



## Point.360 Visionary Archive

### A New Method for Archiving Color Images to Black-and-White Film for Long Term Archiving and Preservation

For decades, color motion pictures have been archived for long term preservation and storage by separating the three primary color components and recording them onto three strips of black-and-white film. Known as YCM separations (for the Yellow, Cyan, and Magenta colors which are the negative of Red, Green, and Blue) this has been the industry standard for archiving motion pictures. Black-and-white film stock creates a permanent non fading color record archival element, unlike color film stock which is prone to color fading. To recover the original images from these three separate pieces of film requires scanning each strip, then recombining them to create the full color image.

This existing process can be costly, and has inherent, age related deficiencies. Each strip of film can decay or warp at different rates over time. If even one strip is warped, the image on the three color channels will not line up, causing color fringing and a loss of resolution. Additional digital processing is then required to correct these flaws.

The Visionary Archive process eliminates the need to create, store, and recover three separate pieces of film. Using our patent pending process the image is separated into its component color channels then recorded to a single piece of black & white film along with a set of alignment patterns that ensure easy and accurate recovery of the full color image long into the future.

Unlike digital archives which require constant migration and are subject to the uncertainties of technological obsolescence and future budgets, film archives are technology independent and cost effective to store. All the information needed to understand and recover Visionary Archive films are recorded in human readable form right at the beginning of each reel of film. If digital technology becomes obsolete, Visionary Archive films will be readable and recoverable.

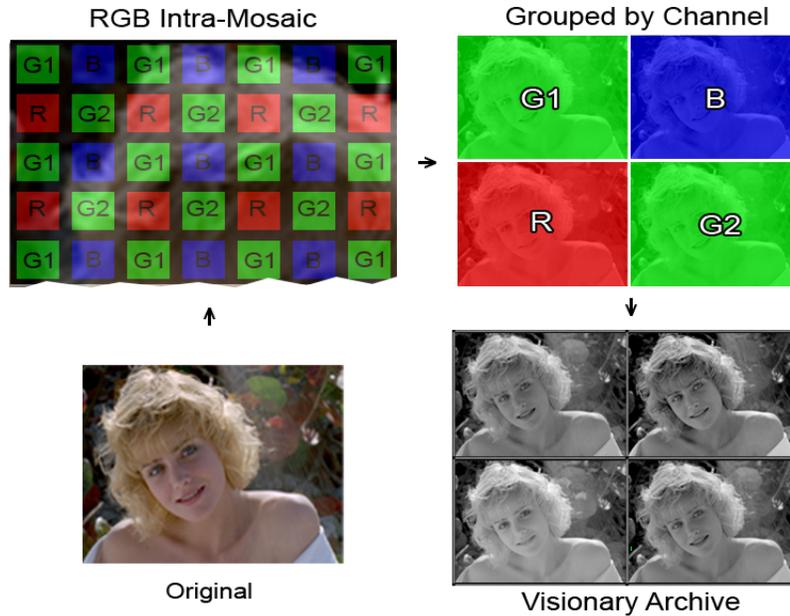
#### How It Works

Visionary Archive works with any digital files, whether from a film scan, digital camera, or mixed film and digital DI. The process consists of four steps:

1. If the source material is HD or 2K it is first up-scaled to 4K using the adjacent pixel method. This results in a new image where each pixel from the original image is now represented by four adjacent pixels in a block. The image is unchanged; it has simply been multiplied by four. 4K images remain at 4K. (This assumes a 4K film recorder is being used.)
2. A filter is applied that reduces each pixel to only a single color. Instead of the RGB values that the original pixels contained, they now contain only R, or G, or B. The fourth pixel in each block of four is another green. This allows greater redundancy in the green channel which is where human vision sees most of the brightness and detail in a color image.

### How It Works - continued

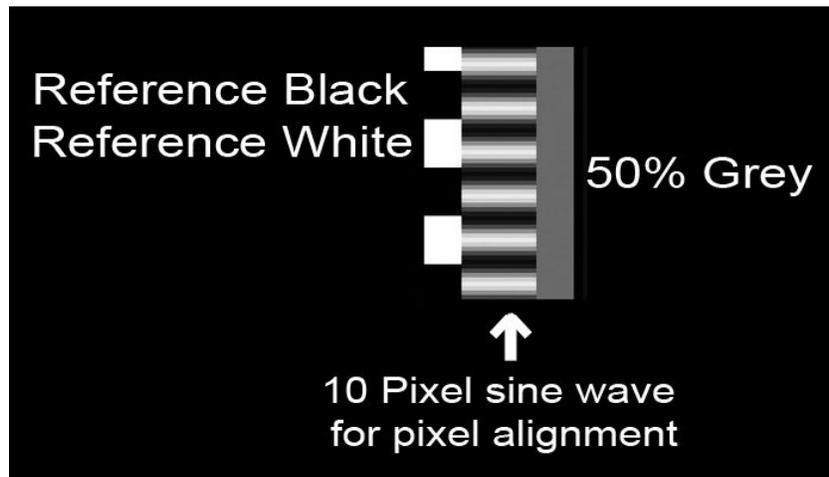
3. The single color pixels are rearranged into four separate images, one for red, one for blue, and two for green. These images are placed into four quadrants in a black and white frame, surrounded by alignment patterns that will aid in reconstructing the full color image.
4. The Visionary Archive image is recorded to black-and-white film, which is then safely stored until needed.



### The Visionary Archive Frame

One of the key elements in the Visionary Archive process is the alignment patterns which surround each image in the frame. These patterns allow the accurate realignment of the images back into the original pixel patterns, and then into the full color picture. The central element of the pattern consists of a 10 pixel sine wave that allows pixel accurate location of one quadrant image relative to another. This way even shrunken or warped film has a grid that allows the original location of the pixels to be determined. The other elements are black, white, and gray reference levels that allow the original color levels and balance to be recovered regardless of the levels used in the scanning, or any fading of the film.

### The Visionary Archive Frame



**Visionary Archive *alignment* patterns details**



**Complete Visionary Archive frame**

## **Recovering the Archive**

For any archival process to have value it must be possible to easily and reliably recover the images in the future. With Visionary Archive we provide two methods to ensure recoverability in the near term, and the very long term. We will be providing open source software that will be able to read the scanned Visionary Archive frames and generate the full color images. But a true archive is technology independent. To address this, we add a detailed description of the process used to encode the images at the beginning of each reel of film. Using this information, future engineers will be able to easily recover the full color images with a high level of accuracy. When the four quadrant images are assembled together into a single large black-and-white image it will resemble the raw Bayer pattern files that are created by nearly every digital camera in use today, from still photography to high end digital cameras. Generating a full color image from this common format is fast and easy today, and unlikely to be forgotten in a hundred years.

Visionary Archive provides an economical, reliable, high quality way to preserve motion pictures for the future.

Visionary Archive

*The future of our history is now.*

**For further information contact:**

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