

ACC/ACM-3D

Adaptive Color & Contrast™
Active Color Management™

Image Enhancement

Color is a vital part of any image. Subtle changes in the color of an image can change its entire character. Manipulating the color content of an image, to make it look more pleasing to the eye, is one of the most important activities of image enhancement.

The majority of video content is often mastered for optimal viewing on older analog display technologies such as Cathode Ray Tube (CRT) televisions and monitors. In order to make newer digital displays look more attractive to the end user, it is desirable to boost the chrominance and luminance on the display to enhance the colors and brightness of an image to deliver the best possible viewing experience.



Original

Enhanced

Genesis Active Color Management (ACM)

Genesis Microchip's *Active Color Management™* (ACM) technology is designed to address the lower contrast ratio and different color gamut characteristics of the Liquid Crystal Display (LCD) to produce a higher quality viewing experience.

In order to enhance the color and contrast ACM transforms the video signal from the native red/green/blue (RGB) color space into the luminance/chrominance (YUV) color space. The YUV color space separates the luminance component from chrominance (color) information enabling more precision and flexibility in color adjustment.

Advantages:

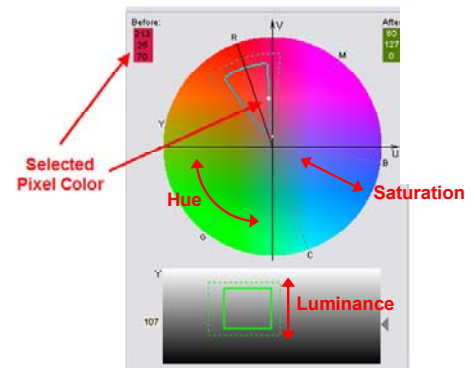
- Contrast enhancement of luminance
- Superior flesh tone correction
- Better gray guarding
- Adjustable blue stretch and green enhancement

YUV Color Space

Hue – Color (e.g., Red, Blue, Yellow).

Saturation – Clarity of the color: highly saturated colors are vivid; desaturated colors are dull, more gray.

Luminance – Brightness; amount of light reflected (e.g., minimum = black, maximum = white).



Luma / Chroma Color Space

Independent gain and offset controls for hue, saturation and luminance enables a large amount of control over the color correction applied to an image. Increased flexibility allows for specific color adjustments such as flesh tone correction and global adjustments that can affect the entire image, such as increasing the overall color saturation.

Theme Modes:

Theme modes enable the end user to optimize the viewing experience by changing the corrections applied to an image based on the content or viewing conditions. For example, a sports theme mode might enhance blue and increase green saturation to better distinguish the action and players from the playing surface; a nature theme mode might increase the saturation on all colors to produce a more vibrant image.

Color Considerations

Whenever the colors or contrast of an image is enhanced there are certain factors to consider:

Contrast Enhancement versus Color Resolution

- The color resolution is the number of different intensities that the display is able to reproduce. When the contrast is increased the color resolution is decreased proportionally.

Color Enhancement versus Linearity

- The linearity is the smoothness of visible color variation as a function of the intended color variation. When the color hue or saturation is enhanced the linearity will be adversely affected.

Reduction in color resolution or linearity may result in 'banding' or 'contouring' with images that contain smooth color gradients.