Mastering
ChromaZone

Welcome to **Mastering ChromaZone**. Once you have ChromaZone up and running, this on-line guide will show you how it all works. You can explore ChromaZone step by step, or you can jump around anytime and anywhere you choose. Everything you'll need to get the most out of ChromaZone is right here. I know you'll have a great time becoming a ChromaMaster!

DON'T FORGET: Extensive POP-UP help is built right into ChromaZone, available for all controls and display regions just by clicking with the right mouse button. This on-line guide is intended to supplement -- not replace -- ChromaZone's built-in help.

The Table of Contents below lists everything contained in this on-line document. You may click on any item to jump there immediately. Click on the **"Start Your Engines"** item to begin your exploration of ChromaZone.

Steve

For best viewing, set the window's width so this arrow almost touches the right edge.

NOTE: Some of the colors in this on-line guide will be adversely affected when ChromaZone is running alongside. This is an unavoidable side-effect of the use of such colorful images in a help file while ChromaZone is active and on screen.

Other Places of Interest you can visit now or later . . .

I'm presuming that you've installed the product, and have it running now. Although you don't need to follow along step-by-step, **Create Your First Button** section is designed to take you through the process of creating your own button, and the process of doing this exposes you to all aspects of ChromaZone. In any event, you're going to want to have ChromaZone handy as you explore.

The first part of having ChromaZone at your beck and call is having it running. If it's **not running** now, and if this CHROMA.HLP file is located in the same directory as CHROMA.EXE, then the help engine will know how to start ChromaZone at any time if you either click on the "Chroma" button just below the title bar above, or if you just click on the "Get ChromaZone" sign right here. Either way . . . this will get ChromaZone running. Then . . .

The **secret** to having ChromaZone instantly available, but **never** in the way, is the Control Panel **Mouse Corner**. The control panel's mouse corner allows you to have ChromaZone running but out of sight (either completely hidden, or as an icon, or obscured behind other windows), yet still pull it back to the top for experimentation at any time. As shown here, the lower-left corner is the one initially selected when ChromaZone is installed, but you can choose any corner you wish by clicking the appropriate corner on the mouse corner control. So as long as one of the four corners is depressed (and not the center "deactivate" button), moving the mouse to that corner will display the control panel.

In order to see what's happening as you adjust the various controls, you will probably want to have the slide-out preview screen open.

To open the slide-out Preview Window, drag the window open by clicking the mouse somewhere near the "Pull Here" label and while holding the mouse button down, move it up.

One Important Comment:

To make this guide useful to new users, but not annoying to Masters of the ChromaZone, I've **deliberately buried** the definitions for most new ChromaZone terms inside these **GREEN** pop-up window triggers. This keeps the mainline of the text flowing smoothly while creating convenient stopping points for people who are gathering these new terms for the first time.

NEW USERS: Important concepts are located in
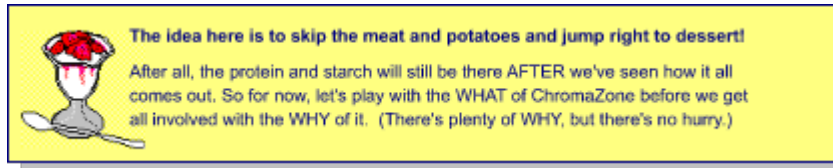*(most)* **of these "greenies", please browse them!**

Okay. So you've setup a mouse corner to give you access to the ChromaZone control panel any time you wish, you've slid-out the slide-out preview window, and you're ready to party ...

NEXT

So now . . . let's
make a button!:
(Click on the "Next" button to proceed)

Create Your First Button

The idea here is to skip the meat and potatoes and jump right to dessert!

After all, the protein and starch will still be there AFTER we've seen how it all comes out. So for now, let's play with the WHAT of ChromaZone before we get all involved with the WHY of it. (There's plenty of WHY, but there's no hurry.)
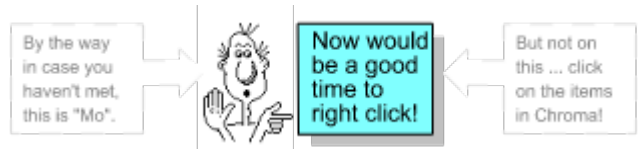

To create a **New Button** on the **Button Grid** press the **New** button located below the deck of control cards. This creates and inserts a brand new "starter" button at the location of the previously selected button and moves all the other buttons down. This new button's initial settings are designed to get you going quickly. (If you're new to ChromaZone, did you click on both of those **greenies** above?   There's some great information there!)

Press the New button to create a single new, blank config button that you can use for experimentation.
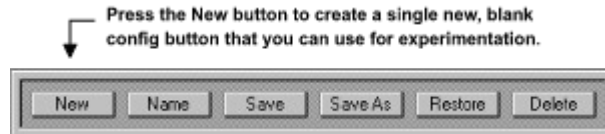
So go ahead, if you haven't already done so, press **New**.

> **Note**: If a dialog box with Mo comes up at this point, it's because you had previously changed some of the settings on the previous button. That's okay, just select the **Restore** option to restore that previous button to its original settings.

Now switch to the Colors card by clicking on the **Colors** tab:

By the way in case you haven't met, this is "Mo".   Now would be a good time to right click!   But not on this ... click on the items in Chroma!

Before we go any further, I'd like to help you develop a good ChromaHabit: **right clicking**. Right now, use the right mouse button to explore this entire Colors card.   Don't worry, you can't actuate any controls using just the right mouse button.   Just take as long as you like to browse across the card, right-click-and-hold on everything you see. There's no place you can't click and receive some help, so click away!   Take your time . . . .

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Okay. Since all new buttons start out in the **Background** setting mode (which is probably what you'll

want after you've become a Master), you should now press the **Objects** button located on the left side of the Colors card. This tells ChromaZone that we're going to be working with Foreground Objects for the moment.

<h3 style="text-align:center;color:red;">Okay! Now the fun begins!</h3>

With the slide-out preview window open (so you can see what's going on), click on the first button-name at the top of the list of **Coloration** Presets.
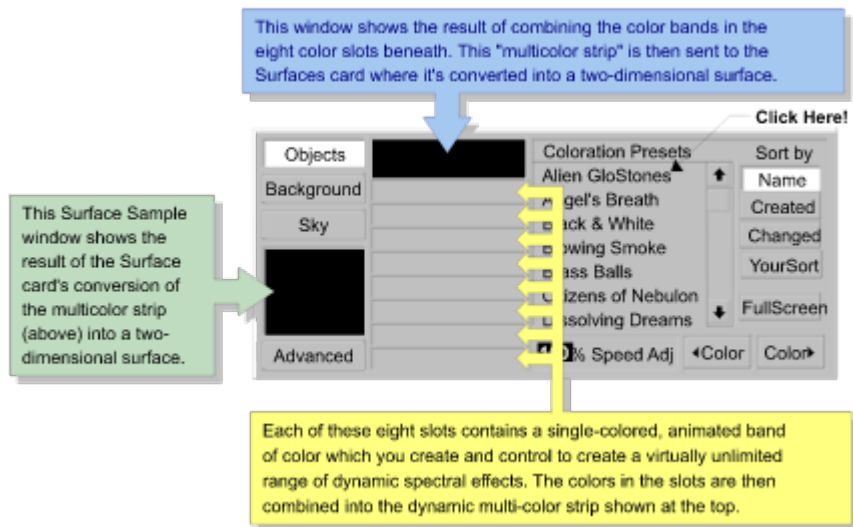
Take some time to browse down through all the button names in the **Coloration Presets** list and look at the diagram above.

You'll see all the many ways colors can move in the eight **color slots**. Watch the slots on some of the buttons for a while and you'll see some surprising behavior.

You'll see how those single colors combine into the top slot to form one multi-color result strip. Look at the top multi-color strip. Look at all the different ways the colors can be combined. (If you're curious, click **Color Combining** to see how color combining works.

You'll see how that one-dimension multi-color strip is converted and shown as a two-dimensional flat surface pattern in the window on the left.

And, finally, you'll see how that surface pattern is wrapped around the spherical object in the preview window to give the final result.

**Propeller
Head
Alert!**

If your curiosity is driving you nuts, you can peek under the covers of the color system. Choose a particularly **gnarly coloration** setup, then press the **Advanced** button at the lower left corner of the Colors card. This removes the preset controls and shows the control panel used to build these colorations.

Go ahead and mess around with the color control **spin-dials**. **(Remember about right clicking to get help anywhere, anytime!)** Since this is your own "New Button," anything you do will be contained within it and can't leak out into any other buttons.

> And if you happen to stumble upon something amazing and incredible that you want to save to show off, just press the "**Save**" button (below the card deck) to save this masterpiece. You'll also probably want to name it something other than "New Button." Perhaps to something more appropriate, like "Nightmare at Dawn" or whatever. To rename any button, just press the "**Name**" button below the cards and edit or type over the existing name which will have lit up over in the button grid. (You can also rename any button by double-clicking on it.)

When all this excitement has died down, please press the **Advanced** button again to release advanced mode and return to the preset controls (and to sanity.) Whew.

What's the Story on these Coloration Presets?

Coloration Presets are a cool way of **borrowing** the colorations from existing buttons and using them in your own. You can even select existing buttons and place another button's colorations into them. After borrowing another button's colorations you can mess with the coloration, customizing it any way you like, or leave it unchanged.

The Presets list is dynamic. It always contains **every** button's colorations . . . even the new one's you create as you work. So it's a simple way for you to grab something brilliant you created in the past and reuse it on something new.

The Presets list can be sorted in any one of four ways as shown by the button labels here. They may be sorted **alphabetically** by name, in the order they were **created**, by the recency of being **changed**, and also by **your own personal sort order** which is set with **Sort The Buttons** on the Operations card.

Settle upon your favorite "borrowed" coloration for the foreground spherical objects, then let's grab some colors for the background!

. . . To do this simply press the **Background** button at the upper left of the Colors card.

The Presets list will change to show those objects with active background colorations. Now browse around through **THIS** list. One of the things you'll notice (well, maybe you will if you've got a good memory) is that these colorations don't look **anything like** the colorations -- of the same name -- that you were looking at before. That's because you were looking at the foreground Object **colorations** for the buttons . . . but now you're seeing the Background colorations for the same buttons. Remember that every configuration has three entirely separate colorations, one for its Objects, one for the Background, and one for the Sky. The Presets list always shows you the list of colorations for the currently chosen element type.

If you were wondering whether there's any way to yank a coloration from one button's <u>object</u> coloration and stick it into another button's <u>background</u> . . . then you **really do deserve** to have a propeller spinning overhead!   The answer is: Yes you can.   (And if you weren't wondering anything of the sort, don't worry, anyone who would wonder that is probably an alien anyway.)

If you look at the Advanced coloration controls (by pressing the Advanced button in the lower left of the Colors card) you'll notice four buttons at the lower right: **Cut, Copy, Paste, and Clear**. They normally operate upon just one **color slot's** data. This is really handy if you get one slot all setup and want another one just like it, but with a different color. You'd just COPY the slot with the goodies, change to the new slot, and PASTE the data into it.

But, if you hold the **shift** key down at the same time, these functions operate upon <u>all eight slots at once</u> . . . in other words, they operate upon the <u>entire coloration</u>!   You can use this to "capture" (Copy) any of a button's three colorations, and then Paste it into any coloration in any other button. This allows you to move colorations between buttons, and also between foreground objects and backgrounds. Whew!

Okay, so choose a **background** coloration for your new button from the Coloration Presets list.

Unless you've been wandering around and pushing buttons without telling me, your slide-out preview window should be showing you some variation on the theme of obnoxious spirals. (If you chose tastefully sedate colorations, please excuse me for presuming otherwise!)

FullScreen

Yes, it's true. It's <u>nearly</u> time for you to press the
FullScreen button on the non-Advanced Colors card.

IF you've somehow managed **not** to press this seductively-named button until now, I salute you. Lesser sentient beings (many of them human) have caved in to the temptation of the FullScreen button, finding it far too difficult to resist. **The only thing you need to know, like Dorothy in Oz, is how to get back home:** <u>Just press **Close**</u>. As always, you can right-click everywhere and on everything, so any questions you have can be quickly answered. **So go ahead, if you haven't already visited the "Hyper-Dynamic Color Editor" (catchy name), press the FullScreen button now.**

The Hyper-Dynamic Color Editor

The HDCE allows you to work with <u>all three button colorations at once</u>, **while** viewing the actual button in operation (cool huh?). The HDCE control panel can not be repositioned (because there's nothing behind it), but its advantage is that you're able to watch your buttons operate while still making major changes to any of its colorations. You're able to completely manage all coloration effects right in the middle of the screen saver running.

To see how powerful this can be, while in the HDCE, and after the background and several foreground objects have been drawn, use the Coloration Presets to quickly browse around through Object and Background colorations. Notice how the object and background colorations can be changed instantaneously.

When you're done with the HDCE, use the Coloration Presets to set your new button's Object and Background colors to something you can live with for awhile . . . since we're about to leave the Colors card behind and trek into the land of Surface patterns!

> **NOW**, **if** you're in the mood for detailed information on **Color Combining** and the **Advanced Color Control System**, click on those words and we'll head over there right now . . . but I'd suggest that you stick with the colorations we already have, and read onward about how we turn those colorations into a two-dimensional surface, then three dimensional objects.   **The choice is yours...**

ChromaZone's Surface Patterns

Now that you have a sense for where the colors come from, let's look at what we do with these colors once we have them. You'll recall that the top of the Colors card shows the multi-color result of combining the color bands from the eight individual **slots**. The Surfaces card converts this one-dimensional strip into a two-dimensional surface. Check out the diagram below and you'll see how it

works!
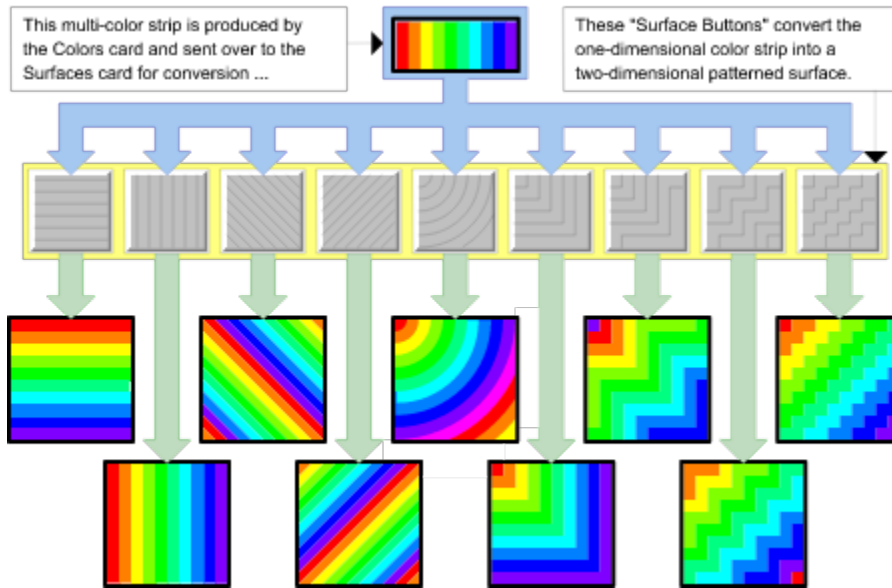
Look at the relationship between the patterns on the buttons and the resulting color surfaces. The diagram on each button graphically shows how the multi-color strip is converted into a two dimensional surface. It's that simple.

Now click on the **Surfaces** tab to switch to the Surfaces card and also press the **Objects** button (at the upper left) if it's not currently depressed. Unless you've already been there punching buttons and changing things around since you created your New Button, the spiral surface pattern button will be pushed in and surrounded by a black ring.

The button being pushed in means that the spiral pattern is enabled for use in drawing objects, and the black ring means that the spiral is the pattern we're currently editing.

Right-click on any surface pattern button and read what the pop-up help says . . .

Let's go over this carefully since it's a bit weird and it's important for you to understand. The weirdness arises because it's possible to have multiple foreground Object surface patterns enabled for use when drawing. Thus, more than one button can be selected and "on" at once. Yet it's only possible to be editing the pattern settings for one button at a time. So, I created **a black highlight ring** to encircle the button that's being edited.

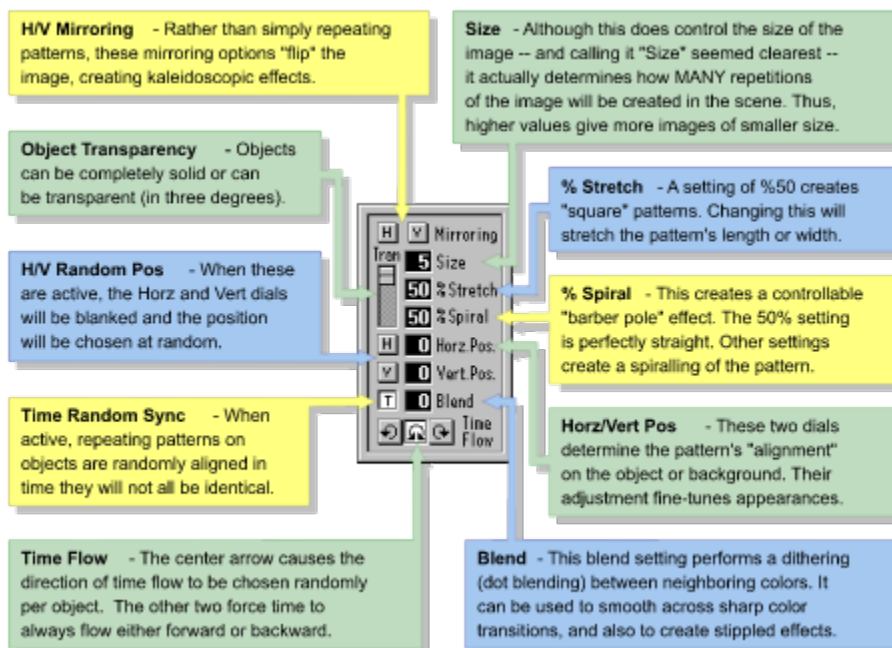## Let's see how this operates:

Click **once** on a surface pattern button without the ring. You'll notice that the black ring jumps to this button and that the pattern shown in the surface preview window changes. The new position of the black ring shows that we're now **editing** the various parameters for this new surface pattern. Now

click again on this same button *(the one that already has the ring around it).* Since this is the button we were already editing, the black ring stays where it is, and the button's on/off state changes. If the button is now "on" (depressed) then this pattern is now enabled as one that ChromaZone can choose to use when drawing objects. **If the button is "off" (not depressed), then even though we're editing it and viewing it here, it will not be used when ChromaZone is running.** That's all there is to it.

Things are simpler for background patterns: Since only one surface pattern can be selected at a time, when **Background** mode is selected the buttons behave like a simple selector. Push one in and the old one pops out.

Customizing the Surface Patterns

Each surface pattern starts out being rather plain and vanilla. However, the Surface pattern controls shown below allow each pattern to be tailored to suit your taste. As you'll soon discover for yourself, the possibilities are literally endless. Here's what each control does:

H/V Mirroring - Rather than simply repeating patterns, these mirroring options "flip" the image, creating kaleidoscopic effects.

Object Transparency - Objects can be completely solid or can be transparent (in three degrees).

H/V Random Pos - When these are active, the Horz and Vert dials will be blanked and the position will be chosen at random.

Time Random Sync - When active, repeating patterns on objects are randomly aligned in time they will not all be identical.

Time Flow - The center arrow causes the direction of time flow to be chosen randomly per object. The other two force time to always flow either forward or backward.

Size - Although this does control the size of the image -- and calling it "Size" seemed clearest -- it actually determines how MANY repetitions of the image will be created in the scene. Thus, higher values give more images of smaller size.

% Stretch - A setting of %50 creates "square" patterns. Changing this will stretch the pattern's length or width.

% Spiral - This creates a controllable "barber pole" effect. The 50% setting is perfectly straight. Other settings create a spiralling of the pattern.

Horz/Vert Pos - These two dials determine the pattern's "alignment" on the object or background. Their adjustment fine-tunes appearances.

Blend - This blend setting performs a dithering (dot blending) between neighboring colors. It can be used to smooth across sharp color transitions, and also to create stippled effects.

As always, the best way to learn about the operation of these controls is to discover the effect for yourself. So jump in and start twiddling those **spin-dials**!

When you release any button you've pressed, or release a spin-dial at a new setting, the pattern display will show a "flat" image of the new surface pattern and the preview window will show the surface pattern used on the background or foreground objects.

But, to really get a feeling for the result, it's time to introduce you to the screen saver **Test** button . . .

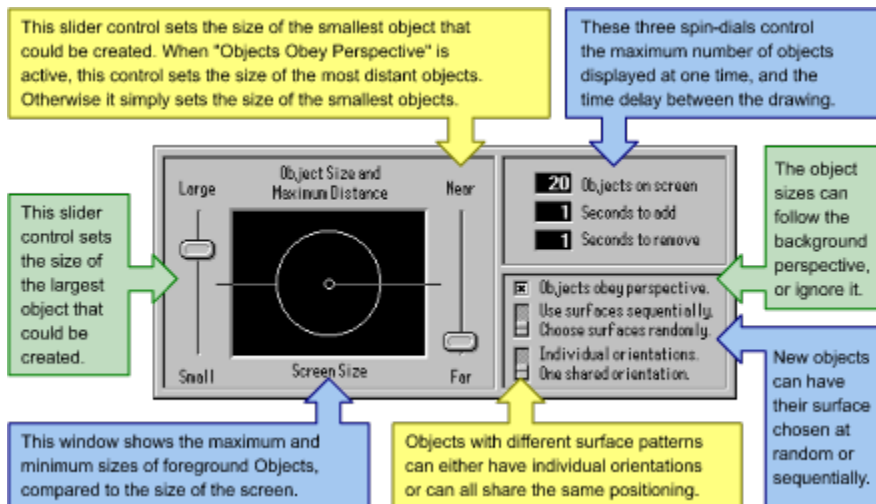# Testing . . . 1 . . . 2 . . . 3 . . .

Test

If by some weird miracle you've actually never pressed the **Test** button before, wait no longer. When you press **Test**, ChromaZone starts running the currently selected button. This is exactly like the way ChromaZone would normally operate with two exceptions: The screen will <u>never</u> change to another button by itself, and a password will <u>never</u> be required to end the testing.

The only tricky thing about the Test operation is remembering to **remove your hand** from the mouse after starting the test (most newcomers don't). I built a delay into ChromaZone to give you time to take your hand off the mouse while watching ChromaZone run . . . but most people become so absorbed by what their wonderful new button is doing, that they forget and put a death grip on their mouse. Then they start twitching in excitement as their button does amazing things and test mode is suddenly canceled by the mouse being moved. It's simple, really: **Just pull your hand away!**

The Objects Card
Setting Size, Number, and Timing

Now that you've mastered the use of the **Test** button, you're ready to look at the Objects card which governs many aspects of the way the objects are drawn. Browse the diagram, right-click the mouse on all of the actual controls, and push that test button a lot!   You'll get the hang of everything here in no time.

This slider control sets the size of the smallest object that could be created. When "Objects Obey Perspective" is active, this control sets the size of the most distant objects. Otherwise it simply sets the size of the smallest objects.

These three spin-dials control the maximum number of objects displayed at one time, and the time delay between the drawing.

This slider control sets the size of the largest object that could be created.

Object Size and Maximum Distance
Large   Near
Small   Screen Size   Far

20 Objects on screen
1 Seconds to add
1 Seconds to remove

☒ Objects obey perspective.
  Use surfaces sequentially.
  Choose surfaces randomly.
  Individual orientations.
  One shared orientation.

The object sizes can follow the background perspective, or ignore it.

New objects can have their surface chosen at random or sequentially.

This window shows the maximum and minimum sizes of foreground Objects, compared to the size of the screen.

Objects with different surface patterns can either have individual orientations or can all share the same positioning.

The **ONE THING** which might be a bit confusing about this card is the idea of **object orientations**.

Let's explore a shortcut for setting object orientations and background perspectives before checking out the "official" approaches. If you're in Objects mode (with a spherical object shown in the preview window), <u>try clicking somewhere on the object</u>. You'll see that the object's orientation

changes so that the "pole" of the sphere is exactly where you clicked. You can use this shortcut anytime to quickly orient any object. **SO THIS** is what's meant by the **Object's Orientation**. It's the angular orientation of the sphere.

This also works for setting the **background perspective** vanishing point. Just switch to Background mode, then click anywhere in the preview window. The background will adjust to set the view's vanishing point to the location you clicked.

And now, the FINAL frontier!

We want the Details...
all

ChromaZone's last control card is called: **Details.** It contains three sections, one for each of the screen elements (**Objects, Background, and Sky**) and provides controls used for fine-tuning the presentations:

Foreground Object Orientation Details

Shared Orientation

Spherical orientation can be shared among objects of all surfaces, or each surface pattern can have its own orientation. (See Objects card.)

This 3D sphere can be easily positioned with the mouse. Either click or drag the pole to any location. Tap the right button while dragging to exactly center the pole. The colored region shows the angular spread which is the region of possible pole locations. By setting an angular spread greater than zero (see the two controls underneath the sphere) ChromaZone is allowed to randomly choose the location of the sphere's pole each time a new sphere is drawn.

± **45** ° Rotation Spread
± **15** ° Incline Spread

Background Perspective Details

Background Perspective

This 3D display window shows the current background perspective mode, which is chosen by the three buttons located beneath the display window. The display also shows the relative degree of depth perspective, set by the %Depth control beneath the buttons

These buttons select a background display with Sky and Horizon, or a square or round perspective tunnel with moveable vanishing points.

∞ ↕ Depth

This %Depth spin-dial sets the degree of depth illusion to apply to any of the three background perspectives. Perspectives can be negative!

Sky Composition Details

Sky Composition
100 Star Field

Stellar Phenomena
Galaxies   Clusters
25 Count **10**
∞ Density **50**
5 Smallest **25**
60 Largest **40**

This spin-dial sets the relative density of the starfield which is seen when sky is visible in the Sky and Horizon perspective. The random stars shown by this control are separate from galaxies and clusters.

These eight spin-dials control the number, density, and size of galaxies and nebular clusters shown in the sky.

The Count can range from 0 to a maximum of 25. Density can be set between 0 and infinity. And the minimum and maximum object sizes, which are percentages of the screen size, range from 0 to 99%.

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((((That's pretty much the <u>whole</u> story.))))

If you have followed along through everything in this section, you now have an extremely firm grasp of all major ChromaZone aspects. The **wonders** of the **Advanced Color Control System** may still lie ahead, and now might be the right time to plow into that, but there are other places you're welcome to browse through. Checkout the signpost below, and make your choice!
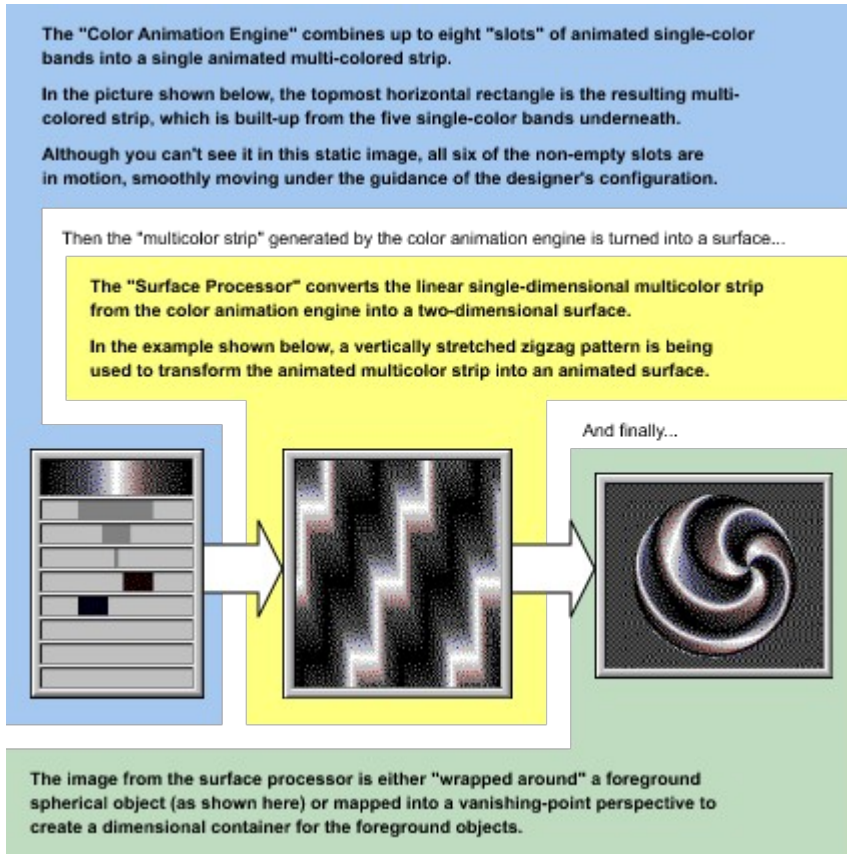

From this signpost you can head in a number of directions. This also appears at the end of each of the locations it advertises, so you can easily jump from one place to another, browsing yourself into oblivion.

<u>By the time you're done, you'll qualify as a Level 7 ChromaMaster!</u>

ChromaZone Overview

The ChromaZone animation system consists of a few sub-systems:

The "Color Animation Engine" combines up to eight "slots" of animated single-color bands into a single animated multi-colored strip.

In the picture shown below, the topmost horizontal rectangle is the resulting multi-colored strip, which is built-up from the five single-color bands underneath.

Although you can't see it in this static image, all six of the non-empty slots are in motion, smoothly moving under the guidance of the designer's configuration.

Then the "multicolor strip" generated by the color animation engine is turned into a surface...

The "Surface Processor" converts the linear single-dimensional multicolor strip from the color animation engine into a two-dimensional surface.

In the example shown below, a vertically stretched zigzag pattern is being used to transform the animated multicolor strip into an animated surface.

And finally...

The image from the surface processor is either "wrapped around" a foreground spherical object (as shown here) or mapped into a vanishing-point perspective to create a dimensional container for the foreground objects.

(The images shown above look "grainy" because they had to be **color-reduced** from ChromaZone's custom 256-color palette to the standard sixteen Windows colors. As you probably know, the actual images created by ChromaZone have none of this grainy appearance.)

ChromaZone's color animation system operates on the principle of color summation.

The classic example of **color summation** is the three overlapping color circles that we first encountered in elementary school:
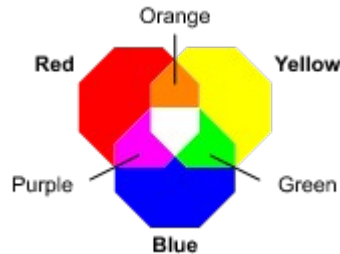
Where the Red and Yellow overlap we get Orange, Yellow and Blue gives us Green, Red mixed with Blue yields purple, and all three together gives us White.

Although Mrs. Johnson may have told us that this was the way the world worked, and that Red, Yellow, and Blue are the primary colors, she was keeping just one chapter ahead of the rest of the kindergarten class . . . and she was wrong! There are colors which can not be created from ANY combination of red, yellow, and blue. Artists are told that such colors are "difficult" to mix, so they purchase those colors specifically. The real fault is with the Red/Yellow/Blue color model, which is flawed.

As it happens, the natural evolution of human eyesight worked out the optimal system all by itself. The three true primary colors that are detected by the human eye are **Red**, **Green**, and **Blue**, from which -- it stands to reason -- ALL possible intermediate visible colors can be readily mixed:
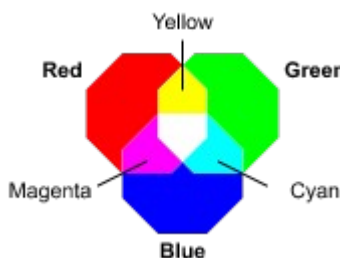
The colors red, green, and blue are the three primary colors which combine to form **Cyan**, **Yellow**, **Magenta**, and **White**.

You'll notice a few interesting things about the colors **R**ed, **G**reen, and **B**lue:

Their initials form the acronym **RGB**, which you may recognize as being a designation used with computer display monitors. You may also notice that these seven colors are **exactly** the colors you keep seeing coloring various things inside Windows (along with their half-intensity cousins). And, if you stick your face right up against the glass of your household television set (and manage to focus), you'll be up close and personal with a repeating grid of tiny glowing **red**, **green**, and **blue** dots:
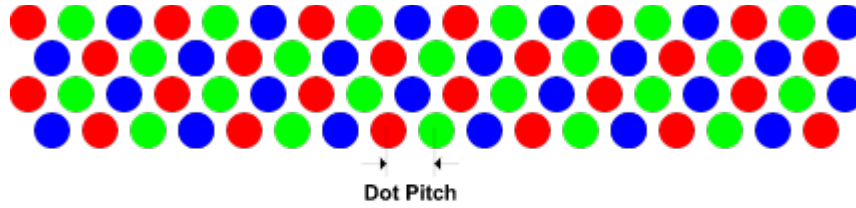
Dot Pitch

An interesting bit of trivia is that the spacing between these dots is called the dot pitch of the color CRT (Cathode Ray Tube) monitor, and since all displayed images must be made up of these discrete dots, smaller dot pitches create a finer grained result.

Okay, so we've established that the use of red, green, and blue is pervasive throughout nature and that it makes good sense as a **color-synthesizing** technology. You won't be surprised to hear then, that these are the three colors used by ChromaZone for its **color animation** synthesis.
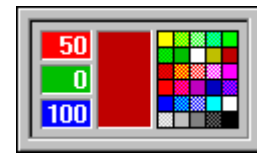
On the Colors card you'll find a set of color controls that looks like this. The red, green, and blue rectangles are **spin-dials** containing numbers that specify the **percentage** (0 to 100) of each of the three primaries which will be used to set the color within a single **slot**. The rectangular window in the middle shows the result of the color mixing, and the little palette of 25 color samples allows you to quickly select from among the most commonly used colors.

To create complex animated colorations, ChromaZone **overlaps** up to eight single-colored bands of color. For example, here is the result of overlapping three primary colored bands:

This "multicolor strip" is created from the combination of the three single-color bands below.

This "slot" contains only RED

The three single-color slots on the bottom are merged into one multi-color strip at the top. The resulting colors are similar to the overlapping circles we've seen before, but we've stretched them out into linear stripes. (They're much easier to work with when they're stripes.)

By animating the motions of up to eight individual single-color slots, and then combining them into a single multi-color result, a virtually infinite array of colorful effects can be attained.

Mixing Your Own Colorations
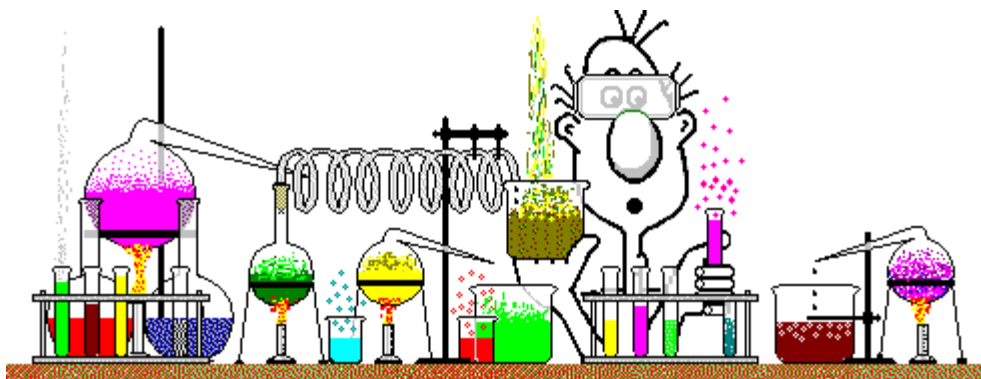
Although you could probably spend several lifetimes re-using the foreground, background, and sky colorations contained within the 100 buttons provided with ChromaZone, **to really go where no one has gone before** *(and see things that* no one *has ever seen before!)* you'll eventually want to understand how all those colorations were created. To do this you're going to become familiar with the:

Advanced Color Controls

Speed - This row of spindials determines the speed of the color band as it moves along the color slot.

Setting - The Setting column contains the slot's "base values" which do not change.

Random - The Random column contains three dials for Speed, Position, and Size specifying how often a new random value will be added to the "Setting" column.

Position - This row of spin-dials determines the color bands position in the slot.

Amount - This column sets the amount of influence random events will have over the setting.

Size - This row of spin-dials controls the size of the slot's color band.

Inertia - This column sets the time required for random change.

Length - The length dial sets the effective length of the slot compared to the top multi-color strip.

Color Samples - This quickly presets the R/G/B dials to color.

Cover -
The coverage setting causes the slot's color band to cover-up the color from the slots closer to the multi-color strip.

Red, Green, Blue - These three spin-dials set the amount of red, green, and blue primary color in the slot's color band. The window to the right shows the color result.

Blur - The blur softens the edges of the slot's color band.

	Setting	Random	Amount	Inertia
Speed	-9.8	13	10	1.6
Pos.	95	915	161	5.0
Size	50	293	20	163
Length	200			
Blur	100			
Cover	28			

I can imagine that the control panel shown above looks like some sort of spreadsheet nightmare, but that's probably because you're trying to take in the whole thing at once. A car's dashboard looks the same way if you try to look at it all at once -- it's overwhelming -- but once you become familiar with all the separate pieces, a dashboard is really pretty straightforward. These color controls are just the same. And once you know what the various pieces do, you'll actually be glad that they're all at your fingertips in one place.

_____

Before we plow into the heart of the Advanced Color Control panel, let's explore a few new concepts that ChromaZone uses.   **If you haven't yet checked out the Combining Colors section, now is the time. Everything** that follows assumes that you've read that, just as if it was sitting right here. So please click on the **Combining Colors** words right now and read through that section if you haven't already.

When you're done, the "U Turn" sign will bring you right back to here . . .

_____

This "multicolor strip" is created from the combination of the three single-color bands below.
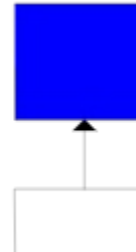
This "slot" contains only RED

What's happening is that the color band **wraps around** from the right end of the slot back to the beginning. This concept of "wrap around" is important. In essence, the right end of each slot is connected to the left end. You can think of it as the colored band traveling around a circular ring which we've straightened out for our convenience. Here's what it would look like if we **hadn't** straightened it out:

This is the middle

Here's the start of the slot

Here's the end of the slot

I don't want to make a bigger deal of this than necessary, and once you see it in operation it'll be really clear and obvious. Okay, so let's examine the three main controls used to manage the motion of a slot's color band:

Speed, Position & Size

Though you probably haven't given it a lot of thought until now, it turns out that there are a good number of things we can control about the way a band of color moves through a slot. To begin with,

we'll want to control the color band's **speed**, **position**, and **size** ...
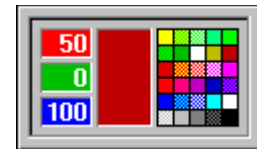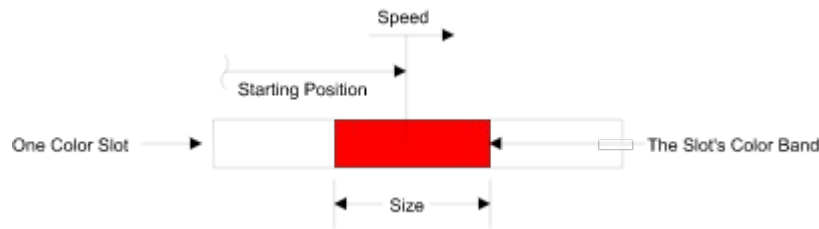
The six control values shown below set the "basic" (unchanging) values for each slot's color band. Just as each slot can have its own unique color, set by the R/G/B controls, each color slot has its own Speed, Position, Size, Length, Blur, and Coverage settings. Let's examine each of these setting one at a time:

Positive **Speed** causes the slot's color band to move to the right in the slot and negative values cause it to move to the left. **The dial's value is in units of cycles per minute.** Higher speed settings cause the color band to orbit around the slot faster. You'll notice as you're spinning the speed **spin-dial** that the sign automatically changes when you pull down below zero, and also that the value automatically scales to give you plenty of control for speeds less than 10, and plenty of range for speeds of 10 and above.
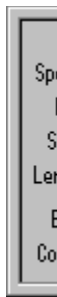
When designing a coloration, you might want two colors to be moving at the same speed, or skewed so that one follows the other. The **Position** setting allows this sort of flexibility. The position control changes the position of the slot's color band **independent of the slot's speed**. (A physics-type person would call this the "phase angle" of the slot, but I didn't want to scare everyone off by calling it that ... and after all, what it does, is change the position of the color band.) **This dial's value is in percent of slot's length**, so a setting of 50 (%) would skew the slot's color band halfway along the slot.

The third parameter, **Size**, determines the color band's size within the slot. **Size is also in units of percentage of slot size,** so that a setting of 25 (%) would create a color band occupying one-quarter of the slot's length. One thing to notice in the diagram shown above, is that the size is measured from the center of the color band. In other words, if the color band were not moving, and you **turned up the size**, you'd see the left end of the color band move to the left while the right end moves right. The color band would be growing from its center-point.

Length

The **Length** parameter is probably the weirdest and least intuitive of the basic settings. But it supports the creation of a wide range of great special effects. Study this diagram for a minute or two, then we'll examine what's going on . . .
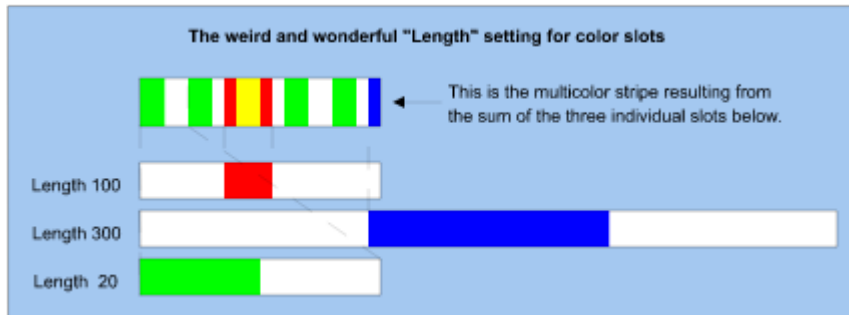
Okay, so the length setting is going to take a bit of explaining . . .

The best way to visualize the **slot lengths** is to imagine that the multi-color strip at the top is permanently set to a length of **100**, and that the lower eight slots can all have their comparative lengths set anywhere between **10 and 999**. (Note that the visible size of the lower slots never changes, just the way the color band in the slot is "mapped" into the top multi-color strip.

When a slot's length is set to **"100"** (the default or standard setting like the red slot above) then the slot is the same (100%) length as the multi-color strip at the top. **And everything in the color slot appears in the multi-color strip above.**

When the length is, for example, set to **"300"** (like the blue example slot above) then the slot is effectively three times (300%) longer than the multi-color strip. This means that when the color band has moved one third of the way along, it is leaving the top slot. **So ONLY the first third of the slot appears in the multi-color strip above.**

When the length is, for example, set to **"20"** (like the green example slot above) then the slot is effectively one fifth (20%) of the length of the multi-color strip. This means that when the color band has moved to the end of its slot, it has only traveled one fifth of the way along the top multi-color strip. **So, rather than leaving the rest of the multi-color strip empty (as it would be since the slot's color band only reaches one-fifth of the way, the slot's color band IS REPEATED throughout the rest of the multi-color strip.** You can see this in the green example above ... where the size of the green band is compressed, and repeated throughout the top multi-color strip.

Applications of the Length Setting

We've discovered a number of neat uses for the Length setting, as you experiment with ChromaZone you'll probably think up some new applications ... but here are a few ideas to get you going:

High length values allow the slot's color band to wander around outside the multi-color strip. For example, let's say that the length was set to 400. This means that the slot's length is 400 compared to the multi-color strip which is always 100. It's like this:

With the color slot's length set to 400, only the first 1/4 of the slot's length appear in the multi-color strip at the top. **This allows you to place color bands into "long" slots, and have the band only showing in the multi-color strip (and thus on the surface of the object or background) part of the time!** In other words, as the color band moves through the first quarter of the color slot, it moves all the way across the multi-color strip, and as the color band moves past the first quarter of the color slot it leaves the multi-color strip and no longer appears.

  Since low length values cause the slot's color band to be compressed and to repeat throughout the multi-color strip, all sorts of interesting effects can be achieved. If different slots have different short-length settings, their color bands wind up repeating, and overlapping, at differing intervals. The result is a collection of color combinations which create many useful and complex effects.

Blur

Blur turned out to be a fabulously powerful effect. By "softening" a color band's sharp edges, many sophisticated effects can be produced. The blur can be set to any value from 0 to 100%. As you'd expect, a blur of "0" provides no edge softening whereas a blur of 100% completely softens the color band's edges, creating a smooth transition into and out of the color's influence. For example, here is the familiar result of overlapping the three primary color bands with **no blur**:

And here's the smoother transition effect when each of the primaries is completely blurred:
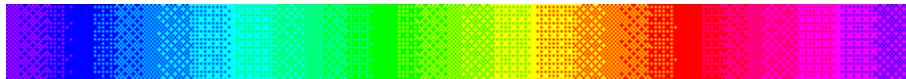
(Note that the blurring effect you will see in ChromaZone is vastly softer and smoother since this diagram had to "dither" the blur using only 6 colors. ChromaZone is able to use more than one hundred custom calculated colors to achieve an incredibly smooth effect.)

Coverage

Coverage is another powerful effect which adds immense capability to your colorations.
Up until now, all slots have been treated equally. If four color slots had different colors, they were evenly mixed together to create a final result in the top multi-color strip. Coverage changes this "slot equality." **Here's the exact definition of Coverage**: With **no coverage** (coverage set to 0%) the slot's color band mixes evenly with all the other colors located above it. But with **total coverage** (coverage set to 100%) the slot's color band covers up the colors from the slots above it instead of

mixing with the other slots equally.

In other words, coverage causes a slot's color band to cover up the color band from all those slots closer to the multi-color strip. Coverage settings between 0% and 100% create blended coverage which allows some of the higher slot's colors to show through the covering slot's color band, but not entirely. One extremely powerful capability of coverage is the use of **black** slots:

The reason I created coverage in the first place was to allow "black color bands." Think about it: The color intensities in the slots are being added together, so how could you ever have a black color band? Since black is just zero intensity, it would be ignored by the other slots which had actual colors. So I invented this idea of coverage to "force" the other slots to be affected by a slot with lower intensity than them. As you look at some of the coloration presets you'll see some black color bands. These darker slots will be beneath other colors, and they'll generally have some coverage turned on so they can have their presence felt.

Creating Randomness

Even though setting the speed, position, size, length, blur, and coverage for individual slots gives us tremendous power and capability, anything we created would seem pretty repetitive before long. To create continually changing effects, we need to introduce the element of chance and randomness into our colorations. This is done for the main three controls: Speed, Position, and Size, with these three spin-dials:

The **Random** setting determines how often a new "random" value will be chosen and added to the unchanging base setting. **The random setting is in units of "random events per minute."** For example, if you wanted an average of one change per second, the random dial should be set to 60 (events per minute).

Note that the inertia setting takes precedence over the random events setting. So, for example, if random was set to 400 events per minute, but Inertia was set to make any change take 10 seconds (an inertia setting of 10), then most of the 400 events per minute would be discarded while the inertia was slowing down the change to a new random value. A new random event will be accepted only after the inertia has completed its cycle.

The **Amount** setting determines the amount of influence the randomness will have over the unchanging base setting. **The amount units are the same as the base setting it's affecting.** The amount is always added (positively) into the base parameter's value. For example, to set a slot's color band so that it's speed will change from -10 to +10, you'd set the slot's base speed to -10 and the random amount to 20. With the random amount set to 20, the random factor added to the base speed of -10 would range between 0 and 20, so the resulting speed would range between -10 and +10.

The **Inertia** setting determines how long a random value will take to be reached. **This setting is in seconds.** The inertia introduces a delay into new random values. When the effect you want is to have the speed, position, or size jump instantly to a new value, set the inertia to zero. When you want a slower or more subtle change in the random value, set the inertia to something greater than zero.

——

You're now equipped with **all** of the ChromaZone's basic principles and concepts. Now that you're armed with this information, the advanced color settings in the more complex buttons included with ChromaZone should make a lot more sense to you. The next step is to play, play, play and see what you can come up with on your own!

NOTE: If anyone asks **what you're doing**, explain to them that you're "engaged in research, studying the empirical behavior, performance, and interaction of the ChromaZone graphical control system."

_____

A Block Diagram of ChromaZone

Operation Card

The Operation Card controls ChromaZone's overall screen saving with controls for activation timing, mouse-corner functions, and other standard screen-saver options and features.
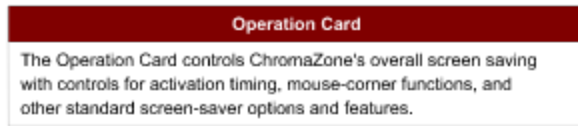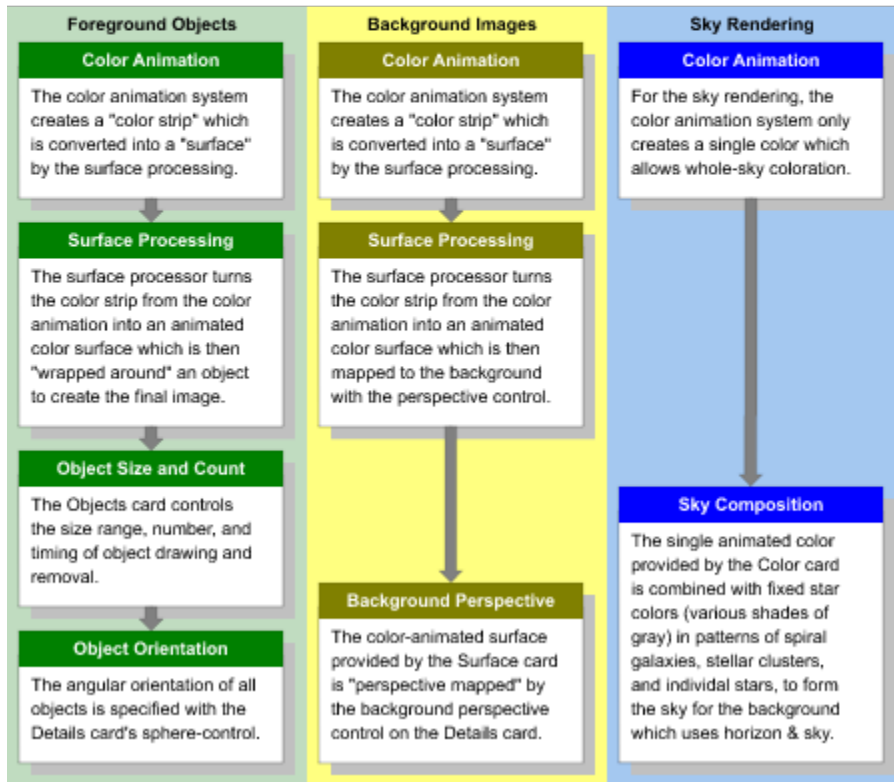
ChromaZone consists of three independent systems: One for drawing the foreground objects, another for drawing the background images, and a third for drawing the sky.

Foreground Objects

Color Animation

The color animation system creates a "color strip" which is converted into a "surface" by the surface processing.

Surface Processing

The surface processor turns the color strip from the color animation into an animated color surface which is then "wrapped around" an object to create the final image.

Object Size and Count

The Objects card controls the size range, number, and timing of object drawing and removal.

Object Orientation

The angular orientation of all objects is specified with the Details card's sphere-control.

Background Images

Color Animation

The color animation system creates a "color strip" which is converted into a "surface" by the surface processing.

Surface Processing

The surface processor turns the color strip from the color animation into an animated color surface which is then mapped to the background with the perspective control.

Background Perspective

The color-animated surface provided by the Surface card is "perspective mapped" by the background perspective control on the Details card.

Sky Rendering

Color Animation

For the sky rendering, the color animation system only creates a single color which allows whole-sky coloration.

Sky Composition

The single animated color provided by the Color card is combined with fixed star colors (various shades of gray) in patterns of spiral galaxies, stellar clusters, and individal stars, to form the sky for the background which uses horizon & sky.

Each sub-system block sends the result of its work on to the next block.   For example, the Color Animation block sends its "color-stripe" coloration to the Surface Processing block.   The tabbed ChromaZone control cards are organized in the same order as the block diagram above, with each card sending its result on to the next card.

ChromaZone Glossary

Color Synthesis

This is the approach of taking two or more single primary colors in combination, and in varying strengths to create a new color that was "synthesized" from the others. (Click on **Color Summation** to see a more complete description of this idea.)

Color Animation

This refers to the process of animating individual colors, which are combined into a single result, for the purpose of creating a more complex animated result.

Overlap

New colors are created when two different colors "overlap" to form a new third color in the region they both occupy. (Click on **Color Summation** to see a more complete description of this idea.)

Slot Wrap Around

Slot wrap around is an important, but simple, concept for ChromaZone.

The idea is simply that the right end of the slot is connected to the left end. As a color band moves out of the slot to the right, it (usually) returns to the slot from the left. (Exceptions to this exist, and are covered in the text under the heading of **Slot Length**. But the important point to understand is that the two ends of the slot are connected as though the slot were a continuous ring.

Color Reduction

. . . is the reduction in the total number of different colors in an image. This can be achieved either by matching the colors that will be removed to the nearest colors which will be retained, or by maintaining the average color of a region by "dithering" (checkerboarding) the region with the proper ratio of available colors.

Dithering is the process of "Spatial Mixing" of different colors. (See **Color Summation**.)

Color Summation

. . . is just a fancy term for the well-known phenomenon of "color mixing."

When differing colors are mixed, the resulting color is the "sum" of the source colors. Another interesting approach to Color Summation could be called "Spatial Color Summation." This operates on the principle that there's a limit to the resolving power of the human eye, and if differently-colored regions are small enough and close enough, we'll see them as a single mixed color. Television sets and computer displays operate on this principle. They don't actually mix colors, but the individual Red, Blue, and Green colored dots are so close together that we can't see them individually. We're fooled into seeing the color sum.

Mouse Corners

**are a fast and easy way of communicating with ChromaZone at any
time. Three "corners" are provided:**

The **Start Blanking** corner causes ChromaZone to begin its screen saving operation. This is handy when you know you're not going to be using your computer for a while to initiate blanking without waiting for the startup time-out to expire. If you have a password defined it's also a great way of quickly "locking" your computer if you need to leave it unattended and don't want anyone coming along and taking advantage of your absence.

The **Prevent Blanking** corner keeps ChromaZone from <u>ever</u> activating. ChromaZone displays an unhappy Mo-face to show that its operation is being suppressed. This might be useful, for example, when you're on the phone and want to refer to data on the screen without ChromaZone kicking in.

The **Control Panel** corner brings ChromaZone's control panel onto the screen at any time.

A Button ...

... is the ChromaZone term for a screen-saver configuration.

The **Button Grid** is that scrollable 3 by 4 array of rectangular buttons at the far left side of the ChromaZone control panel.

The button grid holds all of ChromaZone's screen savers, which are individually encapsulated, each in its own button.

The depressed button on the grid is the one that's being viewed, edited, or tested, and the little green light in the upper left corner of each button (which changes on/off when clicked) is the "button enable" that determines whether the button will be used when the screen saver is running normally.

The individual grid buttons can be arranged on the grid by dragging and dropping them into any new location, and they can also be sorted in many different ways with the Operation card's "Sort The Buttons" option.

A ChromaZone Secret

. . . is something known only to you and other Level 7 ChromaMasters. It's probably regarded as some useless hunk of trivia by most of mankind, but to us, it can make the difference between buttons you're proud to share, and those which scream out in shocking pink, begging for prompt deletion.

**Such secrets never come easily, so treasure those which
you encounter during your trek through the ChromaZone.**

A New Button ...

. . . is actually a bit more than it seems, because it's **not** a "blank button."

ChromaZone consists of several separate sub-systems which mostly need **something** set into them for **anything** to come out the other end. So newly created buttons have initial settings that get most of this started with something meaningful, if not fabulous.

It's up to you to turn an uninspired "new" button into something spectacular!

GREEN

Objects, Background, & Sky

ChromaZone screen savers are composed of three elements: **Foreground** Objects, **Background** Images, and **Sky** Scenes. As a screen saver designer, you work on any <u>one</u> of these elements at a time, choosing which one by pressing either the Objects, Background, or Sky buttons. These buttons are located at the upper left of the Colors and Surfaces cards.

(Skies don't use surface patterns, so this button does not appear on the Surfaces card.)

A ChromaZone Coloration

. . . is a set of color settings for one of the three elements of any ChromaZone screen saver configuration **(Objects, Background, or Sky).** So, for example, a screen saver could have one coloration for its foreground objects, another one for its background, and a third one for its sky.

Each coloration, for each of the three screen saver elements, consists of the settings for up to eight color slots. (Many colorations only use a few of the eight possible slots.)

NO! Don't click on THIS Colors tab!

You need to click on the Colors tab on the actual ChromaZone product!

Borrow:

Appropriate, filch, heist, hook,
lift, nab, pilfer, pinch, pocket,
scarf, snag, steal, or swipe.

You get the idea.

Coloration Presets

Coloration Presets are a cool way of **borrowing** the colorations from existing buttons and using them in your own. After borrowing another button's colorations you can mess with the coloration, customizing it any way you like, or leave it unchanged.

The Preset list is dynamic. It always contains **every** button's colorations . . . even the new one's you create as you work. So it's a simple way for you to grab something brilliant you created in the past and reuse it on something new.

The Preset list can be sorted in any one of four ways as shown by the button labels here. They may be sorted **alphabetically** by name, in the order they were **created**, by the recency of being **changed**, and also by **your own personal sort order** which is set with **Sort The Buttons** on the operations card.

Spin-Dials

Spin-Dials deserve some discussion since they're something you've never seen before. They come in all shapes and sizes: Some display two digits and some three, some have decimals, some can go negative and some can hit infinity. The beauty of Spin-Dials is that **you** don't need to worry about **any** of that, you just push them up or down and they handle all the details.

To increase the value in a spin-dial, hold the left mouse button down in the dial's display and move the mouse upward. To decrease the value, move the mouse downward. That's all there is to it. With just a bit of practice you'll find that spinning the dials becomes second nature and that you're soon thinking about what value you want, rather than how to get it.

One last detail: Each spin-dial has a "home position" which you can quickly jump to by tapping the right mouse button **while** you're dragging the dial's value up or down with the left button.

The Object's Orientation

. . . is the angular orientation of the spherical object. If you imagine a sphere having a pole running through it from North to South, then this sphere's "orientation" would be the location of the North pole on the two-dimensional image of the sphere.

One neat trick you can use to EXACTLY CENTER the pole on the sphere is to tap the right mouse button while you're holding down the left button on the sphere in either the preview window or the orientation sphere on the Details card. The pole will jump to the center.

Whoops!
Okay, any sign
EXCEPT this one!

Rendering

. . . is the Computer Graphics term used to describe any process that converts data from some non-image form (such as a wire-frame model or raw database) into a visible, viewable result.

The term "rendering" has traditionally sent shudders through the souls of computer graphics developers since nearly 100% of their life is consumed in waiting for the computer to "render" its result. Such horrendous math is required, that progress is usually painfully slow.

Although you might not expect any sort of "breakthrough" from a "toy" screen saver, computer graphics professionals (whose lives are spent rendering and waiting) have been stunned by ChromaZone's rendering performance.   Aside from writing the entire product in 100%-pure assembly language (the most efficient by far), I wrote and rewrote an entire transcendentals (trigonometry) package four times to squeeze every last cycle of performance from the Intel processor. This portion of ChromaZone truly breaks all speed records. It is 64-bit, ultra-high performance, hand optimized and manually tuned. It can't go faster . . . **or it would!**

His name is 'MO'

He's sort of the ChromaZone mascot. In fact, you might say that Mo lives in "the Chroma Zone." You'll find him lurking around this help file, keeping us from taking it all too seriously, and also reminding us that personal computing is supposed to be fun, and . . . well . . . personal.

Mo also hangs out in the Setup program (where you probably first met him) and within ChromaZone itself. He rides the pop-up dialog boxes and helps you to know what's going on. After awhile you'll probably get used to him. I hope you find that he even grows on you and that you begin actually looking forward to seeing his smiling face.

Whatever happens, he's here for you enjoyment . . . and he knows it!

Huh?

Are you clicking here to tell me that you've **_ACTUALLY_** registered this fine product?

If so, that's great, and so I thank you and salute you and I'm delighted that this will allow me to inform you of the other ultra-high-quality goodies that I have up my sleeve!

If you haven't registered "yet" . . . well . . . I suppose this amounts to another reminder that it would be great if you would!

In any event, I wish you the best times with ChromaZone!

Steve

Keeping In Touch With Us

Since we're as excited about ChromaZone as you are, we'd love to hear what you think! And we're intensely curious to see whatever new configuration buttons you create. We know that our job didn't stop with your purchase, it's **because** of your purchase that we can be here for you when you need us. So don't be a stranger. We're maintaining a number of ways for you to reach out . . . please do!

By Telephone: (714) 348-7100

Technical Support is available from 8:00am to 5:00pm, Pacific Standard Time, Monday through Fridays, except holidays.

By E-Mail: ChromaZone@grc.com

We can be reached day or night via the Internet. Any mail received will generally receive a response during the next business day.

By BBS: (714) 348-7117

Our TBBS bulletin-board system serves as a meeting place for customer interaction and file sharing. (There are also a few goodies there) The BBS operates 24-hours per day, 365 days per year, supporting multiple 14,400 baud lines. It's checked at least once every business day (often more) and you can expect replies to appear quickly.

By FAX: (714) 348-7110

When all else fails, or if paper is your preferred medium, you're invited to send a fax to us anytime.

How This File Was Created

In one word: RoboHelp

I had heard about something called "RoboHelp" the way anyone hears about anything that lots of other people are using. These guys were in the game early, they built a reputation, and so I didn't even shop around, I just got a copy for myself. (Thank you Gen and Marilyn!)

I can't tell you that RoboHelp is "the best", since I have no idea how it compares to any of the other helpfile-helper products out there -- and I never will -- **because RoboHelp is simply incredible**.

The only problems I had during the development of this fancy help file weren't caused by RoboHelp. I brought all the grief on myself, by knowing what should have been "theoretically" possible (like embedding lean Windows metafiles, or mixing metafiles with bitmaps to save space), then trying to force the Windows WinHelp engine to comply. As you can see, I won that struggle, and RoboHelp was there every step of the way, helping as much as anything could.

RoboHelp's manual is a dream to browse. It's wonderfully indexed, and I found that I was easily able to find anything I needed, every time I went searching ... even when I wasn't sure how I ought to look for it.

Steve

Beautiful job guys!

Color Slots

The ChromaZone color animation system operates by combining the colors from up to eight color slots into a single multi-color strip.

Each **color slot** contains a single-**color band** which is animated by setting a group of color animation controls. Each slot has its own group of controls governing the motion of that slot's **color band**. This allows each slot's color band to move independently of the others.

No One?

Okay, yeah, well, maybe just a few trans-dimensional traveller-type
aliens may have already been peeking over your shoulder at some future
time, so technically speaking they've already seen things that you
haven't.

. . . and would someone *please* tell Mo that **dressing up as an alien** doesn't count?