0	255
		Cyan	0	255	255
		Orange	255	128	0

Xenotech		Black	0	0	0
		Red	255	0	0
		Navy	0	0	128
		Magenta	255	0	255
		Maroon	128	48	96
		Lime	0	255	0
		Olive	128	128	0
		Aqua	0	255	255
		Gray	190	190	190
		Blue	0	0	255
		Purple	160	32	240
		Silver	192	192	192
		Green	0	128	0
		Yellow	255	255	0
		Teal	0	128	128
		White	255	255	255

Creating a Custom Swatch Table for the Laser Engraver

In order to make sure that the colors in your design match the pen colors exactly, you should create a custom swatch table that contains the pen colors specified by the manufacturer. You can then use this table and be certain that the colors you assign to objects and bitmaps will map to the pen settings used by the engraver.

 Uncheck **Use Color Management** to prevent using settings from the color management system.

See "Working with Color" in the Flexi User Manual for details.

Designing for Laser Engraving


The following are design tips that save time and effort when creating a design to be engraved with a laser engraver.

Sizing Page to Match Work Area Dimensions

Before you begin creating your design, set your drawing area size to the dimensions of the laser engraver's work area. This ensures that the engraver will be able to cut your design without shrinking it, and eliminates any need to convert between scales when comparing the design and the final engraving.

To set the drawing area size:

1. From the **File** menu, select **Document Setup**.
2. In DesignCentral, enter new height (↑↓) and width (←→) values for the drawing area (see below).

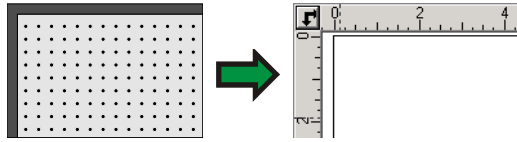
 The drawing area is resized automatically to match the values entered in DesignCentral.

Make/Model	Width & Height (mm)	Width & Height (in)
Epilog Mini	457 x 305	18 x 12
Epilog Legend 24TT	610 x 305	24 x 12
Epilog Legend 24EX	610 X 508	24 x 20
Epilog Legend 32EX	813 x 508	32 x 20
GCC Venus	300 x 210	11.81 x 8.27
GCC Neptune	1280 x 930	50.39 x 36.61
GCC Jupiter	300 x 210	11.81 x 8.27
GCC Mercury	635 x 457	25 x 18
Xenotech XLE 1325	330.2 x 635	13 x 25
Xenotech XLT 1325	330.2 x 635	13 x 25
Xenotech Aurora	457.2 x 762	18 x 30
Xenotech XLE 2436	609 x 914	24 x 36
Xenotech XLT 2436	609 x 914	24 x 36
ULS VersaLaser VL-200	406 x 305	16 x 12
ULS VersaLaser VL-300	609 x 305	24 x 12


Set the Origin to Match Your Engraver

You should set the location of the origin in your software to match the location of the origin on the laser engraver. If the origin is in the upper left corner of the work area on your engraver, set the origin in the

software to the upper left corner also.



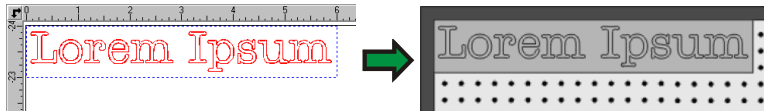
To set the location of the origin:

1. From the **View** menu select **Ruler and Grid**.
2. On the **Ruler** tab, under **Orientation**, press the  button to set the origin to be in the top left corner.
3. Click **OK**.

Positioning the Design

The substrate must be positioned exactly as defined in the design. The laser engraver cannot detect the location of the substrate: it can only cut where it is told.

For this reason, it's best to set up your design so that the substrate sits in a corner of the cutting table. This eliminates any need to measure out the position.



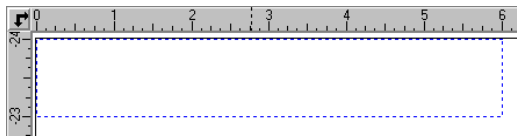
Marking the Boundaries of the Substrate with a Guide

It is often difficult to determine exactly where the boundaries of the substrate are when you are working on your design. It makes it easier if you add an object to your design that has the same size, shape and location as the substrate, then make the object into a guide.

To make an object into a guide:

1. Select the object.
2. From the **Arrange** menu, select **Guides** then **Make Guide**.

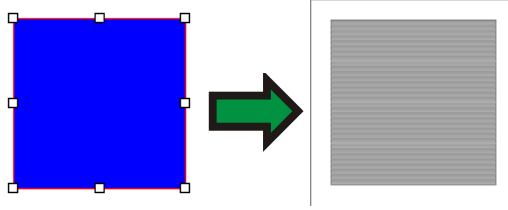
The guide object will appear as a dotted blue outline.



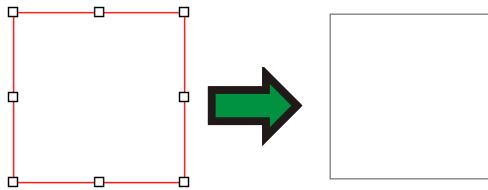
Fill and Stroke Settings

When a vector object is rendered into laser engraving paths, the fill and stroke settings of the object are handled as follows:

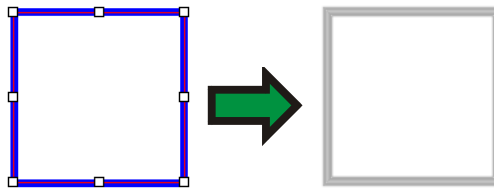
- The fill of the object, if any, is engraved out like a raster fill.



- The stroke of the object, if any, is handled in one of two ways:
 - If the width of the stroke is 0 or 0.001, the stroke will be cut as a vector outline.

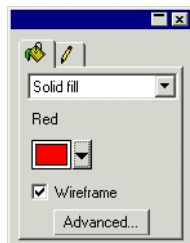


- If the stroke is wider than 0.001, it will be cut as a raster image.

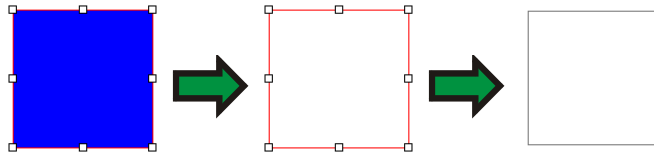


Wireframe

If you want to turn a vector object with a fill into a single engraving path that follows the outline of the object, check the **Wireframe** option in the Fill/Stroke Editor.



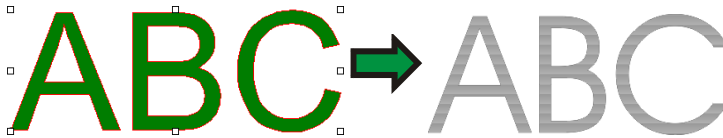
The fill color of the wireframe object will determine the cutting speed and power used to engrave it.



Font Handling

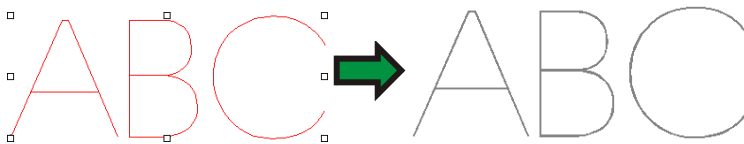
Standard Fonts

When text using TrueType or Adobe Type 1 fonts is engraved, it is treated as an object with a fill and rasterized.

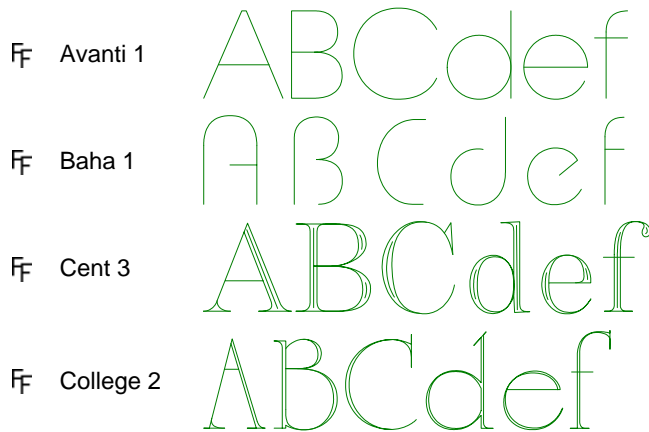


Engraving Fonts

When text using an engraving font is engraved, it is treated like an outline.



The engraving fonts included with the software are:



Ff Engrave 1 ABCDEF

Ff Helvet 1 ABCdef

Ff Huckle 1 ABCDEF

Ff Script 1 ABCdef

Ff Serif 1 ABCdef

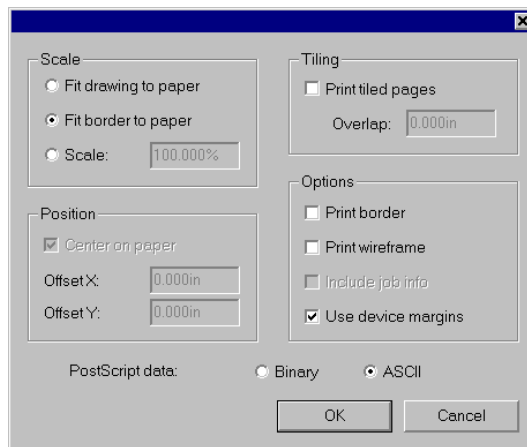
Ff Wedding 3 ABCdef

Sending Output to the Laser Engraver

When you output a design to the laser engraver, you will print it like you were printing to a desktop printer, selecting the laser engraver driver.

To output a design to the laser engraver:

1. Position the substrate in the engraver so that it occupies the position specified in your design.
2. Close the engraver cover.
3. Adjust the focus of your laser.
4. From the **File** menu, select **Print**.
5. In the Print dialog, select the laser engraver driver from the list of available print drivers.
6. Click the **Options** button in the Print dialog.



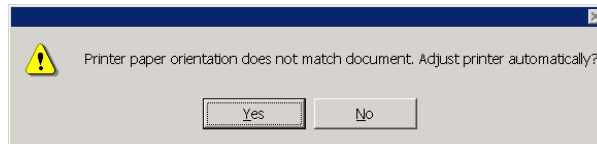
7. Set the following options:
 - Scale** Select **Fit border to paper**.
 - Tiling** Clear the **Print tiled pages** checkbox.
 - Options** Clear the **Print border** checkbox.
Check **Use Device Margins**.
8. Click **OK** to return to the Print dialog.
9. To select laser engraver properties, select the laser engraver driver from the list of drivers in the Print dialog and click **Properties**.

- ☰ If you want to use color mapping to determine the power and speed settings used to engrave your design, select the appropriate option for your engraver:

Epilog	Set the Map Colors to Speed/Power print option to Yes .
GCC	Set Mode Setting to Manual Color Fill .
Xenotech	Set Output Mode to Use Color Settings .
Universal	Set Print Mode to Normal .

- ☰ The available properties will vary for each make and model of engraver. Please consult your engraver manual for details.

10. Click **OK**.



11. If message about adjusting the paper orientation appears, click **Yes**.

Engraving a Job Using Multiple Passes

To engrave a job using multiple passes of the laser, select colors for the elements of your design that correspond to the cutting speed and power needed for a single pass of the laser. Then print the job multiple times on the same substrate. Do not move the substrate between passes.

Printing Multiple Passes of Selected Parts of a Design

If only certain parts of the design need multiple print passes, you can select only certain parts of a design and then print them as needed.

To print selected parts of a design:

1. Select the parts of the design you want to print multiple passes of.
2. From the **File** menu, select **Print**.
3. In the Print dialog, select **Print Selection**.
4. Click **OK**.

Appendix A: Notes on Laser Engravers

GCC, Inc.

Pen Colors

Each pen color can be assigned the following settings:

- Speed** The speed the cutting laser moves at. A slower-moving laser will make a deeper cut than a faster-moving laser, because it spends a longer amount of time at each point along the path.
- Power** The amount of power supplied to the cutting laser. Increasing the power makes the cut deeper.
- Raster** Check to output pixels or raster fills that have this color.
- Vector** Check to output vector objects that have this color.

Focusing the Laser

To focus the laser of the surface of the substrate, first lower the level of the work area so that the surface of the substrate is below the level of the laser cutting head. Move the cutting head over the surface of the substrate, then press the **Auto Focus** button on the engraver.

Printing and Clearing Jobs

After a new job is sent to the engraver, you need to press the **Next File** button on the engraver to access the new print job.

Press the **Start/Stop** button on the engraver to output the job.

Once a job has been output, press the **Del File** button to delete the job from the engraver's memory.

Xenotech, Inc.

Pen Colors

Each pen color can be assigned the following settings:

- Power** The amount of power supplied to the cutting laser. Increasing the power makes the cut deeper.
- Speed** The speed the cutting laser moves at. A slower-moving laser will make a deeper cut than a faster-moving laser, because it cuts for a longer amount of time at each point along the path.
- PPI** The number of laser pulses per inch.

Universal Laser Systems, Inc.

Pen Colors

Each pen color can be assigned the following settings:

Rast		Determines the types of objects with that color that will be output.
Vect		
Rast/Vect	Rast	Only raster fills with this color will be output.
Skip	Vect	Only vector outlines with this color will be output.
	Rast/Vect	Both raster fills and vector outlines with this color will be output.
	Skip	No objects with this color will be output.
% Power		The amount of power supplied to the cutting laser. Increasing the power makes the cut deeper.
% Speed		The speed the cutting laser moves at. A slower-moving laser will make a deeper cut than a faster-moving laser, because it cuts for a longer amount of time at each point along the path.
PPI		The number of laser pulses per inch.

Index

- engraving. See laser engraving
- fonts
 - engraving fonts, 8
 - laser engraving, 8
- laser engraving, 1
 - custom swatch table, 4
 - design tips, 5
 - driver, 2
 - engraving raster images, 1
 - engraving vector graphics, 1, 7
 - fill, 7
 - font handling, 8
 - laser power, 2
 - laser speed, 2
 - multiple passes, 11
 - output, 10
 - overview, 1
 - pen preferences, 2
 - setting origin, 5
 - setup, 2
 - stroke, 7
 - wireframe, 7
- License Agreement, ii
- swatch tables
 - laser engraving, 4