

## General Software Set-up

There are many software programs that you can purchase off-the-shelf that will work with the laser system. Some of them can access more features of the laser system than others may. Whichever program you choose, it must be set up to work with the laser system, otherwise unexpected results may occur. Use the following GENERAL guidelines when configuring your software program.

### Page Setup

To properly generate and position artwork, most graphics software will permit the customization of the page size and orientation. Set the page orientation in the graphics software to Landscape and the page size to match the maximum engraving area of your laser system. The driver's orientation and page size **MUST** then be set to match these specifications **EXACTLY**, otherwise the artwork may not print correctly. When setting page orientation and driver orientation to Landscape mode, the laser system will operate in the horizontal direction, left to right. If page orientation and driver orientation is set to Portrait mode, the laser system will operate in the vertical direction, front to back. The laser system is designed to operate best in the Landscape mode and this orientation is highly recommended. The page size may also be reduced to match the size of the engraving material, but remember to adjust the page size in the driver to correspond to the graphics software's page size. Note that in production situations it is often more efficient to leave the page size at its maximum page size and engrave or cut more than one object at a time. This is accomplished by duplicating the image on screen as many times as possible to fill up the entire page.

### Ruler Setup

Usually the graphics software will provide on-screen rulers, which can be configured to match the rulers in the laser system. Using rulers in the software and matching them with the ones provided in the laser system optimizes the alignment of the graphic on the screen with the material in the laser system. For now, assume that the laser system's origin is fixed in the upper left corner of the engraving area and cannot be altered. Later on you will learn how to relocate the origin. Change the ruler position on screen to match the laser system with the origin (0,0) in the upper left corner. It is also possible to use a page size smaller than the maximum engraving area. For example, if you desire an 8-inch (203.2 mm) x 10-inch (254 mm) page size, set this page size in the graphics software as well as in the printer driver. The laser system will automatically move the engraving area to the origin, so place the object all the way up into the left-hand corner against the rulers in the laser system.

### Power Control through Color Selection

The laser system allows the use of eight different colors to access eight different power settings when cutting and engraving. When using this power change feature, the driver colors used **MUST** exactly match the colors listed in the driver. The colors are black, red, green, yellow, blue, magenta, cyan and orange. Some programs will provide pre-defined basic colors and other programs may require the creation of each of the colors by defining them in RGB. If you are using CorelDRAW, we have made our own custom palette and placed the file on the Software Installation CD-ROM. Please refer to the software setup instructions for your specific version of CorelDRAW. If you are using other graphics software and need to mix your own colors, use the chart below to create them.

|        |         | RED (R) | GREEN (G) | BLUE (B) |
|--------|---------|---------|-----------|----------|
| COLORS | 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     | 102       | 0        |

If using a color other than the exact colors listed above, the driver will attempt to match it to a color in the driver that it most closely resembles. The driver will then use that color's power setting and apply a halftone pattern to represent the original color's shade. For example, if using a color like pink to fill a rectangle, the driver takes a reading of the percentage of different colors used to create that color and will use the power setting assigned to one of the eight colors of the driver that it most closely resembles. It might be expected that the driver will use the power setting assigned to the color red, but instead the driver may choose the magenta setting and halftone the rectangle as a representation of the pink color's lighter shade. To prevent the incorrect assignment of laser power, be sure to use the correct colors. If using graphics with colors other than the eight listed above or to simplify the assignment of power settings, try using the Clipart Mode feature in the driver. This feature will cause the system to only use the power setting assigned to the color black and halftone all of the other colors.

## Outlines and Fills

The driver distinguishes between raster mode (engraving) and vector mode (cutting) by the type of graphic artwork being used. All graphics, other than outlines of very thin line widths will be interpreted as engraved images and the raster mode will be used for output. If laser cutting is desired, set the line thickness of the lines that are drawn in the graphics software to 0.001 inches (0.025 mm) or the smallest possible line thickness available. The printer driver will interpret these objects as vectors and will cut them out providing that your software has the capability of vector output. Basically, all software programs have the ability to provide raster output. However, not all programs have the ability to provide vector output even if you set the line width to the smallest thickness possible. Check page 61 of this guide for software that can vector output. The use of color fills or bitmaps will cause the laser system to engrave. The combination of engraving and cutting is available in most graphics software. We suggest that when combining engraving and cutting objects, use different colors for the fills and outlines since engraving requires different power settings than cutting objects. One thing to keep in mind when creating cutting objects is that if the outline thickness is set too thick, the driver might interpret the outline as a filled object and will engrave the outline instead of vector. This might be desirable if engraving thick outlines is necessary. The outline thickness at which the driver will interpret cut lines as filled objects is dependent on the software used. Usually, any line thickness 0.008 inches (0.2 mm) or greater will engrave. The only way to determine the cross-over point for line thickness is to experiment with different line widths. Software programs that do not have outline capabilities definitely will not have the ability to cut.

## Image Processing Order

When cutting or engraving a graphic image, the laser system will perform all engraving first, and then proceed to vector cutting. Raster engraving will proceed in the exact order of the colors listed in the driver. For example, all black filled objects will engrave first, then all red filled objects, then all green filled objects and so on. When all engraved objects have been completed, the laser system will proceed to vector cut any outlines present in the artwork. Vector output order is dependent on the "Soft" feature of the printer driver. Refer to the printer driver controls for more details.

## Overlapping Fills

If the artwork created has overlapping filled areas, the driver will automatically filter these fills to prevent the overlapped area from being engraved twice. This is similar to color separation in the printing industry. The entire filled area of the object on top will be engraved and only the visible part of the underlying filled area will be engraved. The final result is a what-you-see-is-what-you-get output. This way the color white can be used as an effective drawing tool. Since the laser system will not engrave the color white (this is the background color), it can be used to block out the undesired engraving areas of filled regions and/or bitmaps. However, you cannot use a white fill to cover an outline, the outline will vector cut even though you cannot see it on screen.

## Overlapping Outlines

The driver does not filter outlines that overlap each other. If you are placing one outline on top of another, both outlines will be cut by the laser system. This is a useful feature that will allow deeper cutting by passing the laser over a single outline path twice or more. To take advantage of this feature, duplicate the outline on top of itself.

## Hidden Vector Lines in Artwork

The driver does not automatically filter out outlines that are overlapped by engraved objects such as fills. If there are filled objects with some hidden outlines underneath, the laser system will engrave the fill and cut the hidden outline on top of the fill. This is a common occurrence when using pre-drawn clipart designed for laser printers. To prevent this from happening, turn on the Clipart Mode feature in the driver. This feature disables the cutting mode and converts all visible outlines to engraved objects and ignores all hidden outlines.

## Speed Optimizing

It is advantageous to engrave an object in its longest direction because total engraving time will be reduced when the motion system has to make fewer stops and starts. If the engraving object is taller than it is wide, rotating the graphic 90 degrees and placing the material in the laser system sideways can achieve a greater engraving speed. Be aware that some graphics programs do not allow the rotation of bitmaps. In this case, it may be necessary to use a bitmap image processing software to first rotate the bitmap before importing the bitmap into the graphics program. If the artwork contains engraved objects of the same color with a great deal of space between them in the engraving direction, processing time can be longer since the laser must make long strokes to engrave both objects at the same time. To reduce engraving time in cases like these, use different colors for each of the objects, but assign the same power setting to both colors. This will cause the laser to engrave one object at a time, skipping over all blank space, which in many cases will reduce engraving time. On the other hand, if the objects are relatively close together in the engraving direction, then leave them the same color because it will be quicker to engrave them both at the same time. Experiment with these techniques to optimize the speed of engraving.

## Bitmapped / Scanned Images

There are primarily three types of bitmaps available: monochrome (black and white), grayscale and color. Bitmaps are patterns of dots (pixels) blended to form pictures. Scanning artwork into a computer through a scanner creates most bitmaps. Drawing them in a bitmap image-processing program creates others.

The laser system can print all three types of bitmaps providing that either the driver or the bitmap image-processing program converts the grayscale and/or color bitmaps into a monochrome bitmap. Essentially, the laser system is a monochromatic printer, either it fires the beam to burn a dot or it does not fire the beam to leave an empty dot on the material.

There are several different bitmap storage formats available: TIF, JPG, BMP, PCX and others. The format makes no difference to the laser system. The difference in formats involves how they are stored on your computer's hard disk. Bitmaps cannot be edited in most graphics software. Some basic functions such as cropping, scaling or mirroring might be possible. It is usually necessary to use a bitmap image processing software to perform a dot by dot editing, rotation or scaling of the bitmap.

### Monochrome Bitmaps

If you scan the image in monochrome (black and white) mode, set your scanner to at least 600 DPI. The higher the DPI, the smoother the image will be. Scanning monochrome images at 300 DPI is the minimum recommended resolution, but scanning them at 600 DPI will provide a significant improvement in image quality. You can either print the image directly from your bitmap image processing program or import the bitmap into a graphics program and print it from there. Monochrome bitmaps are engraved in the same manner as black filled text. The black area will turn the laser on and the white area turns the laser off.

### Grayscale Bitmaps

When scanning an image in grayscale mode, you should scan the image at no more than 300 DPI. Scanning at a higher DPI does not improve image quality and it consumes more memory and will take longer to print. Grayscale images cannot be printed directly to the laser system. Since the laser system actually works like a black and white printer, grayscale images must be converted into black and white images. To do this, the driver will do it automatically or you can convert the grayscale image to a black and white image in your bitmap image-processing program.

The two primary grayscale image conversion techniques are Halftone or Error Diffusion. The printer driver can print either one and it is selected in the driver under the Raster Sub-Tab. Please refer to the printer driver section for more details on how to set these parameters. Since the driver has a fixed method of conversion,

you may want to experiment by using your bitmap image-processing program to make the conversion. These software programs usually have more options for controlling the size, angle, shape and the amount of black and white dots (pixels) created when converting the image. Experiment with all of the controls to see which looks the best. Big dots look good on some materials and small dots look better on others. Once the image is converted by your program, save and print it directly from that program or import it into your graphics program and print it. Essentially, a Halftone image and an Error Diffusion image are monochrome images and can be treated as such. If you decide not to convert the grayscale image to a monochrome image in your bitmap image editing program, then the driver will do it automatically and will use settings based on the Resolution settings in the driver.

### Color Bitmaps

The printer driver handles color bitmaps the same as grayscale bitmaps. Since color bitmaps use more memory, they are unnecessary and therefore **not** recommended, however, you can still use them.

## Encapsulated Postscript (EPS) Images

Bitmap images cannot be cut by the laser system, only engraved. The only way to have the laser system cut out or vector a bitmap is to first convert it to a vector file format such as an EPS. Raster to vector conversion programs are available that trace the bitmap (this only works well with monochrome bitmaps) and create a separate EPS vector file. These EPS files can then be imported into the graphics program and printed out from there. Since tracing programs have many adjustments, some practice may be necessary to produce desirable results.

The laser system does not support Encapsulated PostScript (EPS) printing directly. EPS files can only be edited and printed if they are first imported into a graphics program. However, since EPS files support engraving and cutting objects, they are useful for transferring artwork from one graphics program to another. Once an EPS file has been imported into a graphics program, the objects can be outlined, stretched, rotated, mirrored, filled with different colors or anything else desired as long as your graphics software can edit EPS images. Be careful when using EPS files in layout software as opposed to true graphics software. Layout software may allow the placement of EPS files in the artwork, but may not actually import and convert the EPS file to a useful format for the printer driver and therefore may not print correctly. Please refer to your graphics software's documentation on whether or not it can edit and print EPS images to a non-Postscript printer.

## Postscript (PS) Images

The laser system is **not** a postscript device. This means that postscript fills, postscript textures and especially **Postscript fonts will not** be able to print to the laser system. Sometimes using Adobe Type Manager (ATM) will allow postscript fonts to print correctly, but the majority of the time it does not work properly.

### Helpful Tip

If you are having any problems printing a font and you cannot figure out what is going on, select the font and "convert to curves" or "convert to paths" in your graphics software. This will convert the font into a bitmapped image and will print correctly to the laser system. Refer to your graphics software on how to convert fonts. However, postscript textures and postscript fills cannot be converted and will not print to the laser system.