

## MONITORS and PRINTER

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**Rationale:** Currently there are no agreed upon or published quality assurance procedures for PACs or monitors. Monitors have the tendency over time to degrade. They drift, lose lamps, get dirty and may not have been set up properly to begin with. The Society of Motion Picture and Test Engineers (SMPTE) has a test pattern that can be used to measure luminance. Subjective evaluations of brightness, sharpness, geometric distortion and artifacts can be made.

**Frequency:** Weekly

**Procedure:** These SMPTE test pattern can be used to assess the capability of the monitor to display the gray-scale images. The SMPTE test pattern will help you determine whether the contrast and brightness settings of your monitor are acceptable. Using the SMPTE test pattern, you can also check for limitations in spatial resolution and aliasing of your display. If monitor quality degrades, it should be recalibrated by field service engineer

1. Display SMPTE pattern on monitor.
2. Set Background to 0 and Window to 255.
3. Evaluate images for geometric variation: Do lines appear as straight lines without curving or breaks? Do blocks look square? Overall image is displayed evenly.
4. Evaluate gray scale: Can differences be determined for all grayscale levels. The brightness and contrast of your monitor are adequately set if the 5% squares at both ends of gray scale are visible. Using the pattern: The gray scale is shown as a series of squares in the center of the image that range from black (0%) to white (100%) in a semi-rectangle. The 0% and 100% squares (see arrows on image at left) each contain smaller squares within them that represent signal level steps of 5% and 95%, respectively. You should be able to visually differentiate the inner square from the larger square that contains it.
5. Be aware that it may be impossible to adjust your monitor to show both of these inner squares perfectly and equally. Most video monitors do better in showing the 95% square than the 5% square. However, you might see if reducing ambient light improves the visibility of the 5% square.
6. The spatial resolution (linearity) and aliasing (distortion) of your monitor are within acceptable limits if the high contrast bar patterns in the test image are distinct as simple patterns of black and white pairs.
7. Using the pattern: In each corner of the image as well as in the very center, inspect the 6 squares filled with varying widths of alternating black/white horizontal and vertical lines. You should be able to differentiate all the lines, from fat to narrow (6 pixels, 4 pixels, and 2 pixels) and both horizontally and vertically.
8. Print pattern and repeat evaluation. Record results.

