



Technical Newsletter

MURAKAMI SCREEN U.S.A., INC. 745 Monterey Pass Rd. Monterey Park, CA 91754 Tel 323.980.0662

Creating Spot Color Channels:

Spot Color Channels are the basis for many screen printing techniques like simulated process, index, or simple spot color prints.

Artists who make film separations of a design speak of 'alpha channels' which are nothing more than channels that are in addition to CYMK or RGB color, the default channels in a Photoshop file. RIP (Raster Image Processing) programs use alpha channels to output individual film for *each* spot color screen. The Pantone Colors are used by screen printers to call out a specific color that can easily be reproduced using formulas in plastisol and waterbase ink matching systems. PMS Color allows designers to proof their designs on screen or in a print proof and communicate to the screen printer the exact spot colors needed in the print. Ink libraries can be created and saved as specific Pantone Colors making sampling and production faster with ink buckets labeled by Pantone number.



- To create a spot color channel is easy, it all comes down to these three steps:
1. Selecting the Color with Photoshop tools.
 2. Saving the selection.
 3. Opening the saved selection and turning it into a PMS Spot Color Channel.

Any '**selection**' can become a spot color channel simply by saving the selection. Go to **Select>save selection**, give it a name, save it and presto you have created an alpha channel of the color you selected.



A Pantone Solid Coated fan book is often used as a color guide in selecting spot color as it mimics plastisol ink colors. Many ink manufacturers support the Pantone System with ink formulas to achieve matching color.

Selecting the Color for a Spot Color Channel

There are many ways to create separations, this is just one method that can be used for spot color, sim process and index separations.

In the art example below used by Charlie Taublieb in his excellent seminars on screen printing we are going to change the ISS lettering to a red spot color, PMS 185 C in this case.



Before using the Magic Wand click on the square marquee selection tool and enter '0' in the '**feather**' box on the upper tool bar. Then click the magic wand in the tool bar and click on **contiguous checkbox** in the upper tool bar. **Contiguous** means the pixels that are in contact with each other will be selected. If it was turned off the magic wand would select all similar color values in the design. Check for small 'islands' in the art that may need to be added. Hold down the 'SHIFT' key and click with the wand to add art elements that are part of the lettering selection.

Once the targeted art is selected Go to **Select>save selection**, give it a name you can remember, and save it by clicking OK. This has just created an alpha channel. Next we will make this channel a spot color.



The Channels palette now shows the selection that was named Pantone 185 for the ISS letters in the example above. The black channel was also created to make a spot black color plate that will allow the RIP program to separate each as a spot color channel.



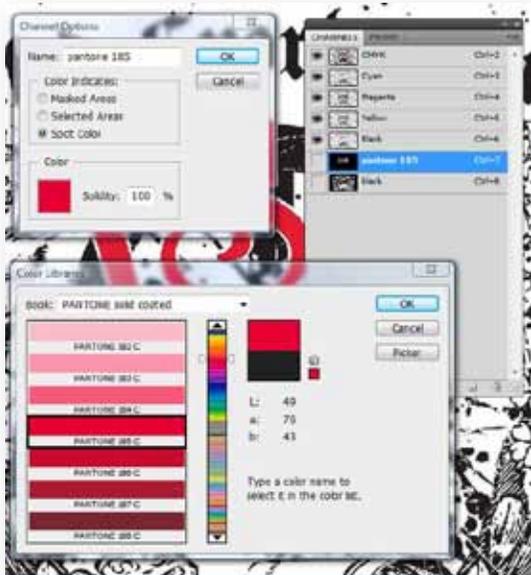
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Next: Changing the Alpha Channel to a Pantone Spot Color Channel

The newly created alpha channel now needs to be turned into a PMS spot color channel. Go to the **Channels Pallete**. Double click on this newly created channel to bring up the Channel Options dialogue box as shown in the graphic below.

In 'Color Libraries Dialogue box' in the drop down 'book' menu select **Pantone Solid Coated**. You can navigate to the exact color by simply typing the Pantone number. In this case typing '185' navigated to Pantone 185 C. Your separation artist should have an inventory of pre-mixed inks in Pantone numbers. Using inks from inventory speeds up pre-press work for both sampling and production.

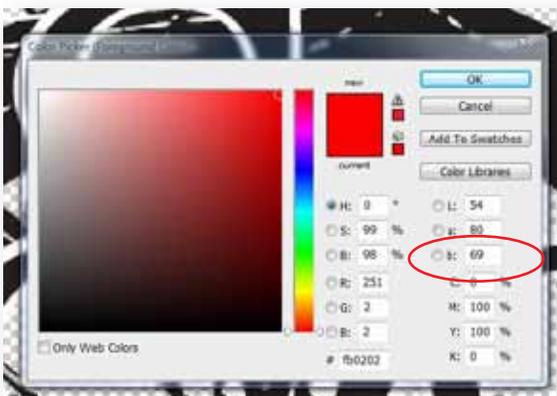


Once the correct Pantone Color is selected click OK in the **Color Library Dialogue** and then click OK in the **Channel Options Dialogue** as shown in the graphic to the left. The Channel is now a specific spot color, **PANTONE 185C** that can be recognized by a RIP program to output a film for this channel.

Highlight the new **PANTONE 185** Channel then go to **Image> Adjustments> Invert**. This will confine the Pantone 185 color to the original letters in the example, or in a more complex piece of art to the selection area, which can be quite intricate.

This was a simple re-coloring of lettering but serves as a starting point example for more complex selection processes used in *simulated process* or *index separations*. In a continuous tone photograph like the guitar shown below a skilled separator uses alpha channels to select colors that when printed together create 'simulated process art' which we will explore on the following pages.

- Click on Spot Color radio button.
- Then Double Click on the color square.
- The Color Picker will appear as shown below, click on the 'Color Libraries' button to the right to bring up the color library books as shown above.





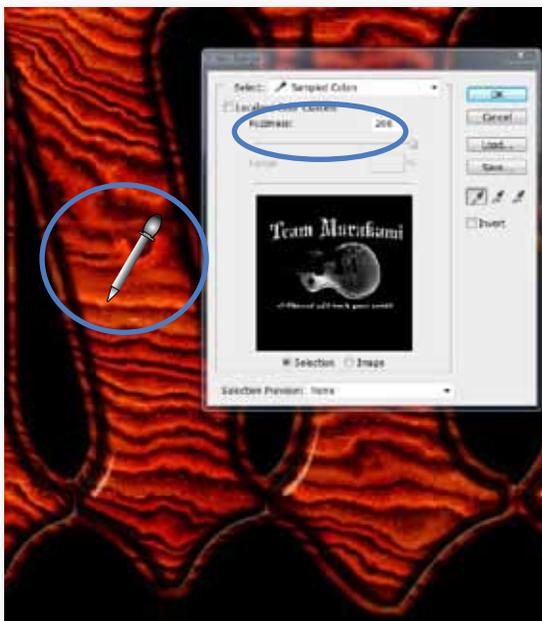
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Using 'Color Range' to make Selections

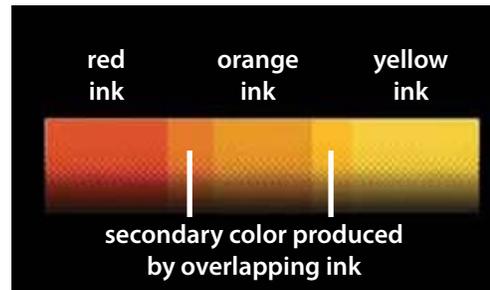


One common approach to a photo like this image is to use 'Select>Color Range' and use the eyedropper to select a color. Zooming in to select color in this example to obtain a selection of the warm orange wood tone helped start the 'palette' of inks with a dominant orange that can mix well with red and gold in the guitar body. The 'fuzziness' slider was raised to capture similar color in the guitar body expanding the original selection area



By 'saving' the selection that results from the color range dialogue an **alpha channel** is created. Go to **Select>Save Selection**. Following the same procedure for the lettering on page 1 we can assign a specific Pantone Spot Color to this channel.

Selections can be highly complex and the techniques in modifying selections, combining or subtracting from selections, applying curve or other image adjustments helps pull a set of separations to print with. A basic rule of thumb is to create separations to print on both the base plate and 'roll off' into the shirt color to create dynamic images of light to dark, and to overlap similar colors to produce additional color combinations of the inks during printing. The guitar body colors of yellow gold, orange, and a deep brownish red can be selected to overlap (remember the 'fuzziness slider' in color range selection) and produce color transitions that simulates the smooth tonal flow seen in the original guitar artwork.



Solid base plate, halftones in the baseplate, or no base plate help to create many more shadings of these colors. To create the base plate go to **Image> mode> grayscale**. Image tools like **Brightness/Contrast, Levels, Curves** and others can be used to increase the dynamics of the base plate, see page 4 for examples.

It should be mentioned that your separations are only as good as the original art you started with. High resolution photos and illustrations are a must. Sharpness of print is directly related to the resolution of the original art. 1.5 to 2 times the size of the final print size at 300 dpi will allow good separation of the art and provide more control in making selections.



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Figure 1 shows the base plate as it appears after converting from an RGB file to a grayscale file. Go to: **Image>Mode>Grayscale.** (Always work on a copy of the original file to prevent irreversible changes.)

The lettering lacks bright highlights and the guitar body's maple wood lacks the contrast to show off the wood pattern. In some cases it is necessary to isolate parts of the image separately to increase contrast and dynamics rather than to adjust the whole image.

In this case 'Team Murakami' and 'S thread will rock your world' were selected roughly with the polygonal lasso tool and then **Levels** and **Brightness and Contrast** were used to create a brighter base plate with more contrast. The guitar body was also isolated with a rough outline and treated with different **level adjustments** and **brightness and contrast** to bring out the maple wood pattern with more dynamic tone.

The final step is to invert the image so that the RIP program can print a positive. **Go to Image>Adjustments>Invert.** Dot gain often runs as high as 20% and knowing what the tonal values are before printing can help control dot gain. Image setters and the print processes can both be **Linearized.** The **Filmgate RIP** we sell can linearize the film so that all tonal values are accurate with a densitometer, and it allows the print process to be linearized as well to create accurate print tonal values. Double checking tonal values with the eyedropper after adjustments let's you know how printable the area will be depending on how accurately your linearization or plan old dot gain guesswork is. For the guesswork method: If you get an 80% reading and you have 20% dot gain on press the print will appear as 100% and lose the tonal dynamics. Adjusting the base plate via **Curves** so this same area reads 60-65%

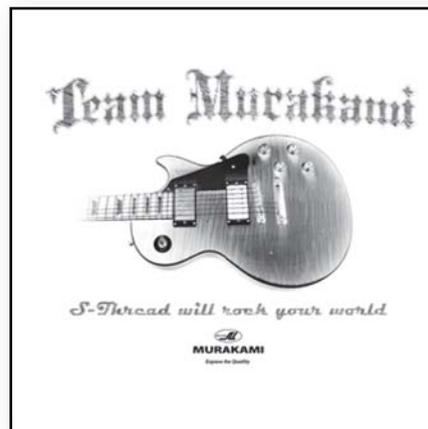
instead will preserve the tonal value in the print. By choosing 'custom' in the drop down menu you can save the curve adjustments as a preset and use it on other jobs.



Default RGB to Grayscale Conversion



After Adjusting with Levels, Curves, etc.



Inverted image to be used as the Base Plate



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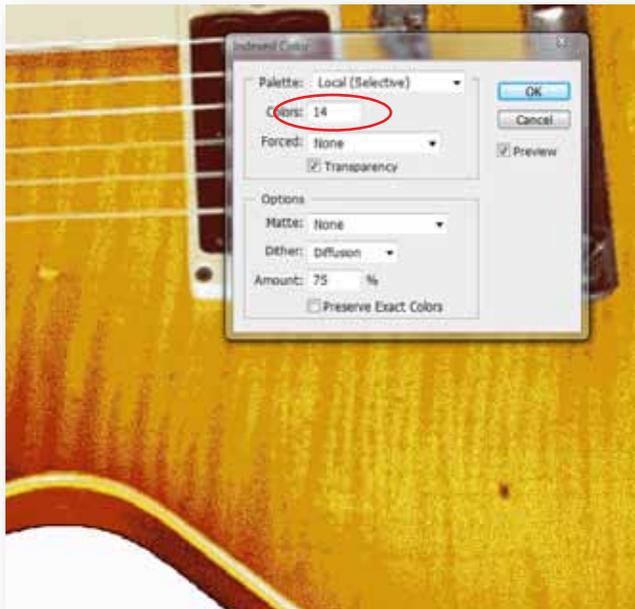
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Index Separations

The previous pages described how to 'pull' individual spot colors to separate a tonal design. Index separations are by far the easiest to generate with the computer doing most of the work.

With an RGB file opened save a copy of the original since **index color mode will alter image permanently** and prevent returning to the RGB Image.

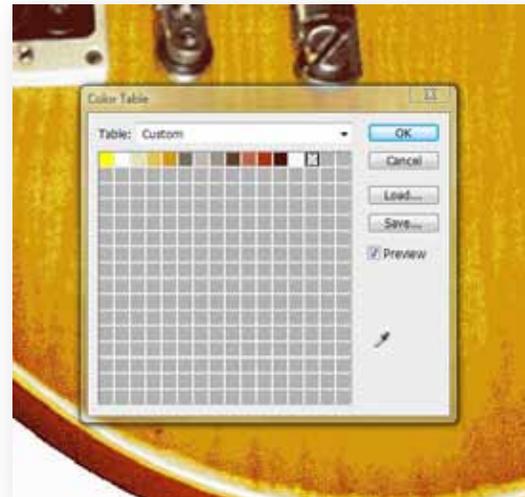
Go to **Image>Mode>Index Color** which will bring up the dialogue box shown below where you can enter the number of colors for the index color mode.



For this example 14 colors were chosen. It is unlikely we will use that many colors since many can be combined or even eliminated. The area above needs at least 3 -4 colors to yield a decent print of the guitar body area. The black shirt color can substitute for any blacks, or darks, and some colors can be eliminated or combined to reduce the ink palette to about 9 colors and a base plate on a 12 color press.

It is important to zoom in and out to see a better quality of preview. Zoomed out will show a very 'chunky' preview, while zooming in will achieve better preview images.

The color table below was generated by the default Photoshop analysis of the image and splitting it into 14 colors. **Go to Image>Mode>Color Table.**



As you can see there are 2 whites, three dark greys and a transparent square that can either be combined or eliminated. This can be accomplished via color range selection, saving the selection to create a spot color channel and then as on page 1 converting this to a specific Pantone Color Channel that can be recognized by a RIP device when output to film.

To merge two selections simply save selections of the two whites using the method described on page 1 and save them in separate channels, then go to **Select>Load Selection** and open one of the saved white selections. Once the selection appears on the art go to **Select>Load Selection** and in the radio buttons below you can add it to the first white selection. Then save the selection with a new unique name and turn it into a spot color Pantone Channel as described on page 1.



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Sim Process and Index Separation Preview

Simulated Process and Index differ in how they display color. Sim Process can have areas where color is on top of color. Index printing however places color pixels side by side with no over printing.

To preview Sim Process seps simply stack them in the channels pallette as they will print. Shirt color on bottom, baseplate, and then generally darkest to lightest ink color. Double click on a channel and reduce the 'solidity' to make the channel transparent to see how the inks will mix.



Index Base Plates

Use the same techniques described on page 4 for Sim Process to create the dynamic halftone base plate for index. Printing index over a high contrast halftone base plate that is slightly choked is the fastest set of spot colored seps you will ever make.

Halftone Base, Mesh and halftone Callouts:

- 280 T Mesh - 65 lines per inch at 22.5 degrees
- 225 S Mesh - 55 lines per inch at 22.5 degrees
- 180 S Mesh - 45 lines per inch at 22.5 degrees

Art Tips

Index separations can put dots in areas where you don't want them to print. It pays to clean up stray dots to prevent this. Unlike the eraser on a 'layer' you will need to highlight the 'PMS Spot Color channel' created earlier and clean up with the eraser and foreground color set to white. With one channel on and the rest turned off it appears as a black and white image. Black prints, white doesn't so the eraser appears to 'painting' white. To see all spot channels in color turn *multiple* spot channels on and the index channel off.

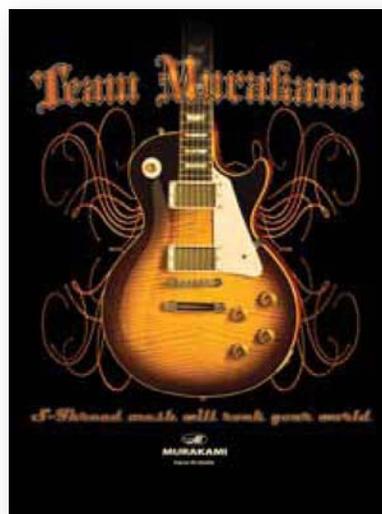
Modifying Index on Press.

Index printing and to a certain extent Sim Process Printing can be modified on press. Halftone base can be used to increase transparency of the inks and allow the overlap or index areas to develop better color.

We did a job for Lord of the Rings that had an almost spectral color range. There were many subtle browns, greys, greens, blues and then bright highlights in gold, red, and orange. By adding halftone base during set-up we were able to quickly modify the transparency of the ink. If the ink is opaque it won't create secondary colors, especially if three colors may be in the same area. Once we slowly modified the transparency in all colors the job came alive. Halftone base helps the colors mix better, the cure was unaffected.

Index Mesh Callouts

Mesh from 300-380 (T or S thread) is commonly used for stochastic dot separations, (index color). This is a case where less is more. It takes about 20 prints to build up ink on the bottom of the screen and to allow the mixing affect of the different index color plates. My rule of thumb was darker colors = higher mesh counts, lighter colors = lower mesh counts all in the 280-380 range.



Final design of the soon to be famous Team Murakami T that will be printed by Motion Textile of Sacramento CA.

We will explore the thin thread technology in the next issue to show how Tom at Motion printed this shirt.