The subject of monitors and lighting for soft-proofing was once again investigated at this year’s Idealliance Spectrum and the Technical Conference (January and May 2011). From the monitor perspective, we’ll take a glimpse at the current display outlook and what we’ve learned.

Although the overall technology is mature, LCD displays have actually changed quite a bit over the past five years. Improvements have come mostly from a few display manufacturers as opposed to the (raw) panel makers. By and large, the LCD market seems to be driven by the advances in televisions and mobile/ tablet displays, with fewer desktop panel makers in the mix. Yet these developments have resulted in better overall specifications and quality across the board, and displays have become better and more affordable. As this situation has evolved, so too have the standards and practices used to achieve consistently accurate color. For all of us, though, achieving dependable color on monitors seems like a greater challenge.

We look first to the latest guidelines for monitors and lighting. ISO standards 12646 and 3664 outline the exacting conditions and test parameters necessary to meet monitor standardization. ISO 12646, last updated in 2008, has stringent criteria for evaluating displays. Some of the areas covered are:

- **Profile Quality** Measure color patches compared with L*a*b* values from the profile
- **Average deltaE** of 5 and max of 10
- **Viewing Angle** brightness not exceed 30% from specified angles
- **deltaEc** should not exceed 2.5 and shall not exceed 10
- **Power on stability** Warm up 30 min, should be 2 hr, calibrated

The ISO standard 3664 puts forth recommendations for lighting, but also assesses the comparison of images on monitors. Last updated in 2009, 3664 states:

- Refer to ISO 12646 for direct monitor comparison
- Brightness of at least 80cd/m2, should be 160cd/m2
- Chromaticity of white to approximate D65*

3664 also specifies that “When viewed under the conditions specified, the monitor will provide the primary adapting stimulus to the eye. The chromaticity of the white of the monitor is not too important in this situation, although many users prefer that the chromaticity of that white be close to that of D65. There is some evidence that, at the low luminance levels obtained with monitors, a chromaticity close to that of D65 provides a better evocation of white and permits a higher luminance … if the monitor is to be compared directly with prints the chromaticity needs to be closer to that of the print … close to illuminant D50…”

As for ambient condition, 12646 and 3664 guide us to an environment conducive to best practices by reducing potential problems:

- Surrounding lighting - ¼ of monitor luminance
- Neutrality of surrounding border
- Eliminating strong background colors
- Reducing glare (including clothes)
- No light to fall directly on the monitor

Proposed changes to 12646 are coming soon. The new draft of 12646 suggests improvement in several areas, reflecting recent

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Monitors for Proofing Standards and Advancements
By Thomas Gadbois
changes in paper, illuminant and monitor brightness, as well as displays and measurement devices. Uniformity and viewing angle quality will also be pressed to improve visual and color accuracy. We also can expect progress in testing methods and criteria. For example, gradation and tonal accuracy will meet higher expectations. Finally, more concentration will be placed on our all-important ambient and surrounding conditions.

In the trenches, we are only trying to find the monitor that helps achieve color accuracy and consistency. The trick is to do this without spending an inordinate amount of time implementing these standards (if you have read the documents, you know what I mean). How can we accomplish productive monitor integration? The truth is you can do this with a variety of monitors and measurement devices. But investing in equipment, following best practices and adhering to standards decreases the time involved and will result in more predictability and consistency. Best of all, you will quantitatively improve your ability to guarantee results to your customer. Some displays provide a number of controls to keep you accurate and tools to preserve defined tolerances.

Here are some features to look for in monitors:

- Name brand with good warranty
- Wide color gamut with good color emulation
- Real color and brightness controls
- Hardware calibration vs. software type
- Higher dynamic range -14-bit vs. 8-bit color
- Uniformity control
- Accurate color mixture (R+G+B= white)
- Gray balance control
- Time metering
- Brightness, color and temperature stabilization
- Color and profile verification

Experience shows that using the same monitors, or at least the same types, throughout the workflow is quite beneficial. The best way to prove a monitor’s worth is to take it for a test drive. Spend a few hours with an evaluation unit to see how it will perform in your environment. A group of companies have moved to a fully soft-proofed workflow, yet we still see the need for at least one light box reference station for approvals.

THE GOOD NEWS

Automation. Recent developments such as automatic and remote calibration and profile validation are bringing us manageability, especially over multiple sites. Internal probes can correlate to external measurement devices such as the standard-setting I1 Pro. Such systems afford you remote control while utilizing the characteristics of your reference device. Today, automatic adjustment of the light box and monitor is accomplished effortlessly, such as with systems by Just Normlicht.

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Proofing and software vendors continue various partnerships to promote advanced automation and ease of use. Before you know it, iPad emulation and control will be at your fingertips (really).

Standards. Here in the U.S., Idealliance continues to deliver industry practices and standards such as SWOP and GRACoL. These standards feature the systems, guidelines and training to make dependable monitor and systems workflow possible. Idealliance members participate worldwide in creating and updating these standards (such as 12646). FOGRA in Europe is also a good source to review certified systems and monitor pre-certification.

Ultimately, the daunting task of selecting and integrating monitors is not as hard as it might seem. We have seen technology and partnerships help us make screen-to-match a reality. And as we work to create tighter standards, it will get increasingly easier.