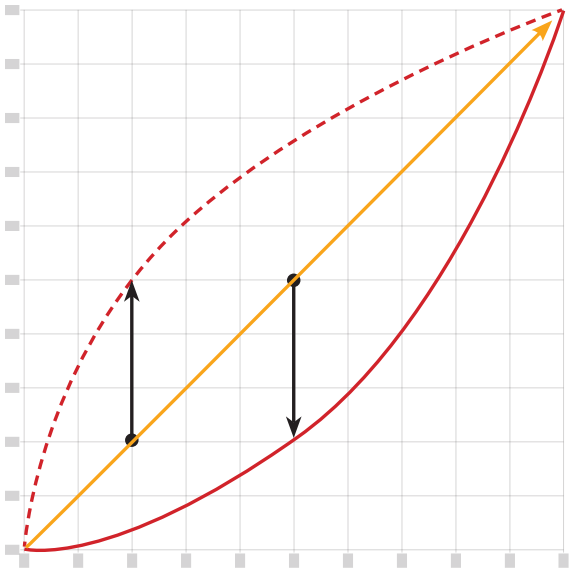
Understanding Gamma and the Use of Scene Settings

Understanding the Synergy$^{UHD4™}$ and Synergy$^{HD3™}$ Systems' scene settings, an understanding of "gamma" is first needed. **Gamma** is the translation of brightness and color in video or still image systems between actual values and displayed values. In short, it maps the input of a video source to the actual output produced for that input.

The below picture illustrates the gamma curve and what different scenes do to achieve an optimal image. The horizontal axis would represent input and the vertical axis shows output.



The orange line is the ideal where the input to the system exactly matches the output on the monitor. The solid bottom curve illustrates how an image is altered and displayed on a monitor. The above dotted line shows an alteration of the gamma curve a system like Synergy^{UHD4} and Synergy^{HD3} Systems implement to make up for the image distortion on the monitor.

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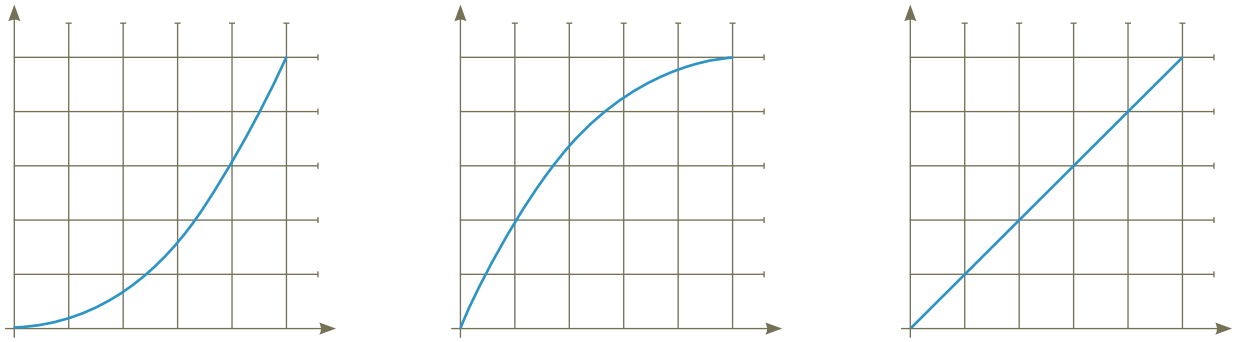
When gamma correction is applied to the input the goal is to overcome the gamma of the monitor to produce a resulting image as close to the optimal orange line or true picture as shown in the following figure.



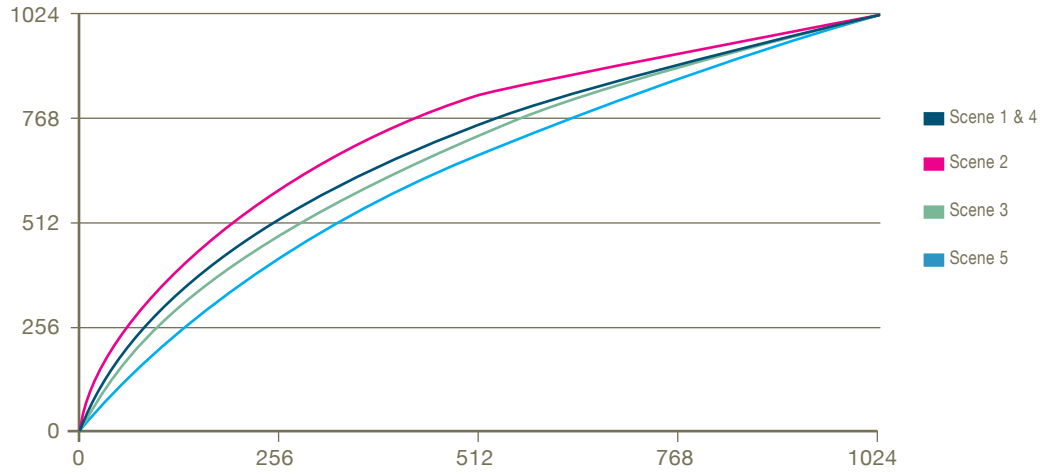
Gamma characteristics of monitors

Color information adjusted to match gamma characteristics

Color handling approaching the "y = x" ideal

The Synergy scene settings manipulate the gamma curve to result in optimal image clarity and quality depending on the procedure chosen. The following graph shows the gamma curves associated with the different scene settings for the Synergy$^{UHD4™}$ System. 10 bit input/output (UHD) refers to how many levels exist on the gamma curve. The more bits along the curve mean more possibilities to adjust the curve and fine tune the curves via the scene settings for optimal image quality. The Synergy$^{HD3™}$ System (not shown here) uses very similar scene settings but with 8 bit input/output (HD).

10bit in – 10bit out



Synergy$^{UHD4™}$ and Synergy$^{HD3™}$ Systems currently offer five scene files:

Scene 1: Set to the default industry broadcast HD standard gamma.

Scene 2: Enhances visibility in dark areas. It allows more detail to be viewed in darker areas compared to other scenes. Increasing the detail in darker areas also increases noise in the image. This scene may create unwanted noise if ample light is not available.

Scene 3: Enriches dark areas by suppressing noise to create a higher contrast between light and dark. This scene lowers gain and as a result lessens detail in dark areas, essentially blacking out all dark areas. This scene is ideal for arthroscopic cases.

Scene 4: Uses the same gamma curve of Scene 1. This scene has enhanced colors to improve the appearance for laparoscopic procedures.

Scene 5: Increases contrast, thereby brings out subtle differences when there is more uniformity between dark and light areas. This scene is ideal for small joint cases.