DK-Audio PTV PM 5639/00 CRT Color Analyzer Demo Guide

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Before you see the Customer:

Read the operator's manual and "The Color Truth".

Charge the batteries. A full charge takes 14 hours.

Know where you are getting the test patterns from before going to the customer's site. It is normally easiest to use the generator (check to see if the customer requires component or composite) that is available with the Analyzer. (Don't forget to make sure the signal is terminated.)

The Demo:

1. Make sure that all contact surfaces are clean. Clean the CRT and suction cup with a damp cloth or whatever they use to clean their monitors. The suction cup on the sensor head does not adhere well to dust.

2. Before you place the sensor on the CRT, display the Red Field pattern to check for purity and then display a "Pluge" pattern on the monitor and adjust the brightness control so that only the "Whiter than Black" (4% above Black) bar remains visible.

3. Place the sensor on the CRT (centered) and select a low light White Window pattern (15% White).

4. Check the Luminance value of the monitor by observing that the "Y=" (CIE display) on the display unit is between 1,0 NIT and 3.0 NIT. Adjust the brightness control (not the contrast) to bring the "Y=" into this range.

5. Adjust the Red, Green and Blue cut-off (Bias) controls on the monitor to move the dark box into the center box on the CIE display. Also check the RGB display for center point alignment and the X and Y numerical values in the CIE display (see "tips" section below) for how closely they correspond to the reference (e.g. D6500, etc.). Check with the zoom button on the display unit to be sure that the gain is at its most sensitive level for this initial adjustment. The gain on the display can be changed using the up or down arrow keys.

These controls may be called by another name depending on the monitor manufacturer. They can be called "Black level", "Bias", or "Background" for example. You can verify that you are manipulating the low light control by radically adjusting one of these controls and watching the darker areas of the monitor react.

Don't be overly concerned about matching your target white reference at this point. There may be some interaction between the monitor's low-light and high-light controls. For example: if your initial reading of the low-light color temperature is T=6100 Kelvin, and your target reference is D6500, you are fine for this first adjustment.

6. Select a 100% White Window pattern. Adjust the monitor's contrast control (not the brightness) to 35ftL. (Caution: Avoid the full screen White Window for long periods of time as this can overdrive the CRT).

Please note that older CRT's and some large monitors (like 32"+ sets) may not be capable of producing this much light. Therefore, adjust the contrast to produce as much light as possible without "blooming". You can use the "Pluge" pattern to check for this. The White box on the upper right of the screen in the "Pluge" pattern should look to be about the same size as the other boxes. If it looks broader than the boxes below it, you are overdriving the CRT (blooming). Also check for overloading of the power supply with the Needle Pulse pattern. If the line is not straight, turn down the contrast.

7. Adjust the Red, Green and Blue gain controls on the monitor to move the dark box into the center box on the CIE display. Also check the RGB display for center point alignment and the X and Y numerical values in the CIE display for how closely the phosphor corresponds to the reference (e.g. D6500, etc.).

This time you can try to be more exact in your matching. Also, pay attention to the CIELUV reading on the display unit. Any CIELUV value of 1 or less is desirable.

8. Go back to the 15% White Window pattern and see if the gain controls had an effect on your previous adjustments. Repeat the procedure in steps (4) and (5). This time try to match as best you can.

Odds are that there will be some change. Broadcast grade monitors will have the least interaction between the low-light and high-light controls.

9. Display a Gray Scale (Stair Step) pattern and check for consistent tracking of gray.

10. If you were using a composite source for the patterns, adjust the color (Chroma Gain) and hue (Chroma Phase) of the monitor using Color Bars and a Blue filter or by turning off the Red and Green guns of the monitor.

11. You now have a correctly calibrated monitor.

Tips:

The CIE display mode on the Color Analyzer works well because it is an absolute reference which is phosphor independent.

The R, G, & B labels in the CIE display indicate in which color direction the monitor is "pulling". For example, if the dark box is directly above the empty box near the G, then the monitor has too much Green and you need to decrease the Green.

Remember that the CIE and RGB displays have three ranges of resolution. You can step through the three ranges with the up and down arrow keys. The finest resolution is indicated by a wide horizontal line underneath the X axis in the CIE diagram. The coarsest resolution has the smallest line. On the RGB display, the percentage of range is indicated (0 - 200, 75 - 125, or zoom 90 - 110) on the right side of the display.

The "zoom" button will take you to the finest resolution (check to be sure that the dot is visible on the CIE display and that the bars are all visible in the RGB display) in both the CIE and RGB display. Make certain that you are in the finest resolution mode before you finalize any adjustments during either the low-light or high-light settings. Don't be fooled by a solid target box when you are in the coarsest resolution mode. A low "CIELUV" (1 or less) value will confirm that you have achieved your desired color temperature.

Refer to the Chromaticity Coordinates and Correlated Color Temperature of some White References in the Tables and Formulas page in the back of the Color Truth booklet. This section gives the numerical values of several color temperatures used by monitor manufacturers in various industries. This is the third way of verifying the correctness of your color alignment and a method favored by many video engineers. These numbers also appear on the "Status" screen on the PM 5639 Color Analyzer just under your selected color temperature.

CIE 1931 Coordinates for Some Illuminants:

Designation	*x*	*y*	*Designation*	*x*	*y*
Illuminant D5500	0.332	0.348	SMPTE Phosphor (red)	0.635	0.340
Illuminant D6500	0.313	0.329	SMPTE Phosphor (green)	0.305	0.595
Illuminant D7500	0.299	0.315	SMPTE Phosphor (blue)	0.155	0.070
Illuminant A	0.448	0.407	EBU Phosphor (red)	0.640	0.330
Illuminant B	0.348	0.352	EBU Phosphor (green)	0.290	0.600
Illuminant C	0.310	0.316	EBU Phosphor (blue)	0.150	0.060

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