040b73747265616d747970656481a203840163c48403737373810a0a810b0b815f5f84012584067f411b312d37

596448_TMSHistWork.tiff ¬   **Histogram**

Histogram is one of the tools accompanying the Bitmap Controller (;../TMSImg/Controller.rtfd;;¬).

It is used for displaying and modifying the distribution of hue, intensity, saturation, or transparency in an image. For grayscale images, only intensity can be altered. (In the case of grayscale images, intensity is a synonym for brightness.)

11031_paste.tiff ¬*Figure: The Histogram panel.*

The histogram function can best be explained by using example grayscale images. Normally a scanned image doesn't include all possible gray values, and some gray values are more prevalent than others. Where this is undesirable, the histogram can be altered to create a transfer curve in which each original gray value is mapped to a new one, so that all possible gray values are used evenly.

Work Modes
The upper pop-up list in this portion of the *Histogram* panel lets you determine which channel is to be used for the histogram. When working with color images you can choose among *<Hue>*, *<Saturation>*, *<Intensity>,* and *<Transparency>*. For grayscale images, only *<Intensity>* (brightness) and *<Transparency>* are

selectable.

The second pop-up list defines the color depth used for creating the histogram: 8-, 12- or 16- bit.

paste.tiff ¬
 Figure: The Work Modes for histograms.

Read/Write
The options <*Read*> and <*Write*> can be combined in three different ways:

1. Read
If only <*Read*> is activated and you apply the histogram function on an image (using the command <*Apply*> from the Bitmap Controller) the histogram will be read according to the selected channel and color depth.

<*Read*> can't be deactivated until at least one read has been done.

Note: The area from which the histogram is read depends on the <*Impact Area*>, as selected in the Bitmap Controller. This can be either the complete image or parts of it, if you are using a brush. If the option <*Deferred Painting*> is activated in the Brush Toolbox, the whole area you've brushed is evaluated; otherwise only the last spot under the brush tool is read.

2. Read <u>and</u> Write

The histogram is read, as described above. Then the selected part of the image is modified according to a transfer curve calculated by means of the parameters described below.

3. Write
The selected part of the image is modified according to the calculated transfer curve. No new histogram is read with this option, so the same transfer curve can be applied to different areas.

Spread
The <*Spread*> parameter defines what percentage of the original image will remain in the new image. 0% leaves the original image in its original condition. 100% completely spreads the histogram. This slider gives you very precise control over the effects of the spread on an image.

312365_paste.tiff ¬
 Figure: The slider for setting the spread.

Further Settings
Click this switch to obtain access to further histogram controls:
607069_paste.tiff ¬
832291_paste.tiff ¬*Figure: Additional panel for histograms.*

Stepping
This parameter allows you to specify the percentage of all the possible colors or grayscales you want to be used for the spread

image. 100% covers the complete spectrum. 0% creates just two values: a minimum and a maximum value.

Noise Threshold
Colors that occur only sporadically within an image may be regarded as noise. This slider determines how often a color value must exist (as a percentage of the most common color) to be considered for calculating the transfer curve for spreading the histogram.

Lower Threshold
This parameter determines the darkest color value in the image that should be used for calculating the transfer curve. Colors darker than the one specified here won't be considered in formulating the new image. The higher the value, the more the color spectrum is narrowed from the dark end of the scale.

On the left side of this slider control is a color well for directly selecting a threshold color via the color selection panel, the densitometer, or other tools.

Upper Threshold
This parameter works the same way for light color values as the lower threshold parameter does for dark colors.

Histogram Display
In the lower part of the histogram panel, the color distribution curves and the transfer curve can be displayed. The display of the following curves can be selected by checking the corresponding

buttons:

Original
The current (read) color distribution for the selected part of the image is drawn. The greater the y-value in the curve, the more frequent is the color at the corresponding x-position.

New
The <*New*> curve shows the histogram that would result from applying the calculated transition curve to the image, i.e., the spread histogram.

Thresholds
Selecting this option causes three lines to appear that correspond to the threshold parameters described above:
- a vertical line for the lower threshold; all values to the left of this line are ignored
- a vertical line for the upper threshold; all values to the right of this line are ignored
- a horizontal line for the noise threshold; all values below this line are ignored

Transfer Curve
This curve illustrates the mapping of the original values of the histogram (x-axis) to the new values (y-axis). Unlike the former curves, here the y-axis uses the same dimension as the x-axis.

For each curve, you can adjust any color you want by means of the corresponding color well icons on the left. This makes it easier

to differentiate between the particular curves when displaying all of them at the same time.