

Layer It!

Anyone seeking to buy, book or use a color corrector is faced with an increasing choice of machines, features and workflows. So it is natural to look for a simple way to compare these diverse systems. Some situations are price sensitive, while others need market recognition. Good service always helps, reliability is important and all equipment has to be capable of basic standards. While these are all good reasons to consider or exclude a system, they are less useful for in depth comparison. In my view the best way to assess the potential of a color corrector is to explore its layers.

A layer is broadly defined as a set of tools that can be applied in addition to the base grade, usually to a selected part of the image. It follows therefore, that a layer must have some means of selection as well as tools for enhancement. Secondaries (content based isolations), and windows (geographical based isolations) are really types of layers. However, a colorist might also use multiple layers that affect the whole image, because of the architecture of the processing, or as a way of managing the look, or in some cases just to save time. Both the number of layers and the features in each layer are therefore necessary to make useful comparisons.

Isolation

It is necessary to understand why a colorist selects parts of an image to grade in order to assess color selection tools. Beyond the basic corrections to an image, a colorist separates areas, adjusts the color and contrast and then composites them back into the image. That is not the conventional way of describing the process, but it is essentially true. However, color compositing is very different from compositing image elements. Color compositing requires soft ambiguous isolations, often using the scene lighting and color to disguise the borders, whereas traditional compositing usually uses more accurate, hard-edged mattes. Moreover, the colorist is usually extracting a region of interest that was not intended to be isolated, while compositors often work with elements that are shot or created against backgrounds that are designed to separate easily. In reality it is not always easy, but nevertheless it is different to the sort of isolations used in color correction.

Secondary Isolation

The earliest type of isolation in color correction was hue based. Initially, systems allowed changes to red, green, blue, yellow, cyan, and magenta. This feature, known as “fixed vectors” does not have isolation adjustment, and so cannot qualify as a layer. But it evolved into adjustable hue, saturation and luminance qualifiers, and has eventually become a powerful keyer. As the isolation capabilities improved, so did the image manipulation within them. If the isolation is noisy or too hard-edged, color changes become noticeable either as noise or as an unnatural edge. The most recent color keyers use blur to successfully disguise these artifacts. Some systems also offer RGB based mattes. Poor isolation limits the range of color enhancements, so the better the keyer the greater the creative range. Keys are content-based mattes and are useful because they naturally follow irregular areas of the image (sky or skin for example) without tracking or generating complex new shapes for each frame.



Image 1: Source



Image 2: Secondary enhancements



Image 3: Window enhancements

Image 1 is the source image with a base grade applied. The traditional junk gets confused with the modern background, so color enhancement is needed to emphasize the beauty of the boat and to compare it against the architecture.

Image 2 shows the same image with secondary correction. The red of the sails and wooden hull are isolated and enriched using an HSL matte. Since the isolation is color based it does not need tracking. The extra color helps bring the junk forward in the picture, separating it from the background.

Image 3 shows window enhancements on top of the secondaries. A shape with very soft edges is used around the boat and foreground water. The area outside the shape is desaturated, tinted blue and defocused to simplify the background and give the impression that it is further away. These tasks might take several layers in some color correctors. The shape does not need to track because its edges are too soft to recognize. Additional layers lighten the hull of the boat and add a red wash to the highlights on the sails. These are subtle corrections made with a combination of mattes and tracking shapes. The final grade makes the boat the object of attention and contrasts its strong coloring against the monochromatic buildings behind.

Window Isolation

Windows are geographic shapes within an image. Hard accurate edges are generally unusable on a moving image, not least because even slight color enhancement in a sharply defined area looks like a bad composite, even when it is not. So the most important feature of any shape is its softness, that is the way it blends between grades within the image. Geometric shapes such as rectangles and ovals are fast to apply and easy to track, but need lots of softness to disguise the difference between the shape and the object it is isolating. Newer systems allow hand drawn shapes either with straight edges and points, or with curved sides and splines. If the subject of the window moves outside of the isolated area it is necessary to track the shape. All software systems have ways to auto track. The best use motion prediction within the shape and can track position, size, rotation and even the shape itself. The more common approach is to track one or more points and link the shape to those points. Both approaches are effective and time saving compared to the hardware method of manually adding key frames.

In practice a colorist often combines shapes and keys to better disguise the color effect.



Source Image With Base Grade



Sky enhancement

The source image is spoiled by a weak sky. The sky is isolated using hue isolation and corrected to a deeper blue. The key is then combined with a shape to give a more natural, graduated effect that is darker at the top and lighter at the bottom.

Corrections

There is much more variety in the enhancement than in the isolation tools. With the older fixed vectors, colorists used to be able to change saturation, hue and a little luminance. Later primary style black, mid and white controls were added. Today the list can include some or all of the above plus clipping, image defocus and sharpening, tinting, printer lights, curves and other proprietary specialties. Hardware systems usually use different layers to add extra tools, but the more flexible software systems simply assign all tools to all layers, which is much easier to use and less restrictive.

Depending on the distribution of tools, some systems need a separate layer to complete each grading task, whereas others can address many tasks in one layer. This is one of the most significant flaws in judging a color corrector by the number of layers it can use in one scene. More layers are better in theory, but achieving the same

result in fewer layers is often quicker. Moreover, there are an increasing number of color correctors that have unlimited layers, so comparing the functionality of each layer is even more significant.

Grading with Layers

Layers have purpose beyond picture element isolation. If the system architecture is sequential, and each layer selects and grades from the previous one, it is often best to make changes after the existing layers, rather than going back to adjust an earlier layer. Changing a layer that feeds a key for example will alter the key, which will produce a ripple effect on other layers and takes time to fix. One simple solution is to add a new layer after all the dependent ones so that none of the existing mattes are affected.

The effect of one layer on another is known as its priority. A layer that is affected by previous layers is said to be a cascade layer and this is the usual default. In cascade processing the sequence of layers is critical and it is often necessary to switch the order to get the desired result. In these products removing the original color (often called the natural color) limits the possibilities in later layers. Similarly, increasing the contrast could have an adverse effect on detail, although most color correctors use extended dynamic range internally so that crushed or clipped detail can be retrieved.

The alternative is to use a layer from earlier in the system path as the source of a new layer. This is known as a direct or parallel layer and it is useful because it bypasses some of the other grading layers. Direct layers can easily achieve looks and effects that are very complex in cascade systems. For example if the color is removed from an image, a direct layer can isolate and recover natural colors later. Direct processing paths are also cleaner because they reduce the amount of processing applied to isolated areas.

Of course most systems include elements of both cascade and direct processing to some degree or other. The very best can switch every layer of each event. Top of the range systems allow independent source switching of color, key and matte paths. It is important to remember that while colorists learn to work within the constraints of a system, the more flexible and free of fixed priorities a color corrector is, the easier it is to learn and the faster it is to use. In practice most grades can be achieved on any of the available color enhancement products, but a flexible layer architecture will ensure that the colorist is free to explore creative avenues and does not spend too much time managing the grade or avoiding dead end techniques. It is always faster, and simpler to match a known look than to create it with a client, but then matching a grade often takes fewer layers creating one because it is no longer necessary to leave options open, or to use experimental layers.

Separate correction layers are also useful for housekeeping. A colorist can assign matching, effects, highlights, skin, sky and foliage for example to separate layers, so that parts of the grade can be copied into other scenes. On longer projects, or projects with a team of colorists, each element can be assigned to a specific layer. For example

skin corrections would always be layer 3. A few systems allow layers to be named, which makes this method more obvious.

There are many variations of this approach. Some colorists use layers to create a history of the grade, so that changes can be removed and restored. This is an alternative to using memories, but has the advantage of being saved with each scene and of remembering the steps used to create the grade.

Managing Effects

This more advanced usage of layers is efficient beyond a single session. Common tasks such as effects, vignettes and filters can be loaded from one project or library into other projects very quickly. Library layers are sometimes used for a quick assessment before spending time on a more precise grade, or they can be used to recover calibrated settings.

A special case of effect management is the use of on set grading LUTs. These can be imported into the final grade as an effect layer, allowing for more refined scene to scene grading, yet retaining the on set intention.

In conclusion many modern color enhancement products have more than enough layers to get the job done. It is now more useful to study what is in the layers and how they react with each other, rather than to simply count how many there are. Of course, it is usually the colorists that do the studying and the clients that do the counting, so it is nice to know that it is now possible to have unlimited layers of unlimited windows if you know where to go!

Happy coloring!

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Kevin Shaw is a freelance colorist, instructor, and consultant with over 20 years experience. More information and articles by Kevin Shaw at www.finalcolor.com

Contact Kevin directly at kevs@finalcolor.com

Photography by Kevin Shaw.

