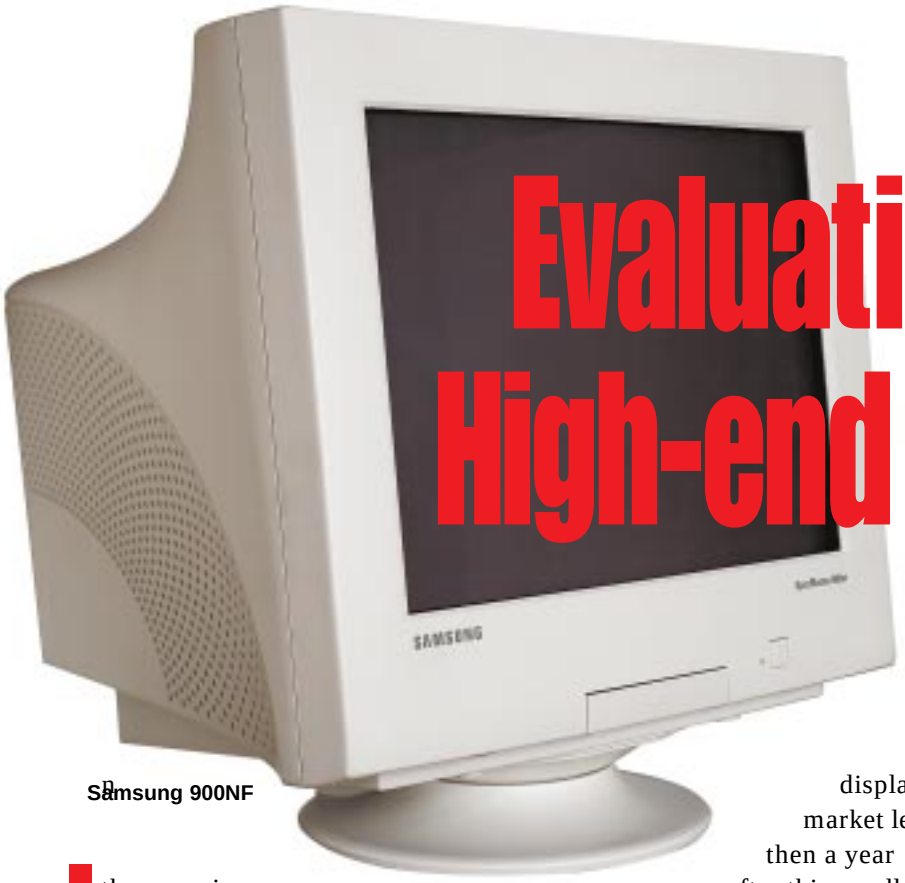
Evaluating High-end Monitors

By Andrew Rodney



Samsung 900NF

In the year since *PEI*'s last report on high-end monitors for imaging professionals there have been some changes—good and bad—to report. First, the good news: Prices continue to drop even while quality improves.

A year ago, the first crop of flat CRT displays (ideal for graphic professionals because they ensure virtually no distortion or glare) were just coming to market. Today, prices have dropped to the point where 21-inch and 19-inch CRT (cathode ray tube) displays are an obvious choice for a main monitor. And prices for 17- and 15-inch displays are so sharp that a dual-monitor set-up is no longer a luxury item.

The bad news is that two excellent high-end calibrated displays have been discontinued.

The Mitsubishi SpectraView display, which I reviewed in November 1998, is no longer on the market. Also, you may remember my glowing review last year of Miro's PressView XL. Unfortunately, Miro has left the display market less then a year after this excellent monitor was released.

Both had been designed from the ground up to be calibrated using internal electronics, and both were very accurate units. While the loss of these units leaves a much smaller selection of very high-end calibrated displays, at least one display in this round-up should provide users who need the finest all the features they could wish for.

Get What You Need

Purchase the best display you can possibly afford, even if that means cutting the budget by going with a slower processor or less RAM. Owning a superb display means that you will have the most accurate and comfortable conditions during the hours spent in front your computer. If you're shooting with high-end digital cameras in the studio, the display is critical because it's the primary tool for evaluating your images. The same is true for displays used at scanning workstations or for retouching.

Once you decide how much you can afford and the size you need, what next? Specifications are useful for narrowing down the contenders, but nothing beats sitting down in front of a display and opening a good, colorful image in Adobe Photoshop. Examine the display for sharpness while looking at fine text as well. Open a new document in Photoshop and fill it with 50 percent gray (Edit>Fill>Contents>Use: 50% gray). Size the image to fill the entire screen and hide all the palettes.

Assuming the display has been properly calibrated and the various geometry and color controls have been properly set, you want to see if the gray is even from edge to edge. This may not be totally possible depending on the display, but you certainly don't want to purchase a display where the purity from corner to corner is so poor that one corner is showing a magenta cast while the other is green. The better displays on the market have controls, either accessed from the display itself or using software, to adjust purity and myriad other variables. Being able to individually adjust

the CRT's red, green and blue electron guns is especially useful.

If you must concentrate on specifications alone, keep in mind that some figures are misleading. One usually hears about dot pitch, for example. But there are several different methods for measuring dot pitch, so, as the saying goes, "your mileage may vary."

Many of the finer displays on the market use an aperture grille that makes measuring the dot pitch even more difficult to calculate. Aperture grille design uses vertical stripes to form an image rather than dots. This technology generally produces a very sharp, well-defined image that most users seem to prefer. Sony Trinitron is the name most frequently associated with aperture grill design, but other tube manufactures use similar technology. You can usually assume a CRT features aperture grille technology when the manufacturer uses uses "tron" in the model name.

What most users don't realize is that there are only four CRT manufactures in the world: Sony, Mitsubishi, Hitachi, and NEC. While each manufacturer makes many different models of tubes, any company that produces a monitor will use an OEM tube from one of these four manufacturers.

Barco Prepress

Barco Reference V

Barco has been producing very expensive, very high-end displays for years. Walk into any high-end prepress house, retouching studio or even film studio, and you'll likely see a Barco display. With the demise of the PressView and SpectrView, the Barco line represents one of the few displays that can be internally calibrated using onboard electronics rather than a look-up table (LUT).

With other methods of hardware calibration, a color LUT is created and downloaded to the host video card. This technique can adversly affect the dynamic range of the display, and not all video boards on the Windows platform support the use of downloadable LUTs.

Barco uses very sophisticated electronics built into the display to ensure calibration and much more. This means that users on any platform can take advantage of a highly accurate display regardless of video hardware.

To ensure color fidelity from corner to corner, Barco uses digital uniformity correction technology it calls WAVE. According to Barco, the Reference V creates waves that correct for deviations over the tube to adjust focus, convergence, and colors in no less than 25 zones within the tube. Understanding that displays alter their behavior over time, Barco checks and processes the signal to the display in real time, adjusting for color stabilization and continuously adjusting the electrical characteristics of the display to compensate for variances in environment. Thus, the color produced is accurate and repeatable over time. Information is constantly generated and read from the display so that colors as well as black and white levels are at optimal settings.

Most displays need to warm up for at least 30 minutes before it is advisable to do any critical color work. Not so with the Barco, which automatically compensates for temperature variations, allowing it to be used pretty much immediately upon powering up.

For calibration, each Barco Reference V ships with the Optisense IV colorimeter and software. Each colorimeter is serialized to each individual display. The Optisense is designed for dark tone sensitivity and adjusts both highlights (gain/whites) and lowlights (bias/lowlight) for each gun during calibration.

Barco measures each display in the factory prior to shipping and claims an accuracy of one deltaE (deltaE is a mathematical equation of color difference. A deltaE of one or less is said to be invisible to the human eye).

The Reference V, has a 19.6-inch viewable area, a 0.26mm dot pitch and can be driven to a maximum resolution of 1844x1300 ppi. The display features a USB port and must connect to a USB-supported host computer. A sturdy metal hood is supplied to keep stray ambient light from hitting the screen. The display itself is darkly colored, rounded, and quite attractive compared to the industrial design of Barco's older displays.

Barco also has cleaned up the software used to drive the calibration and set a multitude of controls. Earlier versions were crude as far as the graphical user interface was concerned. I'm happy to report that the Calibrator V software is well-designed and intuitive, providing an astounding level of control over geometry, focus, convergence and so on. To give you an idea of the level of precise control to which Barco has gone, you can individually control 25 different focusing blocks.

This all comes at a steep price. The Barco Reference V has a suggested price of **$XXXX** and comes with one year of free tech support though, sadly, just a one-year warranty.

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Samsung 900NF

My try-out with the new 900NF was my first experience with Samsung displays, and I have to say that it's a very nice unit at a great price—just $469.

The 900NF monitor is a 19-inch flat CRT unit that supports resolutions up to 1600x1200 ppi at 76 Hz and has a 0.25mm dot pitch. The tube is a Mitsubishi DiamondTron, which accounts for its sharpness. The 900NF is TCO 99 certified (an international certification of environmental and ergonomic safety).

The front of the display is absolutely flat and very sharp. The onboard controls are excellent, providing four-corner purity controls for a nice even color. The individual guns have hardware controls and there are three preset color preferences.

Additionally, there is a four-way convergence control, something you don't see that often in displays in this price range. You can even reposition the on-screen menu—a wonderful feature when using a calibration product and a colorimeter. Often that onboard menu is right in the middle of the screen where a colorimeter should be placed for most uniform measurement of the display. You can even program how long the menu remains on screen.

A small, lockable panel on the front flips open and the controls are intuitive and easy to use. Out of the box, the preset 6500K calibration was very close to where it should be.

Colorific software for visually calibrating the display is included in with the 900NF. With Colorific, the user visually adjusts the display and creates a profile, similar to Adobe Gamma. Both Windows and Macintosh versions are included.

At $46, the 900 NF is ideal for imagers on a budget, as is the 17-inch unit 700NF for just $312. Both have three-year warranties. (*www.samsungelectronics.com*)

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CTX PR1400F

I also had no experience with displays made by CTX before

CTX PR1400F

reviewing the new PR1400F, their top-of-the-line display for imaging professionals.

The 21-inch monitor (19.8-inch viewing area) offers maximum resolution of 2048x1536 ppi at 77Hz and a 0.24mm dot pitch, with USB support and TCO 99 certification. It is one of five new units in CTX's Professional PureFlat Series, all of which use advanced FD Trinitron technology.

This FD Trinitron technology employs a precise inner curve on the monitor screen to optimize image quality. These new tubes feature advanced electron guns outfitted with MALS (Multi Astigmatism Lens System) and EFEAL (Extended Field Elliptical Aperture Lens) technology to minimize video spot size. The smaller spot area prevents elliptical distortion commonly found in conventional lenses.

Another feature found on CTX's high-end PR1400F is the use of L-SAGIC (Low-Power, Small Aperture, Grid 1 Impregnated Cathode), which is said to maximize image brightness at the edges and sides of the monitor screen. The PR1400F certainly sports a very sharp and totally flat screen. The EFEAL does appear to produce a very even brightness in all corners. The onboard controls feature the modern convenience of today's displays, including control over the RGB guns, four-corner purity adjustment, and a multitude of control over geometry and color settings.

I prefer Samsung's slide-open control panel to the PR1400F's exposed buttons because it's possible to alter the display condition on the PR1400F with an accidental touch. The PR1400F also lacks provisions for repositioning the on-screen menu or setting the timing of the menu. MSRP is $999, and the display has a three-year warranty.

Profiling Hardware

Calibrating and creating a profile for a monitor is a function most users should seriously consider. Displays alter their behavior on a regular basis, and the calibration/profiling process needs to be updated on a regular basis. (Many vendors agree that this process be conducted every 300 hours of use).

If your monitor does not have onboard calibration electronics (most don't), you must purse one of several other options.

The easiest, and least accurate, is to run Adobe Gamma (a control panel that comes with Photoshop 5.0/5.5). The Gamma process uses your eyes, not an instrument, to record the condition of the display.

A more accurate alternative is to buy a colorimeter, a hardware devices that is able to read red, green and blue data from the monitor. See my article on color management (*page xx*), for detailed information of related hardware and software.

An important issue to consider in purchasing a new monitor is the type of manual controls it offers the user. Out of the box, most monitors are very blueish (their whitepoint is generally around 9000 Kelvin). It is helpful if your monitor allows you to do this manually first, before you use other hardware or software calibration, as the necessary adjustments won't be as severe. Unfortunately, not all displays have provisions for setting the white point using internal adjustments over the individual guns. Therefore, if you do need to use an external colorimeter, use it with a utility like PreCal from Color Vision (part of the OptiCal package—www.colorcal.com/new/opticalmc7.html). It allows you to alter the guns very precisely before calibration even takes place.

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Other displays in the CTX Professional PureFlat Series include the CTX PR500F 15-inch display ($219), the CTX PR705F 17-inch at $349, and the CTX PR960F 19-inch, at $649.00. *(www.ctxintl.com)* ◀

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