

CromaClear™ CRT

INTRODUCTION

Recent advancements in multimedia applications employ far more complex graphic images compared to those from several years ago. For example, gaming, video conferencing and Internet surfing all rely on vivid colors and crisp text to provide impact. Consequently, increased clarity and contrast are essential for maximum screen performance.

WHAT IS A CROMACLEAR CRT?

A CromaClear CRT is a new standard in display technology, specifically optimized for rapidly emerging multimedia use. This CRT combines the best features of dot-trio and aperture-grille monitors into a unique slot mask. Utilizing a mask design already established in the television industry, which uses a similar slot design, CromaClear CRTs excel when displaying video images.

The most significant difference between CromaClear CRTs and existing CRT technologies is their viewable phosphor pattern. When combined with the slot mask, the red, green and blue (RGB) P22 phosphors of the CromaClear CRT appear elliptical in shape, compared to round phosphors (used in dot-trio CRTs) and stripes (used in aperture-grille CRTs). The illuminated phosphors of the CromaClear CRT are also grouped into separate bundles of three in a vertical alignment, providing improved clarity and focus.

With the new CromaClear CRT, the conventional "dot pitch" measurement is no longer applicable. The term "mask pitch" is more appropriate when discussing this specification. A mask pitch measurement is the distance between like-colored phosphors on the CromaClear CRT mask. The mask pitch of the new CromaClear CRT is 0.25 mm.

IMAGE QUALITY AND THE CROMACLEAR CRT

Overall monitor image quality is difficult to quantify. Given the inherent complex nature of CRTs, a variety of factors combine to produce a monitor's image. These factors — focus, contrast and color saturation — all come into play when deciding which monitor and CRT provide the "best" image. When discussed in relation to the new CromaClear CRT, these items need further explanation.

Focus:

The new CromaClear CRT incorporates a new SDF-ELA (Single Dynamic Focus - Expanded Large Aperture) gun for 15-inch tubes and DQF- ELA (Dynamic Quadruple Focus - Expanded Large Aperture) gun for 17-inch tubes. These guns provide uniform image clarity and focus. When viewing images in monitors' corners, other CRTs could distort image ratio and perspective. Using the CromaClear CRT's ELA gun, this problem

is virtually eliminated. This also provides improvements for viewing six-point text and fine, single-pixel elements.

As mentioned earlier, the Cromaclear CRT incorporates a new mask shape and alignment. As a result, the electron beam used to pass through the slot mask had to be adapted to match. The ELA gun utilized in Cromaclear CRTs has an exact beam/mask match (an elliptical electron beam passes through an elliptical mask opening) for maximum power transfer from electron beam to screen phosphors with no energy spillage onto the slot mask.

Although it was possible to use existing round phosphor gun technology with the new Cromaclear CRT, a certain percentage of electron power would have been lost, thereby degrading overall image focus. An effective visual to describe this phenomena is a "round peg, square hole" analogy: while contact might be taking place, it's not completely precise. Excess energy transfer could lead to a warped grill or mask, resulting in possible image degradation (color purity and/or brightness uniformity problems). This mismatch tends to occur in aperture-grille CRTs (stripe grille/circular electron beam). On the other hand, dot trio CRTs match a circular beam to a circular shadow mask.

This combination of dynamic beam focus and new electron guns also reduces the need for end-user moiré and convergence controls.

Contrast:

The term "contrast" has a unique role in overall image quality. Technically speaking, contrast refers to the use of opposing elements, such as colors, in proximity to opposites. Applying this definition to CRT-based monitors, contrast provides the appearance of depth to related objects. A good example is an illustration that provides highly defined, detailed image quality, such as a black ball resting on a white floor.

Contrast has a symbiotic relationship with overall CRT brightness: the higher the overall CRT brightness, the better the overall image contrast. As such, high contrast images cannot be achieved on CRTs with poor light output. These high levels are fundamental bases for the Cromaclear CRT.

Color saturation:

Another subjective portion of overall image quality is color saturation. Colors appear differently to each end-user, making this a difficult specification to quantify. However, lack of meaningful numerical data does not prevent making a decision on which CRT type displays color in the best manner. Low-quality CRTs display colors in muted and blanché tones and are noticeable to end-users. A high-quality tube like the Cromaclear CRT provides highly saturated, vivid colors.

CONVERGENCE

Convergence is the process of controlling the CRT beam deflection to keep the red, green and blue beams properly overlapped when scanning the raster (area illuminated by the scan lines on a CRT). As the electron gun scans across the screen, the shape of electron beams slightly varies as the beam reaches the outer edges of the screen. Misconvergence, the technical term used when this process is not completely accurate, appears as color fringing on the edge of an image displayed on the screen. For example, a CRT monitor with misaligned electron beams will show a white "H" on a black background with one of the primary or secondary colors shadowing its edges. CromacClear CRTs provide numerous deterrents to misconvergence, including the ELA guns and their tight mask pitch.

CROMACLEAR VS. APERTURE-GRILLE CRTs

Aperture-grill CRT monitors currently use dampening wires to hold the black striping in place between the phosphors. Comparatively, CromacClear CRTs utilize a shadow mask that does not require the use of dampening wires. Often, dampening wires are visible to the user and mechanically obstruct the flow of the electron beams, critical to maximizing image focus. Without dampening wires, the electron guns of a CromacClear CRT hit the phosphors more consistently on all areas of the CRT.

In addition, dampening wires are highly sensitive and are more susceptible to shipping damage. They also have the potential to be affected by harmonic distortion when speakers are placed near the CRT.

CROMACLEAR VS. DOT-TRIO CRTs

CromacClear CRTs improve upon the image sharpness and focus attributed to dot-trio CRTs. The new slot mask design and illuminated phosphor alignment provide a tighter mask pitch, leading to improved image quality. In addition, the tighter mask pitch and ELA guns furnish sharper focus, while at the same time combating possible moiré.

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