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# Universal Control Panel (UCP) Raster Image Enhancements Explained

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The UCP's raster "Image Enhancement" software feature improves marking and engraving quality at high speeds by compensating for laser response in order to make edges crisp and defined and to keep thin elements of a graphics and thin vertical lines from fading out. Image Enhancement works best when the motion system is moving at the requested speed when at the edge of the image. This requires a margin be added to the raster stroke length on either side of the image being marked or engraved for acceleration and deceleration ramps. However margins add time to the job and margins are not possible when the image being marked or engraved is near the edge of the engraving field.

A version of Image Enhancement called Auto: No Margin was designed to allow the user to engrave up to the edge on either the right or left side of the table or to mark and engrave with margins removed for faster completion times. This mode tries to compensate for laser response while accelerating and decelerating. However, this mode can produce shifting of parts of an image being marked or engraved with some images on some materials. If shifting is encountered, running with the "Frame Rasters" check box selected in the job settings should correct this effect.

The following pages contain screen shots of the scenarios mentioned above for your reference, a brief description of all raster Image Enhancement modes available, as well as a list of the automatic type Image Enhancement benefits and a list of their limitations. Please note that Image Enhancement is a feature unique to the Universal Laser Systems UCP.

If you require assistance, please contact the ULS Technical Support team at telephone number 480-609-0297 or email [support@ulsinc.com](mailto:support@ulsinc.com) (or your local support office in Vienna or Yokohama).

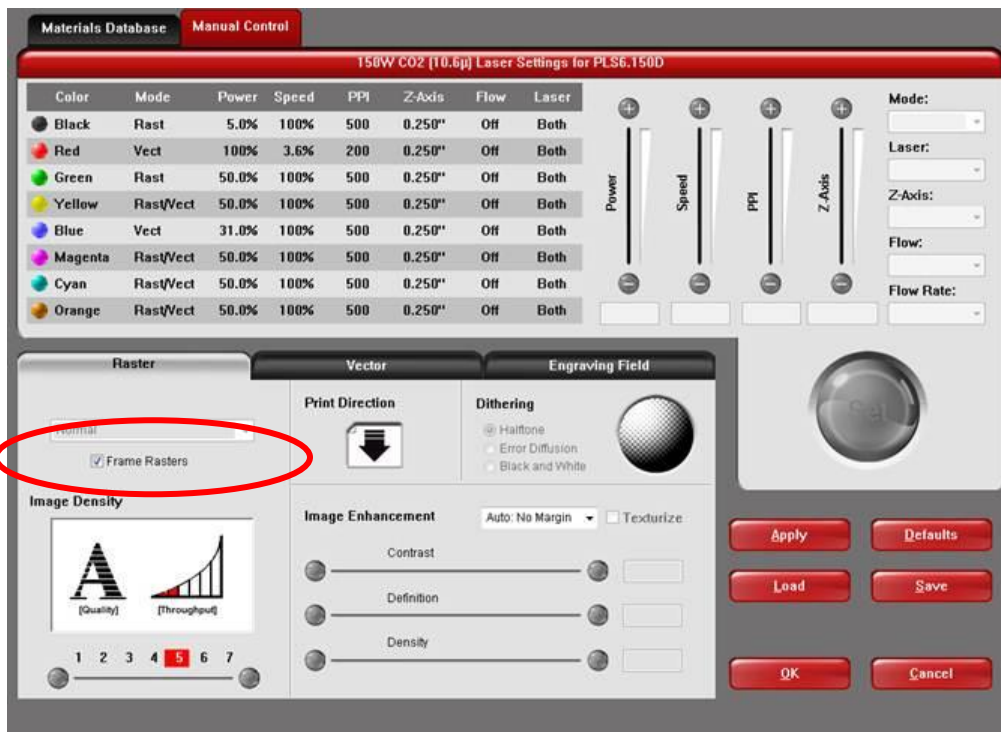
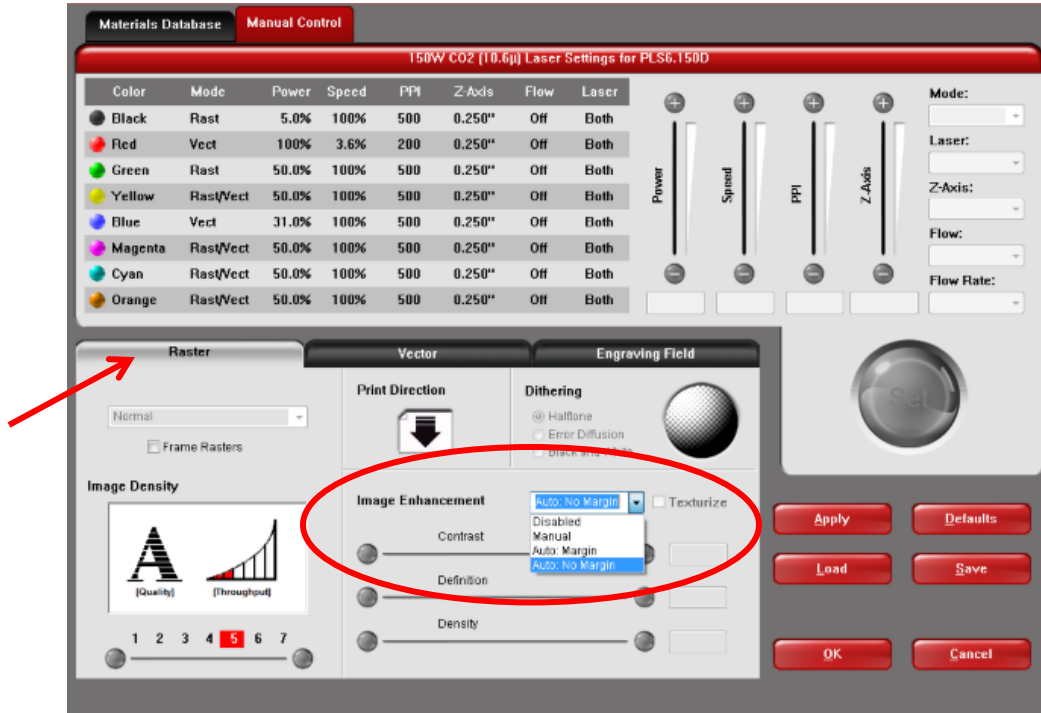
Best regards,

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RASTER SETTING SCREEN SHOTS



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## RASTER IMAGE ENHANCEMENT MODES

### **Disabled**

When Image Enhancement is set to Disabled, no image enhancement is performed on rasters. All controls on the Image Enhancement panel except for Tuning are grayed out and not selectable. Depending on the particular application, there may be some undesirable artifacts seen in the engraved results such as inconsistent engraving depth in wide versus narrow features, and jagged or faded appearance at the left and right edges of engraved areas at higher processing speeds. The tuning control may have to be set to some value other than 0 to properly line up left-traveling and right-traveling raster lines. Margin will be added to the left and right sides of the raster engraving area in order to provide for acceleration and deceleration of the carriage. If the engraving area is located very close to the right or left edges of the engraving field, there may not be sufficient room for margins and the engraving may appear faded very near the edge.

### **Manual**

When Image Enhancement is set to Manual, Image Enhancement is performed on rasters in a manual manner. The controls on the Image Enhancement panel are enabled and their settings determine the results. The user must experimentally determine the control settings that give good results in terms of consistent appearance of wide versus narrow features, crisp edges, and alignment of left-travelling and right-travelling raster lines. Margin will be added to the left and right sides of the raster engraving area in order to provide for acceleration and deceleration of the carriage. If the engraving area is located very close to the right or left edges of the engraving field, there may not be sufficient room for margins and the engraving may appear faded very near the edge. The settings are speed dependent and may have to be adjusted if speed of laser processing is changed. The tuning value (located at the top center of the System tab) should be set before setting up enhancements. This is the traditional method used before auto enhancements were introduced and should be familiar to long time users of ULS laser material processing systems.

### **Auto: Margin**

When Image Enhancement is set to Auto: Margin, the UCP software applies raster auto-enhancement to each raster line. All controls on the Image Enhancement panel except for Tuning are grayed out and not selectable. The software will automatically compensate the power and location of each engraved pixel to give good results in terms of consistent appearance of wide versus narrow features, crisp edges, and alignment of left-travelling and right-travelling raster lines. Margin will be added to the left and right sides of the raster engraving area in order to provide for acceleration and deceleration of the carriage. If the engraving area is located very close to the right or left edges of the engraving field, software will automatically compensate as required to avoid provide good engraving and marking results. The tuning value (located at the top center of the System tab) must be set properly for best results. This is the recommended default mode for most laser processing needs.

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**Auto: No Margin**

When Image Enhancement is set to Auto: No Margin, the UCP software applies raster auto-enhancement to each raster line, and also takes steps to reduce the amount of time required to engrave each raster line. All controls on the Image Enhancement panel except for Tuning are grayed out and not selectable. The software will automatically compensate the power and location of each engraved pixel to give good results in terms of consistent appearance of wide versus narrow features, crisp edges, and alignment of left-travelling and right-travelling raster lines. Margin is not added to the left and right sides of the raster engraving area, in order to minimize the time required to complete each raster line, and software automatically compensates as required to provide good engraving and marking results. The tuning value (located at the top center of the System tab) must be set properly for best results.

Note: Auto: No Margin may cause image degradation with some images on some materials in the form of shifts in images. If this occurs, select the Frame Rasters check box to correct the problem.

### [BENEFITS OF RASTER IMAGE AUTO-ENHANCEMENT \(either Auto: Margin or Auto: No Margin\)](#)

**No Experience Required**

Raster image auto-enhancement is very simple to use, especially for users without experience using the traditional Image Enhancement controls. For these users, simply choosing Auto: Margin will give excellent results for the vast majority of applications, without any understanding of the behind-the-scenes details.

**No Experimental Adjustments**

Raster image auto-enhancement maintains consistent engraving results for all engravers, fixtures, lenses, lasers, materials, Speed settings, Power settings, and Image Density settings. There is no need to dial in the enhancement settings manually when changing any of these factors: the adjustments occur automatically, behind the scenes.

**Backwards Compatibility**

The updated Image Enhancement controls can duplicate the functionality of previous versions by using Disabled or Manual settings. This means no loss of functionality for users with a significant investment in the development of specific applications, who are happy with the results they see using the traditional Image Enhancement controls.

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**Edge of Field Performance**

Raster image auto-enhancement compensates for the response of the laser, allowing engraving all the way to the left or right margins of the engraving field for most applications.

**Reduced Job Completion Time**

The Auto: No Margin option results in lower job completion times for all raster engraving jobs by removing the acceleration/deceleration margin added to the left and right side of each raster line. The speed increase depends on the width of the engraving area: very wide areas will exhibit modest improvement, while very narrow raster features can be dramatically faster.

**LIMITATIONS OF RASTER IMAGE AUTO-ENHANCEMENT****Consistency over Special Effects**

Raster *image auto-enhancement* maintains engraving consistency, without regard to the specific material or application. In some cases, the user may desire to dramatically change the normal behavior of raster engraving in order to handle an unusual material or achieve some special effect. Auto-enhancement does not allow the user control over the raster process, so the Manual enhancement option remains the best way to achieve detailed control for unusual applications.

**Quality versus Speed**

Using the Auto: No Margin option allows for reduced job completion time, and in most cases there is no corresponding reduction in the engraving quality. But some very sensitive applications may not tolerate the required compensation well, resulting in a visible reduction in engraving quality. Whether the speed increase is worth the quality decrease must be made by the user on a case-by-case basis.

**Margin Quality**

Both the Auto: Margin and Auto: No Margin options greatly improve the appearance of raster engraving performed very close to the left or right edge of the engraving field. But some very sensitive applications may not tolerate the required compensation well, resulting in visible engraving artifacts very near the edges of the field. Relocating the engraving to move it away from the left or right edge of the field and/or using the Auto: Margin option may be necessary to give sufficient quality.