ACP6500

Auto CalPro
Video Calibration Software

Operation & Application Manual

SENCORE

3200 Sencore Drive, Sioux Falls, SD 57107

WARNING

PLEASE OBSERVE THESE SAFETY PRECAUTIONS

There is always a danger present when using electronic test equipment. Unexpected voltages can be present at unusual locations in defective equipment and distribution systems. Become familiar with the equipment with which you are working, and observe the following safety precautions.

Every precaution has been taken in the design of the Auto CalPro Video Calibration Software System to insure that it is as safe as possible. However, safe operation depends on you, the operator.

1. **Never exceed the limits of the Auto CalPro** as given in the specifications section or other special warnings provided in this manual.

2. **Always be sure that your equipment is in good working order.** Broken or frayed test leads or cables can be extremely dangerous and may expose you to high voltages.

3. **Remove test leads** immediately following measurements to reduce the possibility of shock.

4. **Do not work alone when working under hazardous conditions.** Always have another person available in case of an accident.

5. **Never assume that a cable shield is at earth ground potential.** Both static and electrical voltages can be present on a cable's sheath.

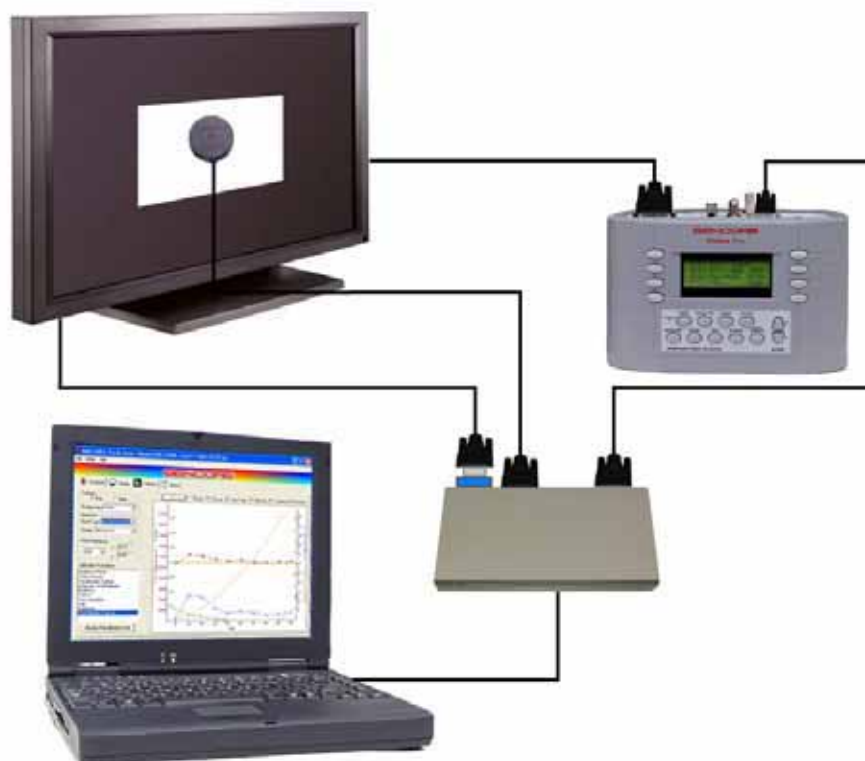6. **Always follow standard safety procedures.**

When in doubt, be careful.

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DESCRIPTION

Introduction

The ACP6500, in conjunction with the VP400 & CP5000 series video generator and color analyzer, allows you to calibrate video displays quickly and accurately, with minimal manual adjustment. The Auto CalPro remotely controls the VP400 and CP5000 to automatically calibrate white balance and to automate user settings for profiled ISF C3 chassis. The ACP6500 also semi-automatically calibrates **all** other displays. Setup is a snap. Connect the TV under test, the VP400 and CP5000 to the PC, start the program, and you are ready to effortlessly recreate film-like pictures on any display.

ACP6500 "Auto CalPro" Features

- Delivers automatic video display calibration on selected chassis with the click of a mouse.

- Calibrates video displays to produce picture perfect images to manufacturer specifications in minutes.

- Provides automated guided-process video calibration on any video display by automating the video generator and color analyzer functions.

- Simplified user interface and easy-to-interpret chromaticity diagrams take the guesswork out of video display calibration.

- Guided calibration procedures with simplified application pointers help you quickly and accurately calibrate every video display. Helps you calibrate like a pro the first time and every time.

- Easy-to-create calibration reports demonstrate to your customer how their display performed before and after calibration.

- Pre- and post-calibration gamma report shows how closely the video display performed to ideal.

- Obsolete-proof system. As new manufacturers and chassis are added, you can perform automatic calibration on a growing list of video displays.

Required Hardware

Personal Computer: Windows 98SE, ME, 2000 or XP based

Sencore VP (VideoPro) series Generator

CP5000U (USB ColorPro) or CP5000S (Serial ColorPro) All Display Color Analyzer

If your PC has only one USB port and you use a CP5000 USB ColorPro pod, a USB hub is required.

* Note: This diagram shows the CP5000 Serial *and* USB ColorPro pods connected. One or the other will be used, not both. The picture is for display purposes only.

ACP6500 Auto CalPro Accessories

| Sencore Part #s	Description	Photo
39G1117	USB to serial port expander, RS232 adapter with four 9-pin ports; including the USB cable and a serial gender changer (for profile link) **supplied**	
39G1124	USB Security Key (Dongle) **supplied**	
26G1534 26G1129	Adapters: null modem (26G1534) and mini gender changer (26G1129) **1 of each supplied**	
39G523	Six foot serial null modem cable with a 9-pin female D-sub on each end **2 supplied**	
CC307	Video suite case with storage capabilities for: • the ACP6500 'Auto CalPro' Calibration System • the CP5000 'ColorPro' All-Display Color Analyzer with both calibration pods, its tripod holder, software and serial or USB extension cables • a product from the VP400 'VideoPro' Multimedia Video Generator family • Leads, power adapters and laptop PC storage space in the cover **optional**	

Installation of Software and Drivers

Installation of the ACP6500 Software _____

Insert the ACP6500 Video Calibration Center software disc into your drive. The "auto-run" feature should sense the disc in the drive and automatically begin the software installation using the "Install Shield Wizard". Follow the installation instructions.
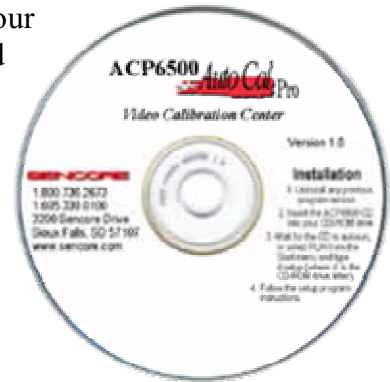
If the software does not automatically start, click on "My Computer", right click on the drive which has the software disc in it and select "explore". Look for the "Setup.exe" file and double-click it. The "Install Shield Wizard" should now appear. Follow the installation instructions in the Wizard. Once the installation has finished, you can remove the disc.

***NOTE**: If you get an Error Code 1931, select "**OK**" and continue the installation. Some spyware programs which actively scan the computer may also try to stop the installation of the program. If you receive any such message, instruct the program to allow the installation of the software or temporarily shut down the spyware program until the ACP6500 Software installation is completed.
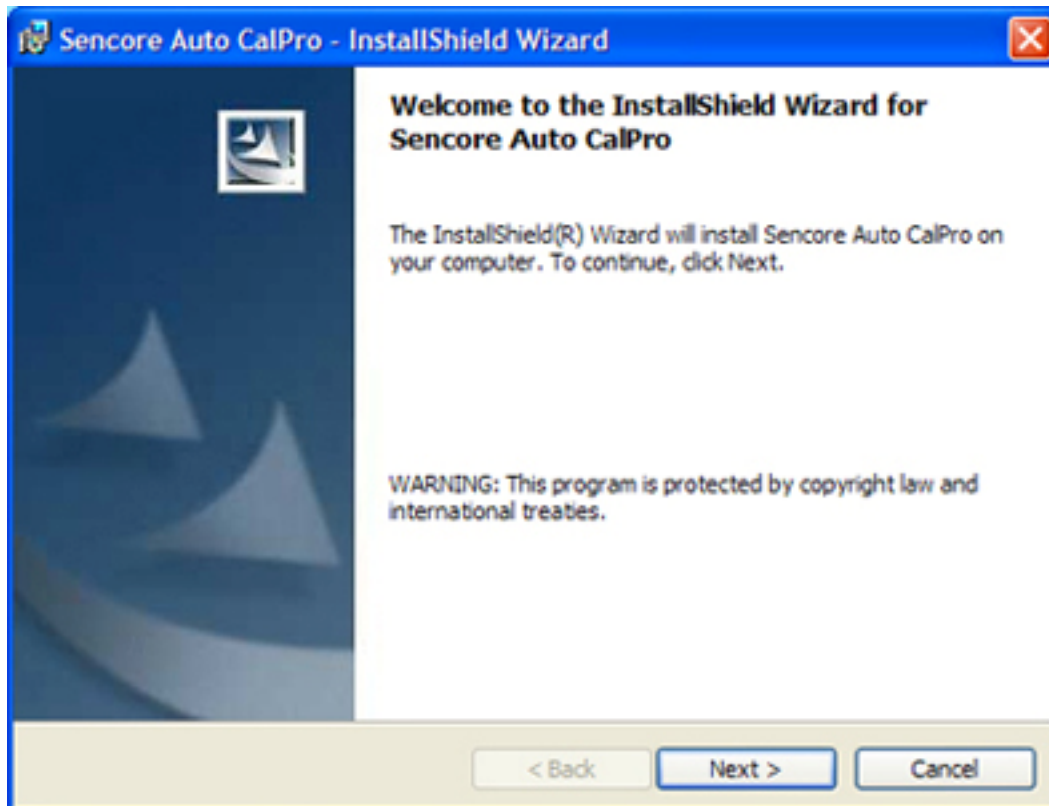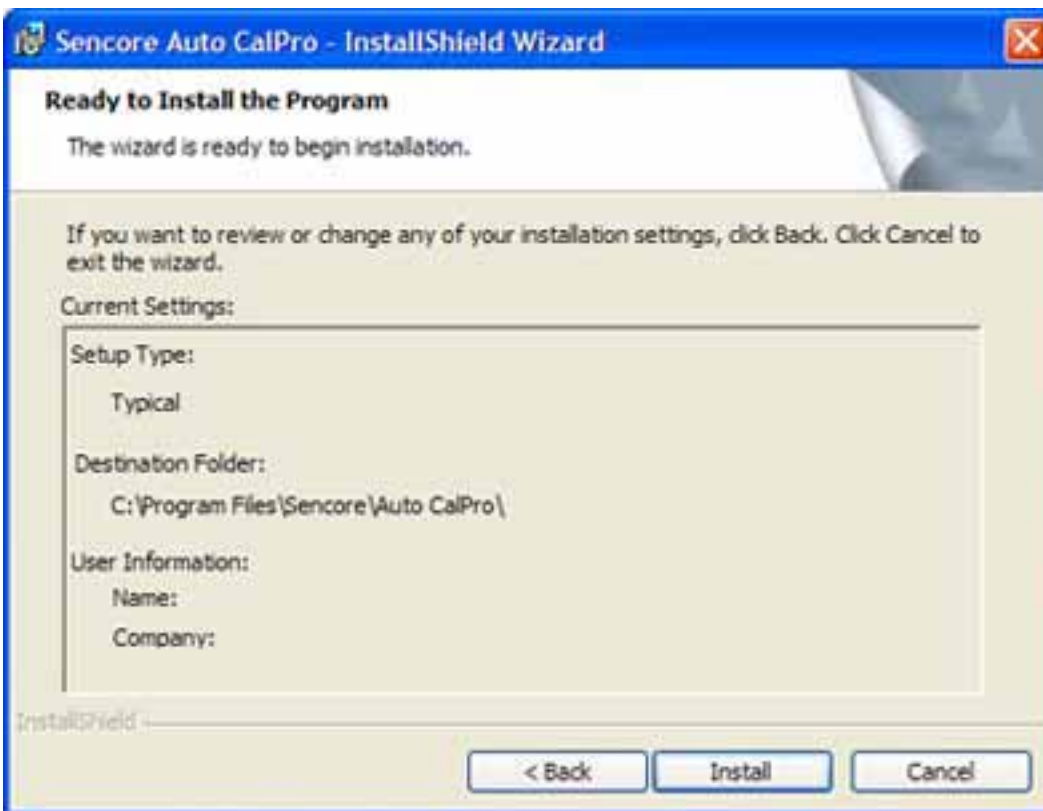

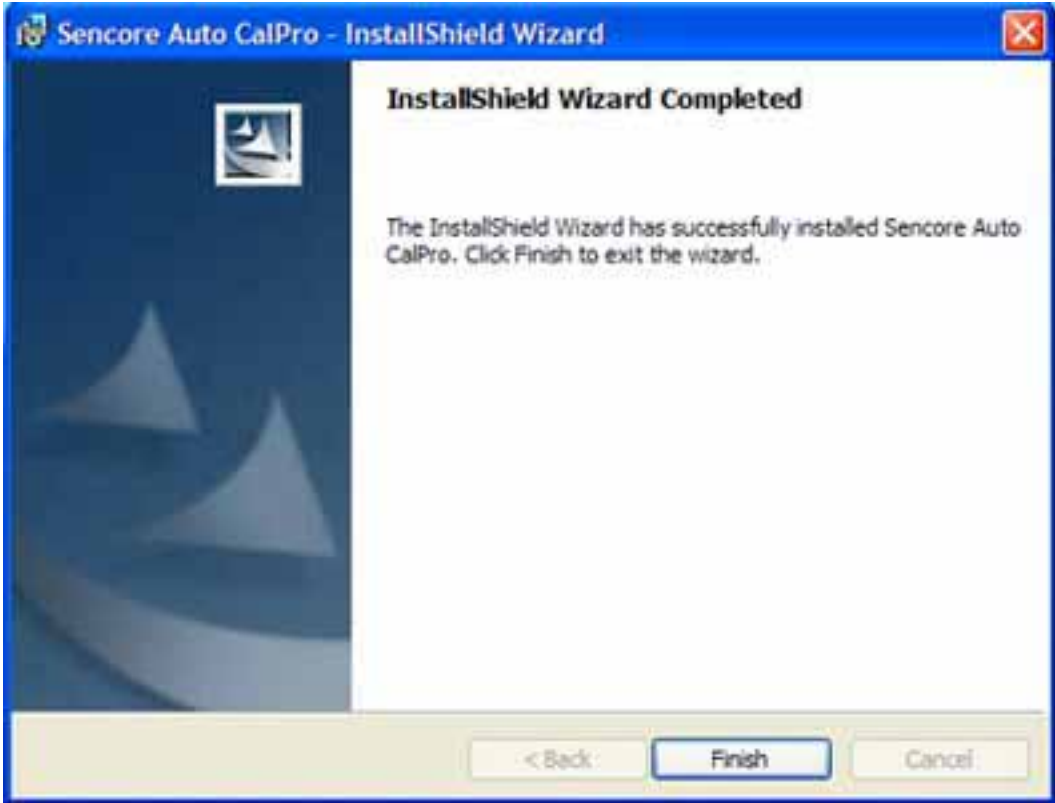Select "**Next**" to begin installation of Sencore Auto CalPro software.

Select "**Next**" to continue.

Select **"Install"** to continue.

A progress bar will track the installation.

Select **"Finish"** to complete the Auto CalPro software installation.

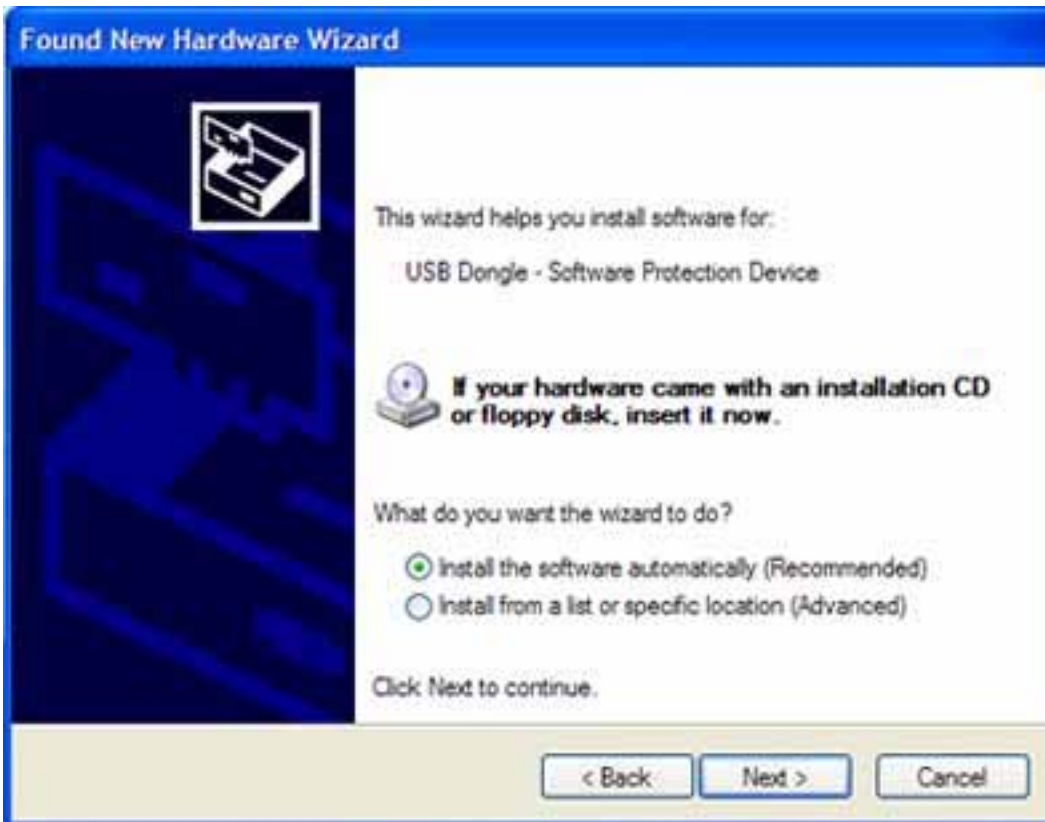## Installation of the Security Key _____

Plug the Security Key into any USB port. Once you plug it in, the New Hardware manager should sense the key, and the following window will be displayed.
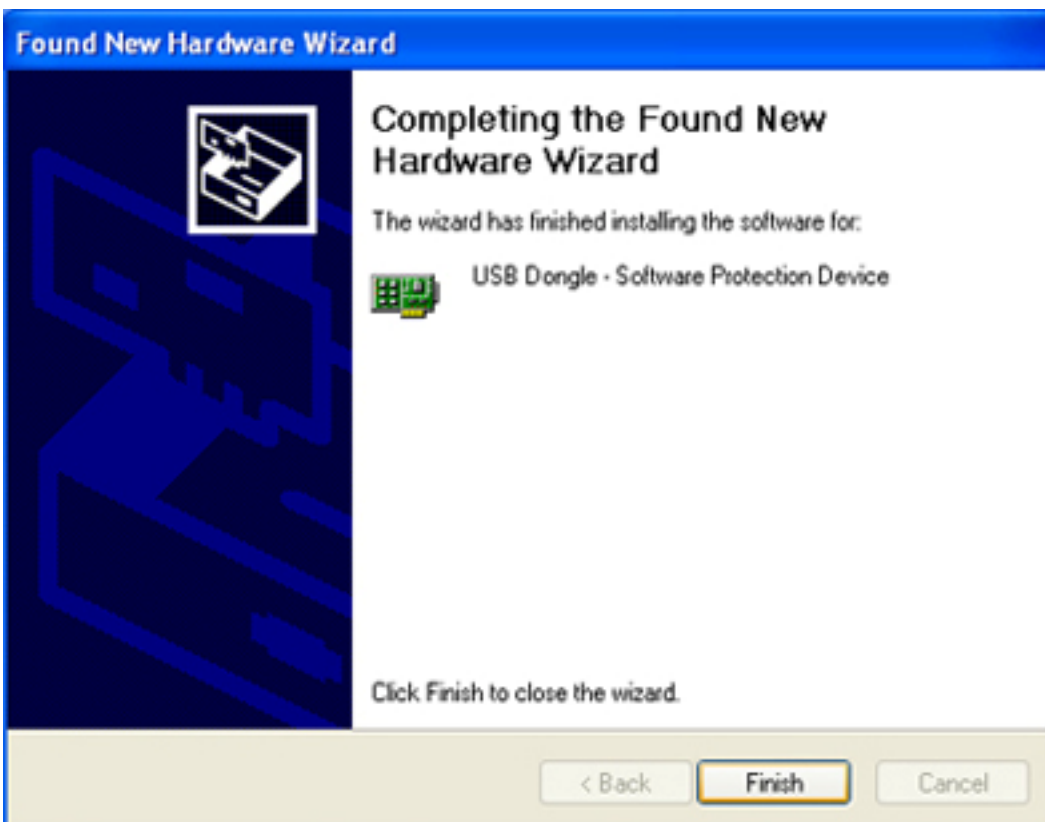

39G1124 USB Security Key (Dongle)

Select "**No, not this time**" and then press the "**Next**" button to continue.

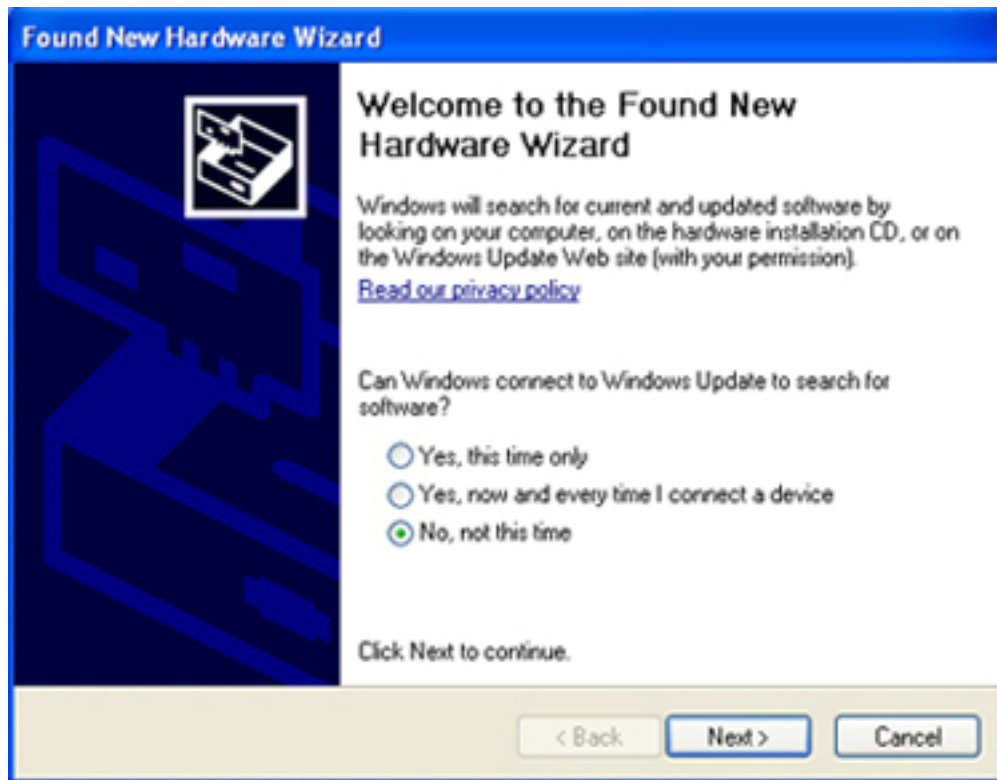Select **"Install the software automatically"**, and then select the **"Next"** button to continue.

Installation of the Dongle driver is complete. Select **"Finish"**.

Installation of the USB Serial Port Expander_____

The ACP6500 is supplied with a USB Serial Port expander which creates four additional serial ports for your computer. This port expander will be used whenever you need more serial ports than you have on your computer. A serial port is required to control the VideoPro generator, and may be needed to control a serial ColorPro and a profiled video display.

As a USB device, the Serial Port expander requires a USB driver to be installed. Insert the ACP6500 installation CD into a drive. Plug one end of the supplied USB cable into the port expander box and the other into an open USB port on your computer. The "New Hardware Wizard" should appear, and you can begin installation of the USB software driver.

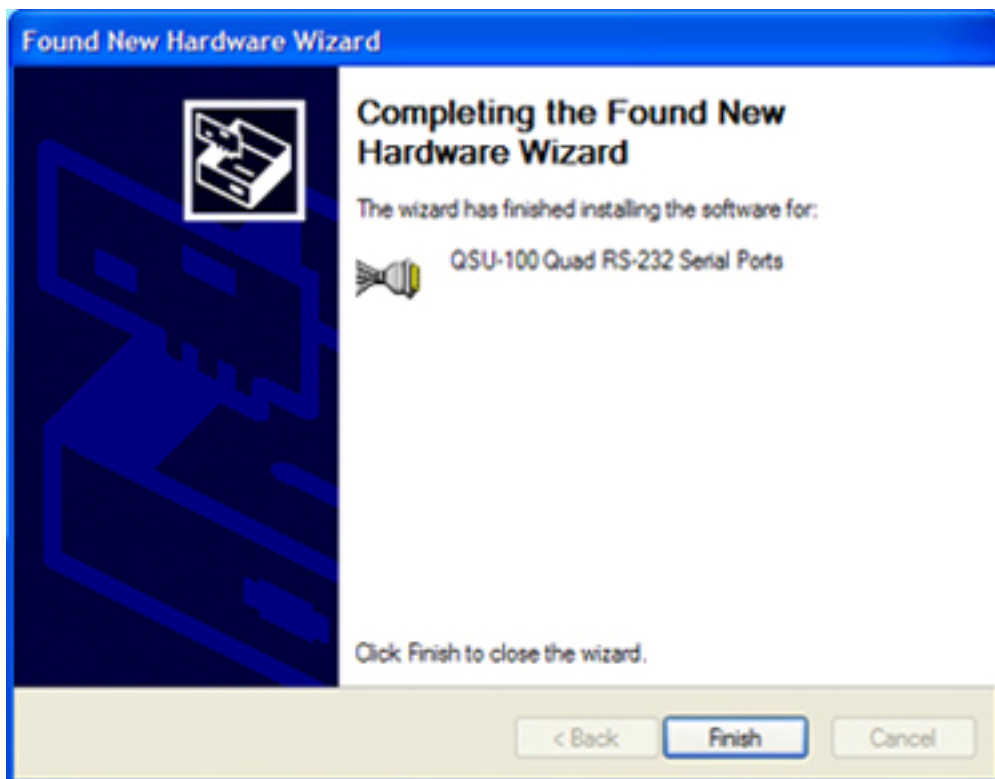Select **"No, not this time"**, and then press the **"Next"** button.

Select **"Install the software automatically"** and then press the **"Next"** button to continue.
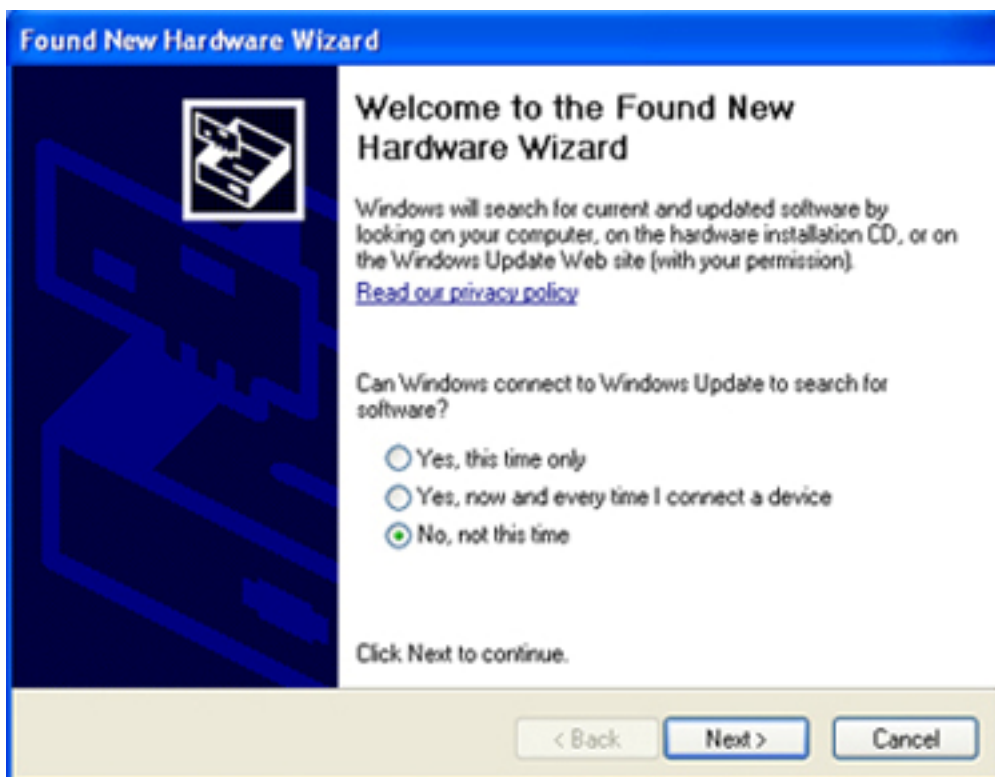

Click on **"Continue Anyway"** to complete the installation of the port expander software driver.

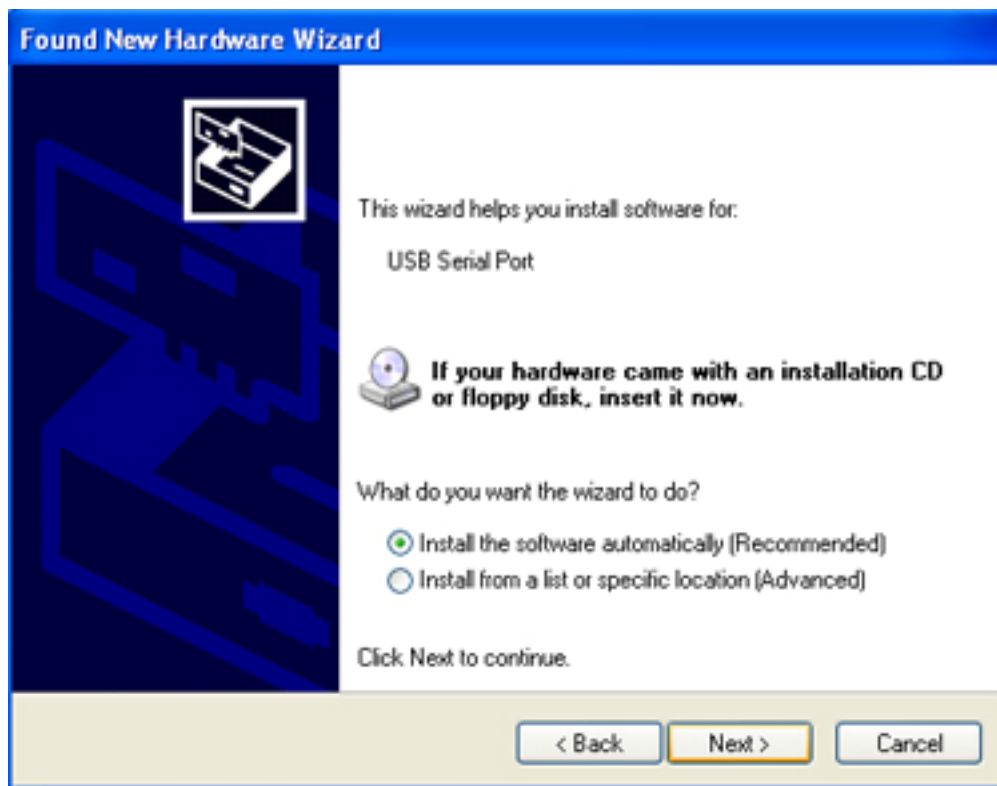Press the **"Finish"** button to complete the installation.

After the driver is installed for the expander box, your computer will start the installation of the drivers for each of the four ports on the expander box. The **"Found New Hardware Wizard"** window should appear once for each of the four ports being added.

Select **"No, not this time"** and press the **"Next"** button to continue.

Select **"Install the software automatically"** and then press the **"Next"** button to continue. You will see a **"Hardware Installation"** warning window.

Click on **"Continue Anyway"** to complete the installation of the USB Serial Port. You will have to repeat this installation for each of the four ports on the expander box. Once the drivers are installed for all four ports, your expander box is ready for use.
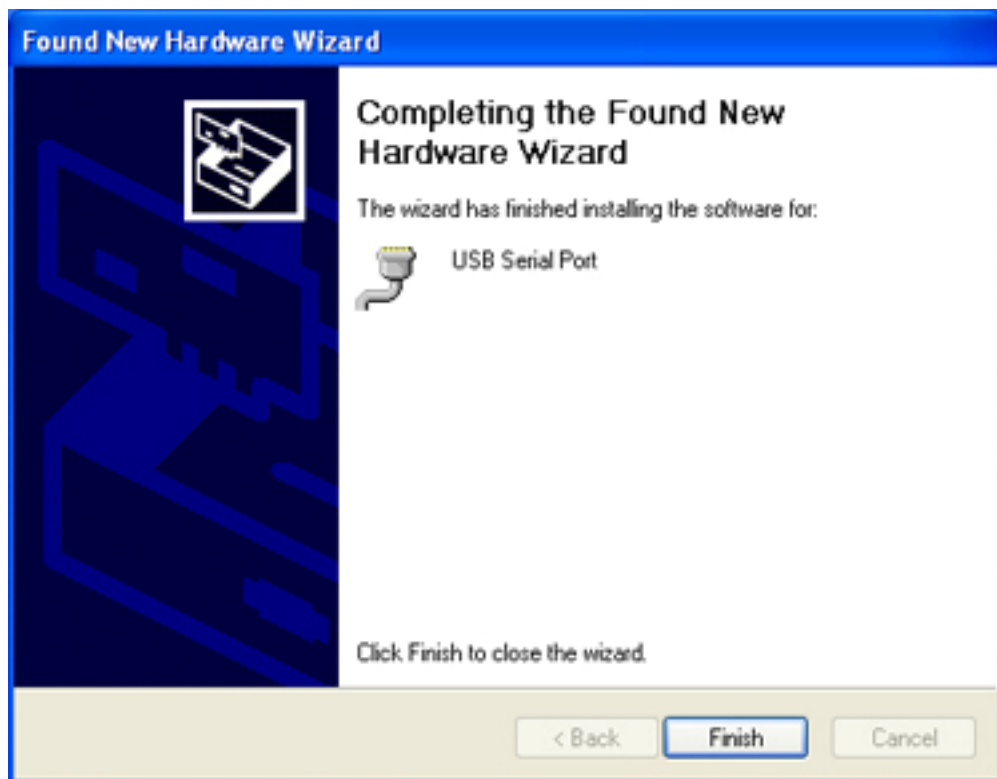
Select **"Finish"** to continue, remember you will go through the USB Serial Port installation four times, once for each port.

To check your COM Ports, to verify that they are all installed and to check for the assigned port numbers, right click on **My Computer** and select **Properties**.

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Select the **"Hardware"** tab.

Select the **"Device Manager"**.

Select **"Ports (CPM & LPT)"**.

The com ports that have been added with the port expander box are listed as USB serial ports with a com port number assignment. The four com ports listed correspond to the four ports on the port expander box.

To determine EXACTLY which USB com port is assigned to each of the four ports on the Quatech expander box, simply double-click on each of the USB Serial Port entries. A window like this will appear.

The com port assignment is listed at the top of the window. The physical port on the expander box to which that com port is assigned is listed to the right of "Location," in the middle of the page.
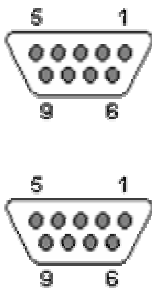
OPERATION

Profiled displays

To stay abreast as new displays are added to the profiled displays list and learn how to connect them to your ACP6500 system, visit www.sencore.com and navigate to the ACP6500 page. There you can find a current list of displays and their connection information.

Your ACP6500 is shipped with two null modem cables, a null modem adapter and a gender changer. These accessories are all that are needed to perform calibration on all currently profiled displays and all non-profiled displays at this time. In the future it may be necessary to purchase other configurations of cables and adapters, depending on the individual display requirements.
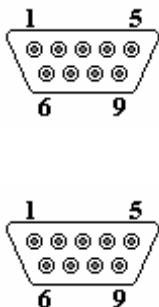
Always connect your VideoPro to a serial port with one of the included cables. Both are null modem cables.

Here is a drawing showing the pinouts of the null modem cables which are included. The null modem adapter has the same pinout as the null modem cables.

Receive Data	2	3	Transmit Data
Transmit Data	3	2	Receive Data
Data Terminal Ready	4	6+1	Data Set Ready & Carrier Detect
System Ground	5	5	System Ground
Data Set Ready + Carrier Detect	6+1	4	Data Terminal Ready
Request to Send	7	8	Clear to Send
Clear to Send	8	7	Request to Send

Null Modem cable pinouts

Receive Data	2	3	Transmit Data
Transmit Data	3	2	Receive Data
Data Terminal Ready	4	6+1	Data Set Ready & Carrier Detect
System Ground	5	5	System Ground
Data Set Ready + Carrier Detect	6+1	4	Data Terminal Ready
Request to Send	7	8	Clear to Send
Clear to Send	8	7	Request to Send

Null Modem adapter pinout

Connection of Equipment _____

Up to three serial ports and at least one USB port are necessary to connect your PC to your VideoPro generator, a profiled display and your ColorPro pod.

The **current profiled displays** all use the same cable configuration. The picture displays the cable and its components.
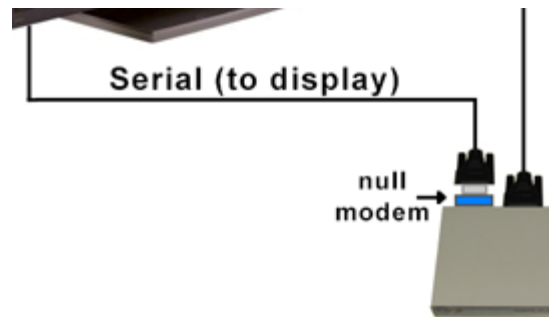
The following diagrams show the most common connections for profiled and non-profiled displays using USB and serial ColorPro pods.

If your PC has a serial port it may be used instead of or in addition to the USB to serial port expander.
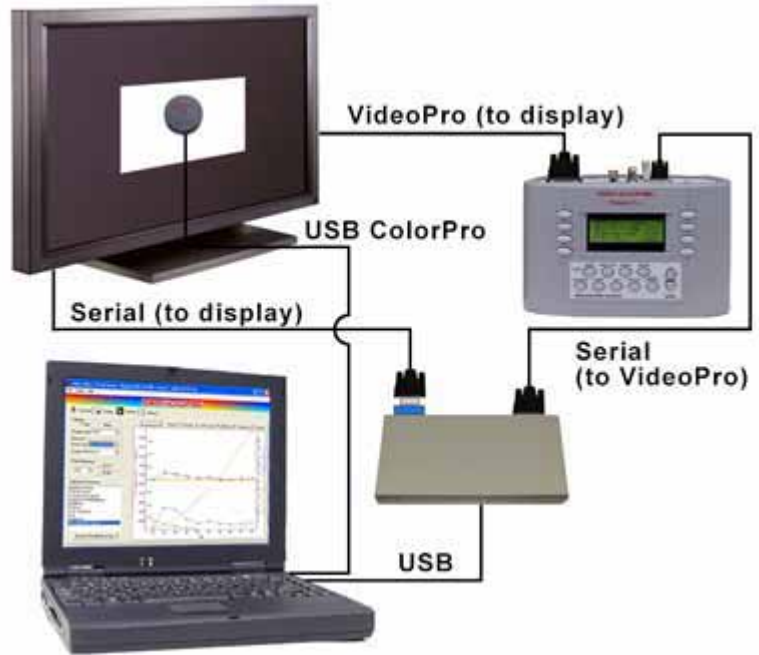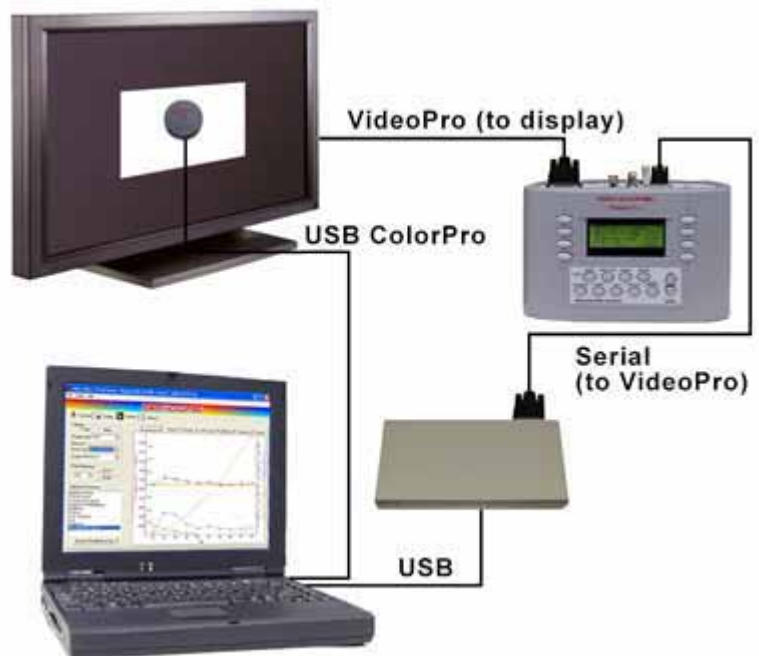
Profiled display with serial ColorPro pod

Non-profiled display with serial ColorPro pod

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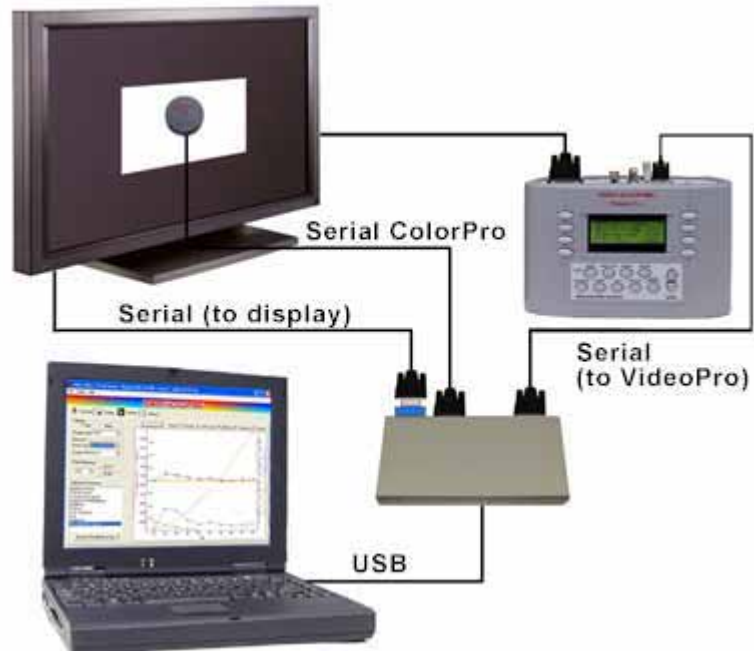
Profiled display with USB ColorPro pod
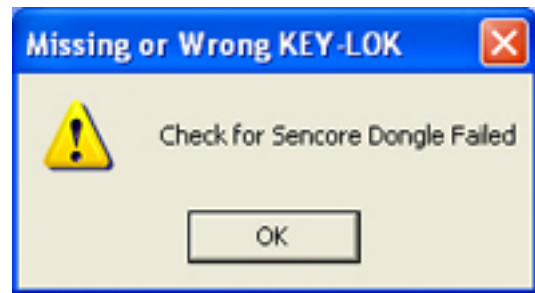

Non-profiled display with USB ColorPro pod

Startup

Insert the Security Key (Dongle) into an available USB port on your computer before starting the program. The program will not start up without the Security Key.
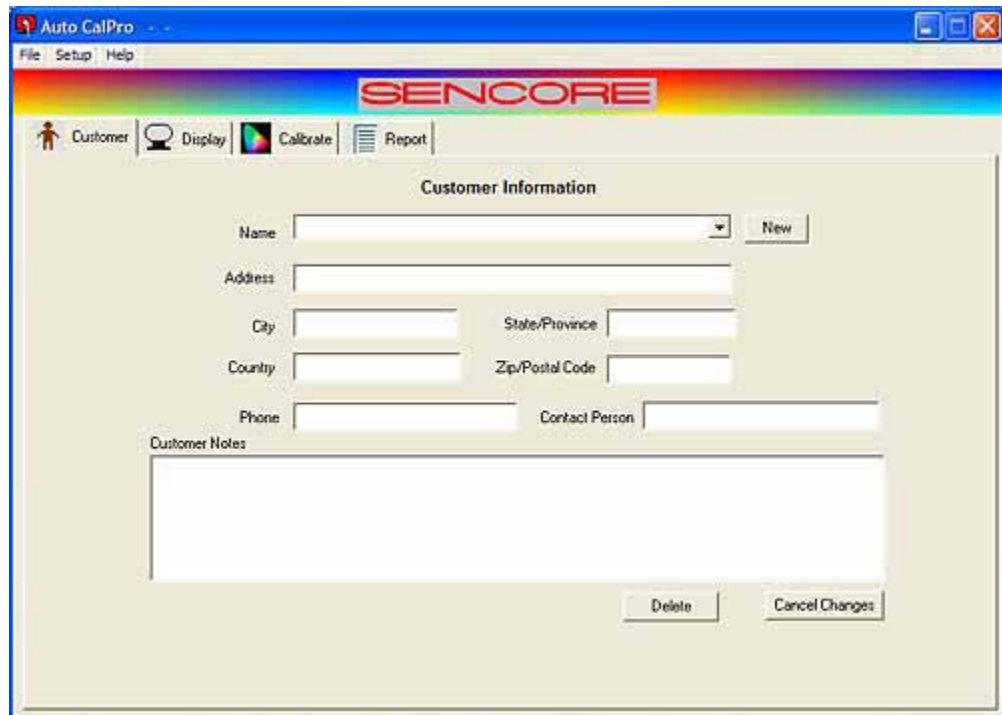
Failure to insert the Security Key will result in this error message.

Note: After Auto CalPro has been started, you may remove the dongle and use the USB port to connect a USB ColorPro or the Quatech Serial Port Expander, if necessary.

The following screen appears when the Auto CalPro program is run.

Auto CalPro opening screen

Entering Your Business and Calibrator Information

Select the **Setup** option and choose **Calibrator**.

You will see the following window open.

Here you enter your business and calibrator information which will print out on the calibration reports. Select **"OK"** when you are finished.

Video Generator Setup

Select the **Setup** option and choose **Video Generator**.

Choose the generator **Model** you are using from the drop-down box.

Set the **COM port**. If you are not sure which COM port to use, or if you are using the USB Expander box, you may have to look at your Device Manager to see how your ports are numbered. This procedure is explained in detail on pages 13 through 15.
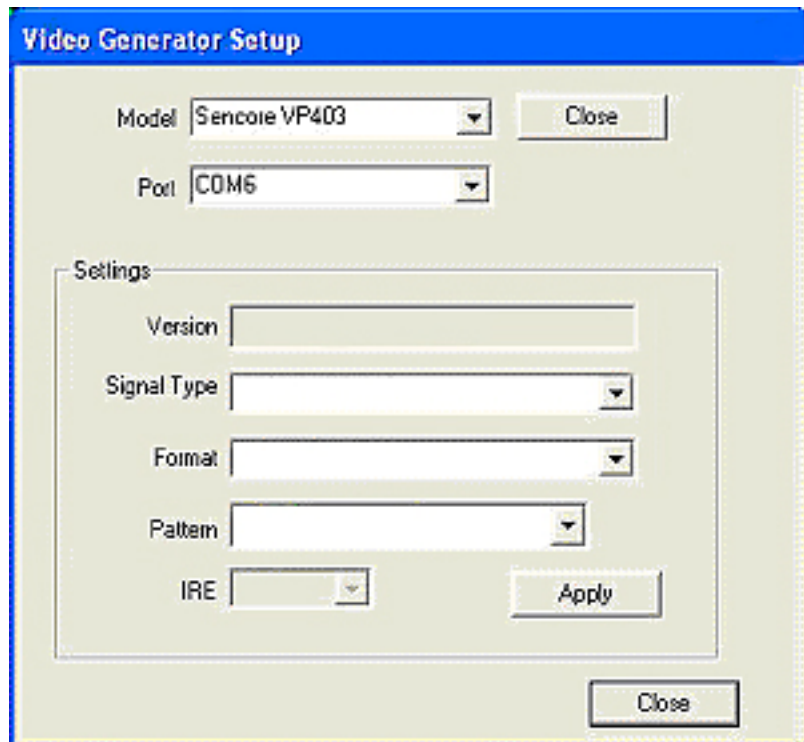
Click on the **"Apply"** button to start communications between your PC and the generator. If you see the generator information in the Settings/Versions window, you know you are connected.

You can set up the signal type, format and pattern now; however, this procedure is covered in a later step also.
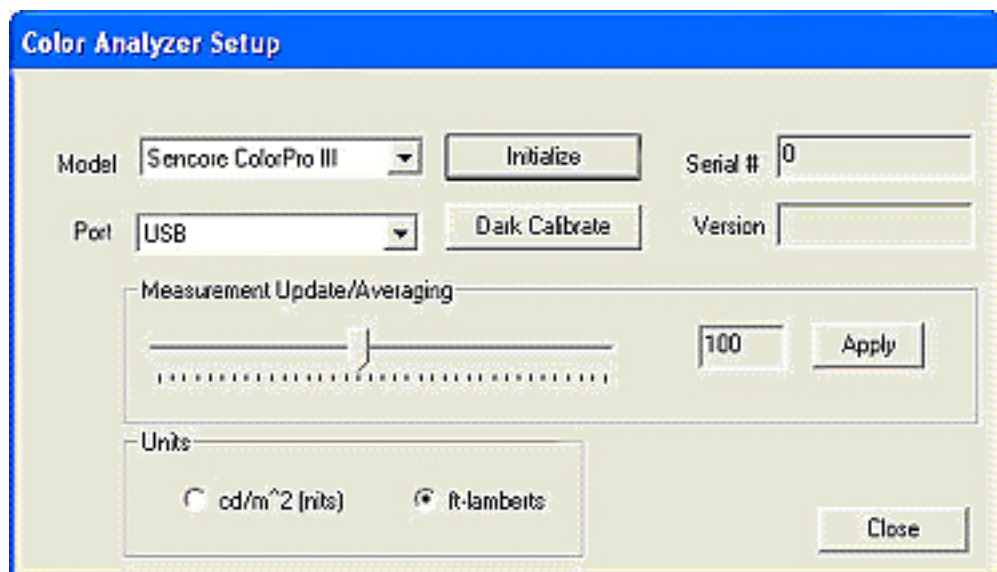
Click on the **"Close"** button.

Color Analyzer Initial Setup

Select the **Setup** option and choose
Color Analyzer.

You should see a window similar to the one below.

Select the correct
Model of
ColorPro pod you
are using from
the drop-down
box.

Set the **COM port**. If you have the ColorPro connected directly to the PC via the USB port, you should be set up. If you have a Serial type ColorPro connected through the USB Expander box, you will then have to choose the correct port. You may have to find the correct port number, following the same procedure given on pages 13 through 15.

Click on the **"Initialize"** button to start communications between your PC and the ColorPro. If you see the serial number and version information appear to the right, you are now connected.

The "Measurement/Update Averaging" can be adjusted during white balance calibration, if needed. If you experience unstable readings when taking measurements, lower this adjustment. This will reduce measurement update rate, but will provide additional measurement averaging.

Select if you wish to measure the light intensity in "nits" or **"ft-lamberts"**. Foot Lamberts is uaually used in the United States.
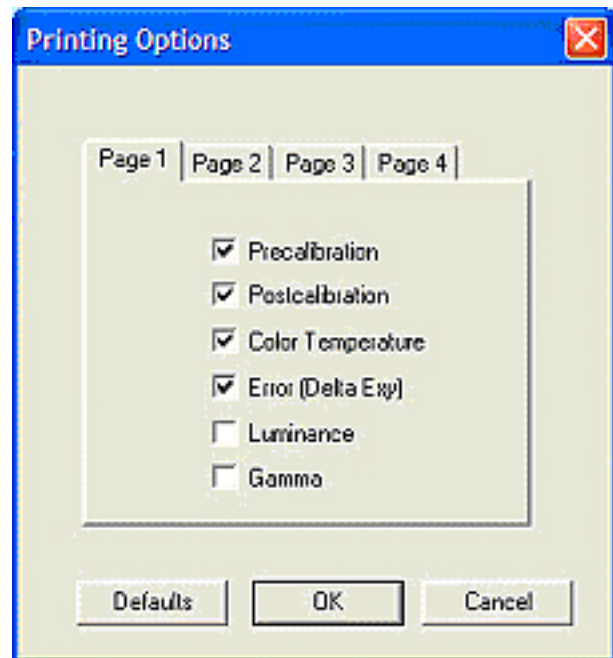
Click on the **"Close"** button.

Setup – Print Screen Options

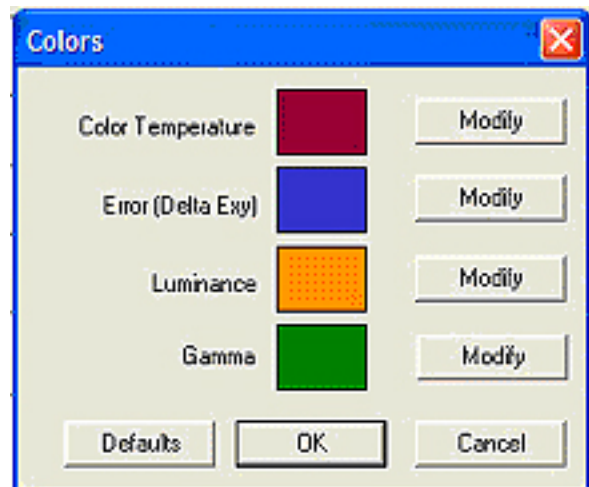Select the **Setup** option and choose **Print Screen Options**.

From the **Printing Options**, choose which data to print on each of the four pages of the report.

Setup – Color Option for Reports

Again, select the **Setup** option and choose **Color Option for Reports** to select a color for each of the graphs that are listed.

Auto CalPro Pages

Four tabs are located at the top left of the ACP6500 software screen. These tabs select the four main Auto CalPro software pages.
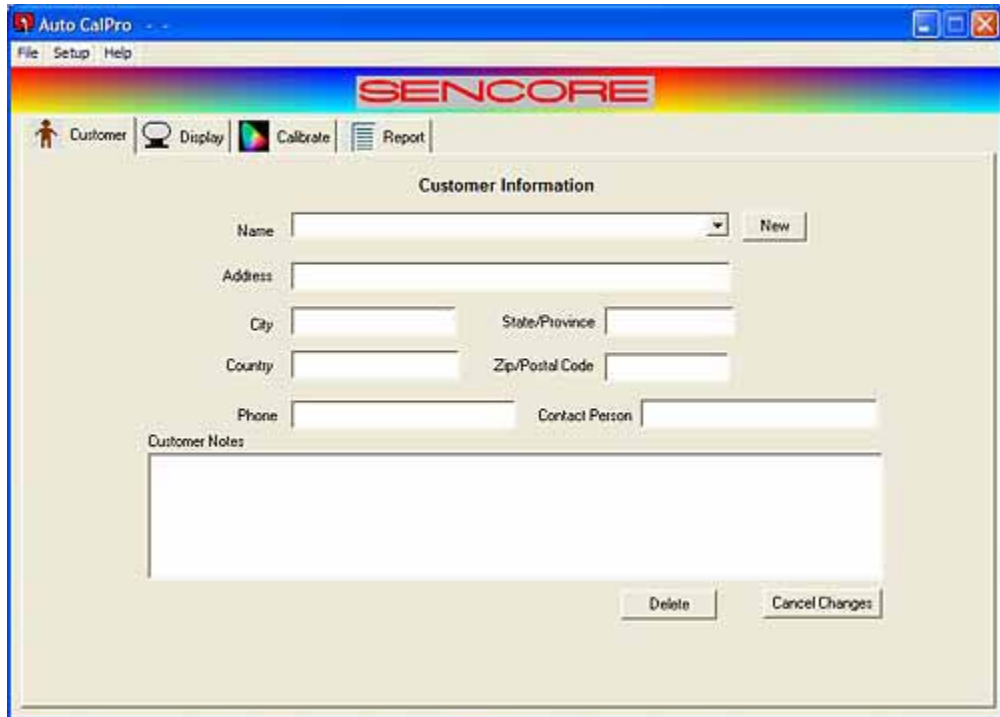

During the course of a calibration, you normally proceed through these four pages in order.

Customer Page – On this page, fill in information about your calibration customer.

Select a customer from the drop down list or press **New** to add new customer information.

Setting up for a Non-Profiled Display (for Profiled Displays, skip to page 35)

Display Page – Here, choose the brand and model of the customer's display from the **Select Model** and **Display Type** drop-down profiled display lists, or type in the brand and model information for a custom display. The process for a profiled display starts on page 35.
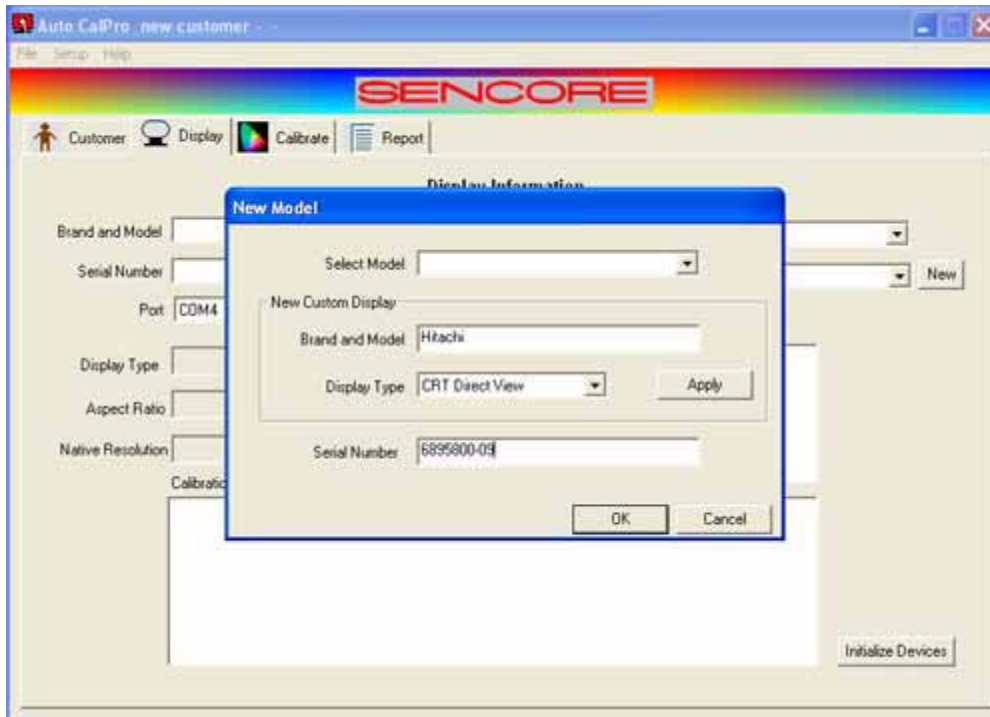
Enter a Brand/Model number, select the Display Type and enter a Serial Number or other identifying information.
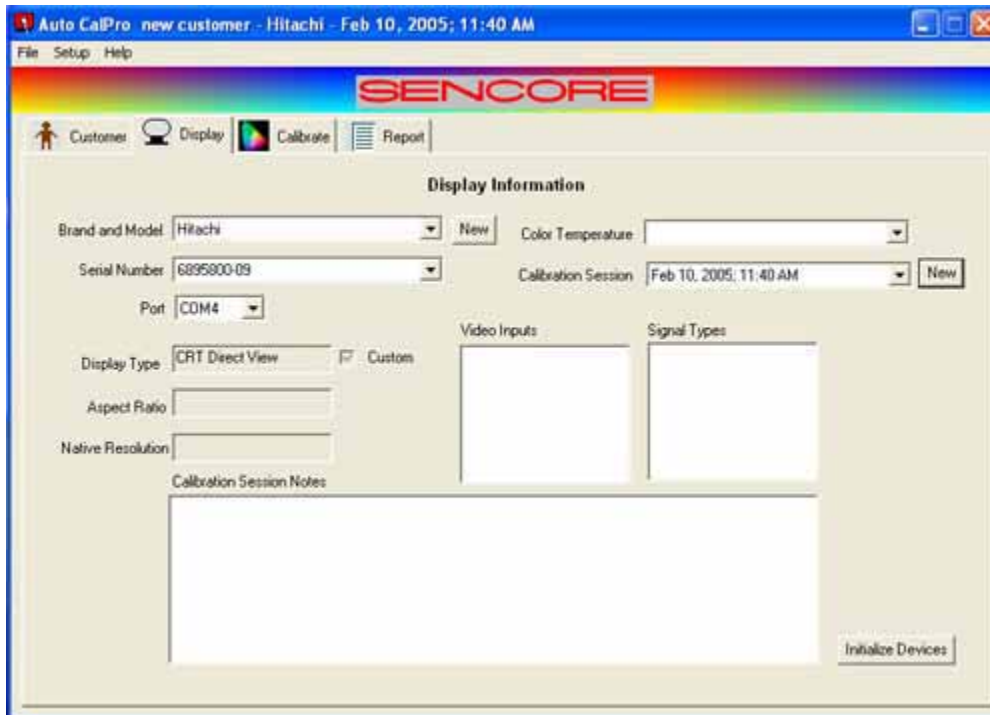
The Serial Number box MUST contain data.
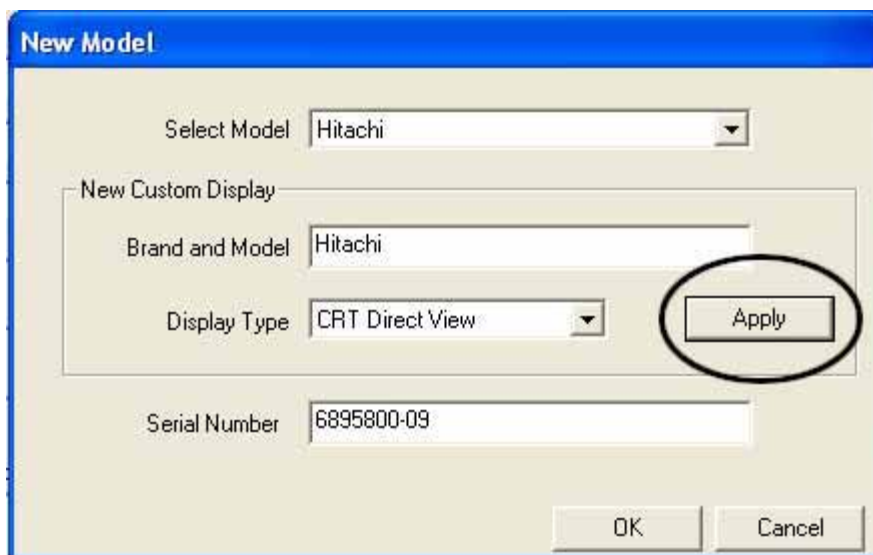
Select **"Apply"**. The Brand/Model number will be moved into the **"Select Model"** box near the top.

Select **"OK"** to continue.

Select **"NEW"** near the upper right. This puts the current Date and Time into the **"Calibration Session"** box.

Select **"Initialize Devices"** near the lower right. This verifies that both the VideoPro generator and the ColorPro pod are correctly setup and are communicating with the PC.

Calibrate Page – Selecting the Calibrate Tab will bring up a reminder box to select the **Signal Type** and **Format** for the video generator.

Calibration Procedures – Brightness Preset

At this time the **"Brightness Preset"** selection is highlighted. Follow the instructions for proper brightness adjustment. Use the display's controls or remote control to calibrate Brightness.
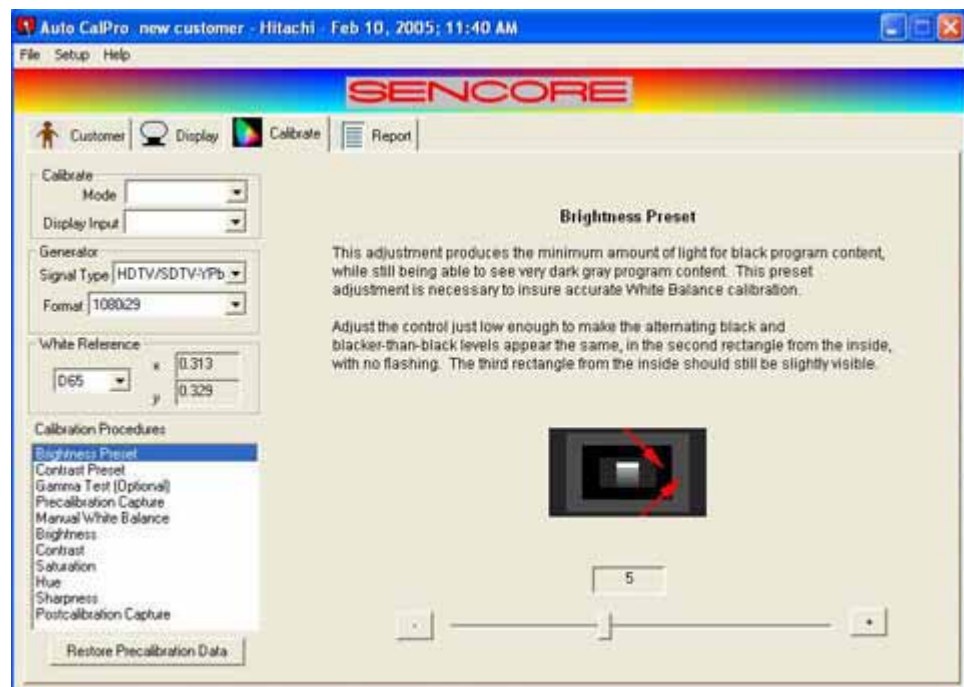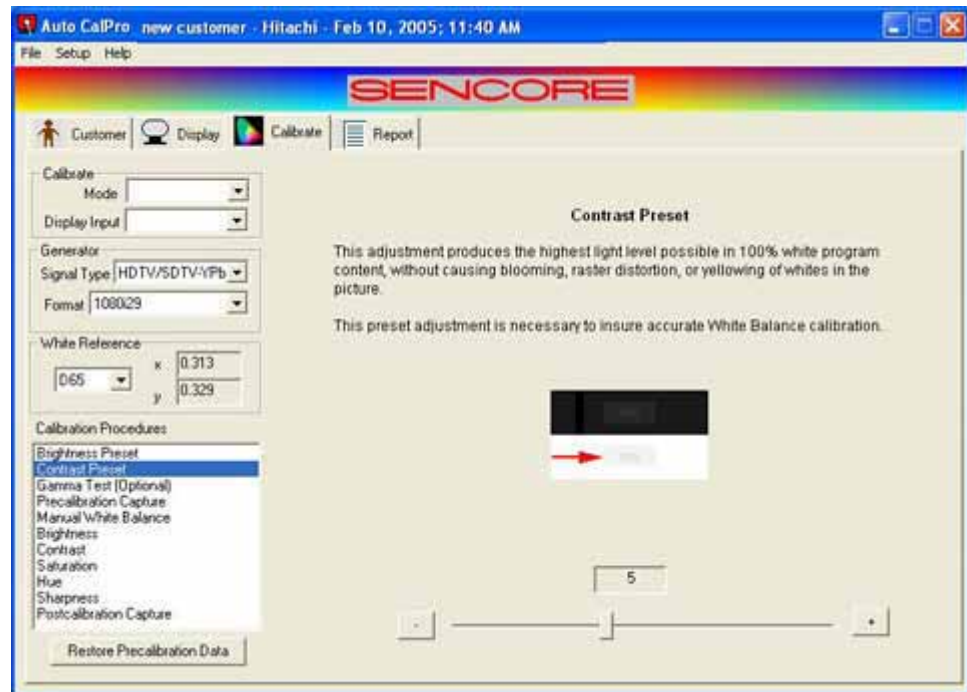
Calibration Procedures – Contrast Preset

Select the **"Contrast Preset"** selection from the **"Calibrations Procedures".**

This screen and instructions will be presented for CRT type displays. Use the display's controls or remote control to calibrate Contrast.
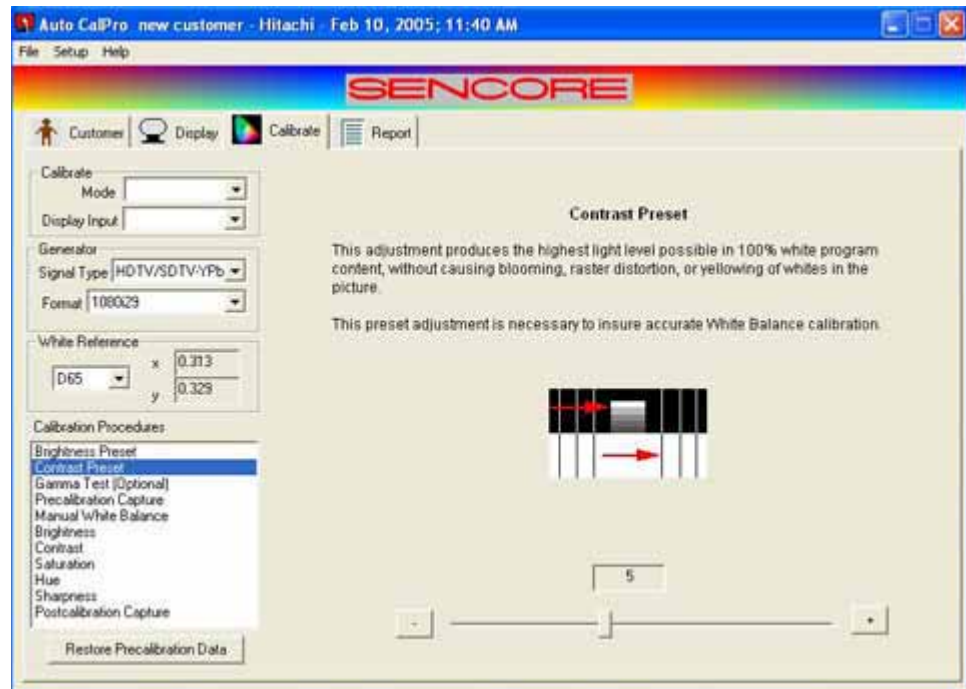

This screen and instructions are for non CRT displays.

Use the display's controls or remote control to calibrate Contrast.

## Calibration Procedures - Gamma Test (Optional)

The **Gamma Test (Optional)** allows you to characterize the performance of the video display with different settings of the Gamma selection in the display's user menu (if provided). If, for example, the display provides three different Gamma settings, you can capture the display's performance with each of the three different settings. Then you can determine which of the three provided settings comes closest to providing a standard gamma of 2.2 across the luminance range.
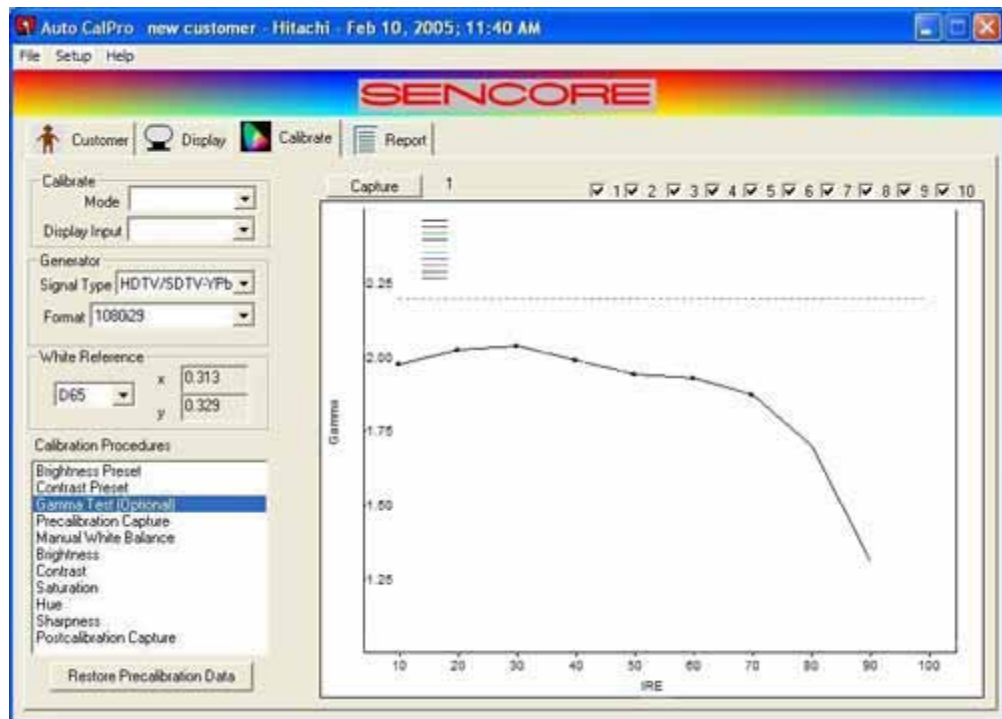
Calibration Procedures – Precalibration

Choose the **"Precalibration Capture"** checkbox and check which graphs you would like to include in the graph and then select the **"Capture"** button.
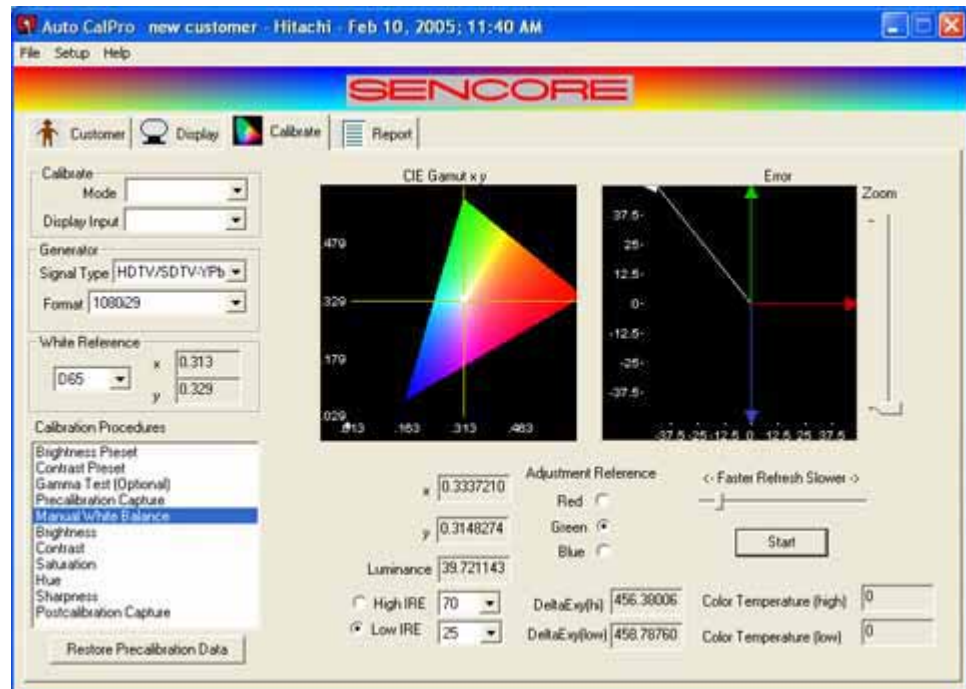
This Precalibration capture can be stored or printed to show your customer 'before' and 'after' calibration reports.
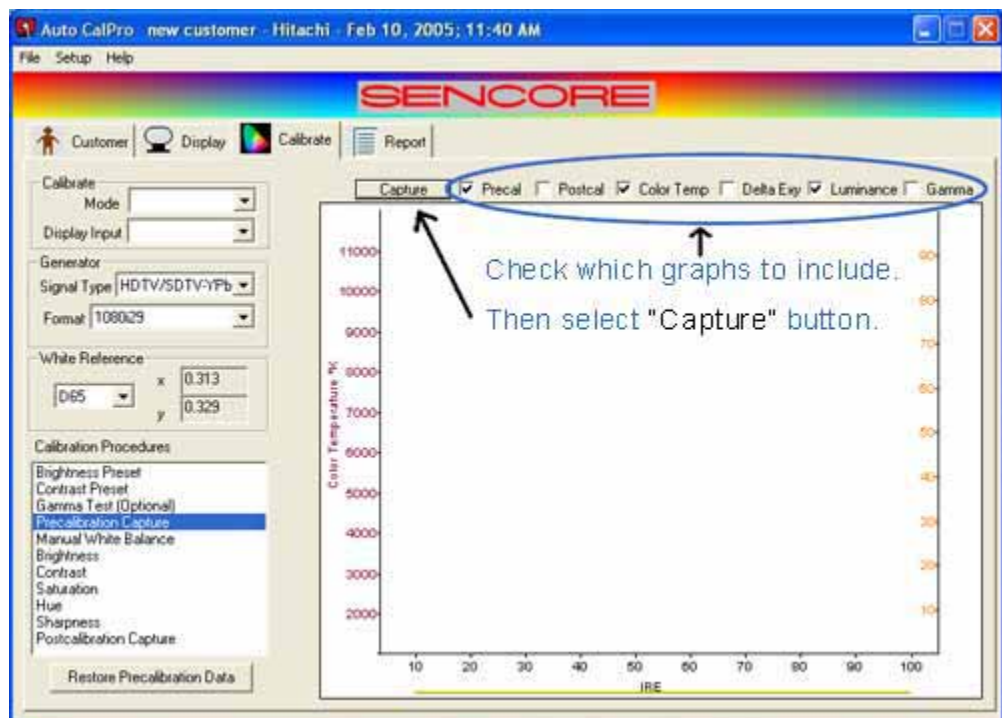
Calibration Procedures – Manual White Balance

Manual White Balance guides you through the proper adjustments using the display's controls or remote control while you center the cutoff and drive controls.
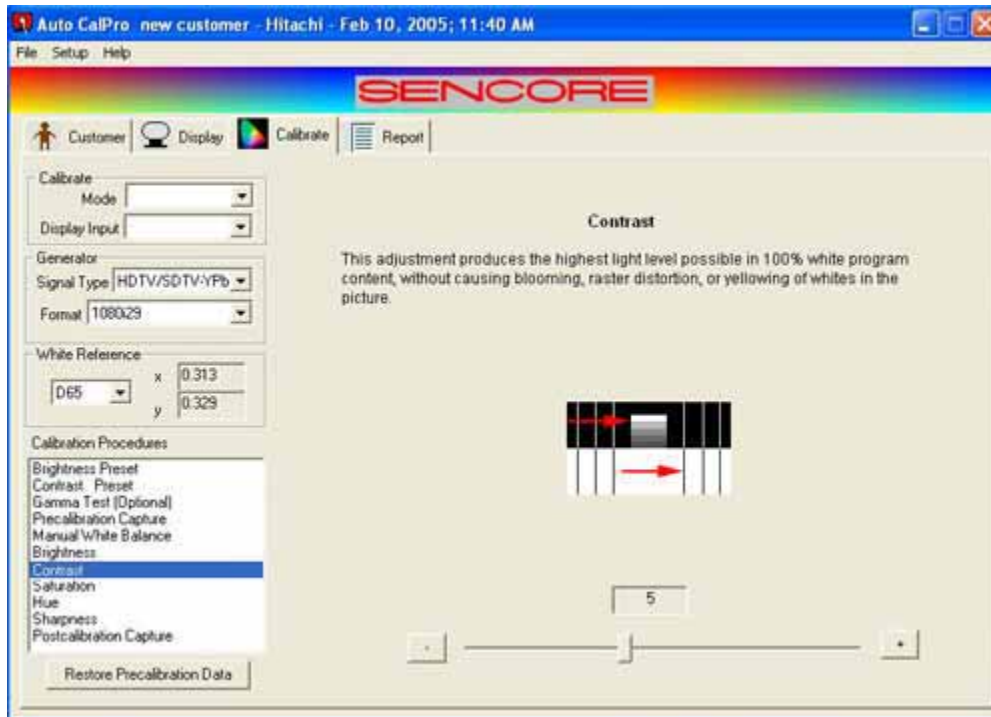

Calibration Procedures – Brightness

Brightness is used to make the black parts of the picture dark without losing any of the darkest gray picture detail. The display's controls or remote control are used to adjust brightness.
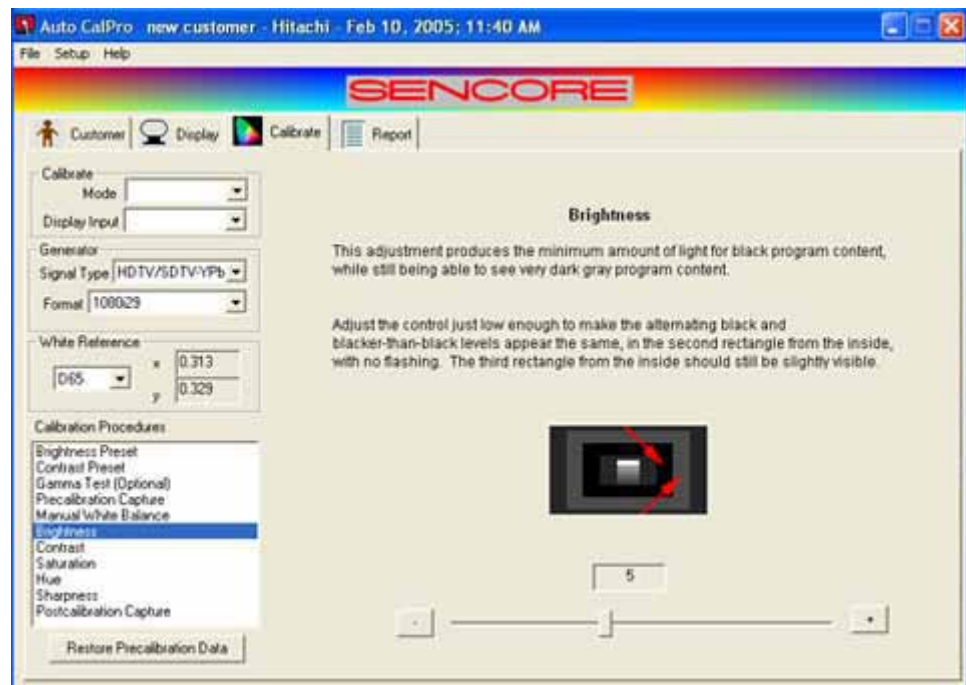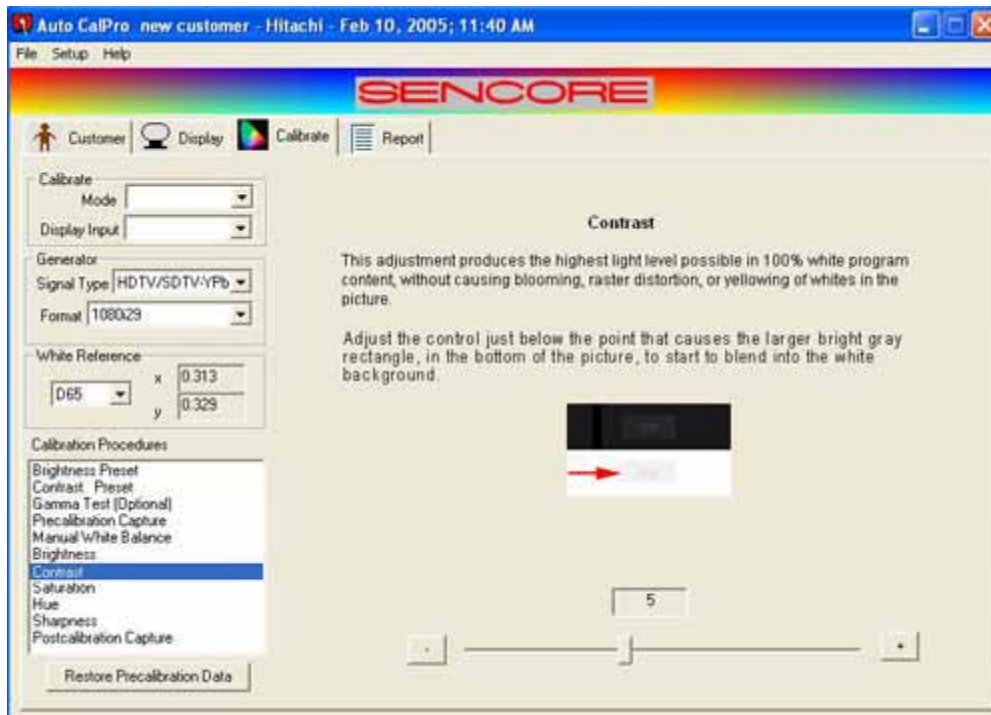
Calibration Procedures – Contrast

Contrast is set to produce the highest white level possible, without degrading the picture. The display's controls or remote control are used to calibrate Contrast.

This screen and instructions are for CRT displays.

This screen and instructions are for non CRT displays.

Calibration Procedures – Color Saturation

The intensity or purity of the colors is referred to as **Color Saturation**. Use the display's controls or remote control to make any adjustments.
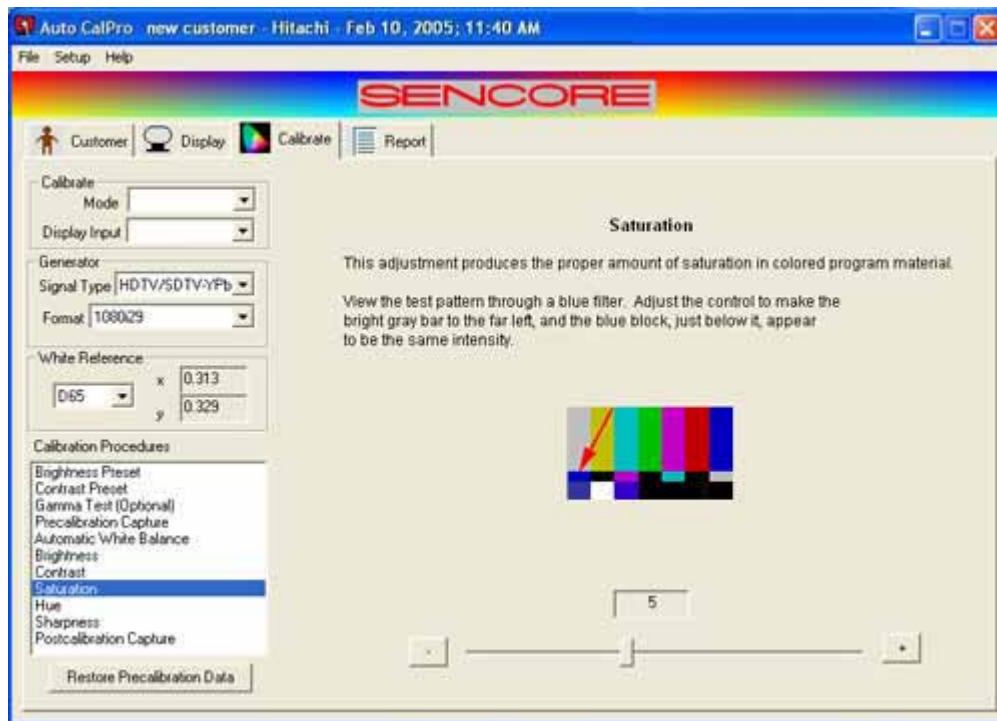
Calibration Procedures – Hue

The **Hue** changes a complete color range into another color range. Use the display's controls or its remote control to calibrate Hue.

Calibration Procedures – Sharpness

Sharpness enhances the fine detail in a picture, by reducing picture distortion or improving picture resolution. This is t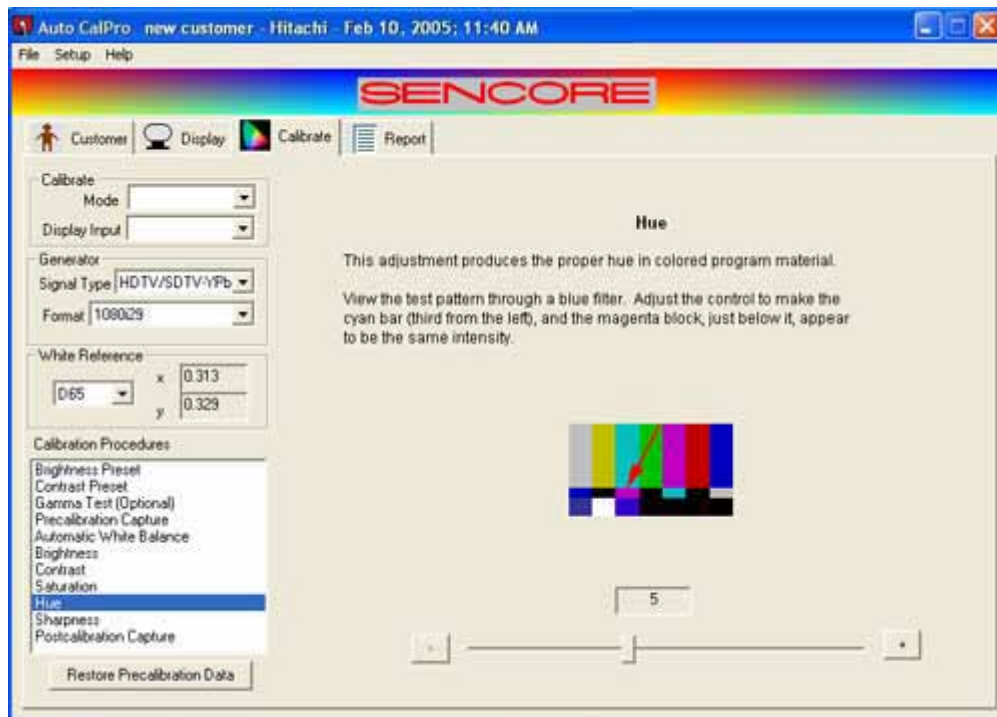he last adjustment step for an overall perfect display. Use the display's controls or remote control to calibrate sharpness.
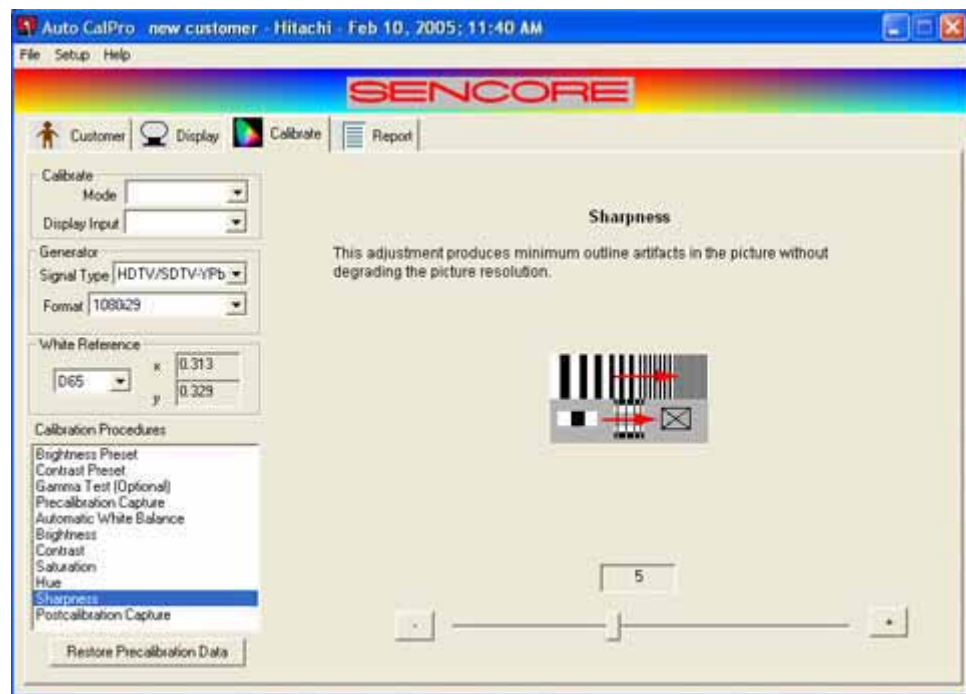
Calibration Procedures – Postcalibration Capture

Select Postcalibration and check which graphs you would like to display on the PC.

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Capture begins the process of capturing and displaying the selected data.

Precal checked enables Precalibration capture data to be displayed.

Postcal checked enables Postcalibration capture data to be displayed
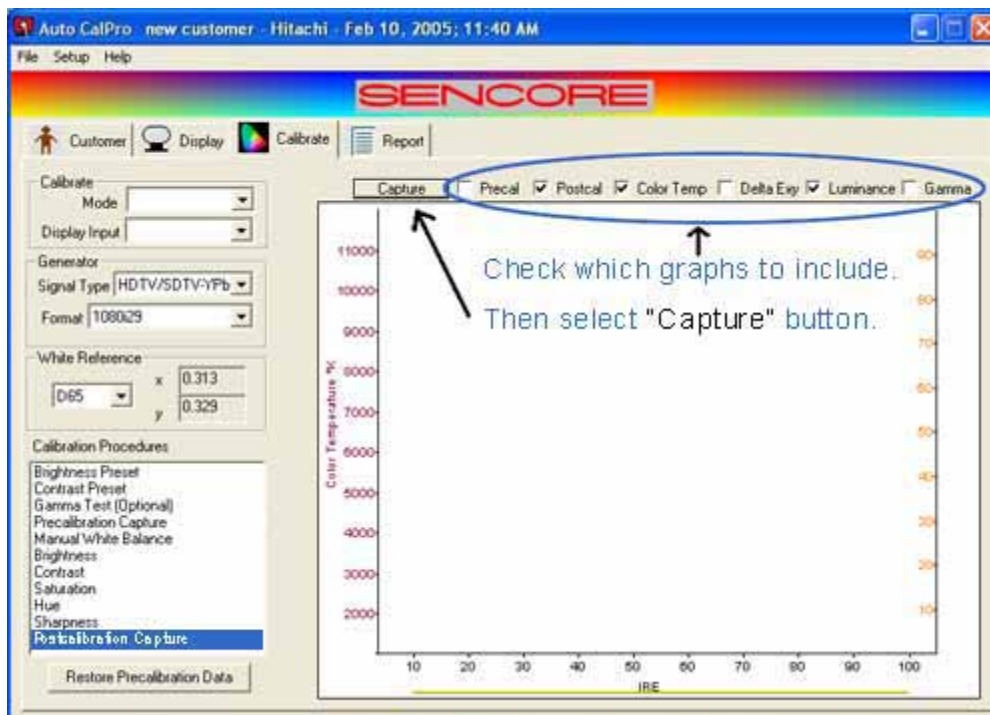
Color Temp checked enables the color temperature of the data being captured to be displayed.

Delta Exy checked displays the difference between Precal and Postcal data.

Luminance checked displays the luminance of the data being captured.

The Postcalibration capture can be stored or printed to show your customer an 'after' calibration report. The calibrated display will have a color temperature that hugs the middle line, luminance that starts about 10 IRE and progresses to 100 IRE, a CIE x y distance error that hovers between 5 and 10, and a gamma that gradually drops to zero.

Report Tab – Select "Report" from the tab selection

The Report page allows you to view or print a report, from the display performance data that was automatically collected during the Precalibration Capture and Postcalibration Capture steps. The Printing Options selection, under Settings on the main menu, allows you to select which display performance graph data to print on each page of your report.

Report is used to store or print a report using the Precalibration Capture and/or the Postcalibration Capture, and for any future calibration sessions.

For Precalibration, make this selection after the precalibration data has been captured.
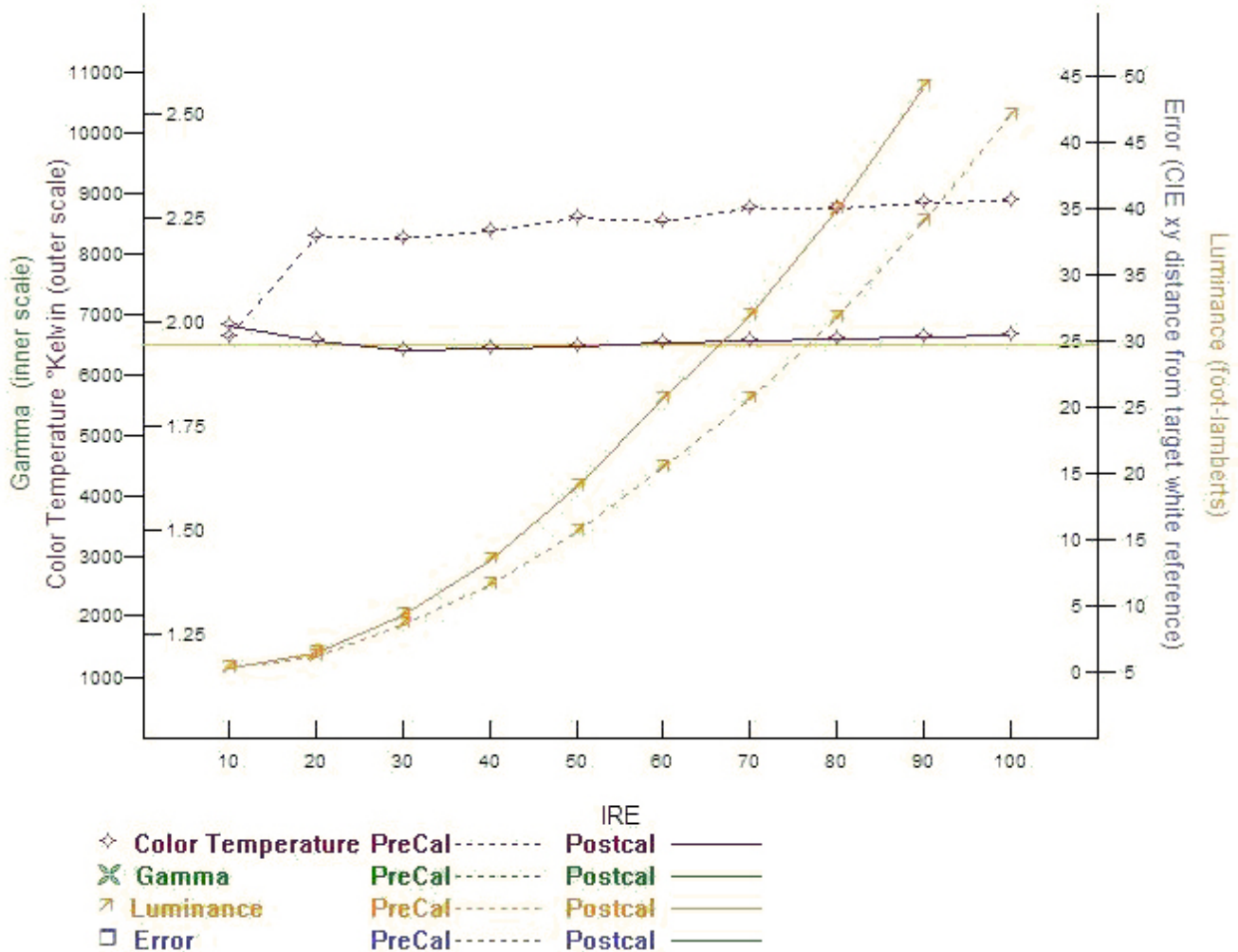
SENCORE

Smith AV
Big Town
Big City Big State 00000 Zip Big Country
Phone: Business Telephone   Fax: Business Fax
email: Businessemail@somewhere.com
Joe Smith

New Customer
Any Street
Any Town, Any State 00000-0000 Any Country
Joe Smith
1- 999-444-7547

Model: Hitachi
Serial Number: 123-Hit-456
Date: Feb 17, 2005; 08:52 AM
Color Temp:
Day Input 1

Legend

✧	Color Temperature	PreCal--------	Postcal ———
✖	Gamma	PreCal--------	Postcal ———
↗	Luminance	PreCal--------	Postcal ———
▢	Error	PreCal--------	Postcal ———

Calibration completed

Show your customer the picture on his calibrated display and explain the before and after reports.
Accept his praise and be on your way to the next site – fast and simple. Who could ask for more?
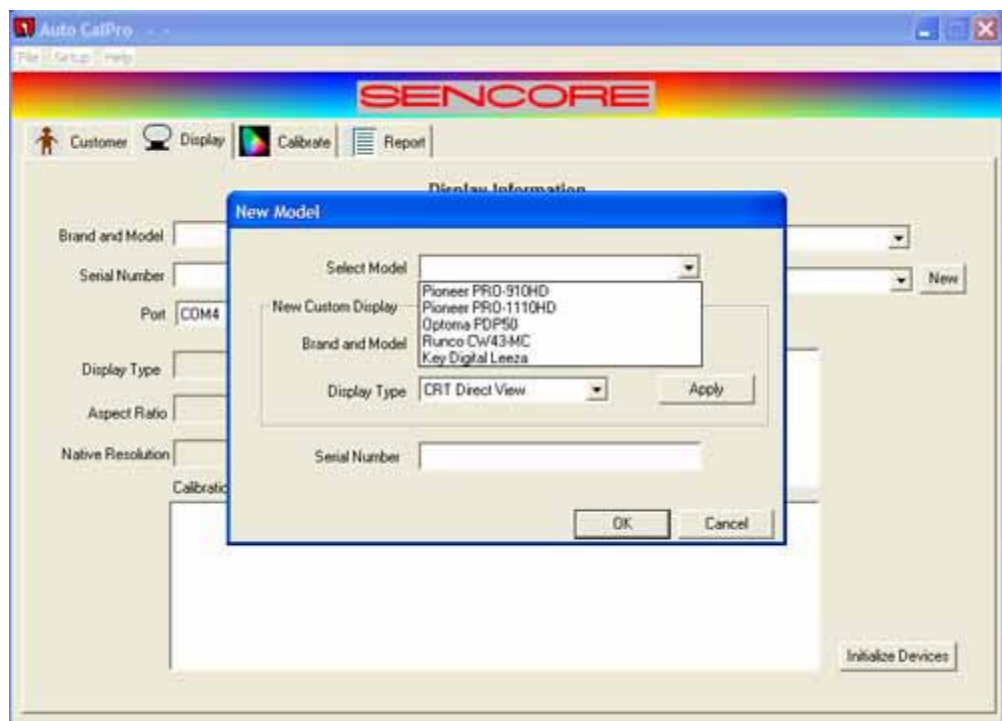
Setting up for a Profiled Display (for non Profiled displays go to page 25)

Display Tab – Press the **Display** tab to select a profiled display.
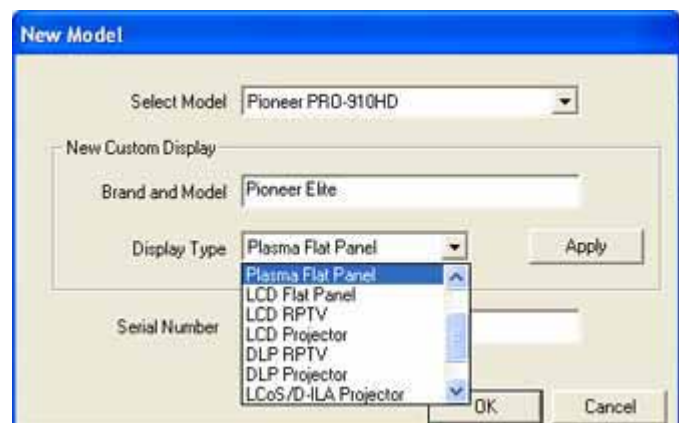

Select Model

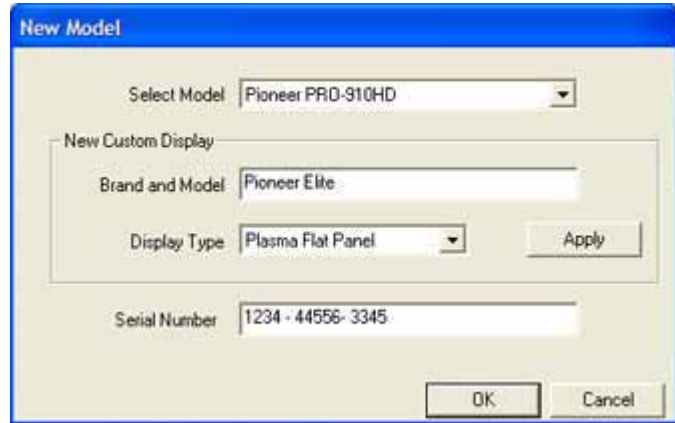Select the correct model from the drop down window.

Select Display Type

Select the correct display type from the drop down window.

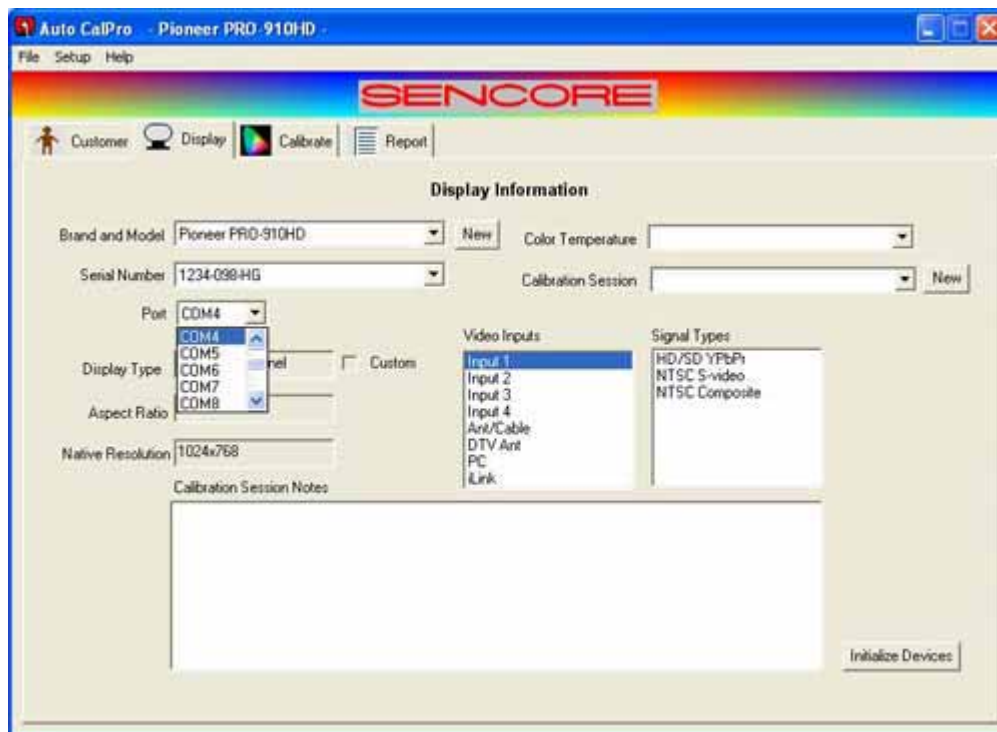**Enter Serial Number (required)**

Enter a serial number or other identifying information. **The Serial Number box MUST contain data.** Select **"OK"** when you have finished.
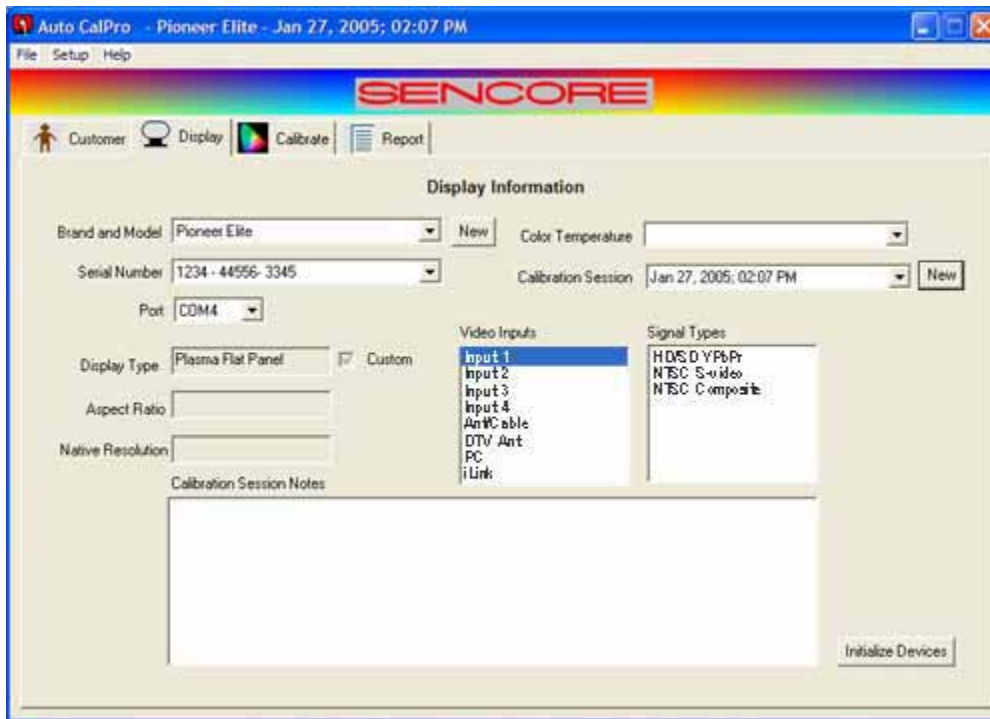

Profiled Display Com Port Selection

Select the port which the display is connected to. Refer to pages 13 – 15 for help in determining which port to select.

Calibration Session - Date and Time

Select **"NEW"** near the upper right, this puts the current Date and Time into the **"Calibration Session"** box.

Select **"Initialize Devices"** near the lower right, this verifies that the VideoPro generator, the ColorPro pod and the display are correctly setup and are communicating with the PC.

Calibration Tab Selection

Select the **Calibrate** Tab
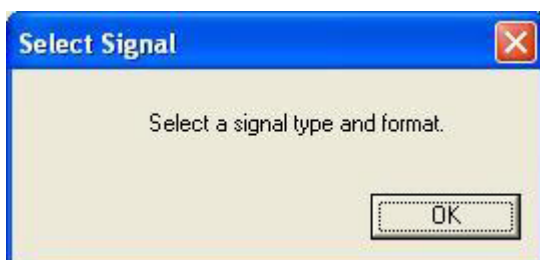
The **Select Signal** reminder will activate to remind you to select the correct signal type and format for the input you have selected.

Calibrate tab – select calibration options

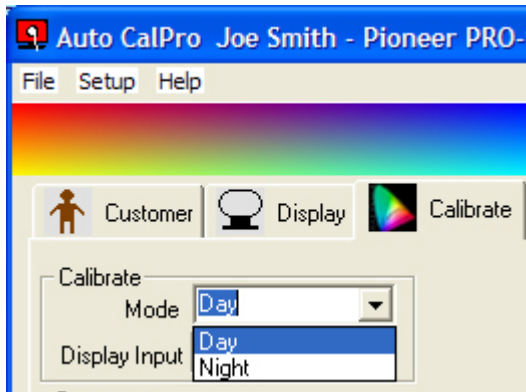Select whether you are calibrating for Day or Night operation from the **Mode**.

Select the correct **Input** from the dropdown box.
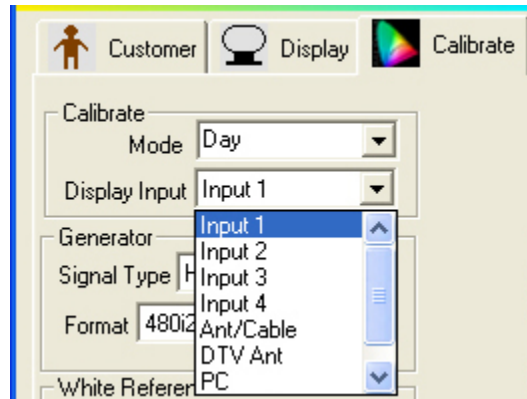
Select the correct VideoPro Generator **Signal Type**.
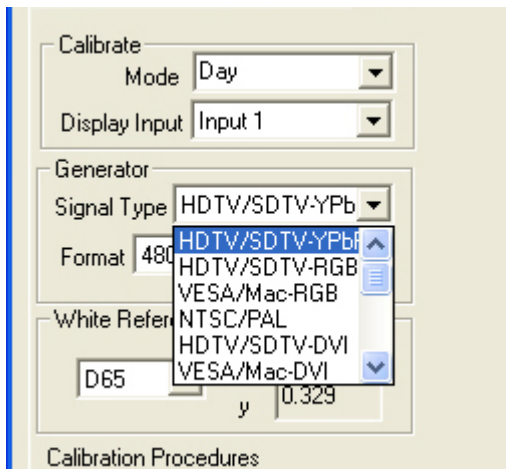
Select the correct VideoPro Generator signal **Format**.
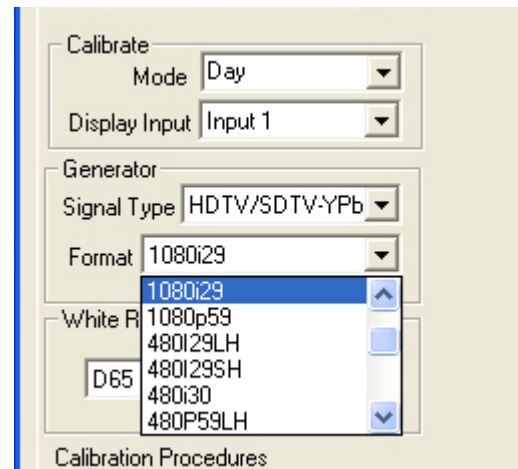
Select the correct **White Reference**.
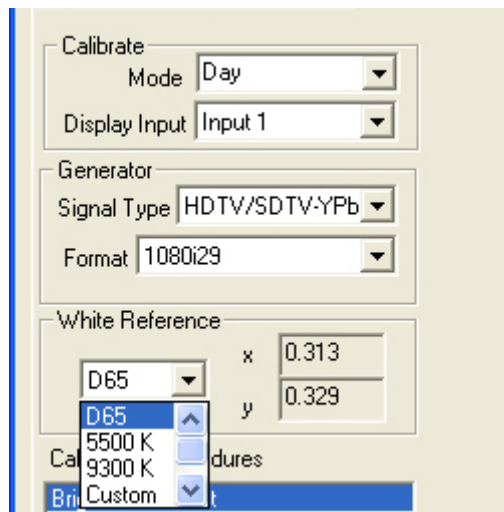
After selecting the generator signal type, format and white reference, proceed step-by-step through each of the listed Calibration Procedures to complete the display calibration.

Calibration Procedures – Brightness Preset

At this time the **"Brightness Preset"** selection is highlighted. Follow the instructions for proper brightness adjustment. Move the slider or press the + and – to calibrate.
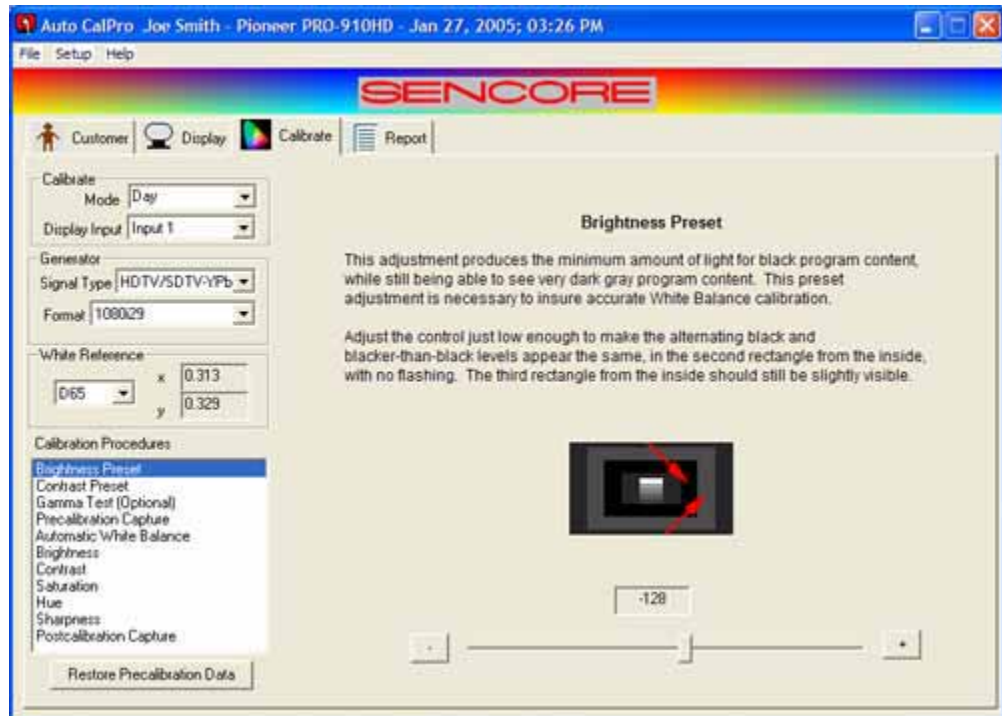
Calibration Procedures – Contrast Preset

Select the **"Contrast Preset"** selection. This screen and instructions will be presented for CRT type displays.

Move the slider or press the + and – to calibrate.
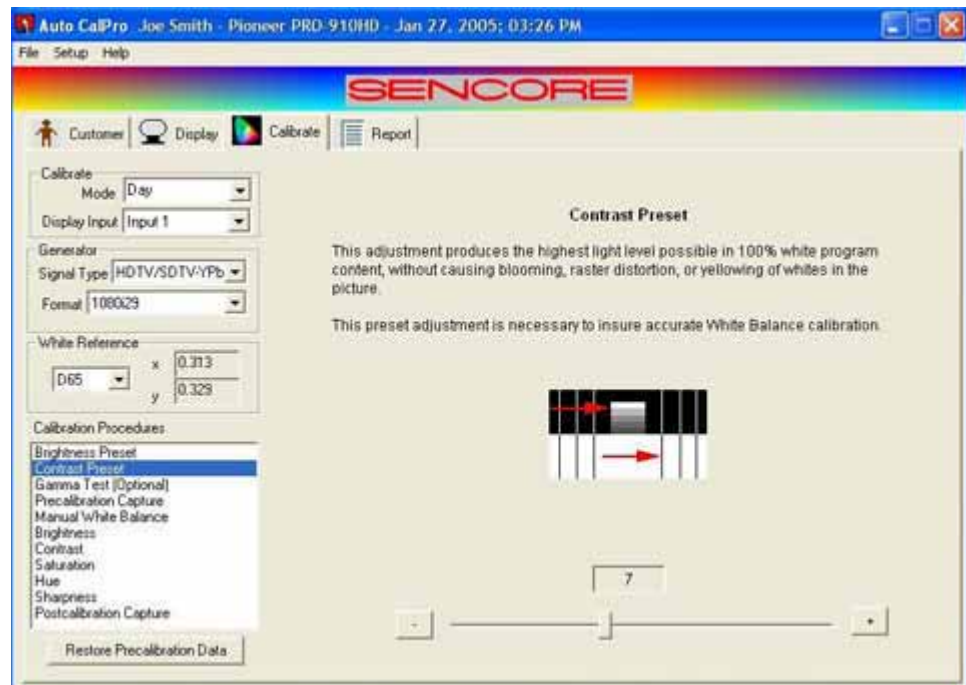
This **Contrast Preset** screen and instructions are for **non CRT** displays. Move the slider or press the + and – to calibrate.

Calibration Procedures – Gamma Test (optional)

The **Gamma Test (Optional)** allows you to characterize the performance of the video display with different settings of the Gamma selection in the display's user menu (if provided). If, for example, the display provides three different Gamma settings, you can capture the display's performance with each of the three different settings. Then you can determine which of the three provided settings comes closest to providing a standard gamma of 2.2 across the luminance range.
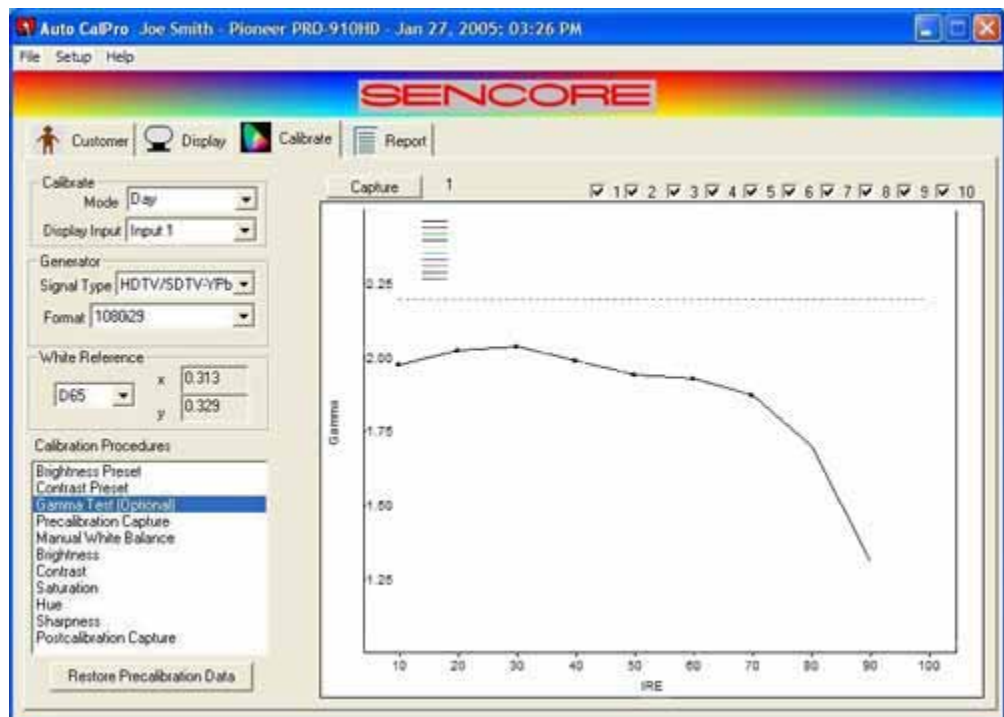
Calibration Procedures – Precalibration Capture

Choose the **"Precalibration Capture"** checkbox and check which graphs you would like to include in the graph, then select the **"Capture"** button. This Precalibration capture can be stored or printed to show your customer 'before' and 'after' calibration reports.
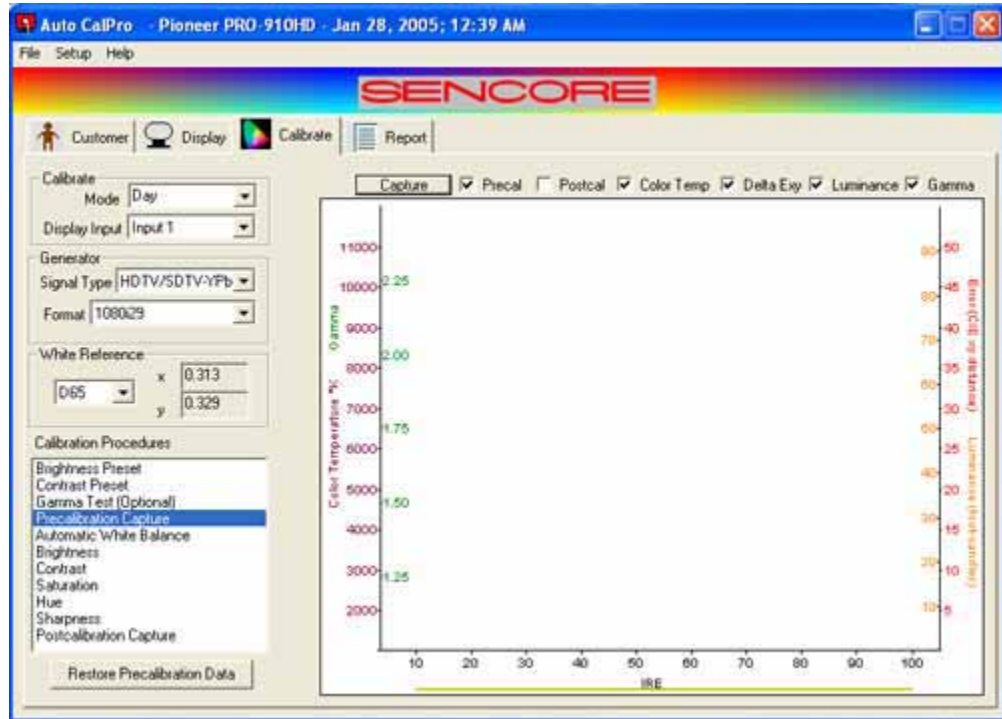
Calibration Procedures – Automatic White Balance

Automatic White Balance is activated by pressing the **"Autoadjust"** button. The ACP6500 takes control and adjusts everything automatically.

Sit back and enjoy the show!
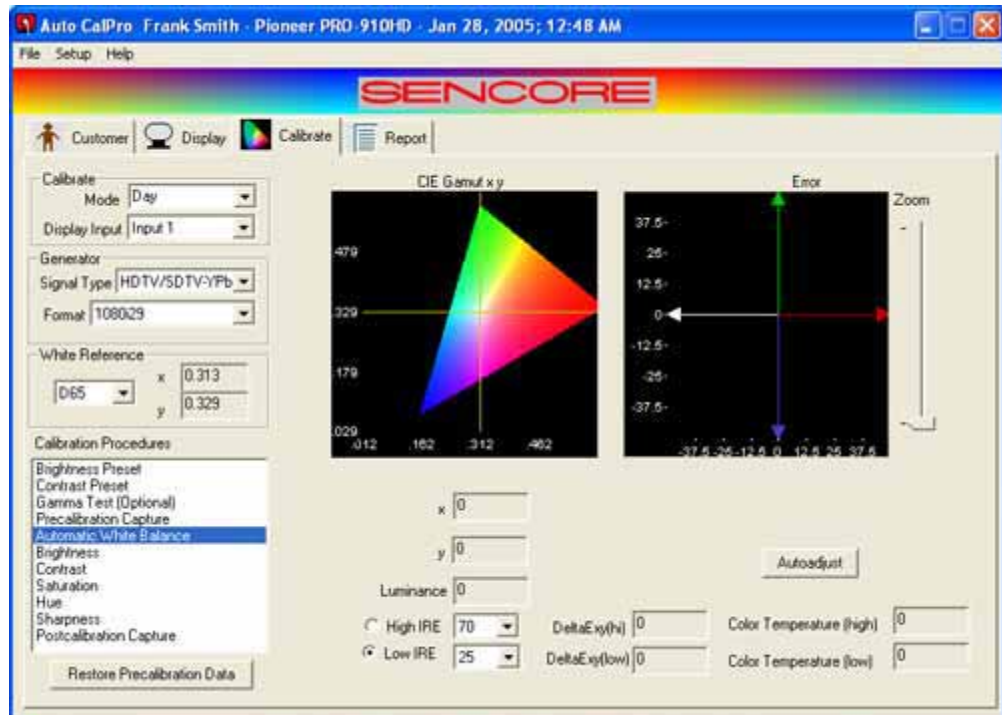
Calibration Procedures – Postcalibration **Brightness**

Brightness is used to make the black parts of the picture dark without losing any of the darkest gray picture detail.

Move the slider or press the + and – to calibrate.
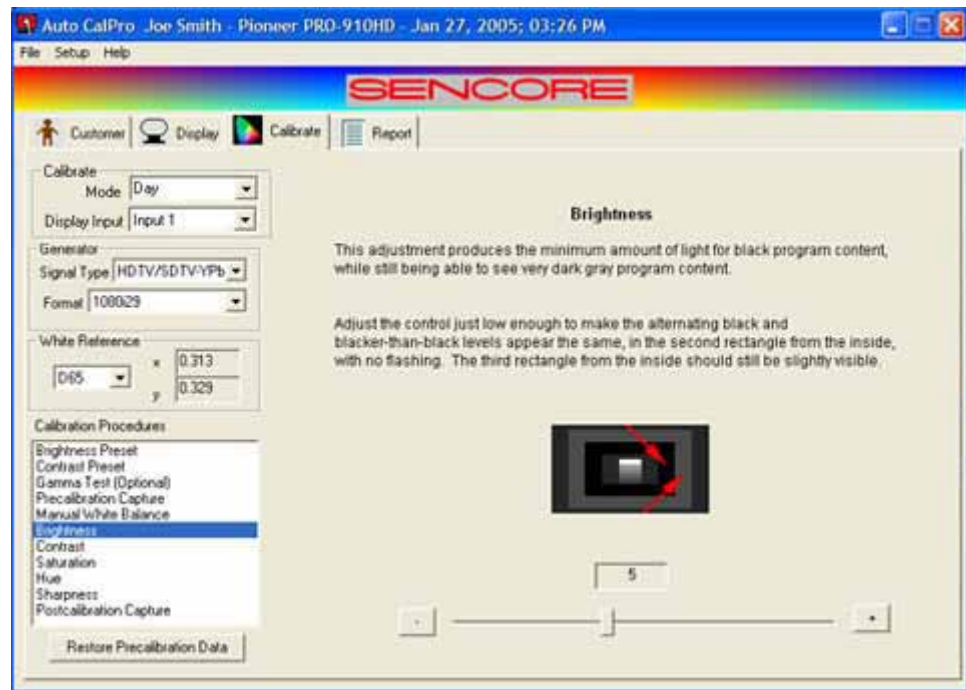
Calibration Procedures – Postcalibration **Contrast**

Contrast is set to produce the highest white level possible, without degrading the picture. Move the slider, or press the + and – to calibrate.
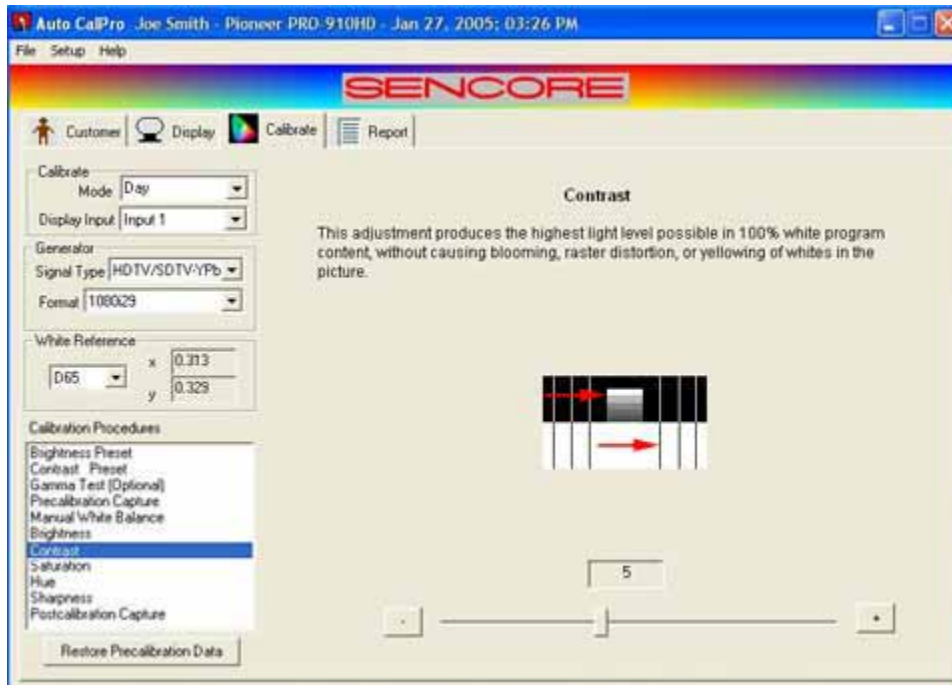
This screen and instructions are for CRT displays.

This screen and instructions are for **non CRT** displays.
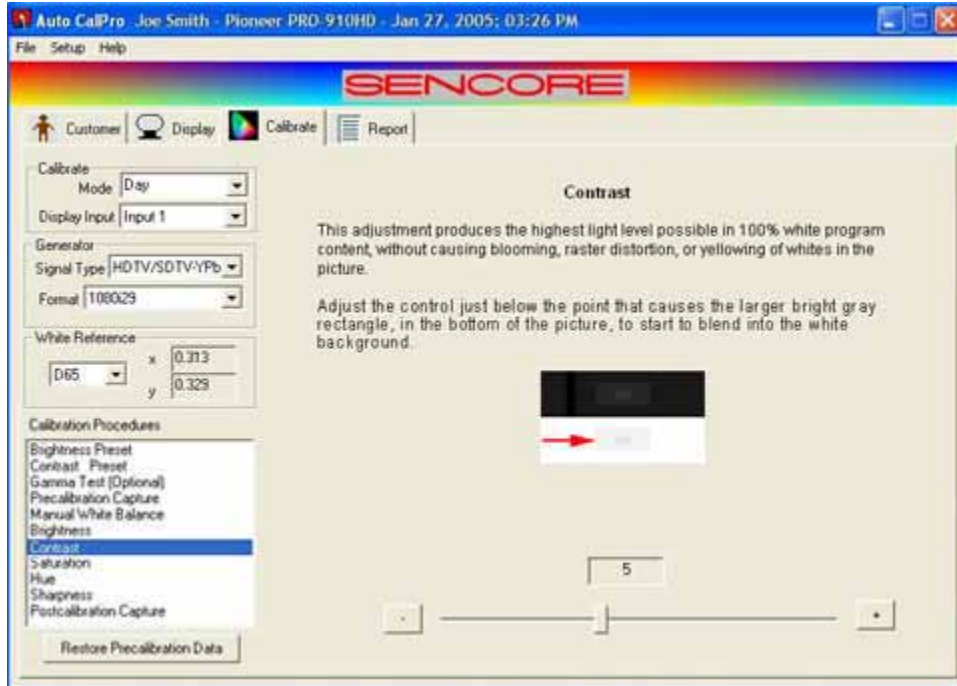
Move the slider or press the + and – to calibrate.

Calibration Procedures – Color **Saturation**

The intensity or purity of the colors is referred to as **Color Saturation**.
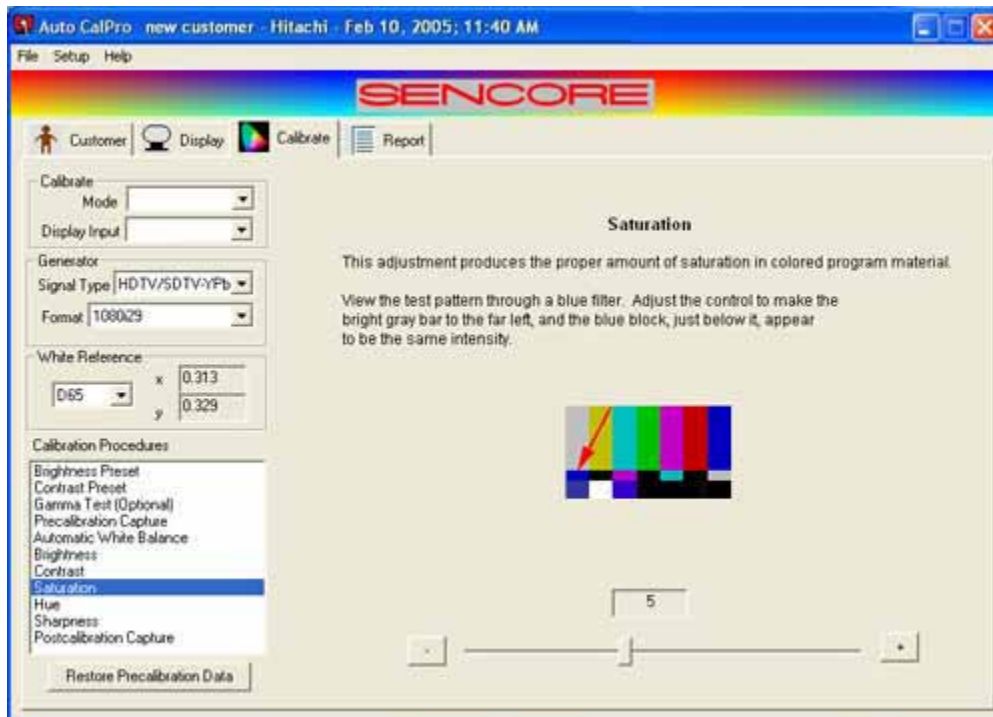
Follow the on screen instructions and using the appropriate color filter move the slider or press the + and – to calibrate.

Calibration Procedures – Hue

The **Hue** (Tint or Phase) control changes a complete color range into another color range. Follow the on screen instructions and using the appropriate color filter move the slider or press the + and – to calibrate.
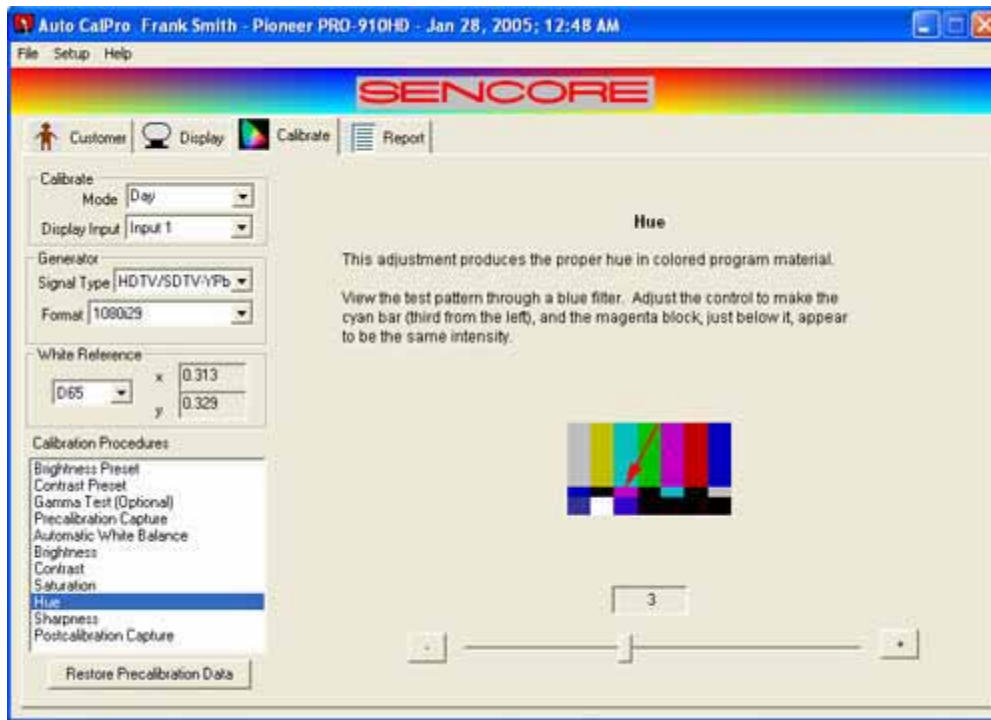
Calibration Procedures – Sharpness

Sharpness enhances the edge detail in a picture, to give the perception of improved picture resolution. This is the last adjustment step for an overall perfect display. Move the slider or press the + and – to calibrate.

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Calibration Procedures – Postcalibration Capture
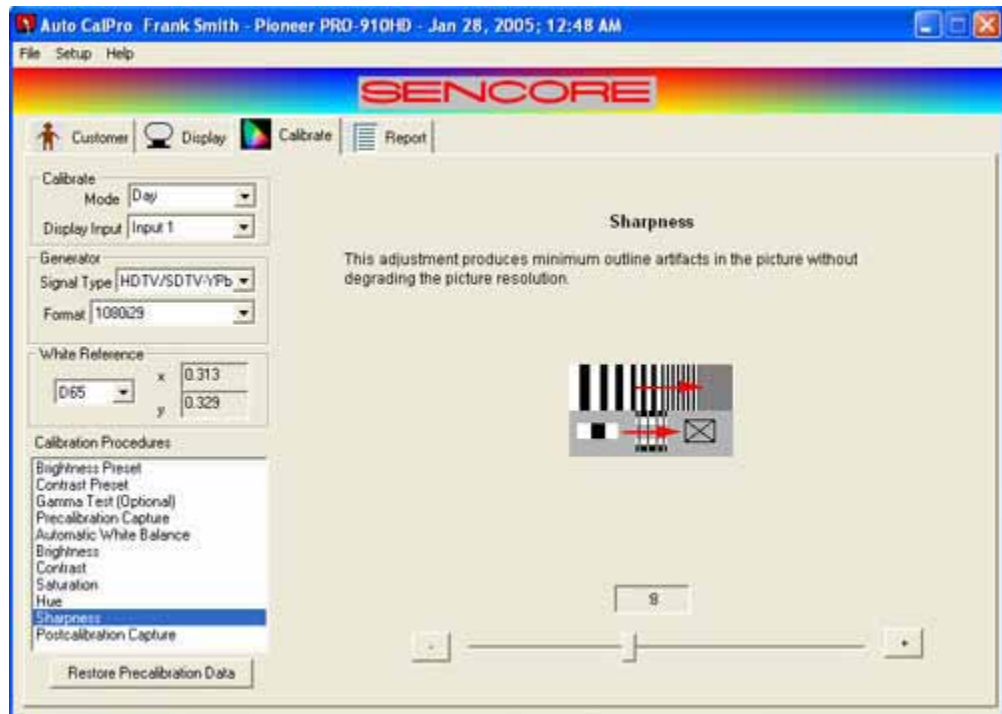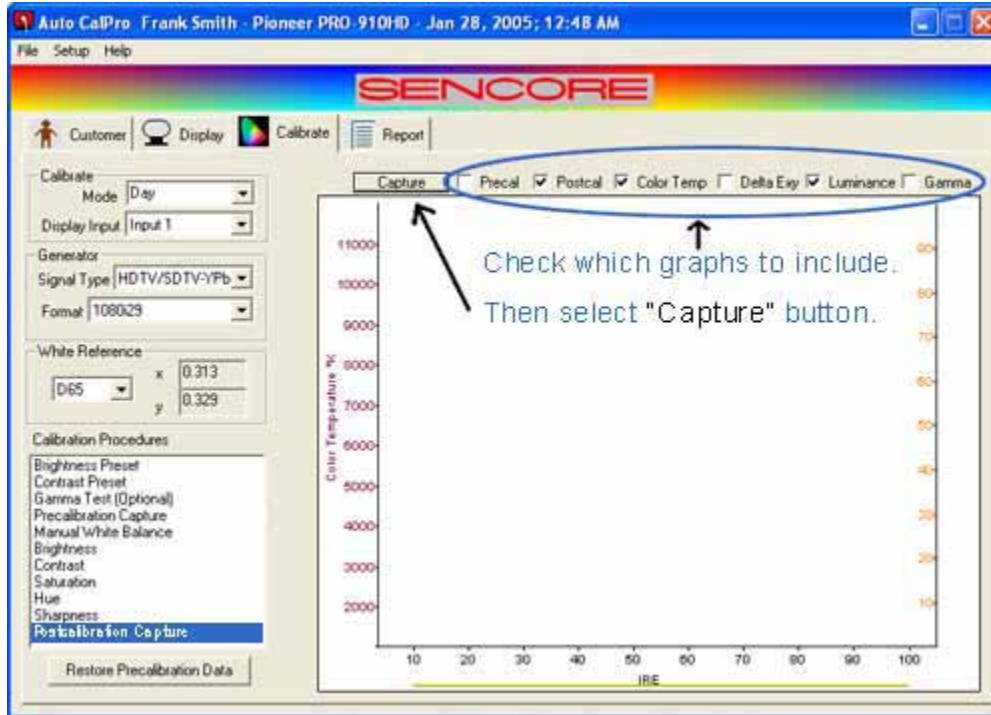

Select Postcalibration Capture and check which graphs you would like to display on the PC.

Capture begins the process of capturing and displaying the selected data.

Precal checked enables Precalibration capture data to be displayed.

Postcal checked enables Postcalibration capture data to be displayed

Color Temp checked enables the color temperature of the data being captured to be displayed.

Delta Exy checked displays the difference between Precal and Postcal data.

Luminance checked displays the luminance of the data being captured.

The Postcalibration capture can be stored or printed to show your customer an 'after' calibration report. The calibrated display will have a color temperature that hugs the middle line, luminance that starts about 10 IRE and progresses to 100 IRE, a CIE x y distance error that hovers between 5 and 10, and a gamma that gradually drops to zero.

Report Tab – Select "Report" from the tab selection

The Report page allows you to view or print a report, from the display performance data that was automatically collected during the Precalibration Capture and Postcalibration Capture steps. The Printing Options selection, under Settings on the main menu, allows you to select which display performance graph data to print on each page of your report.

Report is used to store or print a report using the Precalibration Capture and/or the Postcalibration Capture, and for any future calibration sessions.

For Precalibration, make this selection after the precalibration data has been captured.
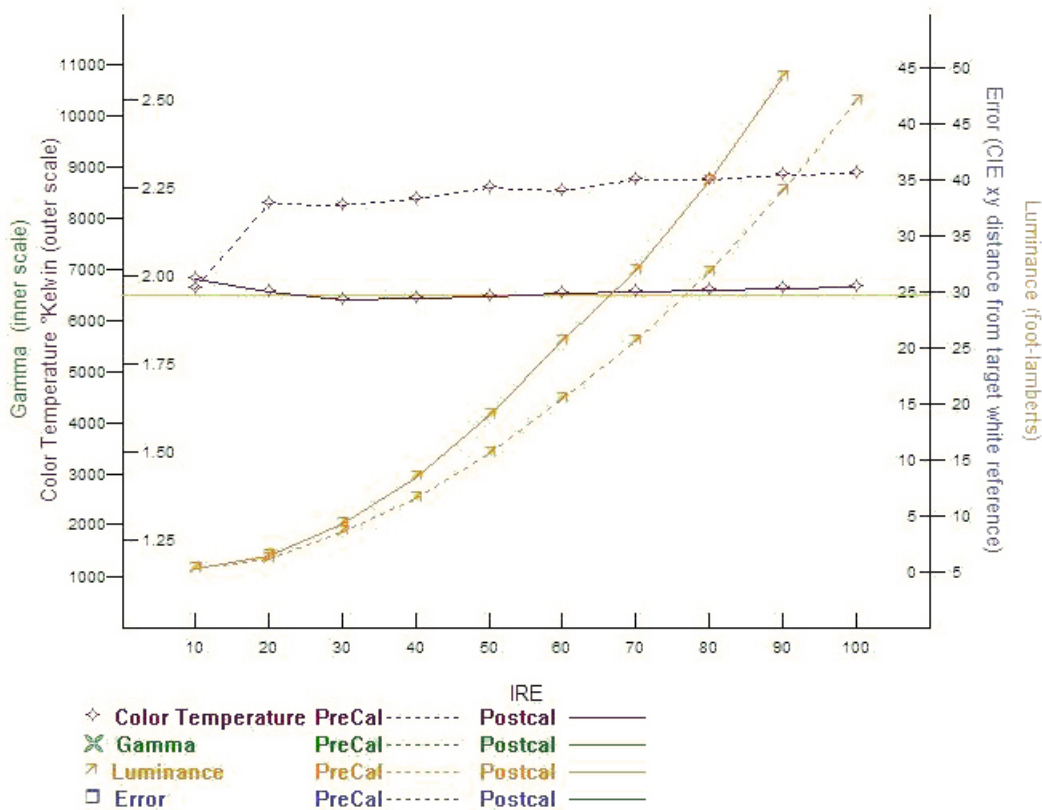
SENCORE

Smith AV
Big Town
Big City Big State 00000 Zip Big Country
Phone: Business Telephone   Fax: Business Fax
email: Businessemail@somewhere.com
Joe Smith

New Customer
Any Street
Any Town, Any State 00000-0000 Any Country
Joe Smith
1- 999-444-7547

Model: Pioneer PRO-910HD
Serial Number:1234-098-HG
Date: Feb 17, 2005; 08:52 AM
Color Temp:
Day Input 1

	Precal	Postcal		Precal	Postcal
Brightness	56	66	Red Cutoff	63	56
Contrast	21	28	Green Cutoff	63	63
Saturation	62	74	Blue Cutoff	63	45
Hue	63	54	Red Drive	64	54
Sharpness	34	48	Blue Drive	64	39

◇ Color Temperature	PreCal -------	Postcal ———
✕ Gamma	PreCal -------	Postcal ———
↗ Luminance	PreCal -------	Postcal ———
▢ Error	PreCal -------	Postcal ———

Calibration Completed - Show your customer the picture on his calibrated display and explain the before and after reports. Accept his praise and be on your way to the next site – fast and simple. Who could ask for more?

If you have any questions about the ACP6500 Auto CalPro, or would like to see how well it fits into your calibration business,
    visit the web page at http://www.sencore.com/products/acp6500.htm,
    give us a call at 1.800.736.2673 or mailto:sales@sencore.com.

WARRANTY AND SERVICE INFORMATION

WARRANTY
Your ACP6500 Auto CalPro has been built to the highest quality standards in the industry. Each unit has been tested, aged under power for at least 24 hours and the every function and range was retested to insure it met all published specifications. Your instrument is fully protected with a one-year warranty.

SERVICE
Save the original shipping carton and packing material for reuse should you ever need to ship your generator, or return it to the Sencore factory for repair.

1. If you are returning the unit to Sencore for service, call the service department at the number below and enclose the following information: owner's address, billing information, purchase order (if applicable), name and phone number of contact person, description of problem and reason for return. No return authorization is required.

2. Completely enclose the unit inside a plastic bag to protect its finish and prevent foreign material from getting inside.

3. Cushion the unit equally on all sides with a minimum of 3 inches of padding material. Pack the padding tightly enough to prevent the unit from shifting during shipment.

4. Seal all seams on the container with strapping tape.

5. Send the packed unit to the following address (we recommend shipping via United Parcel Service):

SENCORE FACTORY SERVICE
3200 Sencore Drive
Sioux Falls, SD 57107

Most service repairs are completed within 72 hours. If you need to ask about your unit, the Sencore Service Department phone number is:
1-800-SENCORE (736-2673) or FAX (605) 339-7032

Fill in for your records:

Purchase date: _____

Serial Number (on opening power-on display) _____

Software version (in Utilities ABOUT menu) _____

SENCORE

3200 Sencore Drive
Sioux Falls, SD 57107
Call 1-800-SENCORE (736-2673)
www.sencore.com

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with your time in mind.

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