



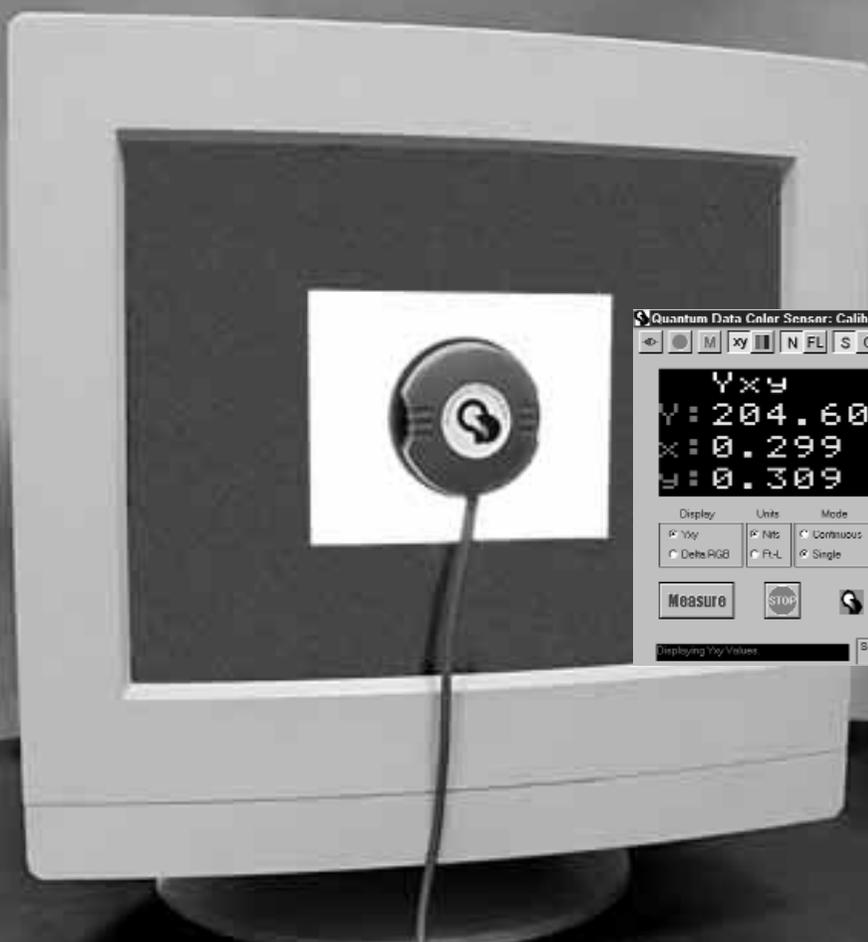
QUANTUM DATA

QUICK START GUIDE

Color Sensor CS-1 Color Management Tool

The Quantum Data **Model CS-1 Color Sensor**, when used with Quantum Data's **VGM (Video Generator Manager)** software, lets you measure the color and light output of a color or monochrome monitor. This Quick Start Guide helps you get the most from these valuable tools.

Using measurements displayed in a data window, the service technician can interactively adjust the monitor under test.





The Quantum Data Model CS-1 Color Sensor, when used with Quantum Data VGM (Video Generator Manager) software, lets you measure the color and light output of a color or monochrome monitor. The color readings can be displayed as a color temperature or either as C.I.E. Yxy luminance and chromaticity coordinates or RGB offset (Delta RGB) values. The CS-1 also displays Monochrome readings. When adjusting a color monitor to a specific color setting you can enter your target values and have the software display the deviation from them. The deviation is graphically displayed both as x,y chromaticity coordinates and relative R,G,B level bar graphs.

- 1) This VGM (Video Generator Manager) software works with MS-Windows® 95 and 98.
- 2) Connect the CS-1 Color Sensor to an open RS-232 (serial) port on the computer. One or more adapters may be needed to match the connector on the CS-1 cable to the connector on the computer.
- 3) Start VGM software version and connect to your Quantum Data Model 801 series video generator if you are using one.
- 4) Select **Color Sensor** from the **Tools** menu as shown in Figure 1.



Figure 1

5) The Color Sensor screen shown in Figure 2 will appear. Figure 3 identifies all of the elements in the screen. All of the elements and their operation are described in later sections of this document.

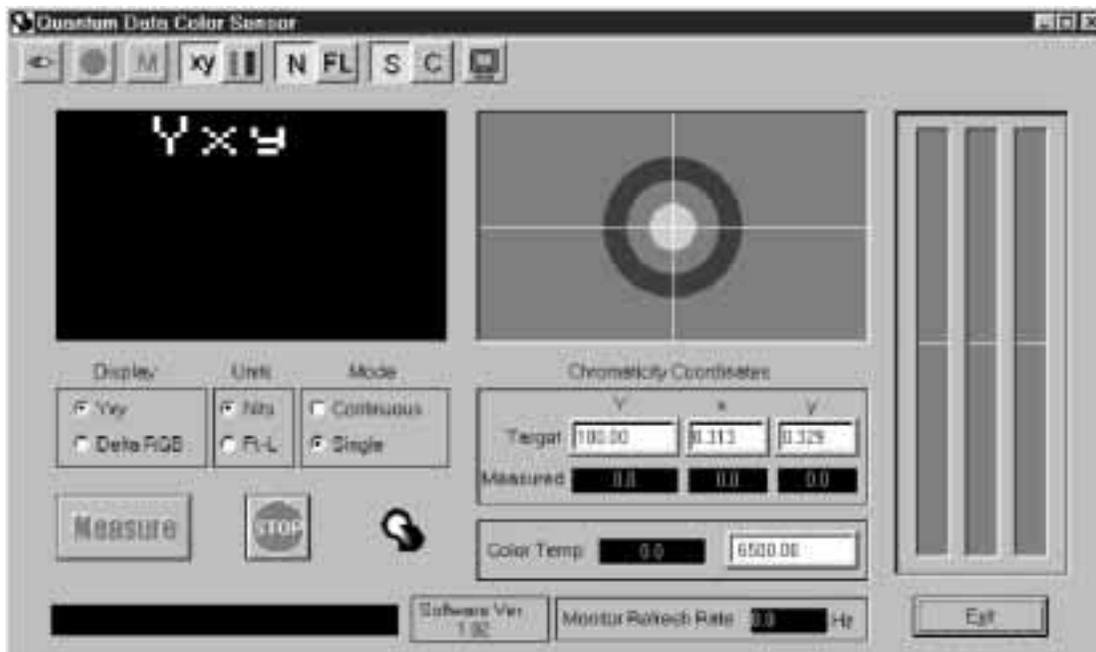


Figure 2

6) Once the CS-1 Color Sensor screen is displayed, you can:

- Have the software connect with the CS-1 Color Sensor
- Display a suitable test pattern and attach the CS-1 Color Sensor to the monitor's screen
- Select display: Yxy or Delta RGB, or from color sensor toolbar, select Monochrome
- Select your preferred units of measure
- Select Single or Continuous measurement mode
- Adjust your target values to a given monitor specification
- Start taking readings and/or adjusting the monitor

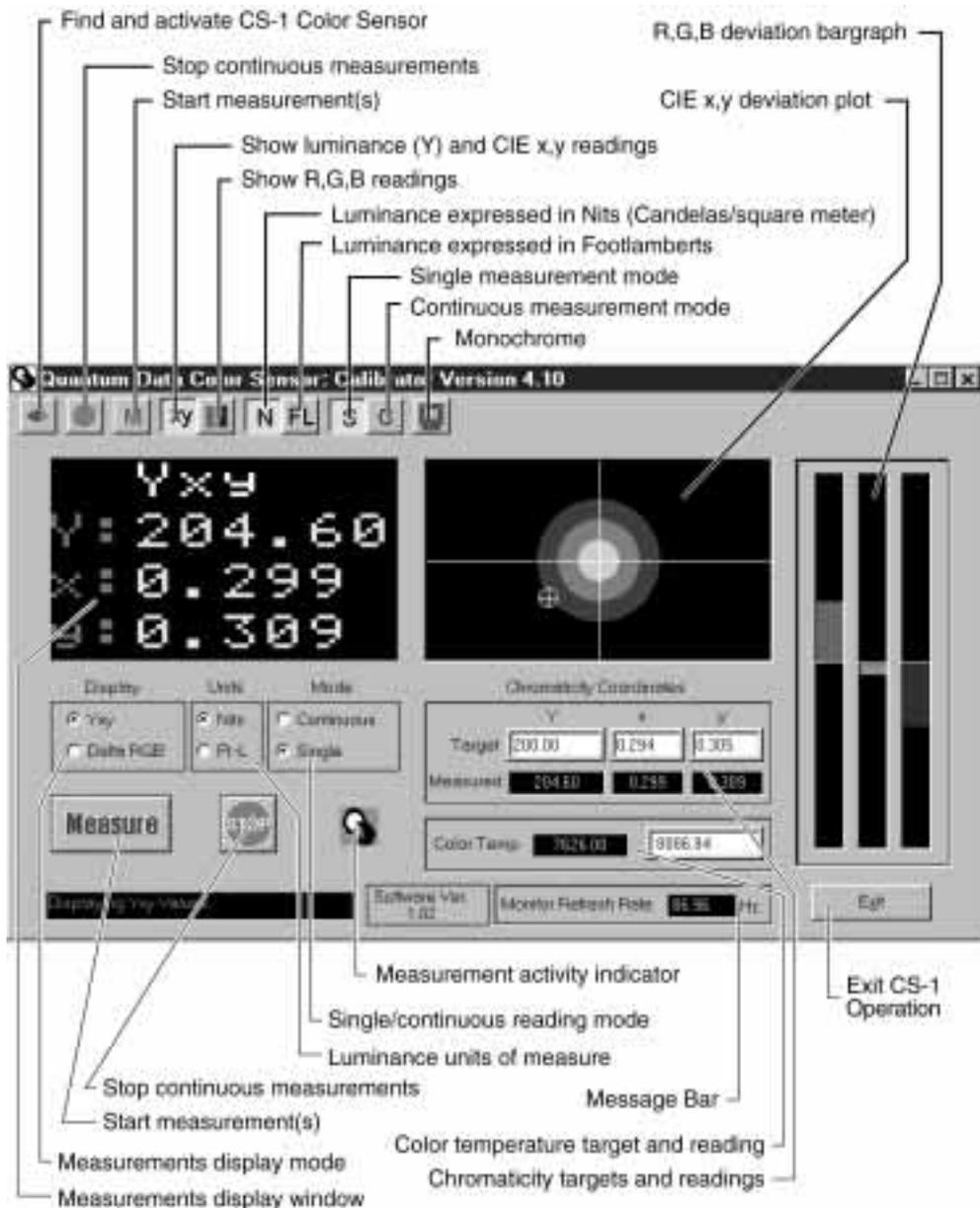


Figure 3

Connecting with the CS-1 Color Sensor

The VGM software has to establish communications and activate the CS-1 Color Sensor before you can start taking readings. Clicking on the “Find and Activate Sensor” button at the Color Sensor toolbar starts the process. The software scans COM 1 and COM 2 serial communications ports for the CS-1. The Message bar at the bottom of the screen reports port number and sensor version number when it is found. Also displayed is the monitor refresh rate. A separate error message screen is displayed if the CS-1 can not be found.

Selecting a suitable test image and attaching the CS-1

The CS-1 Color Sensor needs to see a solid white area in order to produce valid color temperature and luminance readings. The Quantum Data’s Model 801 series provide suitable patterns for this purpose. The BriteBox pattern can be drawn as either a single white box in the center of active video or as a box in the center and in each corner of active video. The CS-1 Color Sensor has a large suction cup on its face. It is attached to the face of the CRT so that the entire central opening in the cup is over a fully lit portion of the test pattern. You can freely switch between the main VGM screen and the CS-1 Color Sensor screen.

Choosing your preferred units of measure

You can choose to use either Foot-Lamberts (Ft-L) or Candela per square meter (Nits) as the unit of measure for luminance. This is done by either selecting the **Ft-L** or **Nits** option in the Units box or by clicking the **FL** or **N** button at the toolbar. The relationship between the two units of measure is:

$$1 \text{ Nit} = 0.29186 \text{ Foot-Lamberts}$$

You can also choose to have the measurements display window show color temperature deviation from your target value in terms of CIE Yxy color coordinates or relative R-G-B levels. This is done by either selecting the **Yxy** or **Delta RGB** option in the Display box or by clicking the **xy** or **colorbar** button at the top of toolbar.



Choosing Single or Continuous measurement mode

You can set whether the software takes a single reading and then displays the results or if it is to take continuous readings and updates the displayed values after each reading. This is done by either selecting the **Continuous** or **Single** option in the Mode box or by clicking the **C** or **S** button at the top of the screen.

Entering your target values

If you are adjusting the display to a given color temperature you can enter the desired target value and the software displays the deviation from them. You can enter your target as either a single color temperature value or as CIE luminance (Y) and chromaticity x,y coordinates.

Start taking readings

To take a single reading first make sure you select **Single** mode. Then click on either the large **Measure** button or the small **M** button. The measurement activity indicator is animated while taking a reading and stops when the reading is completed.

To take continuous readings first make sure you select **Continuous** mode. Then click on either the large **Measure** button or the small **M** button to start taking readings. The measurement activity indicator is animated while taking readings. Clicking the red Stop button causes the software to stop taking readings and displays the last set of readings taken.

Adjusting a display to a given target value.

First enter your target values as previously described. You can then adjust the monitor's individual color channels using either the R,G,B bar graph or the CIE x,y deviation plot.

The R,G,B bar graph shows the relative amplitudes of all three primary colors above or below the reference centerline. The monitor is properly adjusted when the lengths of all three bars are minimized.

The CIE x,y deviation plot shows the current x,y coordinate reading relative to the desired target coordinates. If either x or y is way off (more than about .006 units), the target area resembles Figure 4. The color of the large central disc matches the primary color that is off the most and the plus/minus symbol in the disk shows the relative amplitude of that color.



Figure 4

Once the colors are adjusted so that the x and y deviations are less than .006 units, the deviation is displayed as a small colored disc as shown in figure 5. The disc is positioned to represent the relative x,y deviation from the central target value. When both x and y deviations are below .002 units, the disc becomes white, to show that the monitor's color temperature has been properly adjusted.



Figure 5

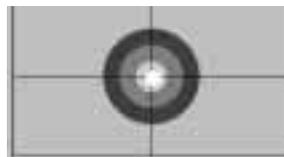


Figure 6



The Quantum Data CS-1 Color Sensor provides an inexpensive, easy to use alternative for adjusting monitor brightness, color temperature and luminance. The CS-1 works with the Quantum Data ISA type video generators and is controlled by a new pull-down menu in VGM. Connection for the CS-1 is through the RS-232 serial communications port and can even be used with ISA boards that are currently in use by simply updating the VGM software. If you have two serial ports available on your computer, you can operate the CS-1 and a stand-alone Model 801 series generator at the same time.

The CS-1 user interface is a Windows compatible control program that allows the operator to run through any series of tests with a minimum of screen changes.

Specifications:

Display Modes: Yxy, Δ RGB, Temperature in Kelvin and Monochrome

Luminance Range: 0.05 to 150 ft-L: luminance units are selectable within the user interface for either foot-lamberts or cd/m² (nits)

Accuracy: Y: plus or minus 4% plus or minus 1 digit

Screen Refresh: 30 to 120 Hz

Minimum System Requirements: PC compatible computer with 486 or better running MS-DOS, MS-Windows® 95 or 98.



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