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Weekly chats are held every Tuesday night at 7:30 p.m. PST in the Mac Graphics (GO MGR) Forum on American On-Line.

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Basics

The Style Setup is the first of the U-I filters. This filter, or plug-in allows the user to change the default parameters of how they will interface with the other user-interface (U-I) dialog boxes. It acts as a "Central Preferences" spot for all U-I filters.

All available HUB files containing the U-I elements (shared by all filters, therefore "HUB") are scanned automatically and presented in a series of selections. The selections include a 24-bit style with turquoise green/orange and a plain restrained "text objects in gray shades" only. "Pre-lighting" is a feature where the buttons and balls can "sleep" and then "awaken" only when the cursor comes close to them. The User Interface design is years ahead of any Windows interface design. If you are not comfortable with it, you may turn it off in KPT Style Setup.

Related Topics:

[Working with KPT User Interface](#)

[Temporary Re-size Option](#)

[Movable Interface](#)

[Keyboard Equivalents](#)

Working with KPT User Interface

The KPT User-Interface is a Windows Dialog Box where the U-I Filter requests user information before carrying out its function. There are several KPT U-I filters which use the KPT U-I. These filters are the Gradient Designer, Gradients on Paths, Julia Set Explorers, Mandelbrot Set Explorer, and the Texture Explorer. These U-I Filters have some common elements. Those elements are the Temporary Re-size Option, the Moveable Interface and keyboard controls or Keyboard Equivalents.

Temporary Re-size Option

Clicking on the KAI circular logo changes the big interface to a small circle with the preview from the U-I visible as a small icon. If you need to make the interface smaller to refer to the original image, you can toggle the interface back and forth. between full size and icon size by clicking on the KAI logo. When the U-I is in the icon size, you can still move it around in the same way by clicking on the left mouse button dragging it around your screen.

Movable Interface

The filter U-I dialog box moves around your monitor's window by clicking and holding on the **right mouse button** while dragging. When you move the interface around on your screen, the image behind the dialog box will redraw itself.

Keyboard Equivalents

All KPT interfaces have keyboard equivalents for the buttons. They are:

OK	return, enter
NO	Esc
Help (?)	? (shift-/)

Basics

Welcome to the Gradient Designer. The Gradient Designer is the cornerstone of Kai's Power Tools. It allows you to design complex, multi-color 24 bit gradients, save them (as presets), and/or apply them to your image. A couple of hints:

- When you find a gradient you like, **SAVE** it.
- Don't forget that "None" is a color. Different levels of "None" or varying opacity and translucency will allow for some great special effects.
- All of your Gradient Designer presets will be available to you in other KPT User-Interface Filters such as Gradients on Paths and the Fractal Explorer.



Filter Preferences

Preferences for loading gradients

Clicking on the Title Bar (large top button that says "KPT Gradient Designer") brings up a dialog box asking you for Gradient Designer viewing preferences.

There are three choices which determine the gradient display when the filter launches. They are:

- Load normal gradient from image
- Load smooth gradient from image
- Return to previous state

The first two load a gradient based on your image or selection area. It loads color from a horizontal strip across the middle of the selection. "Load normal gradient from image" will load the color selection un-interpolated or anti-aliased. The second, "Load smooth gradient from image" includes the same colors as the normal gradient, interpolated to a smooth blend.

The third, "Return to previous state," remembers the last gradient you applied and will display that gradient the next time the filter launches. If you choose "Return to previous state" and forget to save your selection as a preset, it will be waiting for you the next time you open Gradient Designer.

Using Gradient Designer

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The Movable Bracket

The Movable Bracket defines the area within which the blending occurs. It is located just above the Gradient Bar. The Moveable Bracket default setting spans the entire width of the blend area. You can change the size of the Moveable Bracket:

Click and drag the bracket ends to resize.

Click and drag the top center to move entire bracket.

Double-click the center of the bracket to reset to full width.

If the Movable Bracket spans the middle third of the Gradient Bar, the blend affects only that area. It will not change the colors outside the bracket. If you choose an area outside of the bracket ends and choose a color, the color will be smoothly interpolated **only through the area underneath** the bracket. Colors outside of the bracket will not be changed. Adding a new color at the left edge creates a smooth blend from the new color toward the right, but a hard blend to the color immediately to the left of that bracket edge.

Using the Movable Bracket will enable you to make many short little blends and create composite long multi-colored complicated ones, as you will find in the presets.

The Gradient Bar

The Gradient Bar is directly underneath the moveable bracket. It displays the gradient colors you have chosen and the blend (or interpolation) for those colors. When you click on the Gradient Bar, the Color Spectrum Bar will appear. This is where you choose the colors for your gradient.

Color Picker

When you click on the Gradient Bar (left mouse button), you will instantly access the Color Picker. The Eyedropper represents the Color Picker and samples any color displayed on the Color Spectrum Bar or on the screen. When you release the mouse the color interpolates smoothly to the range of the blend area as defined by the moveable bracket. There are over 500 shades of color. The gradient applies and scales to any size and resolution. This is not 500 pixel "resolution," rather, there over 500 possible separate colors in the gradient.

With this click-drag-release motion, it takes about a half-second to select a 24-bit color. Above the color spectrum and below the numerical readout bar is a grayscale ramp for instant selection. At the left of the numerical readout bar is a circle giving access to the color palette. A choice made here will be reflected as if it were choice from the Color Spectrum Bar.

To cancel a selection hit the <ESC> escape key.

Additional Color Spectra

The Color Spectrum Bar has over 400 hues in the RGB/HSL color spectrum in the center at full saturation. Moving up the spectrum bar, each full shade modulates toward white; moving down, each hue modulates toward black. Approximately 40 shades of varying intensity are available.

Also included are 7 additional spectra. These include spectra like full modulation (RGB range), Metallic Dark Glow, Light Pastels, and a spectrum optimized for CMYK reproduction

Transparency

At the left side of the Color Spectrum Bar is the choice "None." You may choose "None" as a color for complete transparency. If you release the mouse in that area, you will assign complete transparency as if it were a color. The image underneath will "show through" at that spot. The underlying image is represented by a black and white checkerboard pattern, giving a quick and accurate survey of which parts of the gradient will be opaque and which will be translucent. When applying the filter by clicking the "OK" button, there is, of course, no checkerboard pattern in the application area. The image underneath the area of the gradient represented by the checkerboard will be visible through the gradient to the degree of opacity chosen.

Opacity Selection Bar

The Opacity Selection Bar is under the Color Spectrum Bar. It's a checkered bar that fades from black. Selecting from the right side, where it is light it blends more transparency. A selection from the dark to black section on the left will blend in slight transparency. The Opacity Selection Bar operates independently over an area. It differs from "none" (to the left of the color spectrum), which treats transparency as if it were a color. See the Figures 2 and 3 for a comparison of the difference.

Numerical Readout

When you click on the Gradient Bar to choose a color, you will notice a Numerical Readout directly beneath. The numerical readout represents Red, Green, Blue and Opacity values from the sample color picker location. As you drag the cursor across the screen notice the values change constantly. The numerical scale runs from 0-255. The 255 represents full saturation of any or all of the red, green or blue color values while the value 0 represents full transparency.

Apply Modes

Gradients apply in a Linear Direction, Circular Sunburst, Radial Sweep and Square Burst.

There are several options that change the application of the current gradient to a selection or image. The three boxes beneath the Title Bar in the top center will show at a glance what the settings are at any one time.

The left two are pop-up menus. Click and hold to see all available alternatives, drag to your choice and select. The Direction Control, on the right, adjusts and previews in real time.

The Preview/Mode Control (left most box) shows the current style by rendering a sample gradient in the box. It is also a pop-up menu with a set of four choices:

Linear Directional

Circular Sunburst

Radial Sweep

Square Burst

Linear and Sunburst (called "radial" in Photoshop) options have always been part of the Photoshop blend tool dialog. Exclusive new styles of the Gradient Designer include the Radial Sweep style, which is like a clock hand or a radar screen sweep drawing 360 degrees. The Rectangular inset blend can be used with transparency to create uniform framing effects.

Loop Control

The Loop Control, the center box, displays the repeat mode or loop. There are four options here:

Starting the gradient at the left-most color and executing the gradient style to the right- most color once.

Starting the gradient at the right-most color and executing the gradient style to the left- most color once.

Starting from the left-most color to the right-most color and back.

Starting from the right-most color to the left-most color and back.

The Mode Control causes different gradient effects. For instance, the Sunburst ("radial") blend can create ball (with sawtooth) or doughnut (with triangular) shapes. The Radial Sweep style creates symmetrical color blends and "dimple" like center shapes. (Try twirling such a shape.)

Direction Control

The Direction Control, the right box, controls directional styles. Click inside and a vector will snap to that angle. It will apply to the linear and radial sweep styles. Holding the shift key while selecting direction constrains the angle to 45° increments.

About Presets

The Gradient Designer comes with over 150 presets that you can use directly or gain ideas from for custom color blends. Presets are saved in hierarchical families. To cycle through the presets in a category, you can use the arrow keys.

To navigate to:	Press this key:
Next preset	up arrow
Previous preset	down arrow
Next category	right arrow (also page down)
Previous category	left arrow (also page up)
First preset/category	home
Last preset/category	end

Presets can be added and deleted very easily. Click on the ADD button to add the current blend as a preset. Click on the DEL button and the current preset will be deleted. If you are adding a preset a dialog box will ask you to name your new preset.

When you add a preset, you can make your own categories as well, such as saving all your own concoctions in "My Favorite Blends" or "Interesting Mistakes." When you add a category, you will go through a two-step naming process. First, you name the category, and second you name the preset. The top of the dialog box will direct you depending on whether you are naming a category or naming your new preset.

Presets are saved in their own central file called PRESET.KPT. PRESET.KPT is accessed by all other KPT filters using gradients. Whenever you make a new preset you are changing that file. Be sure to back up the PRESET.KPT file as you would any other file or document you create.

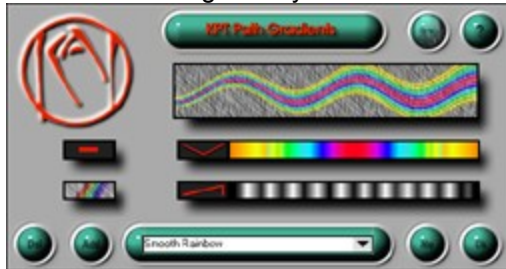
RGB and CMYK Output

The Gradient Designer will output to CMYK as well as RGB. There are two ways to produce CMYK legal colors. First, design in RGB and change to CMYK before you save the file. KPT does not warn you if your colors are not CMYK legal as you choose them. To ensure consistent CMYK legal values, start your new document as an RGB and choose the "CMYK Modulated" from the "Spectra" menu on the color bar in Gradient Designer. If you work solely in CMYK, it's probably best to code name your presets "CMYK" so you know which ones they are, even though you are still working in RGB. Working from the CMYK Legal Gamut means that you will not experience any change in color from KPT generated artwork when you convert from RGB to CMYK mode.

Basics

Gradients on Paths can "wrap" any blend extremely smoothly around a free-form user path. This creates unique effects like glows, halos, rainbows, metallic tubes, lasers, fogs and complex type outlines. All the gradients used by Gradients on Paths are presets from the Gradient Designer. Gradients on Path uses two blends, one for color and one as an alpha channel to fade in and out and blend with the original image in any Photoshop and Painter document. A quick reminder on some KPT basics:

- If you find a combination you like, save it.
- Don't forget to try this in an exclusive alpha channel.



Using Gradients on Paths

In all plug-in compatible programs, to use Gradients on Paths you must make some type of selection, or path. In Photoshop, for instance, you could make a selection through the lasso/marquee tool or make a path/selection. Then feather the selection. In Painter create and feather a frisket. Follow selection/feathering instructions for other applications using plug-in architecture..

Related Topics:

[Previews and Controls](#)

[Apply Modes](#)

Previews and Controls

Path Preview

Paths Preview Window is located in the center/right portion of the U-I. The Preview Window displays the combined effect of the current gradient and alpha channel.

The Framing Gradient Preview

This displays in color, any preset from the Gradient Designer. Depress the mouse in Gradient Preview and it displays a menu of Gradient Designer presets.

Alpha Channel Gradient Preview

This displays the current alpha channel setting. It, too, is a pop-up menu that accesses all the presets from the Gradient Designer and displays them in grayscale. It has three other settings in addition to those presets. They are "Full Opacity," "50% Opacity," "Default to Color Gradient." and choices from the Gradient Designer.

Blur Control

The box to the left of the Framing Gradient controls blurring of both the color gradient and the Alpha Channel Gradient. The choices range from "None" to "Heavy."

Apply Modes

The Apply Mode Control box allows you to control the effect that the alpha channel has on the rendered path effect. There are three settings:

Normal Transparency

Random Noise

Procedural Blend

Normal Transparency

Airbrushes your effect onto any path to a degree modulated by the alpha channel. A white, "100% Opacity" alpha channel will completely wipe out whatever is below the path; darker shades of gray will let more and more of the underlying image show through.

Random Noise

Replaces transparency with hue-protected noise. "100% Opacity" as an alpha channel yields no noise effect; darker gray areas of the alpha channel yield higher amounts of noise.

Procedural Blend

Wraps the feathered path around the contours of the image below based upon light/dark differential calculations.

Basics

Textures have become a staple component in graphic arts creation. As technology has progressed, it has become standard practice to embellish components with more than trivial color. The term "Texture" encompasses anything that "fills a shape with something more than a simple flat color." Readily available textures such as scanned marble, wood and stone have become common fare as backgrounds. The Texture Explorer puts a new twist on this background texture movement.

Here are some basic ideas worth remembering and exploring:

- The Texture Explorer arrives with over 200 presets. Roam through them and choose a preset name that looks interesting. It will render a main image with twelve derivatives along the outside.
- Click on a mutation ball. The derivative cousins change. If one of the twelve intrigues you, click on it and it becomes your new chosen current texture, now drawn in full-size in the center. The mutation process now starts again. You get both the original texture and twelve derivative cousins. This cycle may be repeated indefinitely creating an infinite number of textures.
- If you are interested in a particular texture, save it. The process is the same as saving a gradient. After you have saved the preset, move down the Mutation Tree and look at smaller and smaller variations of the main theme. Clicking lower on the mutation tree reduces the amount of mutation. Clicking higher increases it.
- At anytime that you're exploring textures you may save the center selection. The process of saving the texture only takes up a few hundred bytes on your hard drive. You may save as many as you like for future use. Saving presets is encouraged. You may never see a particular pattern again.



Using Texture Explorer

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Algorithmically Generated Textures

The Texture Explorer generates completely algorithmic mathematical output. There are no scans or pict files involved. It can render any texture it creates into the current window, selection, or feathered selection. All of the tools in your application are capable of processing the textures.

Color Mutation Ball

The Color Only Mutation Ball has a special decoupled mutation function. It will keep all parameters of the texture frozen and simply change the colors. The twelve cousins around the outside are not variations of the center texture, but only variations of the center's color. The Texture Explorer uses Gradient Designer presets for all the color combinations used by the Color Mutation Ball.

If the texture looks interesting, but the color isn't quite right, use the color mutation ball.

Preview & Variations

In the center of the preview box is the current texture, shown at 96 x 96 pixels. Around the preview, you will notice twelve small previews produced on the fly that are derivatives of the main texture. These twelve outer previews change depending on which "mutation ball" is selected.

Clicking on any of the outer preview squares moves that particular texture into the middle, and the mutation process begins again.

The Mutation Tree

The only control necessary for the process of exploring textures is the series of control points, represented by little balls ascending a tree. The lowest ball, partially in the ground, represents very little change. Rising higher on the tree approaches an abstract "mutation rate" of 100 percent. If we vary one percent of the genes in 100 parameters, that means in every generation, one number will have changed randomly, or "mutated."

The highest point creates vast change, or 100 percent mutation. Every time the Texture Explorer creates a derivative "cousin" of the current texture, it will vary every parameter by some random amount. The result: in one cycle there are get 12 new textures that bear very little resemblance to the current one in the center.

What this is really happening (outside the mutation metaphor) is to show you random examples of textures, spread throughout the gigantic universe of possibilities. You get to see in random areas of the potential space what certain combinations can look like.

If you click on the Main Texture Preview itself you'll see another reason for the vastness. Without changing a single gene or color all you are re-seeding the starting values of all our stochastics (read "random generators"). It's like buying a huge roll of textured wallpaper. Visible is a square inch. With every click in the center, there is a different "square inch" from the same roll. This can be accomplished 16 million times without repeating.

The Options Menu

The Texture Explorer contains a pop-up menu when the Options feature (on the user-interface) is selected. Five selections are possible. Two deal with tiling the pattern, and three deal with applying the selections.

Tiling Options

There are two options here. Either repeating 96 x 96 pixel seamless tiles or as an "Infinite Autostretch," scaling the texture to any size and resolution. CapsLock, when depressed, will force the texture to Autostretch into the current selection. The Infinite Autostretch, too, can be tiled seamlessly (in a square or rectangular selection).

Apply Modes

The Texture Explorer has several methods of application of the texture to the existing image. These apply modes are:

Normal apply

Procedural blend

Reverse Blend

Darken only

Lighten only

Normal Blend/Apply

This acts similarly to the paint bucket in Photoshop, except that it fills an area with texture.

Procedural Blend/Apply

The Procedural Blend mode blends the texture over a selected area based on light/dark value. Where the selection is light, the texture is lightened accordingly. Where the selection is darker, the texture is darkened. This creates the effect of "wrapping the texture around" the existing image or selection. To see this in action you need something with shadows.

If you apply a texture to a complete white or black window with Procedural Blend, nothing will happen.

Reverse Blend

This is similar to procedurally blending. Instead of applying the texture to the image, the image is applied to the texture.

Lighten Only and Darken Only

These functions are the same as in Photoshop. Lighten only will only affect values in the image that are darker than the values in the texture. Darken only will darken those values in the image that are lighter than the texture.

Keyboard Shortcuts

To cycle through the presets in a category, you can use the arrow keys.

To navigate to:	Press this key:
Next preset	up arrow
Previous preset	down arrow
Next category	right arrow (also page down)
Previous category	left arrow (also page up)
First preset/category	home
Last preset/category	end

Texture Explorer Tips

You can overlay multiple layers with GREAT results. Try choosing complementary color schemes and complexity. Or slightly mutate a texture and then use a darken-only second layer, adding depth shadows and get bump map-like effects.

Large feathered selections work well. Consider using a selection with one texture then the Select > Inverse area with another.

Try a Texture in individual channels, like RGB or just the hue channel, for instance. (Or do it to a floating selection <CTRL>-C then <CTRL>-V your selection.) Then use paste controls for even more apply options.

Basics

The Mandelbrot Set and Julia Set Explorers are four filters that create and explore Julia and Mandelbrot Set fractals. If you have not played with fractals, this will be an enjoyable experience. Those familiar with fractals will welcome the easy interface and its placement inside your favorite plug-in compatible program. The output is immediately accessible for manipulation by other the tools of the application.

The fractal filters use the Gradient Designer blends including opacity and [alpha channel](#). The filter wraps 24-bit blends around the Julia and Mandelbrot Sets, with control over loop, repeat count, and spiral angle settings.

At every point of the famous Mandelbrot Set, there exists another four-dimensional complex space inside which lays an infinite domain of Julia Sets. These may resemble Mandelbrot fractals, but are often more complex and asymmetrical, varying from needle shapes to circular regions to dragon-like twists.

Many of the functions in the filter interface and controls for the Julia Sets and the Mandelbrot Set are identical to one another. Unless there is a specific Julia or Mandelbrot Set function, the explanations and functions are generic.

Julia Set Explorer

This plug-in explores the "classic" Julia Set. It takes advantage of additional algorithms that render gradients in the Set's interior and implement the radial (spiral) effect.

Julia Set Explorer II

Type II features a faster version of the Julia Set with two fewer variables, but a modified central formula that explores a different 4-D space. About one-dozen presets are included.

Julia Set Explorer III

Type III features an especially unusual new algorithm that yields astonishing self-similarity at all levels of magnification. One can find triplets of set features and zoom dozens of millions of times deeper and find an equally complex substructure.

Mandelbrot Set Explorer

This filter explores the "classic" Mandelbrot Set. This allows users to search for well-known features and published set locations, and/or compare to images they may have generated in other programs. A known Mandelbrot area can be explored and then rendered using the KPT 24-bit gradient technology including translucency. The effect will surprise even the most jaded "Mandelbroter".

Special Features of KPT's Fractal Explorers:

The Julia/Mandelbrot Explorers will not only provide access to all parameters necessary to locate any published Julia Set, but also extend the vocabulary and complexity of the images with revised algorithms and proprietary extensions.

Specifically:

- The color scheme is executed in full smooth 24-bit, rather than the 8-bit dwell band approach of many other programs.
- The colors are not only computed in a hue wheel rainbow, but are taken from the complex gradients created in the Gradient Designer, featuring up to 512 key colors which interpolate at

2,000 lines, with loop controls, continuous transparency, etc.

- A new algorithm allows the rare case of coloring the interior of the set in addition to the exterior and, better yet, is able to utilize separate color blends for each!
- In addition to the standard "equipotential" lines, the algorithm can also resolve the field lines which run perpendicular outward towards infinity.
- There are separate variables for the number of the field gradients and a powerful twist parameter that can vary from concentric circular modes all the way to tightly wrapped spiraling around the sets.
- With these new methods, a variety of never-seen-before pictures are at your disposal. The dozens of presets supplied are a mere preview of the dynamics inside this most complex space.



Using Julia/Mandelbrot Set Explorers

Basics

Gradients in the Julia Explorer

Fractal Parameters

Basics

Preferences Dialog

Clicking on the Title Bar of the Julia/Mandelbrot U-I engages the Preferences Dialog Box. There are three variable categories to choose from.

- The stepsize or "Zoom Ratio." Zoom a lot or zoom a little with each click.
- The Panning distance. Scroll in minute or gigantic distances with each click.
- Place Gradient Bar at top of image, or keep it out. You can have the gradients that created the fractal show at the top of your window. This is good for some special gradient designing effects. Use the Gradient Bar as a selection in Gradient Designer to develop more gradient presets.

Preview Window

The Preview Window shows what the final rendered image will be. The preview is generated by iteration so that a rough idea is visible in about a quarter of a second, with three steps of increasingly defined previews. Repeat clicks pre-empt the computation. This allows extremely fast exploration of the space. Color choices are instantly mapped into the set.

Data Picker

The Data Picker is similar to the Color Picker: a momentary pop-up with a slider control. The slider has a 400 step resolution factor and features a secondary full Vernier scale for each point, essentially creating a 160,000- step resolution slider.

Panning Control

The Panning Control allows 360° continuous panning of the Set through the Preview Window. Pan size increments can be set in the Preferences Dialog.

To the left of the Preview Window is the Panning Controller that provides continuous control in a 100x100 pixel area.

You can use the 8 arrows as shown to move about as you would expect: to see a little more what's above the current picture, click on the UP arrow and a new section will come into view.

Instead of clicking exactly on the 8 arrows, though, you can click anywhere on the Panning Control window to move in that direction. Clicking in the upper left corner will essentially scroll up and left in a large step. Clicking in dead-center will not move at all.

Selecting "Normal" in the Preferences, clicking inside the pan becomes the new center of the preview window.

Zoom Controls

Zoom In/Zoom Out Controls allow centered zooming; clicking on the Preview Window enables zooming directly. Zoom size increments are set in the Preferences Dialog.

There are three ways to zoom into the set, revealing more and more of the detail.

- Centered Zooming

Use the two controls to the right of the Preview Window. The upper one zooms IN; the lower one OUT, with the center of the window staying constant.

- Direct Zooming

Simply click on the spot you want to magnify inside the Preview Window. It will zoom in and make that the new center of the preview. Holding down the option key while clicking will zoom out from that point.

- Data Picker "View Radius Zooming"

The third method is the most precise. The "View Radius" variable is an exact expression of the zoom degree. Overall, the basic range is in the millions, allowing you very, very fine control. Setting the View Radius to "5" shows the set at full distance with all edges. You can start with a new set this way, zoom out to "5," then set the gradient frequencies, find the blend you want, then hunt for the Set's r (real) and i (imaginary) values and zoom in, or the other way round. If you become lost, set the View Radius to "5."

Gradient Pop-Up Menu

There are the two gradient pop-up menus in the center of the dialog box. The Fractal Explorers render the gradient blend samples here. The left gradient governs the exterior of the set (usually the dominant area and in most other programs the only area), the right gradient governs for the interior of the set.

The gradient selections are arranged hierarchically. The first categories are Blends (Basics, Frames, Special Effects, Translucent, Metallic, Julia Gradients, and personal categories you have created using the Gradient Designer), then the actual gradients in each family. This is the same menu that's used by the Gradient Designer. The triangle/sawtooth icon shows the loop control

Gradients in the Julia Explorer

If a particular Julia Set region intrigues you and has a pleasing zoom & pan, you can alter the set by playing with the gradients. This will provide a huge array of new ways to view that region.

The resulting render is also affected by the Equip and Radial values! See the upcoming section. Different portions of the gradient are stretched, twisted, twirled, spiraled and distorted differently with every new setting.

Check out the presets to get a better idea of the possibilities.

Notice that some gradients have dark regions that will render portions of the Julia Set to "vanish." Others have highlights, such as the metallic ones, which, in Triangle Loop Mode, can create thick 3-D shapes.

Many gradients include translucent portions, indicated by a checker board pattern. Wherever that pattern is visible to some degree, any image in your window is visible in the background. You can use the Julia Explorer to create interesting overlays and shadow effects.

Data Picker

Whenever you need to change numbers, click and hold on the numbers on the interface, and the Data Picker will pop up.

The action is similar to the Color Picker. Select a number you wish to change and a sliding scale appears. This slide allows you to change the values of the numbers within the Julia Set. Holding down the <Shift> key will freeze your selection until you release the <Shift> key.

At the far left there are fields displaying the legal range of the variable. (For instance, if percentage was a field, the minimum number would be 0 and the maximum 100.) It also shows you the last value set and, next to it, updates the current value in real time.

The Data Picker contains two scales/sliders. The large scale allows a 400 step resolution. A secondary scale (called a "Vernier" scale) allows for additional fine resolution. At any one point on the main scale, you can drag down to the smaller Vernier and have another 400 point of resolution! The two combined are just like a slider that spans 160,000 pixels.

With this Vernier scale you can set variables such as the imaginary Julia Seed Constant that spans from -2 to +2 with 5 digit precision in continuous increments:

The main slider steps numbers in one hundredths, i.e. -0.02 -0.03 -0.04.

The small Vernier scale steps numbers in millionths, i.e. -0.0201 -0.0202 -0.0203.

(In Julia Set exploration, these tiny differences can have major effects!)

When you drag the main scale pointer around, only the rough horizontal motion counts. At any point you can drag further down and then pick up the Vernier slider.

Fractal Parameters

There are 8 parameters in the basic Julia Explorer. Three of them can be set using both direct controls as well as the Data Picker. They are the zoom depth and the 2-D cross-section position. The five remaining parameters are set only with the Data Picker.

Julie Seed Constant

The Julia Set's "Seed Constant" is the first of many traditional methods to define the Julia Set. It is a complex number with a real and an imaginary component. For any point of the real there are a very large number of potential "imaginary" settings. It has nothing to do with "imagination," of course; "imaginary" is a mathematical term.

These values vary for every preset. The legal range is -2 to +2 with 4-8 digit precision after the decimal point. There are numerous books on the subject, many with exhaustive examples of r and i values.

Complex Plane Focus

The Complex Plane Focus deals with a complex number that defines the position of the 3-D space within the 4-D "potential," of which a 2-D cross-section is the picture we are rendering. The Complex Plane Focus can be changed by the 360° Panning Control or set directly by the Data Picker.

The View Radius is an expression of the size of the rendering window and adjustments made in the Data Picker in fine increments or by using the Zoom Controls.

Gradient Frequency

The Gradient Frequency comprises three variables that form the nucleus of the determinate draw engine.
Number of Iterations (Iterate)

The Number of Iterations, (abbreviated as "Iterate" in the filter) controls the repetitive or iterative process to find the color for each pixel. This is determined by the Julia Set formula expressing whether a given point belongs to the set or not and is colored according to its potential to fall toward so-called "attractors" inside the set.

The number of iterations has a dramatic effect on the ability to discern small changes, particularly inside the set's interior. The larger the number of iterations, the longer your computing time.

You might note certain speed differences between presets. The majority of examples will use closed sets and only one gradient. Here low settings of the Iteration number are used, often between 10 and 90, whereas other examples show very deep zoom levels and subtle details near the attractors. To resolve any dynamics at that "depth," iterations on the order of 500-999 are necessary.

Equipotential Gradient Frequency (Equip)

The Equipotential Gradient Frequency ("Equip") is a number that controls how fast the color cycles as one moves from one equipotential line to the next. (The lines are expressing the potential of any point in 4-D space to fall towards the attractors, roughly analogous to rings around a planet with equal attraction to their gravitational center. Within a ring, the gravitational pull is the same and there can be many such rings as you fall towards the center of the planet.)

Radial Frequency

This number interacts closely with the last one. The Radial Frequency ("Radial") defines how often the gradient repeats over the entire 360° unit circle around the set.

To see "traditional" Julia Sets, set the Radial to "0," creating seamless images. The legal values here are -50 to +50. This corresponds roughly (but not always) to the number of gradients repeated. A setting of 5 would cycle 5 gradients.

They will be affected in large degree by the "Equip" number which at "0" would render straight spikes outward. Values here range from -50 to +50 in fractional increments. Variations in the Equip setting will result in widely divergent effects. Some settings will render lines that go straight out, others will wrap a spiral around the set, and still others will create concentric circular blends.

Manipulating just these two Radial and Equip number values will give you a wide range of image variance.

Note that the Radial setting affects only the outside of the set, while the Equip value also affects interior detail.

Setting the Radial Frequency to anything other than "0" may allow pixellation or other artifacts at certain regions of unfilled sets. The variety and unusual nature of the images makes it well worth accepting the limitations of computability. If you find a region with artifacts, either look elsewhere or try to "close the set" by lowering the Imaginary component of the Constant. If all else fails, you can use Photoshop's or Painter's tools to spot clean the final image.

Basics

A researcher at Bell Labs discovered a method to create a special dithered noise where certain points will be seen by both eyes as if they converge on a plane. This filter creates this effect by processing any grayscale image into a single-bit black and white noise. The result has incredible stereo 3-D depth properties and can be seen without special glasses. You would swear there is a hole in your monitor when certain figures or letters seem to mysteriously appear 3 to 6 inches inside your monitor. Examples shown in Omni and Games magazines have garnered great response. It's a specialized interest. Some people cannot perceive the depth effect.

The images that produce the best results with the 3-D Stereo Noise filter use gray levels, are blurred slightly, and don't use extreme contrast. The filter generates a pixellated noise pattern that has horizontal frequencies that correspond to the gray levels of the initial image. This means that white maps to the highest frequency and appears closest to the viewer; black maps to the lowest frequency, appearing furthest away.

Using 3-D Stereo Noise

Create a grayscale image that uses text and simple objects. Although the filter will apply in all modes, the best images use gray levels initially. The smaller and more detailed the image you choose, the harder it will be to focus the stereo image. Apply a standard "Blur" filter. This will soften the edges of the image for easier viewing. Apply the 3-D Stereo Noise filter to the entire image. The results will appear to be a random array of black and white noise.

Related Topics:

[Viewing 3-D Stereo Noise pictures](#)

[Controlling Depth in Stereo Images](#)

Viewing 3-D Stereo Noise pictures

After you have created a stereo noise picture, it is time to focus your eyes and energies to see the image. Don't feel bad if you don't see it right away; it may take a few tries. There are several ways to view the image in-depth. Try placing two black dots about a half-inch apart at the bottom of the image. Defocus your eyes and gaze through the image as if you were looking in the distance. The dots you placed at the bottom will separate into four. If you focus so the middle two dots fuse, depth should pop in or out. Another way is to try crossing your eyes to fuse the four dots into three. You may also try holding a thin object like a floppy disk or your hand between your eyes to separate each eye's vision.

Controlling Depth in Stereo Images

When you see a 3-D object close-up, the object seems to be in a slightly different place depending on which eye looks at it. Hold your finger about five inches from your computer monitor and look at it with one eye, then the other. Observe how it seems to move left and right with respect to objects on the screen. This discrepancy gives your brain information on how far away the object is. Against the background of your screen, for instance, your finger that is five inches away is displaced about one inch depending on which eye views it.

The amount of depth is modulated by the keypad, using keys "1" through "9." The default setting is "5." Using the "1" key setting is very shallow, whereas "9" is so deep that it can be very difficult to see the effect up close.

RGB Files

This filter may be applied to individual channels as well as entire documents. For best results, create your image in grayscale mode and then convert to RGB mode. Apply the filter to each channel (Red, Green, Blue) in your document (be sure that you only write to the channel you are working on). When you are one, you should have a tri-colored noise image.

Basics/Using Smudge Darken/Lighten

These Smudge filters are two sets of symmetrical effects de coupled to be standalone. They are directional motion blurs that take the current selection and create a multi-level blurry blend using a transfer mode (either lighten or darken). They are unlike Photoshop's Motion Blur in that the latter extends in both directions and has no apply mode. They are also totally unlike other blur filters in that they are constrained to horizontal features, not cell-based, and utilize lighten and darken apply modes.

You can easily create subtle trailing motion and wind effects, as well as interesting alterations of textures.

The Darken version will slowly build up the dark content in the selection. After about 4-6 repeat applies the image converges on black. Repeated Darken works particularly well on a mostly light background with black speckled noise. Darken creates smooth trails which eventually result in needle-like structures.

Smudge Darken Right is a complement to the left version. Note that a Right after a Left Smudge will not recreate the original image. In the multi-layer process information is irretrievably lost. Consider it a donation to entropy.

The Smudge Lighten filters are similar except they use a lighten transfer mode. The combination of darken and lighten can be very effective.

Consider making macros of multiple applications and/or combinations of the four.

Basics

The KPT filters go further than any previous spherical filter that takes a selection and "bumps" it outward to the front. The Glass Lens filters actually use a special-case ray tracer, complete with a 10 position user-defined, shadow casting 3-D light source and ambient light.

The result will look like an anti-aliased 3-D rendered ball.

There are three versions:

- Glass Lens Bright

- Glass Lens Normal

- Glass Lens Soft

Bright has a low ambient setting, medium aliasing and high intensity spotlight, casting a "hot" spot.

Normal reduces the intensity of the light to about 60%, resulting in less harsh lighting and contrast. Smooth spheres with small highlights and soft, rich shadows can be easily created.

Soft has very soft settings of a low intensity sun (<15%) and higher ambient, creating less hot spot and softer shadows on the sphere.

Using Glass Lens

Glass Lens Options

Quick Tips

Glass Lens Options

When using rectangular or free-form selections, you have the option of rendering the Glass Lens on the selection or on a black background. By default, the sphere is rendered onto the selection. Pressing the "Caps Lock" key will render the selection onto the sphere and fill the remaining portion of the selection with black.

Positioning the hotspot

To vary the "sun" position on the sphere, there is a 10-position control via the numeric keypad.

Simply hold down the "7" key to have the light shine from the upper left and a shadow on the lower right and the "2" key to shine from bottom center. Using the "5" key while the Scroll Lock key is on will light the sphere from behind, a special trick that will allow you to create a halo effects. Using the Scroll Lock key and any of the numerical pad keys will give an eclipse effect.

Quick Tips

- Try using Glass Lens Soft over a gradient rainbow sweep with full intensity colors, creating small solid color spheres with very subtle hue modulation.
- You can use all the lenses in odd shaped feathered selections for non-spheroid effects.
- Try rendering glass lenses and then apply the Texture Explorer using the Procedural Blend Mode. This will simulate texture mapping which is very time consuming in 3-D rendering programs.
- Use the Glass Lens Bright on scanned Photographs for "fish-eye lens" effects.
- Create multiple "balls" by using the <Ctrl> C (copy) <Ctrl> V (paste) in a very short time. Or drag the selection while holding down the command-option keys and do repeat applies using <Ctrl>-f.

Basics/Using Pixel Storm/Wind/Breeze

Pixel Storm is a super diffusion process that takes each pixel on the screen and disperses it by a factor of 200 pixels over the current selection area. It also includes a darkening apply transfer mode. Repeated application in small areas can suck in neighboring colors and intensity and dissolve them in a veritable pixel storm, hence the name.

PixelStorm diffuses pixels based on a 200 pixel size and uses a darken apply mode, PixelWind uses approximately 80 pixels but features a different apply mode that diffuses and enhances the image. So, two to three times PixelWind is not identical to one PixelStorm.

Pixelbreeze is set at 30 pixels diffusion size. It features a lighten apply transfer mode, which will add light and fade the selection in repeated applies.

On feathered selections, different variations may be achieved by holding down the Caps Lock key. PixelBreeze will act similarly to PixelStorm with the Caps Lock key down. The amount of diffusion is controlled using the keyboard or keypad, as in PixelStorm and PixelWind.

Each of the PixelBreeze/Wind/Storm filters has a unique character in repeated application and will yield subtly different effects.

Pixel Storm/Wind/Breeze Apply Modes

On feathered selections, a different variation of PixelStorm and PixelBreeze can be achieved by holding down the Caps Lock key. By default, PixelStorm/Breeze will decrease the amount of the effect on a feathered selection but will retain the color of the moved pixels. When the Caps Lock is applied, the effect will fade out over the feathered area, actually blurring and blending the pixels for a subtle effect. The difference is most noticeable on color documents.

The amount of diffusion can be controlled by using keys "0" through "9" on the keyboard or keypad. "1" is assigned as the lowest amount of diffusion and "0" the greatest.

Basics

Grime Layer is a seemingly innocuous little thing, tiny and fast. It applies a special dark transparent noise over the current area, subtly different from any the normal noise would produce. It is handy as a quick way to add texture to an area and a starting point for scratch textures.

A simple example of an implied effect: use Grime Layer on a plain white background and repeat 4-5 times. The dark regions will obscure more and more space and choke the white area into a perfect "star field" background! It will even create the anti-aliased "less than one pixel" stars that are necessary for realistic screen images. (Single pixel dots do not look like stars!) Try that!

Using Grime Layer

Start with a new document and apply Grime Layer several times. Try using the Smudge filters repeatedly to create needle-like effects. Try inverting the document.

Grime Layer will create nice fogs when used in moderate amounts and blurred.

Related Topics:

[Keypad controls](#)

Keypad controls

The application of Grime Layer is controlled with the numbers on either the keyboard or keypad. Pressing the "1" key will lay a faint gray haze across your selection while the "0" key (here interpreted to equal "10") will create a mezzotint-like layer of black grime.

Basics

The Hue Protected Noise filters act similarly to Photoshop's Noise filter but preserve the hues so that a slight random dither texture is created rather than random noise of different colors. This is very effective when color must be preserved, such as original scans or skin tones. (The Photoshop Noise function applied to an RGB image will create tri-colored speckles. Using that on a face will add red green and blue dots to the skin tones and "ruin" the look in the process.) In combination with some of the other smudge, diffuse and scatter tools, this is a new small brush to paint with. These three filters work in CMYK, RGB, Lab, and Grayscale modes in Photoshop. Each of the Hue Protected Noise filters can be controlled using the number keys or the keypad to vary the effect about 20% more or less intense.

Using Hue Protected Noise

The Maximum setting will create a serious amount of noise. The default is set at about 80% noise and may be controlled with the number keys "1" to "0" to cover a range of about 60-100% noise. The apply curve is weighted to preserve bright whites and blacks. This subtle feature makes a big difference as all previous noise generators would affect both highlights and background in black with high contrast opposite colors.

The Medium setting, about 50%, will generate noise with the same characteristics as the Maximum, but the resulting noise will be visible yet not harsh. The variable range that can be obtained using the number keys is 30-70%.

The Minimum setting is at about 20% and is barely visible in most cases. That is exactly the purpose: an extremely fine control for ever-so-little texturizing. The variable range that can be obtained using the number keys is 1-40%. If you take standard blend you can create tiny micro perturbations with the minimum Noise and then use Levels or Sharpen or Find Edges to accentuate these little anomalies. In fact, it is such detail work that can bring natural looking images to computer generated art, taking away the all too smooth linearity and adding the chaotic fractal-like micro-change that Nature so favors. Use it in many different situations. Don't give up if you don't see instant gross effects; this is a detailer's tool.

Basics/Using Special Noises

Here we have a trio of plug-ins providing unusual noises. These actually subscribe to the gradients. They can serve as a nice starting point or intermediate stage to build up backgrounds and textures.

Large feathered selections of Special Noise, when copied and pasted, then altered using paste controls can yield very new and subtle images. Also try processing the noises with the Smudge and Edges filters.

Each filter uses a different gradient with an alpha channel. The Blue Noise uses the gradient "True Blue Frame Round," the Green Noise uses the gradient "Floating Doughnut," and the Red Noise uses "Red Plastic Overlay Frame." The method of deriving the Noise from the Gradient presets implies that each one has unique alpha channel opacity behavior. This is not simply one noise filter with three hue settings.

Basics

Sharpen Intensity applied to an image will yield stronger contrast and brighter colors. This is a good tool for brightening up an image. Use it as a first step. For correction of scanned images it will "punch up" the colors. In the best situations, the resulting image will look so much more vivid, that an undo to the previous version will seem as if it had a drab hazy gauze layer over it.

Repeated applies of Sharpen Intensity will posterize an image. With extreme repetition you may converge on black and over saturate your image, but used in controlled dosage the filter is extremely effective.

Using Sharpen Intensity

Modulating Sharpen Intensity

The degree of Sharpen Intensity's effect is controlled with the keyboard/keypad. Pressing the "1" key will faintly increase the intensity while the "0" key (here interpreted to equal "10") will intensify your image to the point of saturation.

Basics/Using Diffuse More

This is a basic example of an extension of an already useful standard Photoshop tool. Photoshop's Diffuse shuffles the pixels in a small cell area of less than 25 pixels. Diffuse More simply gives you a bigger brush, set to about 4 times the cell size.

This is not simply saving you three repeats of the normal Diffuse filter. No matter how many times a Diffuse filter is applied, the pixels affected will always be within a 25 x 25 pixel cell size. Diffuse More operates on a much larger set of pixels at once, so the diffusion effect will take place on a broader basis.

Number key and keypad controls ranging from "1"(least amount) to "0"(representing 10, the most amount) will vary the intensity of the Diffuse More effect.

Basics/Using Find Edges Invert/Charcoal/Soft

Find Edges and Invert is a very simple filter combining Find Edges and Invert in a single one-step filter, undo-able on the fly.

Number key and keypad controls ("1"-0", here the zero is interpreted to equal "10") will vary the intensity of the Find Edges effect from light to very intense.

*In Adobe Photoshop 2.5 version, Adobe's Find Edges was changed to include an invert, so in that version, Find Edges and Invert will appear to be identical to Find Edges while the Find Edges Soft will appear to be inverted.

Find Edges Charcoal, with alternate settings in the algorithm, will also invert the image. On a full color RGB scan often the results are faint grayish lines on white wherever the edges pass a certain threshold. While this can look strikingly like gray charcoal on white paper and earn its name, do not forget that these are algorithmic operations processing your existing image and the result will vary tremendously with different source material. It would be futile to name the filter across that broad spectrum and you should merely regard the name as a mnemonic reminder of the type. You should acquire more knowledge of its real range and capabilities by applying it to a variety of images, feather settings, and other effects and tools used in your drawing program.

Number key and keypad controls ("1"-0") will vary the intensity of the Find Edges effect from very light to intense.

Find Edges Soft is a softer algorithm than the original Photoshop Find Edges, creating an effect that is less harsh and intense. This one will, for instance, not create full rectangles around single bright pixels, but rather smooth edge outlines. Using the number keys "1" to "0" will modulate the amount of Find Edges from very soft to very intense.

Basics/Using Scatter Horizontal

Scatter Horizontal is an unusual special case filter: this one diffuses only on the horizontal axis, and it includes a lighten apply mode. This filter really comes into its own with several repeated applies, stretching a selection and swallowing certain features while bringing out others. A unique streaking trailing effect can result. It's an odd shaped brush in your palette, but it does have its moments.

Here's a suggestion to expand its use: you can rotate the window or selection 90 degrees to get a vertical version (multiple crossed repeats of both can do neat cloth-like stuff) or invert the image to have a "darken" effect. Many interesting combinations with the other filters are yet to be tried.

The degree of effect obtained with Scatter Horizontal KPT can be controlled by holding down one of the number/keypad keys. "1" will render a faint effect, while "0" (here it equals 10) renders an extreme effect.

Basics/Using Page Curl

Page Curl simulates the effect of a page being peeled back, with a highlight running along the center of the curl and a shadow being thrown from beneath the image. (if your image is light enough to see the shadow.

The curl begins in one corner of your selection and follows a perfect diagonal line to the opposite corner of the selection. You may also notice a slight transparency to the curl if there is any pattern or texture in the selected portion of your image.

The origination point of the curl is controlled by using the numeric keypad. The placement of the numbers on the keypad is analogous to the corner that will be affected. The vertical or horizontal orientation of the curl is controlled by the caps lock key.

To curl this corner:	Press this key
Upper left	7
Upper right	9
Lower left	1
Lower right	3
Curl Orientation	Caps Lock key is:
Vertical	up (off)
Horizontal	down (on)

Glossary of Terms

[ADD Button](#)
[Alpha Channel](#)
[Apply Modes](#)
[CMYK](#)
[Color Mutation Ball](#)
[Color Picker](#)
[Color Spectra](#)
[Color Spectrum Bar](#)
[Complex Number](#)
[Complex Plane Focus](#)
[DEL Button](#)
[Derivative Cousins](#)
[Direction Control](#)
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[Gradient Bar](#)
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[Opacity Selection Bar](#)
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[Radial Frequency](#)
[Reverse Blend](#)
[RGB](#)
[Stochastics](#)
[Title Bar](#)
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[Vernier Scale](#)

ADD Button

Used to save your presets.

Alpha Channel

Analogous to a plate in the printing process, channels represent information about the color elements in a image. In addition, channels can be added to an image for storing and editing masks. Some image types have only one channel, while other types have several channels.

Apply Modes

Variations defining how the texture or gradient will be blended or applied to the selection.

CMYK

A color definition usually associated with print media. CMYK stands for Cyan, Magenta, Yellow and Black. (Why "K" stands for black instead of "B" is still a mystery.) It forms the basis for subtractive color.

Color Mutation Ball

A feature in Texture Explorer which mutates the color of the selected texture without mutating the pattern.

Color Picker

Picks the colors for display in the Gradient Bar.

Color Spectra

Displayed by the Color Spectrum Bar. Additional color spectra are available for choice from the right side of the numerical readout bar by clicking on "Spectra."

Color Spectrum Bar

Displays the color selections you may choose.

Complex Number

Any number of the form $a + bi$, where a and b are real numbers and i is an imaginary number whose square equals -1 . ($i^2 = -1$)

Complex Plane Focus

Plane: A surface containing all the straight lines that connect any two points on it.

Complex Plane: A plane whose points have complex numbers as their coordinates.

DEL Button

Used to delete presets.

Derivative Cousins

The twelve windows that surround the main Texture Explorer mutation window.

Direction Control

Controls the direction of the gradient during application.

Equipotential

Having equal potential at all points. As in, gravity effects us all equally.

Gradient Bar

Directly underneath the moveable bracket. The Gradient Bar displays the color and mixture of the colors you have chosen.

Gradient Designer Apply Modes

Gradients can be applied four ways:

- Linear Directional
- Circular Sunburst
- Radial Sweep
- Square Burst

HSL

A color space like RGB, using Hue, Saturation and Luminosity.

Interpolation

To estimate a value of (a function or series) between two known values.

Iterate

Number of iterations or repetitions of a given variable.

Iteration

A computational procedure in which the desired result is approached through a repeated cycle of operations, each of which more closely approximates the desired result.

Loop Control

Control how many times and in which direction the gradient "loops" or repeats itself.

Movable Bracket

Bracket which defines the gradient selection area.

Mutation Ball

Changes color settings in Texture Explorer.

Mutation Tree

Controls in Texture Explorer that control the amount of mutation in the 12 surrounding views.

Opacity Selection Bar

Allows you to choose the saturation level of a color or gradient, or portion of a gradient. It MAY be applied in addition to/or with a color.

Preferences

Chosen by clicking on the top button which says " Gradient Designer."

Procedural Blend

An "Apply Mode" based upon light/dark values and differences.

Radial Frequency

Radiating from or converging to a common center, like spokes on a wheel.

Reverse Blend

Applies image selection to the filter selection, the opposite of Procedural Blend.

RGB

A color spectrum, Red, Green and Blue, which forms the basis for additive color.

Stochastics

Involving or containing a random variable or variables, such as stochastic calculus.

Title Bar

Displays the name of the U-I filter you are working with. In Gradient Designer, clicking here will allow you to set your Gradient Designer Viewing [Preferences](#).



Transparency

The degree of color saturation or lack of color saturation. Kai's Power Tools treats fully transparent or "None" as a color.

Vernier Scale

A small, movable auxiliary graduated scale attached parallel to a main graduated scale, calibrated to indicate fractional parts of the subdivisions of the larger scale, and used on certain precision instruments to increase accuracy in measurement.

