Sencore's Automated All-Display Color Calibration System – IMPROVED!

Glen Kropuenske
SENCORE, Inc.
Application Engineer
1.800.736.2673 or 1.605.339.0100
mailto:ae@sencore.com
http://www.sencore.com

Computer automation can do amazing things, but what can it do for color calibration?

Can the computer self-configure its interface ports for communication with a video test generator, and automatically identify other ports for easy setup?

Can the computer select the proper generator test pattern and provide step-by-step instructions for each calibration step?

Can the computer step the generator through each 10 IRE step and record the test data from the color sensor at each step automatically?

Can the computer automatically plot a gamma curve from each 10 IRE step?

Can the computer assemble and print professional data graphs to show before and after calibration results?

Can a computer give the display alignment commands and automatically perform color balance calibration without remote control entry into the display's service menu?

The answer is **YES** to all of these questions. In fact, the improved ACP6500 Automated Color Calibration system provides you automated assistance on every display you calibrate. This article summarizes the ACP6500's automation that makes each color calibration you perform go faster and easier than any other calibration method.

ACP6500 Auto CalPro Automated Color Calibration System

The ACP6500 provides computer automated color calibration. It interfaces a VideoPro Video Generator, ColorPro Color Analyzer, and HDTV display (profiled) to a computer. The system is fully integrated with the ACP6500 Color Calibration Software operated on the PC. The entire display calibration process including setting the user controls, white balance calibration, gamma testing, and report generation is performed through the software.

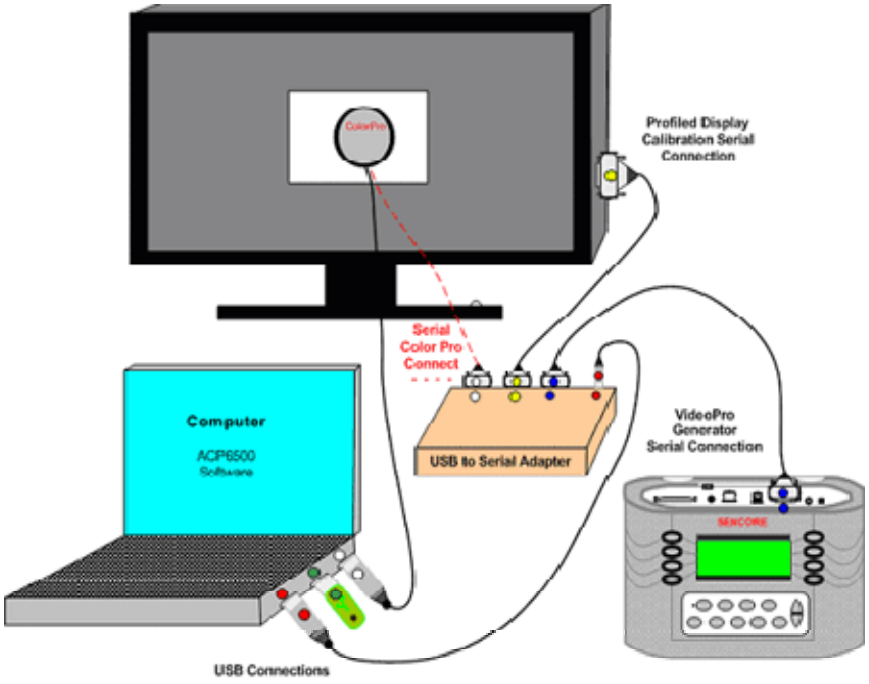

Figure 1. *The Pass Mode function of the Sencore DA795 can change the digital audio signal interface format, audio sample rate, channel status bit information, digital audio level and improve jitter.*

Automation: Self Configures Interface Port to Sencore "VideoPro" Generator

One of the challenges of getting started with a computer automated system is getting the computer to communicate with the peripheral devices. The ACP6500 makes one part of this process fast and easy. A recent software improvement now automatically searches and identifies the communications port connected to the VideoPro generator and assigns this port for generator use. Here is how easy it is. Simply select the model VideoPro generator you are using in the SETUP menu and click on the INITIALIZE box. You'll see the serial port number automatically selected and listed.

Other ACP6500 setup steps are covered in the "ACP6500 Auto CalPro Startup Guide" (available upon request). This guide provides step-by-step instructions on how to setup communications with the USB to Serial Adapter's ports and install the software key. Recent software improvements have simplified port identification, further speeding up the startup process.

Hint: *When communicating to an HDTV display profiled by the ACP6500, the com port number is simply the next higher or lower port number than the port found for the VideoPro generator.*

Automation: Selects VideoPro Pattern - Gives Instructions for Each User Control Adjustments

The Auto CalPro breaks each color calibration job into a ten step process. In each of the 10 steps, the software automatically selects the proper video test pattern on the generator, provides measurements from the color analyzer, and shows easy-to-follow instructions on how to make the selected adjustment.

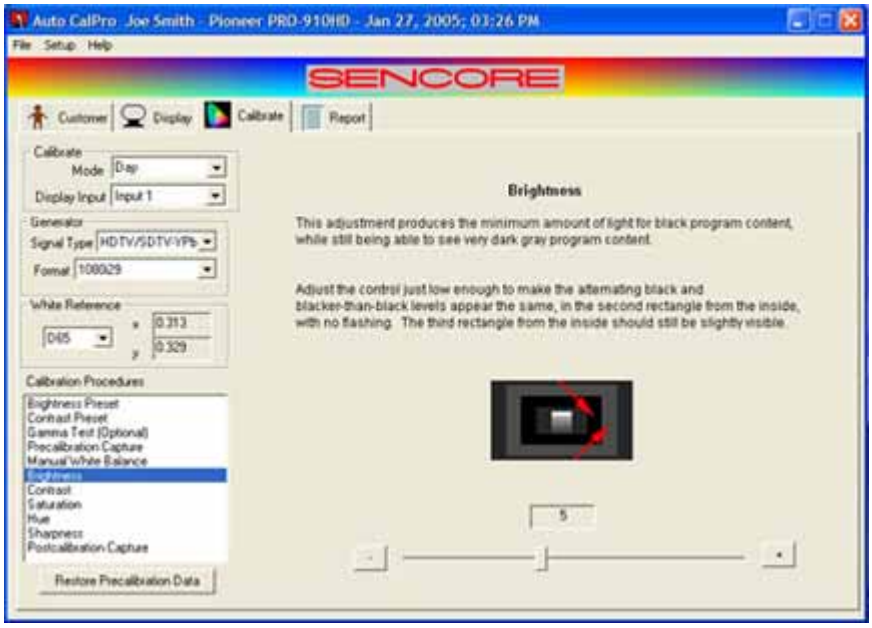

Figure 2. *Each calibration step is accompanied by specific instructions. The proper VideoPro pattern is automatically selected for the display type.*

The 10 Auto CalPro Calibration Steps Include:

1. Brightness Preset
2. Contrast Preset
3. Pre-calibration Capture
4. Automatic/Manual White Balance
5. Brightness
6. Contrast
7. Saturation
8. Hue
9. Sharpness
10. Post-calibration Capture

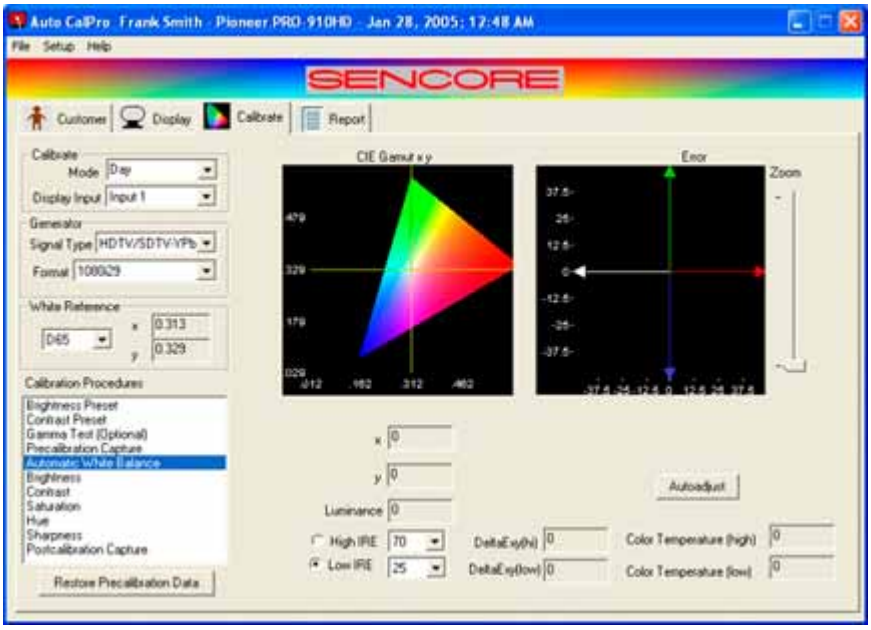

Figure 3. *The Auto CalPro color calibration screen provides graphic guidance and color coordinate values for easy white balance adjustment.*

Automation: Increments VideoPro Window in 10 IRE Steps - Captures Luminance & Color Measurement Data (Pre and Post Calibration Data Captures)

The ten step process includes a Pre-calibration Capture and Post-Calibration Capture procedure. A manual procedure has you increment the generator in 10 IRE steps from 10 to 100 IRE, stopping at each step to record luminance, color temperature, and color error measurements. This manual process is terribly repetitive and time consuming. Plus, in a typical calibration, you do this at least two times, before and after calibration.

The ACP6500 Software completely automates this process for hands-off calibration data capture and analysis. When you instruct it to start, the Auto CalPro steps the generator through the IRE steps from 10 to 100 IRE, capturing measurement data at each step. The captured measurement data is graphed for easy analysis and is available to put into a customer report. Since this is repeated before calibration (Pre), during calibration as needed, and after calibration (Post), your color calibrations are much less time consuming and more accurate with the Auto CalPro.

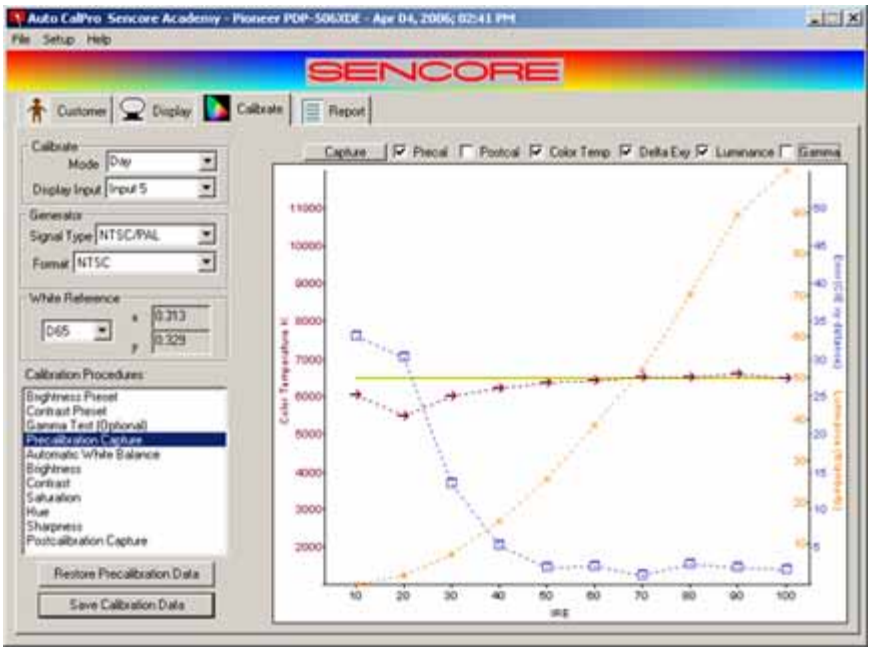

Figure 4. *The Auto CalPro steps the generator through IRE steps from 10 to 100 IRE, capturing measurement data at each step and graphing it for easy analysis.*

Automation: Plots Pre-Calibration Gamma Curve for Best Display Gamma Selection

A Gamma Test may be performed at any time during the 10 step calibration process. The Gamma test characterizes the gamma performance of the video display you are calibrating. A gamma test again walks the generator through IRE steps from 10 to 100 IRE capturing light information from the sensor. A graphic display shows the gamma test results.

The gamma test not only shows you the performance of the display, but, more important, it enables you to test each of the gamma selections offered by a video display in its user menu. Please note that some displays offer multiple gamma selections while others do not. Therefore, this is an optional ACP6500 test during the calibration process.

If, for example, the display provides three different Gamma settings, you can capture the display's performance with each of the three different settings. Each result can be graphed and shown as a different color. Select the user gamma setting which comes closest to providing a standard gamma of 2.2 across the luminance range. This provides the most accurate movie reproduction gamma. What would be very time-consuming, manually, is simple and fast with the Auto CalPro.

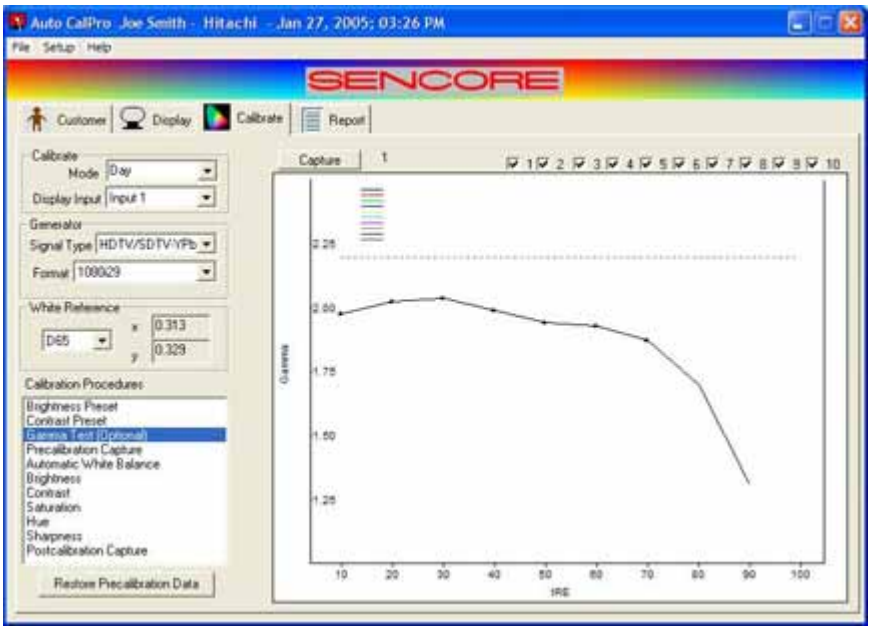

Figure 5. *The Gamma Test increments the generator from 10 to 100 IRE, capturing luminance information and plotting the gamma test results for easy analysis. Multiple gamma tests can be plotted on the same graph for comparison.*

Automation: Perform Color Calibration via the Display's Serial Communications Port

What is even more amazing is the ACP6500's ability to send calibration instructions directly to the display via the display's serial communications port. Imagine not having to enter the service menu of the display to find those menu items which you must increment while watching the color meter changes. That's right; the computer software can read the sensor and send the proper calibration commands directly to the display, resulting in a completed color calibration. You push the start button and watch. This is possible with an increasing number of displays which are profiled in the ACP6500 software.

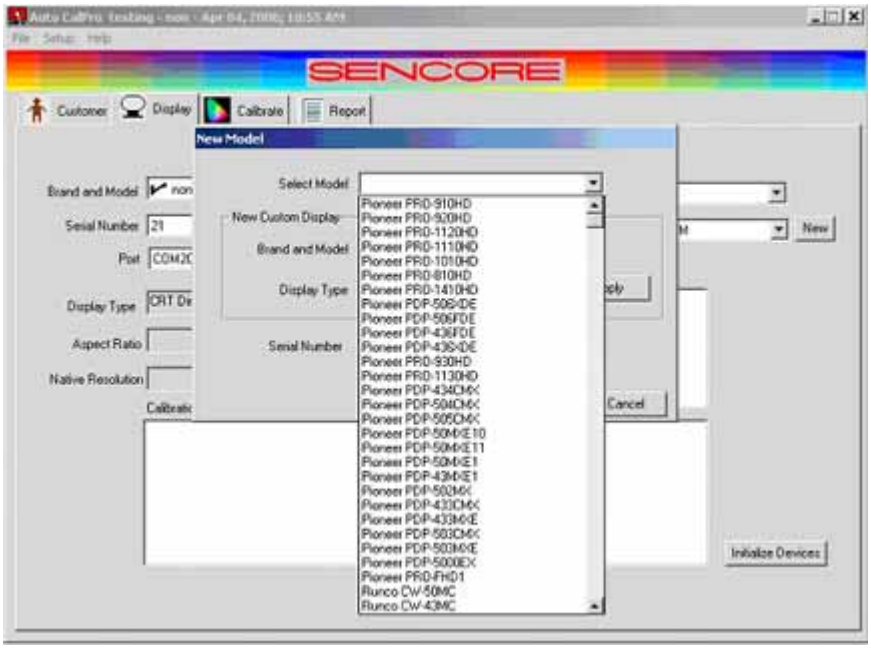

Figure 6. *An increasing number of profiled displays in the Auto CalPro can be calibrated automatically through computer commands to the display's serial interface.*

Automation: Print Professional Color Calibration Reports

The AutoCal Pro provides versatile customer report generation. You can choose to print up to 4 different report pages. Each page can be configured with the desired information from the Pre-Calibration and Post-Calibration data captures.

SENCORE

Golden Calibrations
3200 Sencore Drive
Sioux Falls SD 57107
Phone: 605-339-0100 Fax: 605-339-0432
email: tschulte@sencore.com
Tom Schulte

Ultimate Video
1200 Rodeo Drive
Hollywood, CA 90200
Chuck
649-708-1234

Model: Pioneer PRO-910HD
Serial Number: 1
Date: Aug 01, 2004; 05:57 AM

Day Input 0

	Precal	Postcal		Precal	Postcal
Brightness	128	131	Red Cutoff	128	126
Contrast	40	46	Green Cutoff	128	128
Saturation	128	128	Blue Cutoff	128	137
Hue	128	128	Red Drive	128	134
Sharpness	128	128	Blue Drive	128	120

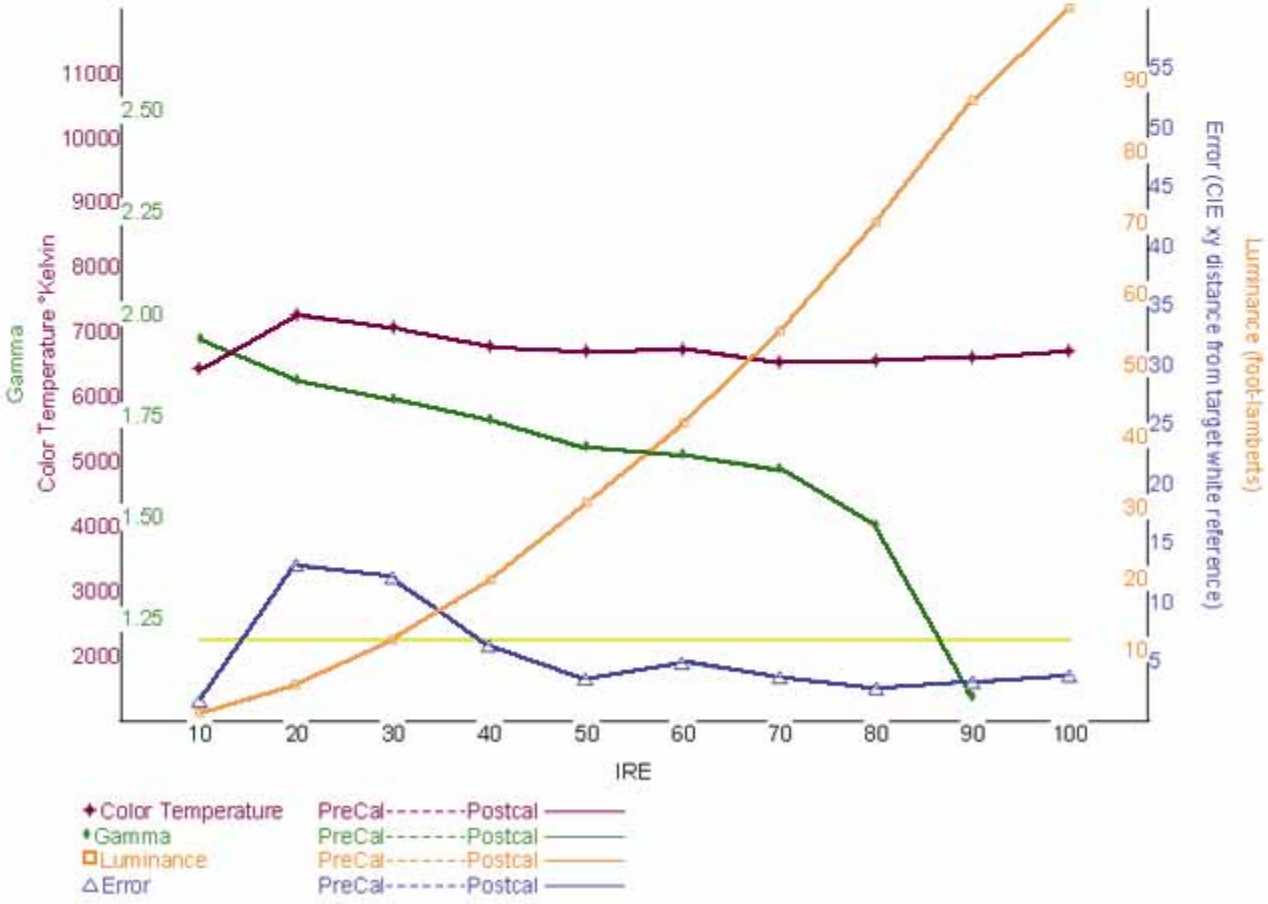

Figure 7. *A sample customer report. The Auto CalPro provides customized customer calibration reports from the pre-calibration and post-calibration data.*

Automated All-Display Color Calibration System

Automation with the ACP6500 Auto CalPro speeds your calibration process by eliminating the manual selection of video patterns and IRE level steps. Selecting the

best display gamma setting is simple and fast. The calibration reports are the most professional and concise you'll find compared to any other color analyzing system.

The Sencore ACP6500 is now more automated than ever with an increasingly growing number of displays which can be calibrated automatically via their serial communications port. Also, the ACP6500 has been recently enhanced to assure even faster, more consistent, user friendly operation. If you are currently using Auto CalPro, free upgrade software is now available. For more information on the ACP6500 or to upgrade call 1-800-Sencore (736-2673).

Learn more – ACP6500 Auto CalPro Video Calibration Software:
http://www.sencore.com/products/acp6500.htm

http://www.sencore.com mailto:sales@sencore.com 1.800.736.2673 or 1.605.339.0100