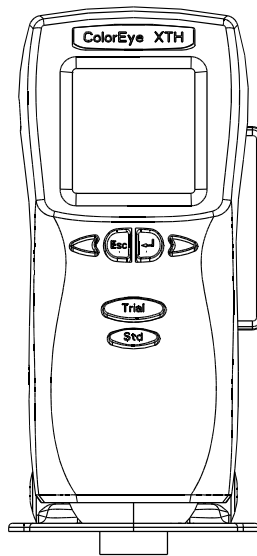


# COLOREYE® XTH Spectrophotometer OPERATION MANUAL



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# INSTALLATION

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## About This User Guide

The ColorEye® XTH Operation Manual contains the information you need to install and set up the instrument, take measurements, and perform maintenance procedures on the spectrophotometer. The manual is presented in four chapters:

Chapter 1: INSTALLATION, presents all important safeguards, describes the process of unpacking and connecting any cables, and understanding the basic operation of your instrument.

Chapter 2: SETUP, describes how to select your unique Setup Options for your color environment.

Chapter 3: OPERATION, describes how to use the Data Menu which controls the save, delete, and recall functions, use the printer, calibrate the instrument, and install a battery.

Chapter 4: MAINTENANCE, provides routine maintenance procedures that can be performed by the user such as cleaning the calibration standards.

## Basic Tasks to Get Started

We recommend that you follow these basic tasks when you first receive your instrument. All of these tasks are covered in this chapter.

- Review all the **safety instructions** presented in “Important Safeguards” on page 1-2.
- **Unpack** your instrument from the carrying case following the instructions found in “Unpacking the Instrument” on page 1-3.
- **Activate the Display** on your instrument following instructions in “Activating the Display” on page 1-4.
- **Charge the battery** following the steps detailed in “Charging the Battery” on page 1-5.
- Understand **how to use the instrument** by reviewing the sections
  - “Operating the Keypad” on page 1-7,
  - “Understanding the Three Power Modes” on page 1-12,
  - “Adjusting the Screen Contrast” on page 1-8,
  - “Using the Main Menu” on page 1-9,
  - “Taking Measurements” on page 1-12
  - “Connecting the Instrument Cables” on page 1-12
- Review the operating **specifications** listed in “Specifications” on page 1-14.
- Learn about the available **software** described in “Service” on page 1-15.
- Know how to contact a **service** professional by reading “Service” on page 1-15.

## Important Safeguards

In addition to the careful attention that we have devoted to quality standards in the manufacture of your instrument, your personal safety is a major factor in the design of each instrument we make. Safety is your responsibility too. This section lists the most important hazards, warnings, cautions, and notes that will help you protect your instrument and yourself for many years of trouble-free operation. Please read it carefully before you operate your instrument.

- a. **Please Read and Follow Instructions**—Read and follow all safety and operating instructions before you attempt to install and operate this instrument.
- b. **Retain This Manual for Future Reference**—Once you have read this manual, keep it handy for others to read or refer to when they need to operate the instrument.
- c. **Obey Warnings**—Please comply with all warnings and safeguards that we provide in this manual. They have been written to keep you and your instrument safe.
- d. **Choose Proper Power Sources**—This product should only operate with the power specified in the Electrical Requirements section of this manual.
- e. **Do Not Overload Circuits**—Do not overload wall outlets or use extension cords with this instrument. This can result in a risk of fire or electric shock. Overloaded AC outlets and extension cords are dangerous, and can also affect performance. Periodically examine cords to make certain that they are not damaged, cracked or severely twisted during operation. Cords that show any signs of damage or wear should be replaced immediately.
- f. This device is *not* explosion-proof and should *not* be used in a hazardous atmosphere with exposure to flammable substances.
- g. **Protect from Water and Moisture**—Maintain electrical safety when you use this instrument. Do not use it in an area where there is possible hazard of electric shock from spilled water or other liquids or uncontrolled moisture.
- h. **Clean Properly**—Make certain to unplug the spectrophotometer before you attempt to clean it. Do not use liquid cleaners or aerosol cleaners on your instrument. Such cleaners may not be compatible with the painted surfaces, and may actually damage the optics. Use only a slightly damp, lint-free cloth to clean the surface of the instrument. Do not attempt to clean the inside of the viewport or the inside of the instrument itself.
- i. **Do Not Force Objects into the Product**—Never push objects of any kind into the interior of the instrument in an attempt to mop up spilled liquids that may have entered these areas. If spills should occur that enter the instrument, turn it off immediately and disconnect all power sources. You should contact a Service Representative to determine the best way to handle clean up, drying, and return to the factory for damage assessment.
- j. **Use the Battery Properly**—The rechargeable battery contains Nickel Metal-Hydride Cells. Do not incinerate, short circuit, or puncture. Use only the X-Rite approved charger. The Battery may generate explosive hydrogen gas; do not expose to flame or source of ignition. Do not use the battery inside a gas-tight package. Keep out of reach of children. There is a possibility of personal injury if it is misused.

## Unpacking the Instrument

Your ColorEye XTH comes in a durable, handy carrying case. You should use this case whenever you need to transport the instrument. Below is a picture of the carrying case and its contents.

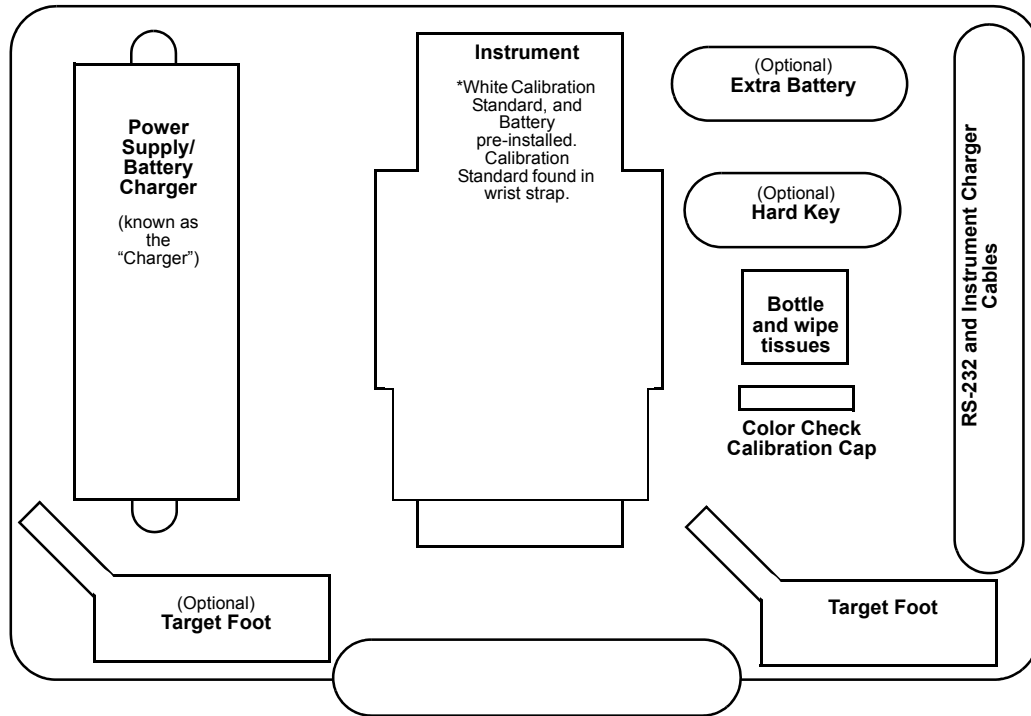


Figure 1-1. Carrying Case and Contents

### Contents of the Carrying Case

**Battery Charger/Power Supply (referred to as the Charger):** The Charger is rated for input voltages of 100/120/220 VAC 50/60 Hz.

**Instrument:** The White Calibration Standard (found in the wrist strap), and battery are pre-installed.

**Color Check Calibration Cap (Tile):** This green ceramic standard (tile) is used as a reflection standard for color checks.

**Targeting Foot:** The Targeting foot allows you to easily obtain accurate measurements on concave and convex surfaces.

**Battery:** If you ordered the optional extra battery pack, it will be located here.

**Hard Key:** The hard key is an optional accessory. If you have purchased any software you will need to install this hard key on your computer to use the software. Without the hard key, you cannot access the software.

**Bottle Wipe and Tissues:** The bottle contains a mild cleaning solution for cleaning the calibration standards. Use the tissues to wipe away any excess cleaning solution. For more information, refer to "Cleaning the Calibration Standards" on page 4-1.

**RS-232 and Interim Cables:** The RS-232 Computer Communication Cable provides communication between the instrument and a computer. The Interim Cable provides connection between the charger and the instrument.

**Note:** *Keep all packing material in the event you need to ship your instrument.*

## Activating the Display

Your instrument is shipped with the battery installed. The instrument should remain in "Sleep Mode" throughout the shipment. After the contents of the carrying case are unpacked, you should "Wake Up" the instrument. Simply press the Enter key and the Start Up Display should appear after a few seconds. In the event the instrument was in "Active Mode" throughout the shipment, the battery may be depleted. In this case, you need to charge the battery immediately before beginning normal operation. Follow the instructions listed in "Charging the Battery" on page 1-5.

## Optimizing Battery Performance

The advanced power management of the ColorEye XTH operates differently from conventional systems. NiMH batteries tend to discharge more rapidly from the initial fully charged condition. The discharge rate then slows dramatically, providing more measurements and extended battery life than conventional batteries. This power management system is designed to optimize battery life. In fact, even when the battery gauge displays less than 10% capacity, there is ample power for more than 100 measurements. To help prolong battery life and reduce memory effects we suggest periodically running the batteries to full discharge -- the point at which the "Low Battery Alarm" condition is reached.

Although you may have fully discharged the batteries, you can continue to use the ColorEye XTH without having to remove the batteries. Simply insert the power supply/charger cable into the ColorEye XTH power connector and charging begins. You can continue to use the ColorEye XTH while the batteries are charging. For more information, refer to "Charging a Battery Installed in the Instrument" on page 1-5. *You should always charge the battery while it is installed in the instrument. If you remove the battery, any stored measurement data in the instrument will be lost.*

## Battery Safeguards and Recommendations

This section lists the most important cautions and notes that will help you protect your battery and yourself during instrument operation, battery replacement and battery charging. Please read it carefully.

- a. Do not charge the battery packs with a battery charger not specified or approved by X-Rite.
- b. You should always charge the battery while it is still installed in the instrument. If you remove the battery, any stored measurement data on the instrument will be lost.
- c. Do not burn the battery pack.
- d. Do not short circuit the terminals.
- e. Do not damage or drop the instrument or subject it to mechanical vibration.
- f. Charging temperature range is 50° to 95°F (10° to 35° C). The lower the temperature, the longer the recharging time.
- g. The battery pack is normally warm after charging or use.
- h. Store battery packs in a cool dry place. Long exposure to high temperatures increases battery discharge and reduces battery life.
- i. Total battery discharge may naturally occur during long storage. Discharge batteries before storing them to extend battery life.

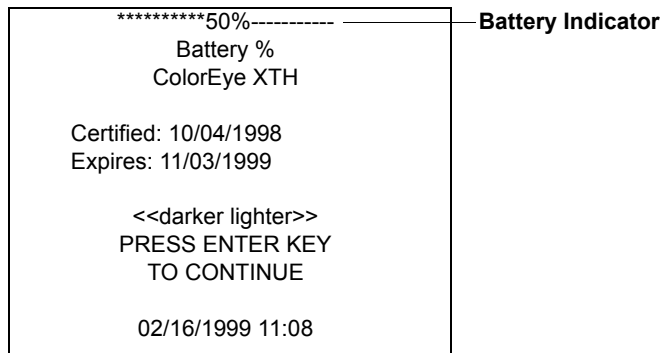


## Charging the Battery

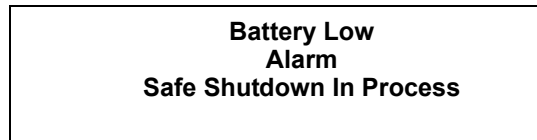


The Nickel Metal Hydride Battery Pack and Charger supplied with your unit was custom designed to provide optimum performance and minimum charge time. Use of any battery or charger not approved by X-Rite will affect your instrument's performance and could result in damage to the unit and its charger. Your battery contains Nickel Metal-Hydride Cells. Do not incinerate, short circuit or puncture the battery. It may generate explosive hydrogen gas: do not expose to flame or source of ignition. Do not use inside gas-tight package. Keep out of reach of children. There is a possibility of personal injury if misused.

The Start Up Display shows a "battery percentage" that indicates how much time is available on the installed battery. For example, "50%" means that the battery is halfway depleted. You *must* charge the battery when the battery percentage is 0%. However, you may charge your battery at any percentage.



**Note:** When the battery is depleted to 0%, the following message appears:

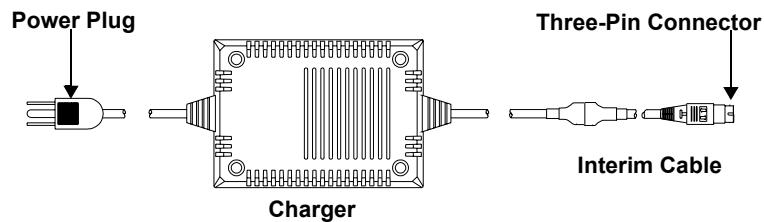


All the current data is saved. However, you should connect the Charger to return to operation and begin charging the battery.

### Charging a Battery Installed In the Instrument

To charge a battery already installed in the instrument, proceed as follows.

1. Make sure the battery is installed in the instrument.
2. Insert the Charger Power Plug into an appropriate electrical outlet. The yellow LED on the charger will be illuminated.

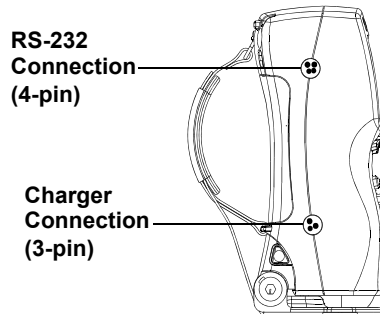


**Figure 1-2. Charger/Interim Cable Connection**

3. If the interim cable is not yet installed, follow the instructions in "Connecting the Instrument Cables" on page 1-12.
4. Insert the three-pin connector on the Interim Cable into the Charger Connection on

the instrument. The red LED on the charger will flash for 2 seconds and then remain illuminated.

**Note:** *The label on the power cable should correspond to the label on the instrument housing.*



**Figure 1-3. Side of Instrument Showing Charger and RS-232 Connections**

5. The battery will begin charging immediately. When the battery is charged (*after approximately three hours*), the Green LED will be lit.

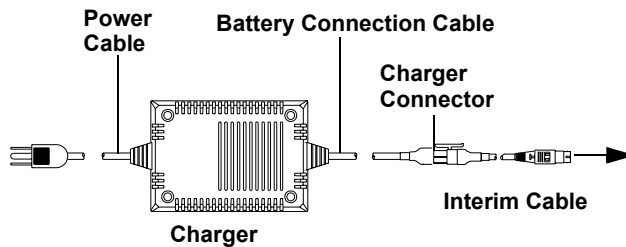
**Note:** *When the Charger is connected to the instrument, the Startup Display shows the battery percentage as 100%. This does not mean that the batteries are fully charged yet. It only indicates the Charger is able to supply 100% voltage (the charger also acts as a power supply). Follow the recommended charging time and wait for the Green LED.*

6. Disconnect the three-pin connector on the Charger from the instrument.
7. Disconnect the AC power plug from the power receptacle.
8. The internal battery is charged.

### **Charging a Battery Directly from the Charger**

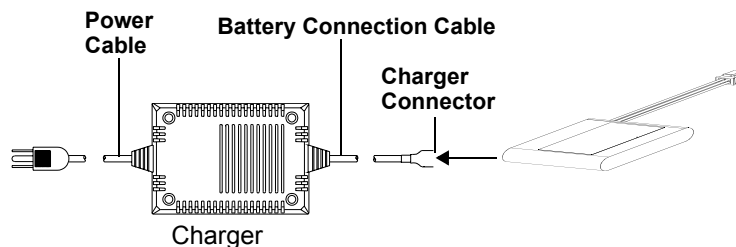
It is also possible to charge the optional spare battery directly from the Charger.

1. Locate the Charger and the battery to be charged.
2. Disconnect the Interim Cable from the Charger at the Charger Connector. See Figure 1-4.



**Figure 1-4. Charger/Interim Cable/Instrument Connection**

3. Connect the Battery to the Charger at the Charger Connector.

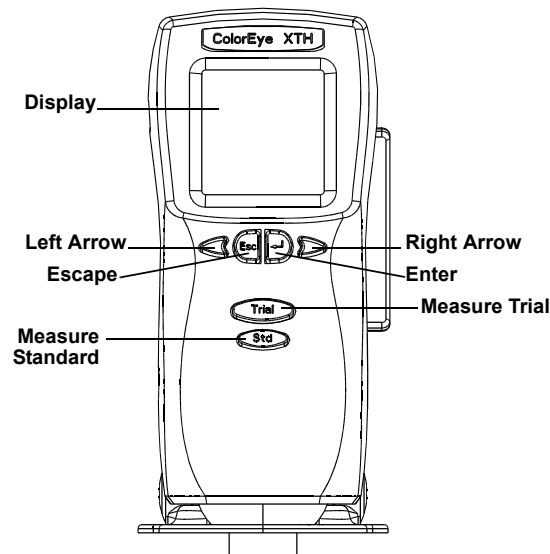


**Figure 1-5. Charger/Battery Connection**

4. Connect the Charger Power Cable at the Power Plug to a power outlet. The Red LED will illuminate. When the charge is complete, the Green LED will illuminate.
5. Disconnect the battery from the Charger at the Charger Connector.
6. Disconnect the Charger power plug from the power receptacle.

## Operating the Keypad


The CE XTH keypad is simple to use, with just six, closely-grouped keys commanding all operation. The instrument is very lightweight and should be easily held with just one hand. The wrist strap can be moved to either side of the instrument to allow for left or right handed use. Insert your hand into the wrist strap and place your palm on the back of the instrument. Adjust the wrist strap to allow the thumb to comfortably reach the Trial and Standard keys. The instrument and keypad is shown below:



Below is a list of the keys and their function:

**Enter:** 

The Enter key is used for making selections on any display.

**Escape (ESC):** 

The ESC key is used to return to the previous display without saving any data or changing any settings.

**Standard:** 


The Std key is used to take standard measurements.

**Trial:** 

The Trial key is used to take trial measurements.

**Right Arrow (>):** 

The Right Arrow key is used to move to the right, from one selection to the next. You may be moving a cursor, an arrow, or to an item whose text changed from lower to upper case (CAPS) to indicate a selection.

**Left Arrow (<):** 

The Left Arrow key is used to move to the left, from one selection to the next. You may be moving a cursor, an arrow or to an item whose text changed from lower to upper case (CAPS) to indicate a selection.

## Start Up Display

The Start Up Display is the very first to appear whenever you “wake up” your instrument. This display also appears whenever you press ESC at the Main Menu.

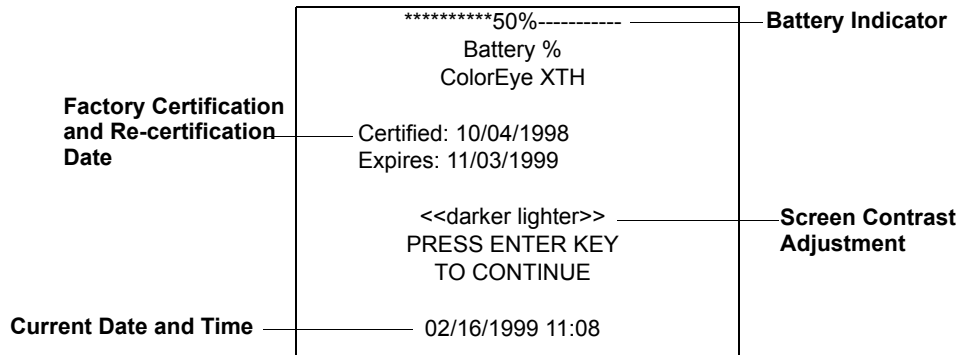


Figure 1-6. Start Up Display

## Adjusting the Screen Contrast

Depending on your preference, you may wish for the display text to appear lighter or darker. The process of adjusting the screen contrast is performed on the Start Up display, the very first screen that appears when you turn on your instrument.

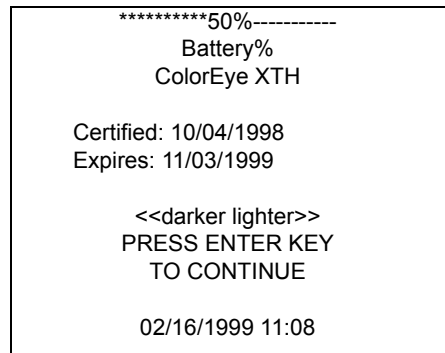


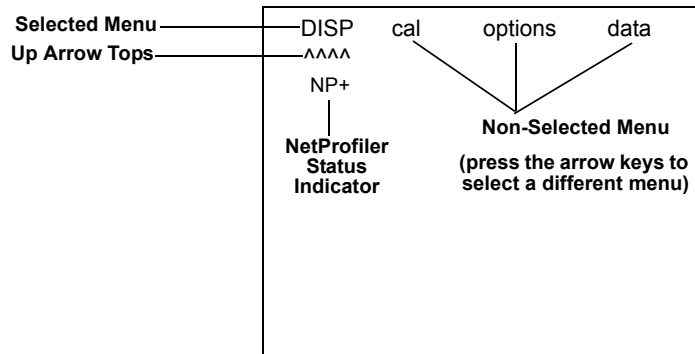
Figure 1-7. Start Up Display

To adjust the screen contrast, proceed as follows:

1. Press **Escape** until the Start Up Display appears.
2. *To lighten the display text*, press the right arrow key.
3. *To darken the display text*, press the left arrow key.
4. When you are finished, press **Enter** to continue.
5. You may adjust the screen contrast at any time. Simply return to the Start Up display and follow the above steps.

## Using the Main Menu

There are four menus available from the Main Menu to help you operate your instrument. To select a menu, press the arrow keys to change the selected menu name to CAPS (capital letters) and the menu name is underlined with up arrow tops. The other menus are displayed in lower case. When the selected menu name is in CAPS, press Enter to display the sub-menu. See Figure 1-8. In addition to these sub-menus, many screens will contain a NetProfiler status indicator.



**Figure 1-8. Main Menu**

### Display (DISP)

The Display Menu contains the options you have for displaying your measurement data. For example, you can choose to have the colorimetric information or indices information displayed for your measurement data. For more information on selecting a Display, refer to "Choosing a Display Mode" on page 2-1.

### Calibrate (CAL)

The Calibrate Menu contains the options for performing a Calibration. For more information, refer to "Calibrating the Instrument" on page 4-2.

### Options (OPTIONS)

The Options Menu contains the options for printing the display screen, using the Shade Search feature, setting up the color equations, and setting up the system options. The majority of this menu is discussed in Chapter 2- Setup.

### Data (DATA)

The Data Menu contains the options for methods of saving and recalling measurements (standards and trials), and for working with the Optiview Color Quality Control software. For more information, refer to "Using the Data Menu" on page 3-1.

### NetProfiler Status Indicator

The NetProfiler Status Indicator is visible on most menus. NetProfiler software creates an instrument performance profile (also known as a "profile"). This profile is exported to the NetProfiler server where it is corrected to agreement with the NetProfiler Virtual Standard. The profile is sent back to you via the Internet. All future measurements will benefit from any corrections made to the profile. Refer to the following table for an understanding of different NetProfiler Status indicators you may see on your ColorEye XTH screen.

NetProfiler Status

Status Indicator on XTH Menu	Is NetPalette Loaded?	Is NetPalette Enabled?	Is NetPalette Active?	Is NetPalette Expired?
Solid NP?	No	N/A	N/A	N/A
Solid NP-	Yes	*	*	No
Solid NP+	Yes	Yes	Yes	No
Blinking NP-	Yes	*	*	Yes
Blinking NP+	Yes	Yes	Yes	Yes

\* In these cases, NetProfiler is either disabled, inactive, or both.

## Installing and Removing the Targeting Foot

The Targeting Foot should be installed and removed with care. To remove the Targeting Foot, proceed as follows:

1. Unlock the Targeting Foot. Slide the lock to the far left. The Targeting Foot will open. See Figure 1-9.

**Note:** *It is very important to UNLOCK the Targeting Foot before you attempt to remove it. Failure to unlock could result in damage to the Targeting foot and the Instrument.*

2. Squeeze the instrument housing just above the targeting foot release buttons located on either side of the targeting foot.

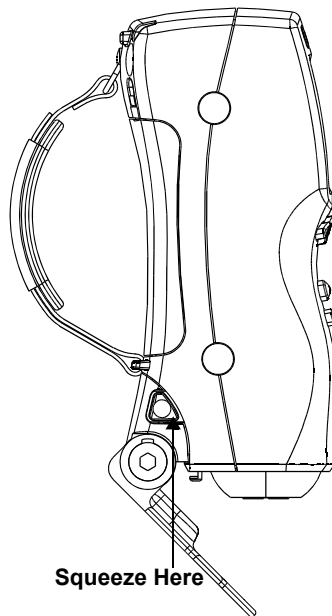
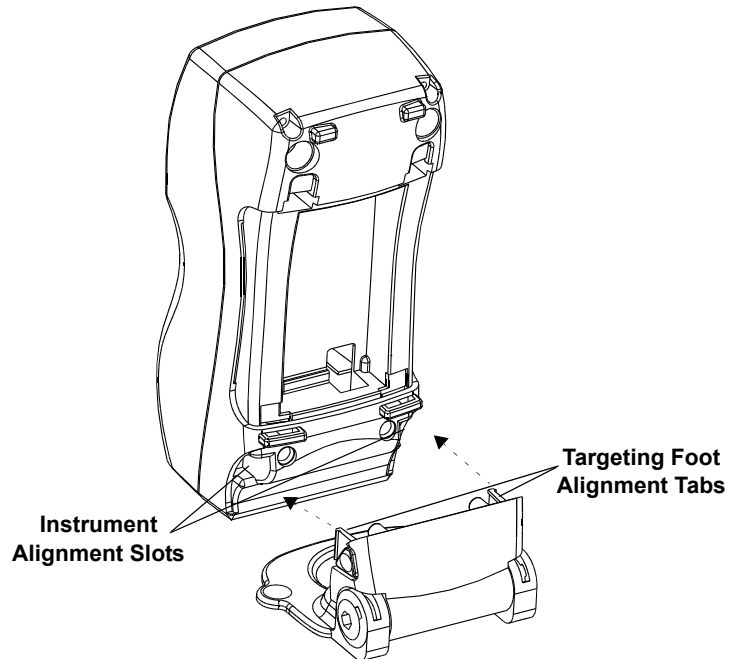


Figure 1-9. Removing the Targeting Foot

3. Slide the targeting foot out away from the instrument. Store the targeting foot in the carrying case.
4. The targeting foot is removed.

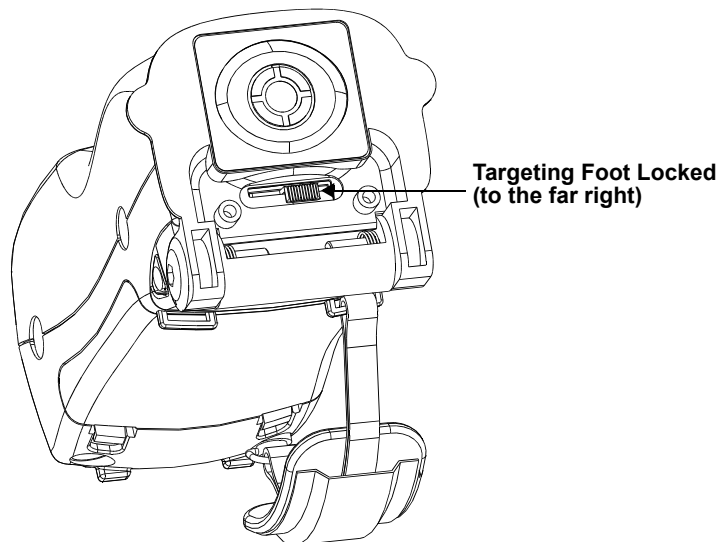
To install the Targeting Foot, proceed as follows:

1. Locate the targeting foot in the carrying case.
2. Insert the targeting foot alignment tabs into the alignment slots on the instrument. You will hear the targeting foot snap into place. Refer to Figure 1-10.



**Figure 1-10. Installing the Targeting Foot**

3. Lock the foot into place as shown in Figure 1-11.



**Figure 1-11. Locked Targeting Foot**

4. The Targeting Foot is installed.

## Taking Measurements

1. Choose an area on your sample to measure.
2. Close the targeting foot.
3. Tip the instrument back to allow the template to be aligned over the sample. Align the ColorEye XTH Targeting template on the area chosen in step 1.
4. Make sure that the template is in contact with the sample. It should be touching the sample to achieve the most optimum measurement.
5. Tip the instrument forward to allow the sphere to come in contact with the sample.
6. Press the Trial or Standard (Std) key to take the measurement.



**Note:** The Std key is **smaller** and is located **below** the Trial key.

7. The instrument flashes and the measurement data appear on the display.

## Understanding the Three Power Modes

You will notice that the unit does not have a power on/off switch. There are three power modes that are monitored by the instrument microprocessors to ensure optimum battery life.

### Active Mode

The instrument enters this power mode when the display is on and responds to keystrokes.

### Sleep Mode

The instrument enters this power mode when it has not been used during the programmed sleep delay interval. It enters a low power mode to conserve battery energy. Any keystroke “wakes up” the instrument and returns the instrument to the active mode. The unit should be in sleep mode prior to removing the battery from the instrument. You can prompt the instrument to go to sleep using the “Go to Sleep Option” in the Diagnostics Menu, described on page 2-13. For more information about the Sleep Delay, refer to “Choosing Hardware Settings” on page 2-10.

### Shutdown Mode

The instrument enters this power mode when the battery energy drops to a level where recharge is necessary. At this point, the keypad does not function. The battery can be replaced (by a recharged battery) or the charger can be used to recharge the battery. In either case, the instrument returns to the active mode.

## Connecting the Instrument Cables

### AC Power Supply/Battery Charger and Interim Cable Connection

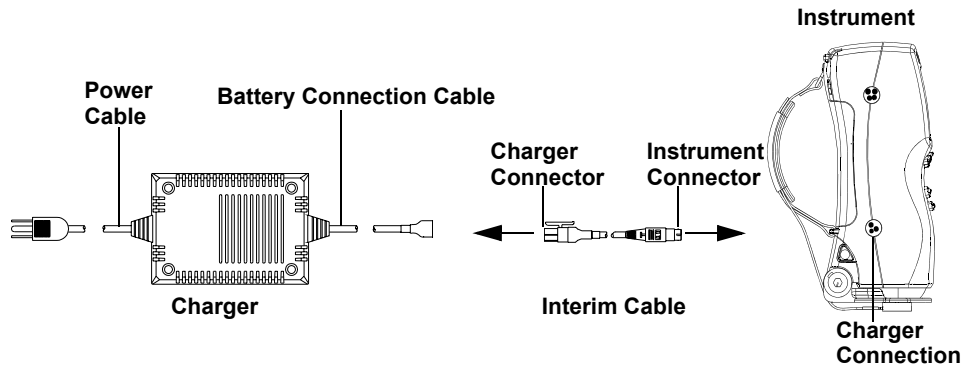
The ColorEye XTH is supplied with an AC Power Supply/Battery Charger (referred to throughout the manual as the “Charger”). Most of the time you will use your instrument with the battery. However, you will need to connect the Charger for one of the following purposes:

- *To provide a power supply for instrument operation* when a battery is not installed. This involves using the Interim Cable.
- *To charge a battery installed in the instrument.* This involves using the Interim Cable.
- *To charge a battery not installed in the instrument.* This involves direct connection of the Battery Pack to the Charger *without* the Interim Cable.

For more information on charging your battery, refer to “Charging the Battery” on page 1-5.



The Charger has two cables: the Power Cable and the Battery Connection Cable. A third cable, the Interim Cable, needs to be connected to the Charger and the Instrument. To perform these connections, proceed as follows:



**Figure 1-12. Charger/Interim Cable/Instrument Connection**

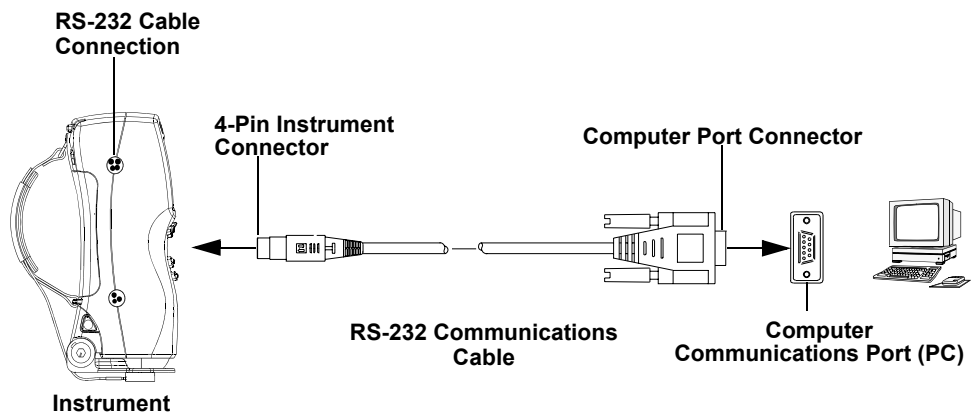
**Note:** The label on the cables should correspond to the labels on the instrument housing.

1. Locate the Charger, the Interim Cable, and the Instrument in the Carrying Case.
2. Connect the Charger to the Interim Cable at the Charger Connector.
3. Connect the Interim Cable to the Instrument at the three-prong male connector at the side of the instrument.
4. Connect the Charger Power Cable at the Power Plug to a power outlet.

### RS-232 Communication Cable Connection

This cable enables you to transfer saved data from the instrument to your computer. After the data is saved on the computer, the cable is used to transfer the new data back to the instrument. The cable is equipped with male to female 4-pin connectors. See Figure 1-13. for proper connection at the side of the instrument. The remaining end of the cable connects to a computer communications port. If you are using the optional printer accessory, you may not use the communication cable and the printer at the same time. The printer cable and the communication cable use the same port on the instrument. This will not present any difficulty for you since you will not be printing and downloading data at the same time.

**Note:** The label on the cables should correspond to the labels on the instrument housing.



**Figure 1-13. Instrument/ RS-232 Communications Cable/ PC Connection**

## Color Software

### Optiview/ProPalette Software

X-Rite offers Optiview/ProPalette color quality control software to simplify your color management. This Windows® based software is available through your Applications Engineer or by calling X-Rite. You can use this software to download your ColorEye XTH measurement data from the instrument to your computer for quality control and then upload the new data from your computer back to the instrument.

## Specifications

The following summarizes specific requirements for proper installation. All specifications are given at 120% Photometric Range for Regular Area of View aperture.

### Electrical Requirements (Standard Power Supply)

AC INPUT POWER	DC OUTPUT	
100, 120 VAC or 220 VAC $\pm$ 10% 50-60 Hz	Charger	8.7VDC
	Power Supply	9VDC - 11VDC

Instrument peak power consumption is 18 watts for a flash, 2 watts at rest, and <5 milliwatts in Power Saver Sleep Mode.

### Space Requirements

DIMENSIONS	
Height:	7.7 in (19.5 cm)
Width:	3.1 in (8.0 cm)
Depth:	2.8 in (7.0 cm)
Weight:	1.8 lb (.81 kg)

### Environmental Requirements

TEMPERATURE & HUMIDITY	ACCEPTABLE RANGE
Operating Temperature	10°C to 35°C
Storage Temperature	-20°C to 55°C
Operating Relative Humidity	20 to 80%, non-condensing

### Battery Specifications

Life: Up to 3000 - 4000 flashes per charge
Charge time (idle): less than 3 hours
Charge time (in use): less than 6 hours
Power conservation: Automatic Sleep Mode

**General**

Illumination .....	Pulsed Xenon D65
Spectral Range .....	360 nm to 750 nm
Wavelength Interval .....	10 nm
Photometric Range (selectable) .....	0%-120%, reflectance
.....	0% - 200%, reflectance
Photometric Resolution .....	0.01%
Baud Rate .....	2400 - 38400
Measurement Cycle Time .....	1 sec.
Optical Geometry Configuration .....	D/8 (diffuse)
.....	Simultaneous Specular Component
.....	Excl./Specular Component Incl.
.....	38mm diameter integrating sphere, Dual Beam

**Aperture Size**

Regular Area of View (standard)	
Illuminated/Measured .....	10mm circular diameter/ 5mm circular diameter
Small Area of View (optional) .....	
Illuminated/Measured .....	5mm circular diameter/ 2mm circular diameter

**Repeatability**

Typical: 0.05 RMS Delta E CIELAB  
 Maximum: 0.10 RMS Delta E, CIELAB (Refer to Note 1 below.)

**Interinstrument Agreement**

Typical: 0.15 Avg. Delta E CIELAB (Refer to Note 2 below.)  
 Maximum: 0.25 Average Delta E, CIELAB (Refer to Note 2 below.)

- Notes:**
1. *Representative of all instruments' performance using a stable white tile under controlled laboratory conditions.*
  2. *Representative of all instruments' performance using the average from the norms of 13 BCRA color tiles under controlled laboratory conditions.*

Representative values (described in NOTES 1 and 2) may vary with the type(s) of samples measured.

**Service**

- a. **Service Properly**—With the exception of those procedures given in the Maintenance chapter of this manual, do not attempt to service this product yourself. If you should attempt unauthorized repairs yourself, you may invalidate the warranty.
- b. **Call X-Rite when You Have Questions**— A full complement of service and applications experts are ready to deliver the finest customer support and service available in the industry. When you contact X-Rite, you contact a group of professionals who are totally dedicated to your individual satisfaction in products and services. Thank you for buying a X-Rite product. We appreciate your business and look forward to working with you.

## INSTALLATION

# SETUP

This chapter describes how to choose the many options that are available for your color environment so that you may achieve optimum results when taking measurements. These options should be set up before you begin using your instrument for the first time. However, you can change your options at any time.

To set up your options, you may choose from using the actual unit to select all of the instrument options or the ColorEye XTH Instrument Driver Software program. If you are using your instrument in an environment where your color settings will *frequently* change (for example, you need to switch color equations or change tolerances), you should use the Setup Options on the instrument. Begin with “Choosing a Display Mode” on page 2-1. However, if your color settings will *rarely* change, you should use the Instrument Driver Software to select your options once, and then return to the software if needed at a later time. Refer to “Using the Driver Software” on page 2-14.

## Choosing a Display Mode

The DISP (Display) Menu is used to indicate your preference for displaying the standard and trial measurement data. Depending on your needs, you can display standard and trial data according to one of the following Display Modes:

- **Colorimetric:** colorimetric values for the chosen color equation
- **Assessments:** literal description of the standard and trial
- **Tristimulus:** available when FMC is the colorimetric equation
- **Indices:** index values
- **Details:** time, date of measurement
- **Shade Sort:** 555 Shade Sort values

In addition to choosing a Display Mode, you also need to choose the Area of View Option and the Specular Option. These two items appear on every display, regardless of the Display Mode you choose.

- **Area View:** regular- RAV or small-SAV
- **Specular:** specular component included (SCI) or excluded (SCE)

To choose the Display Mode, proceed as follows:

1. Use the arrow keys to choose **DISP** on the Main Menu. Press **Enter**.
2. Choose the desired display mode in the Display Menu. Your selection is noted by an asterisk (\*).
3. The measurement data is displayed according to your selection.
4. You may change the Display Mode at any time. Simply repeat steps 1 and 2.

### Colorimetric

The Colorimetric Display Mode lists the colorimetric data from the color equation for the standard or trial. For more information about choosing the color equation, refer to “Choosing the Color Equation” on page 2-4. The Colorimetric display is shown as Figure 2-1.

DISP	cal	options	data
****			
	<u>Std</u>	<u>Trial</u>	<u>Diff</u>
L*	26.02	25.58	-0.44
a*	-0.59	-0.77	-0.17
b*	01.25	1.02	-0.23
DE			0.52
	*** PASS ***		
NetProfiler: Active			
CIELAB: A - 2 RAV-SCI			
S: NP: Measured_Std			
T: NP: Measured_Trial			

Figure 2-1. Example of a Colorimetric Display

## Assessments

The Assessments Display mode lists the literal description of the differences between the trial and the standard. For example,

**“PASS- The Trial is lighter, and stronger.”**

The Assessments Display is shown as Figure 2-2. The assessments apply to each component of the chosen color equation. For more information on Color Setup, refer to “Using the Color Setup” on page 2-4.

DISP	cal	options	data
AAAA			
		*** PASS ***	
Trial Is:		LIGHTER	
		MORE RED	
		MORE YELLOW	
NetProfiler:	Active		
CIELAB:	A - 2	RAV-SCI	
S:NP:	Measured_Std		
T:NP:	Measured_Trial		

**Figure 2-2. Example of an Assessments Display**

## Tristimulus Display

*You must have FMC-II chosen as the Color Equation to view the Tristimulus Display.*

The Tristimulus Display mode lists the amounts (in percent) of the three components necessary for matching a color: X, Y, and Z. For more information on choosing FMC-II as the Color Equation, refer to “Choosing the Color Equation” on page 2-4. The Tristimulus display is shown below:

DISP	cal	options	data
AAAA			
	<u>Standard</u>	<u>Trial</u>	
X	1.85	1.83	
Y	1.67	1.66	
Z	0.61	0.60	
x	0.4486	0.4481	
y	0.04041	0.4043	
NetProfiler:	Active		
CIELAB:	A - 2	RAV-SCI	
S: NP:	Measured_Std		
T: NP:	Measured_Trial		

**Figure 2-3. Example of a Tristimulus Display**

## Indices

The Indices Display mode lists the index values for the standard and trial. The index values are based on the Index you have chosen in the Color Setup. A maximum of six may be displayed. Some index values are absolutes, while others are Delta values. For more information on choosing the Index, refer to “Choosing the Index” on page 2-5.

The Indices Display is shown as Figure 2-4.

DISP	cal	options	data
^			
^			
^			
^			
	<u>Index</u>	<u>Std</u>	<u>Trial</u>
	D1925-YI	121.	121.
	Taube- WI	-291.	-220
NetProfiler: Active			
CIELAB: A - 2 RAV-SCI			
S:NP: Measured_Std			
T:NP: Measured_Trial			

**Figure 2-4. Example of an Indices Display**

**Details**

The Details Display mode lists the measurements details such as time, date, and instrument configuration for the standard and trials. The date, time, and temperature of the last calibration is also listed at the bottom of the display.

The Details Display is shown as Figure 2-5.

DISP	cal	options	data
^			
^			
^			
^			
S:	Measured_Std		
	Time: 3:31:30 09Jul03		
	NP: 14:45:20 16Sep02		
T:	Measured_Trial		
	Time: 3:31:35 09Jul03		
	NP: 14:45:20 16Sep02		
NetProfiler: Active			
Last Calibration:			
	16:47:31 08Jul03		
	at 22.1 degrees C		

**Figure 2-5. Example of a Details Display**

**555 Sort**

*This display is available only when CIELAB or LAB is the chosen color equation.*  
 The 555 Sort Display mode lists the 555 Shade Sort values for the trial compared to the standard. The block size values will be based on your positive tolerance values.

The Shade Sort Display is shown as Figure 2-6.

DISP	cal	options	data
^			
^			
^			
^			
555 Shade Sort			
<u>L*</u>	<u>a*</u>	<u>b*</u>	
5	5	5	
Block Sizes:			
1.00	1.00	1.00	
NetProfiler: Active			
CIELAB: A - 2 RAV-SCI			
S: NP: Measured_Std			
T: NP: Measured_Trial			

**Figure 2-6. Shade Sort Display**

Each measurement taken with the ColorEye-XTH has data for both area of views (RAV and optional SAV) and both Specular Components (Included or Excluded). The following Display Menu options do not result in an entire display of information. They simply indicate which set of measurement data you would like to view. You can choose to view *one* of the following four configurations for measurement data:

**RAV/SCI      RAV/SCE      SAV/SCI      SAV/SCI**

**Area View**

The chosen area of view will be shown at the bottom of every display as **RAV** (Regular Area of View) or **SAV** (*optional* Small Area of View).

**Specular**

The chosen specular component will be shown at the bottom of every display as **SCI** (Specular Component Included) or **SCE** (Specular Component Excluded).

**Options Menu**

The Options Menu is used to perform four major tasks:

- Perform **functions** like printing (Print), searching for a standard (Search Stds) or searching for a trial (Search Trials). For more information, refer to “Performing Functions” on page 3-4.
- Choose the **color setup** options such as the color equation, illuminants, degree observer, index, and tolerances.
- Choose the instrument **settings** such as system setup, date and time, hardware setup, and language to use for the display.
- Check out the **diagnostics** information about your instrument and use the Go to Sleep option in case you need to remove your battery.

You may change any of these options if your environment and needs change.

**Using the Color Setup**

The Color Setup contains ColorEye XTH options that you can customize based on your unique color environment. The options will impact the measurement calculations. The Color Setup options are the following:

- **Color Equations**
- **Illuminants**
- Degree **Observer**
- **Index** (including Yellowness, Whiteness, Miscellaneous, and Strength)
- **Tolerances** (Entry)

Once the color setup is complete, the instrument will use the values you have chosen for all future measurements. Changing the color setup can be done at any time when changes are needed.

**Choosing the Color Equation**

The ColorEye XTH offers six possible color equations. To choose a color equation, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **COLOR SETUP** from the **Options Menu**.
3. Select **COLOR EQUATIONS** from the **Color Setup Menu**.
4. You may choose from the following list of possible Color Equations:

CIELAB	Lch	Lab	Munsell
CMC	CIE94	FMC II	



## Choosing the Illuminants

The ColorEye XTH offers 16 plus 4 customized illuminants. To choose an illuminant, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **COLOR SETUP** from the **Options Menu**.
3. Select **ILLUMINANTS** from the **Color Setup Menu**.
4. You may choose from the following list of possible Illuminants. The list of illuminants may be too long to fit on one display. Use the right arrow key to move to the end of the illuminant display. Press the right arrow key to display the next illuminant in the list. The list will increment one illuminant at a time. Use the left arrow key to move to the beginning of the illuminant list and reverse the procedure.

### Available Illuminants

A	CWF	SPLHOR	D50	TL83
C	DLF	SPLD65	D55	TL84
U30	NBF	SPLD75	D65	TL85
			D75	

## Choosing the Degree Observer

You must choose between a 2 degree or 10 degree observer. To choose a degree observer, proceed as follows

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **COLOR SETUP** from the **Options Menu**.
3. Select **OBSERVER** from the **Color Setup Menu**.
4. You may choose from the following list of possible observers:

### Degree Observers

2 Degree 10 Degree
-----------------------

## Choosing the Index

Indices are single values that are calculated differently from color coordinates. Most of them are intended to provide a single value for assessing the sample, rather than having to interpret the meaning of color coordinates. To choose the index, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **COLOR SETUP** from the **Options Menu**.
3. Select **INDEX** from the **Color Setup Menu**.
4. Choose one of the following Indices:

### Indices

Whiteness Yellowness Strength Miscellaneous
--

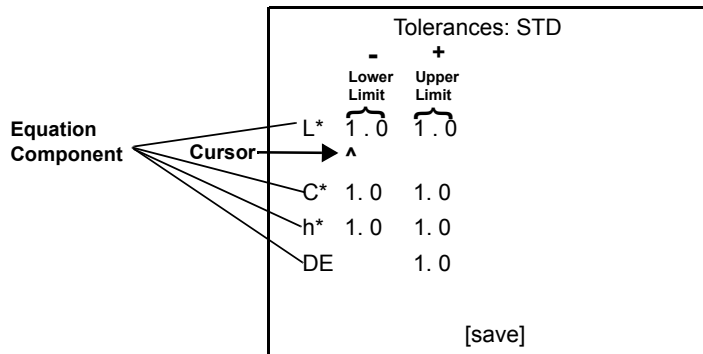
- Choose an indicator for the chosen Color Equation. Choose from the following:

Whiteness	Yellowness	Strength	Miscellaneous
CIE Ganz 1982	ASTM D1925	Chromatic	Metamerism
Berger 1959	ASTM E313	Apparent	Brightness
Stensby		Integrated	Gloss 60
Taube			
Hunter			
Berger 1976			
E313			

### Setting Up the Tolerances

You can set up the tolerance values for the color equation you chose in “Choosing the Color Equation”. To set up the tolerance values for this equation, proceed as follows:

- Select **OPTIONS** from the ColorEye XTH **Main Menu**.
- Select **COLOR SETUP** from the **Options Menu**.
- Select **TOLERANCES** from the **Color Setup Menu**.
- The Tolerance Entry Screen is shown below:



**Figure 2-7. Tolerance Entry Screen**

The Tolerance Entry Screen contains values for tolerances for each of the components of the color equation. For example, Figure 2-7 contains components for the color equation LCH.

- To move the cursor, use the left and right arrow keys on the keypad. To increase the number at the cursor, press the **Enter** key. Scroll through values 0 through 9.

**Note:** *The values in the left column are considered the negative values and the values in the right column are considered the positive values. There is no need to enter positive or negative signs.*

*The positive tolerance values are used as 555 Shade Sorting block sizes if the Tolerance setting is STD. For more information, refer to Tolerances in “Choosing System Setup Options” on page 2-7.*

- Repeat step 5 for all the component values that need to be changed.
- Save the new tolerance values by scrolling the cursor to the **[save]** at the bottom of the screen. When the **[save]** (lowercase) changes to **[SAVE]** (uppercase), press **Enter**.
- The Tolerance values are saved.

## Instrument Settings

There are five major instrument settings that you can change. They are:

- **System Setup**
- **Date and Time**
- **Hardware Setup**
- **NetProfiler Setup and Status**
- **Language**

## Choosing System Setup Options

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **SETTINGS** from the **Options Menu**.
3. Select **SYSTEM SETUP** from the **Settings Menu**.
4. The System Setup Screen is shown below:

SYSTEM SETUP:	
> COLOR RATIO	1:1
PHOTO RANGE:	120%
STD AVG.	1
TRIAL AVG.	1
CALIB AVG.	3
AUTO PRINT	OFF
MI 2nd ILLUM	C
AUTO STANDARD	OFF
AUTO NAMING	OFF
AUTO SAVING	OFF
ASSOCIATIONS	NO
TOLERANCES	SYS
[save]	

5. To change an item in the System Setup list:
  - a. Move the cursor to the desired item using the left or right arrow keys.
  - b. Press **Enter** to scroll through the available values for each item.
6. Repeat step 5 for all the items you need to choose in the System Setup.
7. Save the new System Setup by moving the cursor to the **[save]** at the bottom of the screen. When the **[save]** (lowercase) changes to **[SAVE]** (uppercase), press **Enter**.

## Description of Options on the System Setup Menu

The System Setup Menu contains your preferences for how the instrument operates when taking measurements. For example, What photometric range should be used? Should measurements be automatically saved (Auto Saving option)? If so, what should they be called (Auto Naming option)? The System Setup items and their function are described below:

### Color Ratio Variable:

If CMC is chosen, then 1:1 is appropriate for determining perceptible color difference, while 2:1 is appropriate for determining acceptable color difference. If CIE94 is chosen, then 1:1:1 is appropriate for determining perceptible color difference, while 2:1:1 is appropriate for determining acceptable color difference.

### Photo(metric) Range: 120% or 200%.

If your sample is optically brightened, choose 200%. If it is not optically brightened or is only slightly optically brightened, choose 120%.

### Std Avg.: 1 through 9.

You can set up your instrument to average measurements to achieve a standard. You must indicate the number of standard measurements to average.

**Trial Avg.: 1 through 9.**

You can set up your instrument to average measurements to achieve a trial. You must indicate the number of trial measurements to average.

**Calib(ration) Average: 1 through 5**

You can set up your instrument to take a specific number of measurements during calibration to achieve an optimum calibration measurement. The default number of measurements to take is 3.

**Auto Print**

You can choose to have the trial or standard information printed automatically each time a measurement is taken. This option is different than the Print Report option, which prints a standard ColorEye XTH report. Possible values are:

- **Standard**-This option automatically prints the display each time a standard is measured.
- **Trial**-This option automatically prints the display each time a trial is measured.
- **Both**-This option automatically prints the display each time either a standard or trial is measured.
- **Off**-This option indicates no auto print should be made. This is the option if none of the above options are chosen.

**MI 2nd ILLUM:** If the chosen Index is Metamerism, you need to enter the illuminant for the metamerism. Possible values come from the Illuminant List.

**Illuminants**

A	CWF	SPLHOR	D50	TL83
C	DLF	SPLD65	D55	TL84
U30	NBF	SPLD75	D65	TL85
			D75	

For more information, refer to “Indices” on page 2-2 and “Choosing the Illuminants” on page 2-5.

**Auto Standard**

Choose **ON** to have a standard automatically calculated whenever a trial is measured. The 5 closest standards in the database appear from which to choose.

**Auto Naming**

You can choose to have the trials named based on an automatic prefix whenever the trial is saved. For more information on saving, refer to “Saving Data” on page 3-1. Possible values are:

- **Pre+**- The Optiview **trial prefix** will appear on the name entry screen. (The prefix is entered in the driver software). You may keep the prefix text and add additional descriptive text. For example, *QCE-Blue*. QCE is the prefix and you added BLUE to indicate that the sample is the BLUE trial from the **Quality Control Evening** shift.
- **Pre#**- The Optiview **trial prefix** and the next incremental number (**#**) is used as the name. The name entry screen does not appear for name editing. For example, QCE-16 might indicate that the sample is the **16th** taken from the **Quality Control Evening** shift.
- **OFF**- The name entry screen appears for you to enter the complete name.
- **Std#**- The standard name and the next incremental number is used as the trial name. The name entry screen does not appear for name editing. For example, *BLUE-12* might indicate the data is the 12th sample measured associated with the BLUE standard.
- **Std+**- The standard name appears on the name entry screen for editing. You may keep the standard name and add additional text. For example, *BLUE-091298*

might indicate that it is the BLUE standard measured on September 12, 1998 (091298).

### Auto Saving

The ColorEye XTH allows you to automatically save the current measurement values each time a standard and/or trial is measured. Possible values are:

- **Standard**-This option automatically saves the new standard measurement data.
- **Trial**-This option automatically saves the new trial measurement data.
- **Both**-This option automatically saves both the new trial and standard measurement data.
- **OFF**-This option indicates no auto save should be made. This is the option if none of the above options are chosen. You must use the Data Menu, Saving options to save data. For more information on the Data Menu, refer to "Using the Data Menu" on page 3-1.

**Associations: No or Yes.** You should choose Yes if you want to associate trials with a standard when data is uploaded to the PC.

**Tolerances: STD** (Standard), and **SYS** (System). If you wish to use the tolerances of the current standard, choose *STD*. If you wish to use the system (instrument) tolerances regardless of those of the current standard, choose *SYS*. For more information on the System tolerances, refer to "Setting Up the Tolerances" on page 2-6.

*Note: If you want the block sizes to be updated any time changes are made to tolerances, you must choose STD.*

## Setting the Date and Time

In addition to colorimetric data, each measurement contains time and date information. Choose a format to display the measurement date and to set the correct date and time.

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **SETTINGS** from the **Options Menu**.
3. Select **SET DATE & TIME** from the **Settings Menu**.
4. The Date and Time Screen is shown below:

SET DATE AND TIME

mm dd yyyy

01/ 00/ 1999

^

hh mm

16: 01

date format mm/dd/yyyy

[save]

5. Choose a date format. The current date format is shown at the bottom of the display. There are two possible date formats:
  - mm/dd/yyyy** (month listed first with two characters for month and day and four characters for year)
  - dd/mm/yyyy** (day listed first with two characters for day and month, and four characters for year).
 To change the date format:
  - a. Move the cursor to the date format at the bottom of the screen using the left or right arrow keys.
  - b. Press **Enter** to toggle between mm/dd/yyyy and dd/mm/yyyy.

**Note:** If dd/mm/yyyy is chosen, the values will be separated by a period rather than a slash. For example, 21/04/1999 indicates April 21st, 1999.

6. Set the date. Move the cursor using the left and right arrow keys on the keypad to the date field. To increase the number at the cursor, press the **Enter** key. You will scroll through the values 0 through 9.
7. Set the time. Move the cursor using the left and right arrow keys on the keypad to the time field. To increase the number at the cursor, press the **Enter** key. You will scroll through the values 0 through 9.

**Note:** The time is set using a 24 hour clock. For example, 2:30 P.M. would be entered as 14:30.

8. Save the new time and date by moving the cursor to the **[save]** at the bottom of the screen. When the **[save]** (lowercase) changes to **[SAVE]** (uppercase), press **Enter**. The date and time settings have been saved.

## Choosing Hardware Settings

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **SETTINGS** from the **Options Menu**.
3. Select **HARDWARE SETUP** from the **Settings Menu**.
4. The Hardware Setup Screen is shown below:

SETUP HW:	
> BAUD RATE	38400
SLEEP DELAY	5 MIN
TIME BACKUP	10 MIN
MSMNT BACKUP	50
[save]	

5. To change an item in the Hardware Setup list:
  - a. Move the cursor to the desired item using the left or right arrow keys.
  - b. Press **Enter** to scroll through the available values for each item.
6. Repeat step 5 for all the items you need to choose in the Hardware Setup.
7. Save the new Hardware Setup by moving the cursor to the **[save]** at the bottom of the screen. When the **[save]** (lowercase) changes to **[SAVE]** (uppercase), press **Enter**. The new Hardware setup is saved.

### Options on the Hardware Menu

The Hardware Menu is used for choosing instrument dependent options: Baud Rate and Sleep Delay.

**Baud Rate:** You need to choose the baud rate for your computer. Possible values are **2400, 4800, 9600, 19200, 38400**.

**Sleep Delay:** Possible values are **2 mins, 5 mins, 10 mins, 20 mins, 60 mins**. The sleep delay specifies how much time will elapse if no keys have been pressed before the instrument is put into a power saver sleep mode. For more information, refer to "Understanding the Three Power Modes" on page 1-12.

**Time Backup:** This option prompts an automatic backup of all data (measurements and settings) stored in RAM (volatile memory) at a specific time interval. Possible values are **1 min, 2 mins, 5 mins, 10 mins, 20 mins, 60 mins and OFF**. The default value is 10 mins. For example, an automatic data backup is performed every 10

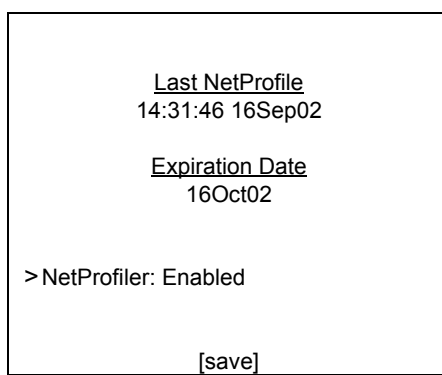
minutes.

**MSMNT (Measurement) Backup:** This option prompts an automatic backup of all measurements stored in RAM (volatile memory) once a specific number of measurements has been taken. You can set the measurement backup between **5 and 100 at increments**. The Default value is 50. For example, once the 50th measurement is taken an automatic measurement backup is performed.

## Checking NetProfiler Status

This option is for checking NetProfiler Status and enabling or disabling NetProfiler on your spectrophotometer.

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **SETTINGS** from the **Options Menu**.
3. Select **NETPROFILER** from the **Settings Menu**.
4. The NetProfiler Setup is shown below:



5. There are two possible settings for NetProfiler: **Enabled** and **Disabled**. Press the **Enter** key to toggle the setting. If you choose Enabled, NetProfiler is available to profile the instrument. If you choose Disabled, you will turn off NetProfiler and no instrument profiling is done.
6. Save the new NetProfiler Setting by scrolling the cursor to the **[save]** at the bottom of the screen. When the **[save]** (lowercase) changes to **[SAVE]** (uppercase), press **Enter**.
7. The NetProfiler Setting is saved.

## NetProfiler Indicators on XTH Displays

Many ColorEye XTH displays (Colorimetric, Assessments, Tristimulus, Indices, and 555 Shade Sort) contain NetProfiler Indicators. Shown below is an example display showing the NetProfiler Indicators.

**NetProfiler Status Line:**  
Possible values are *Active, Inactive, Disabled, Expired.*

```

DISP cal options data
^^^^
555 Shade Sort
L*   a*   b*
5     5     5
Block Sizes:
1.00 1.00 1.00

NetProfiler: Active
CIELAB: A - 2   RAV-SCI
S: NP: Measured_Std
T: NP: Measured_Trial
        
```

**Standard and Trial NP Indicator:**  
Possible values are **NP** and **--**.

### **NetProfiler Status Line:**

**Active:** NetProfiler is loaded and is profiling standards and trials.

**Inactive:** Either a NetProfile has not been downloaded or the wavelength is set to 5nm.

**Disabled:** NetProfiler is not being used.

**Expired:** The instrument needs to be NetProfiled.

### **Standard and Trial NP Indicator:**

**NP:** Standard and Trial have been NetProfiled.

**--:** Standard and Trial were not NetProfiled.



## Choosing the Language

Besides **English**, you can choose from **French**, **Italian**, **German** or **Spanish** for the ColorEye XTH display language. To choose a language, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **SETUP** from the **Options Menu**.
3. Select **LANGUAGE** from the **Setup Menu**.
4. Choose one of the following options for the language:

**English**  
**German**  
**French**  
**Italian**  
**Spanish**  
**Japanese**

## Diagnostics

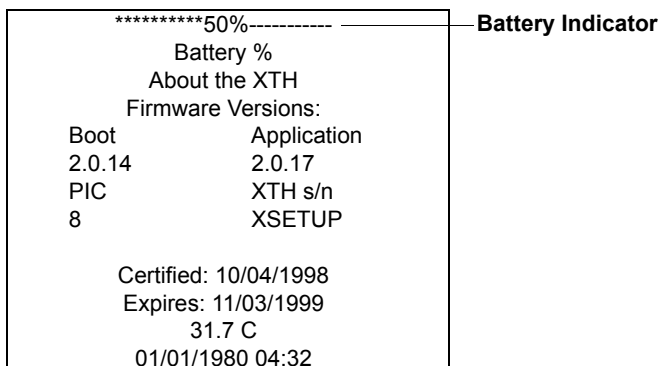
The Diagnostics menu contains several options that give you information on your instrument's performance.

- **About your XTH**
- **Sensor Peaks**
- **Go to Sleep**

### About Your XTH

This option displays the Start Up Display with the Firmware Version numbers. This information will be helpful to you in the event you need to contact X-Rite Service Personnel. To use the option, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **DIAGNOSTICS** from the **Options Menu**.
3. Select **ABOUT THE XTH** from the **Diagnostics Menu**.
4. The Startup Display appears, listing the firmware version.



### Sensor Peaks

This option is only used by X-Rite Service Personnel.

### Go To Sleep

This option is used in the event you need to remove the instrument battery. The unit should be in sleep mode before you remove the battery. To use the option, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **DIAGNOSTICS** from the **Options Menu**.

3. Select **GO TO SLEEP** from the **Diagnostics Menu**.
4. The Display goes blank. The instrument is in Sleep Mode.

For more information about sleep mode, refer to “Sleep Mode” on page 1-12. For more information about removing the battery, refer to “Removing the Battery” on page 4-3.

## Using the Driver Software

If you are using your instrument in an environment where your color settings will *frequently* change (for example, you need to switch color equations or change tolerances), you should use the Setup Options on the instrument. Begin with “Choosing a Display Mode” on page 2-1. However, if your color settings will *rarely* change, you should use the Instrument Driver Software to select your options once, and then return to the software if needed at a later time. Refer to “Using the Driver Software” on page 2-14.

If you have decided to forgo using the instrument to make your color settings and will use the software to do so, you need to first decide which of the following ColorEye XTH user profiles fits your situation:

1. *You are using Optiview Color Quality Control Software or ProPalette Formulation Software.*

You will use the diskette included in your shipment titled “ColorEye XTH 2.X Driver Disk”. Proceed to “Using the Driver Disk Software” on page 2-14.

2. *You are using a third-party software (software not sold by X-Rite) or no PC software at all.*

You will use the diskette included in your shipment titled “ColorEye XTH Monitor Disk”. Proceed to “Using the Monitor Disk” on page 2-14.

**Note:** *You should also make sure that you have your instrument connected to your PC. For more information on this connection, refer to “RS-232 Communication Cable Connection” on page 1-13.*

## Using the Driver Disk Software

If you are using Optiview or ProPalette software, you will use the diskette included in your shipment titled “ColorEye XTH 2.X Driver Disk.” The instructions printed on the disk are repeated here.

### Setup Instructions: (Windows 95)

1. Insert Disk into A: drive.
2. Click **Start** on the Task Bar.
3. Click **Run** on the Start Menu.
4. Type **A:\setup.exe** and press enter.

The Driver Installation program is executed. When the installation is finished, the following Driver Dialog Box appears, shown below.

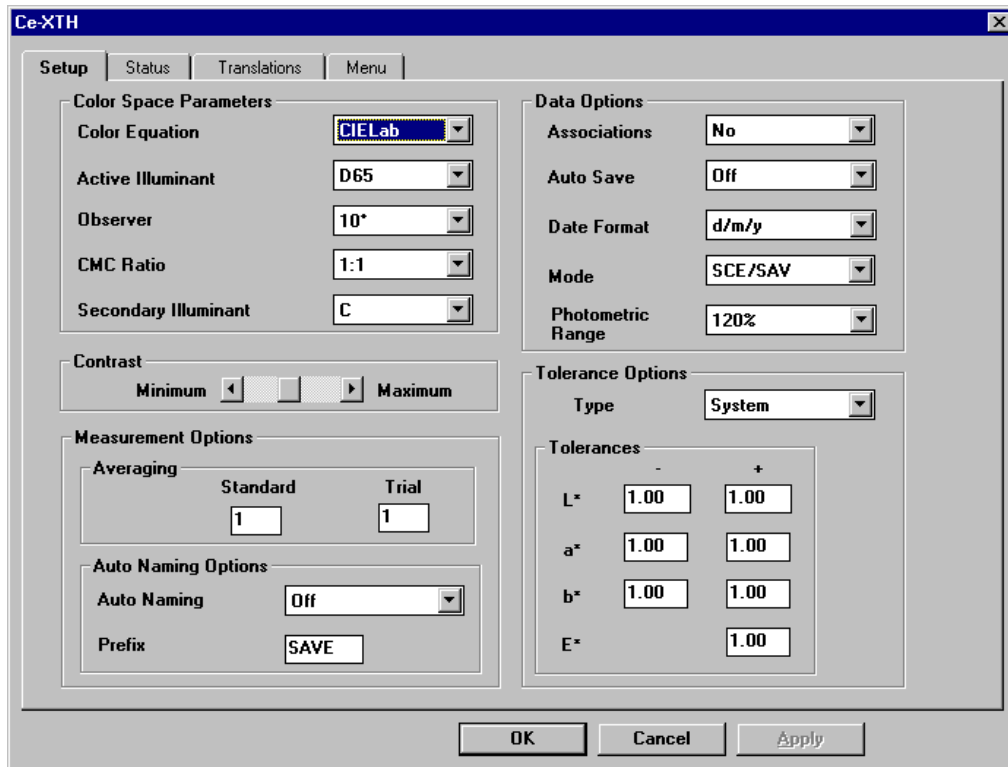
## Using the Monitor Disk

If you are using a third-party software or no PC software at all, you will use the diskette included in your shipment titled “ColorEye XTH Monitor Disk.” The instructions printed on the disk are repeated here.

### Setup Instructions: (Windows 95)

1. Insert Disk into A: drive.
2. Click **Start** on the Task Bar.
3. Click **Run** on the Start Menu.
4. Type **A:\setup.exe** and press enter.

The Driver Installation program is executed. When the installation is finished, the Dialog Box shown in Figure 2-8 appears.



**Figure 2-8. ColorEye XTH Driver Software Dialog Box**

The Driver Software Dialog Box contains four tabs: **Setup**, **Status**, **Translations**, and **Menu**. They are described below.

### Setup

The Setup Tab contains the options for Color Space Parameters, Data Options, Contrast, Measurements, Auto Naming, Tolerance Options and values. Please see Figure 2-8 for more information.

#### **Color Space Parameters**

Click on the drop down list box for each of the following to choose the right setting for your unique color environment:

- Color Equation
- Active Illuminant
- Observer
- CMC Ratio
- Secondary Illuminant (used for the Tristimulus calculation)

For more information on these options, refer to “Using the Color Setup” on page 2-4.

#### **Contrast**

Depending on your preference, you may wish for the display text to appear lighter or darker. Drag the scroll box to the left to lighten the display text. Drag the scroll box to the right to darken the display text. You may adjust the screen contrast at any time. For more information, refer to “Adjusting the Screen Contrast” on page 1-8.

**Measurement Options**

- **Averaging:** You can set up your instrument to average measurements to achieve a standard or a trial. Indicate the number of standard and trial measurements to average.
- **Auto Naming:** You can choose to have the trials named based on an automatic prefix whenever the trial is saved. Indicate the prefix here.

**Data Options**

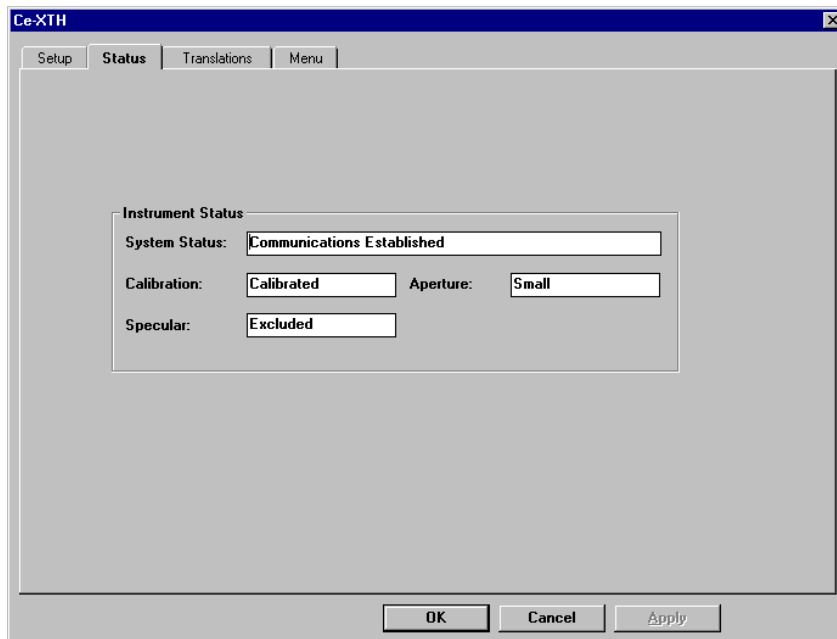
- **Associations:** You should choose Yes if you want to associate trials with a standard when data is uploaded to the PC.
- **Auto Save:** The ColorEye XTH allows you to automatically save the current measurement values each time a standard and/or trial is measured.
- **Date Format:** There are two possible date formats:
  - mm/dd/yyyy** (month listed first with two characters for month and day and four characters for year)
  - dd/mm/yyyy** (day listed first with two characters for day and month, and four characters for year).
- **Mode:** Choose your combination of SCE (Specular Component Excluded), SCI (Specular Component Included), SAV (Small Area View), and RAV (Regular Area of View)
- **Photometric Range:** If your sample is optically brightened, choose 200%. If it is not optically brightened or is only slightly optically brightened, choose 120%.

**Tolerance Options**

- **Type:** If you wish to use the tolerances of the current standard, choose *STD*. If you wish to use the system (instrument) tolerances regardless of those of the current standard, choose *SYS*.
- **Values:** You can set up the tolerance values for the color equation you chose.

## Status

The Status Tab contains information about your instrument. It is shown as Figure 2-9



**Figure 2-9. Status Tab in the ColorEye XTH Driver Software Dialog Box**

There are no changes to make on the Status Tab. It is for informational purposes only.

- **System Status:** Describes the current state of communications for the instrument. Communications Established indicates it is connected properly to your computer.
- **Calibration:** Describes the calibration status of the instrument.
- **Aperture:** Indicates which aperture size is currently being used: small or regular area of view.
- **Specular:** Indicates the specular component setting has been chosen- Included or Excluded. (SCE, SCI).

## Translations

The Translations Tab contains the language to use for the display screens.

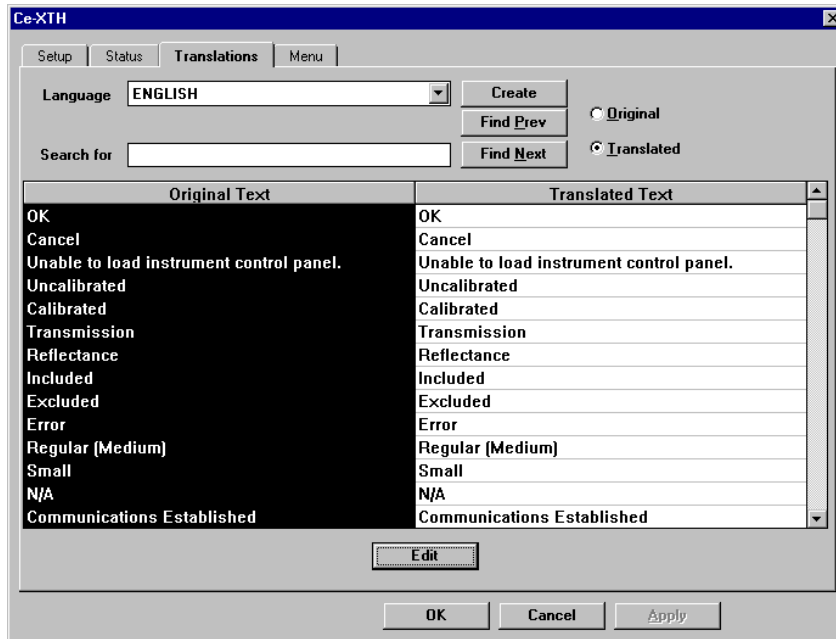


Figure 2-10. Language Tab in the ColorEye XTH Driver Software Dialog Box

### Selecting a Language

1. Select a default language from the drop down Language box.
2. The Original Text column displays the original text for the language you have chosen. This is a reference column and has all the text used in the ColorEye XTH program. It cannot be edited. The Translated Text column displays any modified version of original text. Initially it would contain the same text as the Original Text column.

### Editing a Language

1. Select a default language from the drop down Language box. The following dialog box appears.

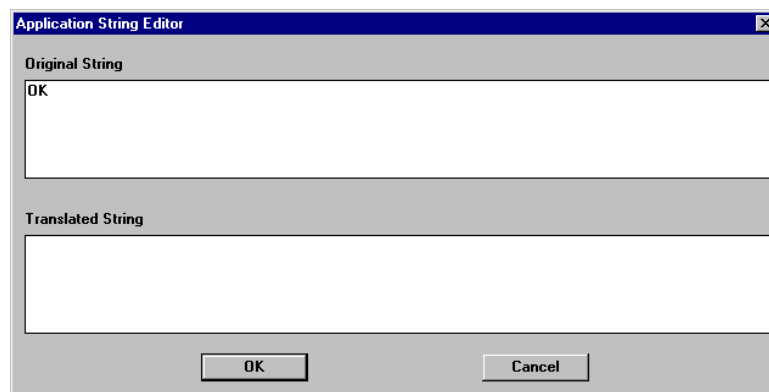


Figure 2-11. Edit Dialog Box for the Driver Software Language Tab

2. The Original Text column displays the original text for the chosen language. This is a reference column and has all the text used in the program. It cannot be edited. The Translated Text column displays any modified version of original text for the chosen language. Initially it contains the same text as the left column. You may edit

this column to change certain terms used in the program to accommodate your specific application.

3. Use the scroll bars at the right side of the dialog box to scroll through the Text lists.
4. To search for a specific word or phrase,
  - a. Choose to search in the column "Translated Text" or "Original Text" for a specific word or phrase.

**Note:** *When searching the Translated Text column, the associated Translated Text is highlighted rather than the original text, since the original text cannot be edited.*
  - b. Type the word or phrase in the Search for text box.
  - c. Choose from either the Find Prev (to search backward) or Find Next (to search forward) search buttons. The Translation column will go to the first occurrence of the word or phrase.
  - d. Continue to click either Find Prev or Find Next to find all of the occurrences.
5. To edit a specific line in the Translated Text column,
  - a. Highlight the item and type the new text, or
  - b. Highlight the item and click Edit.
  - c. The Translate Text Dialog Box appears. The original text box contains the original text for the chosen item. This box cannot be edited. Make your changes to the text in the Translated Text box and choose OK.
6. Repeat steps 4 and 5 until all the needed text changes have been completed.
7. When you are finished with the changes, choose OK to store your modifications.

## Menu

The Menu Tab allows you to choose which ColorEye XTH options are included on the display screens. You may not want for some items to be available to all those who may use your ColorEye XTH. For example, there may be some settings that should never be changed for color quality control purposes. Therefore, you would want to limit access using the Menu tab and “make visible” only those options that should be available to all users.

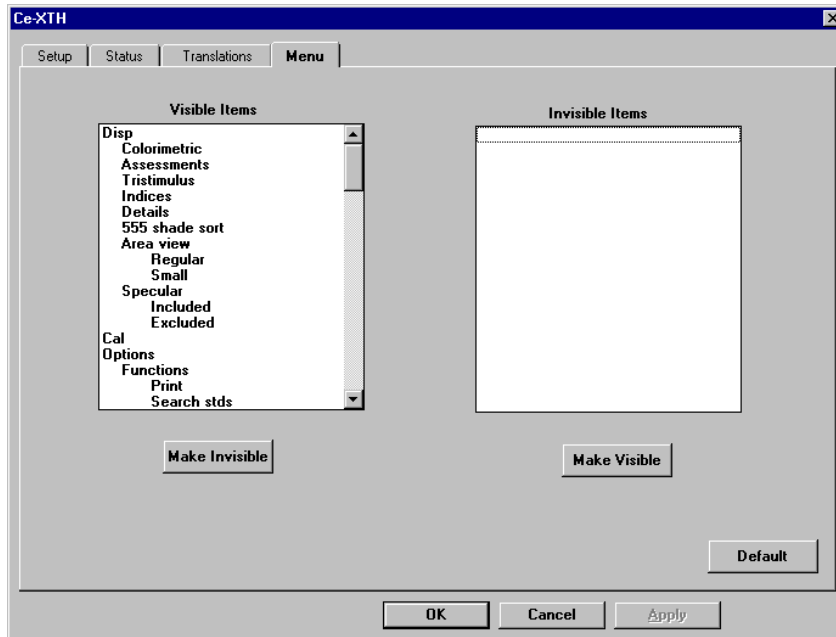


Figure 2-12. Menu Tab in the ColorEye XTH Driver Software Dialog Box

### ***Making items invisible***

1. With the Menu Tab displayed, highlight the item in the “Visible Items” list and then click the Make Invisible button. The selected item is now displayed in the “Invisible Items” list.
2. Repeat step for each item you don’t want to appear in the ColorEye XTH display screens.
3. If you wish to start all over from the original list of Visible and Invisible Items, click the Default button. Both lists will appear in their original state before any changes were made.
4. Click OK to save your changes.

### ***Making items visible***

1. With the Menu Tab displayed, highlight the item in the “Invisible Items” list and then click the Make Visible button. The selected item is now displayed in the “Visible Items” list.
2. Repeat step for each item not already appearing in the “Visible Items” list.
3. If you wish to start all over from the original list of Visible and Invisible Items, click the Default button. Both lists will appear in their original state before any changes were made.
4. Click OK to save your changes.



# OPERATION

This chapter describes how to operate your ColorEye XTH instrument. After reading this chapter you will know how to:

- Use the Data Menu options such as Save, Recall, Delete Data, and Recent Recalls
- Use the Printer
- Perform Function menu features such as Printing, Search Standards, and Search Trials
- Remove and install a battery

## Using the Data Menu

The Data Menu allows you to do four (4) things: **save**, **recall**, and **delete data** and to access recently saved data.

### Saving Data

The ColorEye XTH has a setup option called **Auto Save** that automatically saves a standard, trial, or both standard *and* trial each time one is measured. For more information on the Auto Save option, refer to “Auto Saving” on page 2-9. This option works in conjunction with another setup option called **Auto Name** that automatically names the trial each time a measurement is saved. For more information on the Auto Name option, refer to “Auto Naming” on page 2-8.

If the Auto Save option is *Std*, *Trial*, or *Both*, the measurements are automatically saved and you do not need to manually save them. *If the Auto Save option is OFF, proceed as follows:*

1. Select **DATA** from the ColorEye XTH **Main Menu**.
2. Select **SAVE STANDARD** or **SAVE TRIAL** from the **Data Menu**.
3. Depending on your Auto Name option, one of the following will happen:
  - a. **If the Auto Naming option is Std# or Pre#**, the measurement is saved with the standard name or Optiview Prefix and the incremented number to indicate the number of measurements associated with the Standard or Prefix. For example, Blue-9 or QC-9. The data is saved.
  - b. **If the Auto Naming option is Std+ or Pre+**, the standard name or prefix name appears on the name entry screen, ready for editing or adding more characters to the standard or prefix name. Go to step 4.
  - c. **If the Auto Naming option is OFF**, the name entry screen appears blank, ready for you to enter the entire name. Go to step 4.
4. At the Name Entry screen, there are 16 place holders on the name line to use to name the measurement. Possible values for each character is **0** through **9**, **A** through **Z** (all caps), and blank. See Figure 3-1.

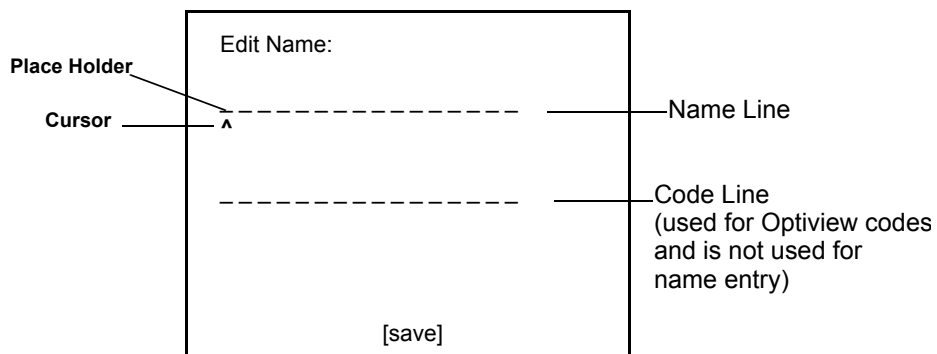


Figure 3-1. Name Entry Screen

## OPERATION

5. To enter a name, proceed as follows:
  - a. The cursor appears at the first character, even if you will use the standard or prefix name as part of the new name. You can use 16 place holders for the name.
  - b. Press the **Enter** key to scroll through the list of possible characters for each place holder. If the place holder initially has no character displayed, the characters scroll through 0 through 9 first, then A through Z, then a blank space. If you are editing an existing name, the characters will begin scrolling to the next character in the sequence, rather than starting at 0. You can press and hold the Enter key to scroll quickly, or press the Enter each time you want to increment in the character list, one character at a time. When you have reached the desired character, go to step c.
  - c. Move the cursor to the next place holder using the right arrow key to move to the right one place holder or use the left arrow key to move the left one place holder. You can press and hold the arrow keys to move the cursor quickly, or press the arrow key each time you want to increment in the place holder list, one place at a time.
  - d. Repeat steps b and c for each character in the desired name.
6. When you are finished entering the name, save the name by scrolling the cursor to the **[save]** at the bottom of the screen. When the **[save]** (lowercase) changes to **[SAVE]** (uppercase), press **Enter**. The data is saved.

### Recalling Data

You may recall a standard or trial to the display that has been saved to the database.

1. Select **DATA** from the ColorEye XTH **Main Menu**.
2. Select **RECALL** from the **Data** Menu.
3. Select **STANDARD** or **TRIAL** from the **Recall** Menu.
4. The list of saved standards or saved trials appears.
5. Use the left (scroll up) or right (scroll down) arrow keys to move the cursor to the desired measurement to recall. If the list of standards or trials is very long and continues past one screen, scroll the cursor to the **[next]** at the bottom of the screen. The list continues to the next screen of saved data.
6. When the data to recall is shown as CAPS (capital letters), press **Enter**.
7. The data for the measurement you selected appears on the display appropriately as the standard or trial.

An associated option to Recalling Data is "Recent Recalls" which lists the most recently recalled data. For more information, refer to "Recent Recalls" on page 3-3.

### Deleting Data

The ColorEye XTH is capable of storing 500 measurements. You may need to delete some previously saved measurements if you are no longer using some of the data, or need to make room for new measurements. To delete data, proceed as follows:

1. Select **DATA** from the ColorEye XTH **Main Menu**.
2. Select **DELETE** from the **Data** Menu.
3. Select **STANDARD** or **TRIAL** from the **Delete** Menu.
4. The list of saved standards or saved trials appears.
5. Use the left (scroll up) or right (scroll down) arrow keys to move the cursor to the desired measurement to delete. If the list of standards or trials is very long and continues past one screen, scroll the cursor to the **[next]** at the bottom of the screen. The list continues to the next screen of saved data.
6. When the cursor is at the data to delete, press **Enter**. An asterisk (\*) appears next to the data.

7. Repeat step 6 for all the standards or trials you wish to delete. There should be an asterisk (\*) next to each item to delete.
8. Delete the data by scrolling the cursor to the **[del]** at the bottom of the screen. When the **[del]** (lowercase) changes to **[DEL]** (uppercase), press **Enter**. The data is deleted.

### Recent Recalls

The **Recall Data option** allows you to recall a trial or standard to use in the current display. You can quickly perform the recall again by using the option Recent Recalls. This option provides a list of data recalled using the Recall data option. You can quickly find an item in the list and recall it once again to the active display:

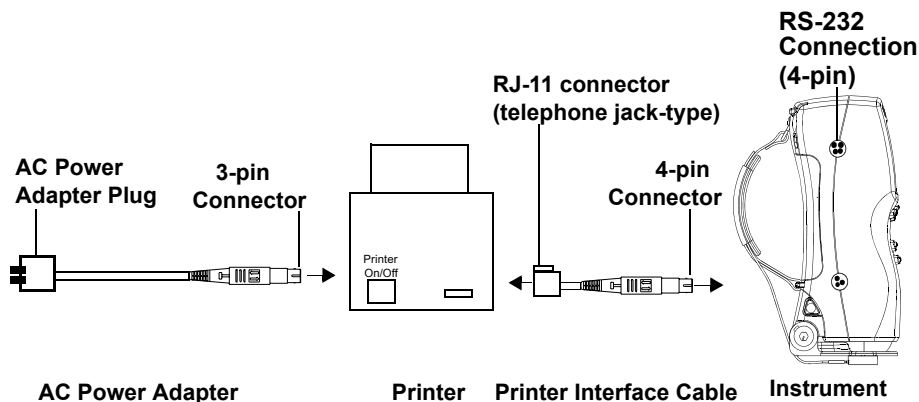
1. Select **DATA** from the ColorEye XTH **Main Menu**.
2. Select **RECENT RECALLS** from the **Data Menu**.
3. The list of recently recalled data appears.
4. Use the left (scroll up) or right (scroll down) arrow keys to move the cursor to the desired data to recall. The text changes from lower case to UPPER CASE, signifying your selection.
5. When the cursor is at the data to delete, press **Enter**. **The data is recalled to the display.**

### Using the Printer

The optional printer is used to print the display. You can print the display on demand (refer to "Using the Print Function" on page 3-4) or setup the Auto Print option to print the display any time you measure a standard, trial or both a standard and trial ("Auto Print" on page 2-8).

To setup the printer, proceed as follows:

1. Locate the printer shipping box.
2. Unpack the AC Power Adapter, printer, and printer interface cable. Retrieve your instrument.
3. Insert the AC Power Adapter Power Plug into an appropriate electrical outlet.
4. Insert the three-pin connector on the AC Power Adapter into the Connection on the printer.
5. Turn on the printer at the On switch located on the front of the unit.
6. Insert the RJ-11 connector (telephone jack-type connector) on the Printer Interface Cable into the connection on the printer.
7. Insert the four-pin connector on the Printer Interface Cable into the four-pin connection on the instrument.



**Figure 3-2. Printer AC Power Adapter/Printer/Interface Cable/Instrument Connection**

8. You are ready to begin using the printer.

## Performing Functions

The Functions menu contains the options to print the data currently displayed on your screen (Print), search your database for a standard (Search Stds), search your database for a trial (Search Trials), display Spectral Data comparing that of the Standard against the Trial data (Disp Spectral), and print Spectral Data (Prt Spectral) for the Standard and Trial from 360 to 750 nm.

### Using the Print Function

The ColorEye XTH allows you to automatically print the data currently on your display. You must have a printer connected to your instrument to use this option. For more information on the ColorEye XTH printer, refer to "Using the Printer" on page 3-3. To print the display, proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **FUNCTIONS** from the **Options Menu**.
3. Select **PRINT** from the **Functions Menu**.
4. The printer prints the data in the current display.

### Using the Search Standards Function

The Search Standards function automatically searches for saved standards in your database whose Delta E value most closely matches that of the current trial. The instrument will attempt to find the closest matches from which to choose a standard. To use this feature, you must measure or recall a standard and have saved standards and trials in the database. Proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **FUNCTIONS** from the **Options Menu**.
3. Select **SEARCH STDS** from the **Functions Menu**.
4. The ColorEye XTH automatically searches the database. A list box appears containing the five closest standards in ascending order of DE. Highlight your selection using the left or right arrow key and press **Enter**.

**Note:** *If there are no records in the database, you will receive the message: "No records available."*

### Using the Search Trials Function

The Search Trials function automatically searches for saved trials whose Delta E value most closely matches that of the current standard. The instrument will attempt to find the closest matches from which to choose a trial. To use this feature, you must measure or recall a trial. Proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **FUNCTIONS** from the **Options Menu**.
3. Select **SEARCH TRIALS** from the **Functions Menu**.
4. The ColorEye XTH automatically searches the database. A list box appears containing the five closest standards in ascending order of DE. Highlight your selection using the left or right arrow key and press **Enter**.

**Note:** *If there are no records in the database, you will receive the message: "No records available."*

### Using the Display Spectral Data Function

The Display Spectral Data function displays the Spectral Data for the Standard and current Trial from 360 to 750 nm. To use this feature, you must measure or recall a trial. Proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **FUNCTIONS** from the **Options Menu**.
3. Select **DISP SPECTRAL** from the **Functions Menu**.

4. The Spectral Data for the standard and Trial are displayed. The first screen of data will list 360 nm to 480 nm.
5. To display more Spectral Data, use the right arrow key to increment the nm list. Continue to use the right arrow key to display more data in further down in the list. Use the Left Arrow Key to decrement the list back to the beginning, one nm at a time.
6. Press Esc to return to the Functions Menu.

### Using the Print Spectral Data Function

The Print Spectral Data function prints the Spectral Data for the Standard and current Trial from 360 to 750 nm. To use this feature, you must measure or recall a trial and have a printer attached to your instrument. Proceed as follows:

1. Select **OPTIONS** from the ColorEye XTH **Main Menu**.
2. Select **FUNCTIONS** from the **Options Menu**.
3. Select **PRT SPECTRAL** from the **Functions Menu**.
4. The Spectral Data is printed on the attached printer.

## OPERATION

# MAINTENANCE

---

## General

This chapter provides step-by-step routine maintenance and minor repair procedures.

## Cleaning the Exterior of the Instrument

The exterior of the instrument should be periodically cleaned since grime buildup can occur during heavy use. Gently wipe off the Touch Pad and instrument casing with a dust free tissue.

## Cleaning the Calibration Standards

Calibration standards (tiles) are widely used in color science as standards of reflectance factor. Their principal virtue is the stability of their reflection properties. If they are to serve their intended purpose, it is necessary that the surfaces of these tiles be maintained in a stable condition. The cleaning of any precision optic risks degrading the surface. Therefore, the need for cleaning should be *minimized* by returning the tile to its storage case or covering it with a protective bag when it is not in use. If cleaning is required, the following procedure is recommended.

### Materials Required

- *Camel's-Hair brush*: Available at most camera, hardware, or art supply stores.
- *Dust Free tissue*: Use a lens tissue which meets *Federal Specification NNN-P-40A*, Type I or equivalent.
- *Distilled water*: Available at most pharmacies.
- *Isopropyl alcohol*: Spectroscopic grade in Teflon® squirt bottle.
- *Soap*: Ivory® brand or any non-moisturizing soap, available at most grocery markets.

### Routine and Special Tile Cleaning Procedures

**CAUTION**

Do not touch the white surface of the tile with the fingers while you are cleaning it. Natural oils, creams, and other materials found in the hands can alter the optical properties of the tile and can result in an inaccurate calibration.

Lint and other small particles are usually best observed by illuminating the tile with a diffuse light sources at an angle so that the light does not produce surface glare. Inspect the tile at an angle rather than looking directly at the tile's front surface

To remove dust, lint, and invisible gritty particles, proceed as follows:

1. Brush the tile's surface with a camel's-hair brush.
2. Breathe a light mist of condensed vapor at the center of the tile.
3. Immediately wipe the tile's surface *lightly* with lens tissue. Avoid smearing the tile with natural greases and perspiration from the hands by wiping with the untouched center part of the lens tissue.
4. After the tile has been dusted and wiped, it should be inspected again.

## Calibrating the Instrument

The ColorEye XTH should be calibrated with the White Ceramic Calibration Standard (tile) provided with the instrument in the pocket of the carrying strap. It is best to calibrate the instrument at the location it is to be used. This will accommodate ambient temperature changes.

### Before You Calibrate . . .

Please note the following before you calibrate the spectrophotometer:

- If the instrument is exposed to rapid changes in ambient temperature, calibrate to accommodate for these changes.
- Make certain that the serial number on the White Ceramic Calibration Standard is the same as the serial number on the instrument. Do not substitute another calibration standard for the one originally supplied.
- If the standard should be broken or become damaged, call X-Rite for advice on how to replace it.

To perform a calibration, proceed as follows:

1. Select **CAL** from the ColorEye XTH **Main Menu**.
2. The following message appears:

#### PRIMARY CALIBRATION

**Place White  
Calibration Standard In  
Position and Press  
the ENTER key**

3. Remove the white calibration standard from the pocket of the carrying strap. It is tethered to the strap.
4. Close the target foot and latch it in place.
5. Position the white standard at the aperture opening. See Figure 4-1. Make sure that the standard is properly aligned with the ridges on the aperture foot. Locate the Top Alignment Notch on the standard and make sure it is aligned with the top of the aperture foot. See Figure 4-2.

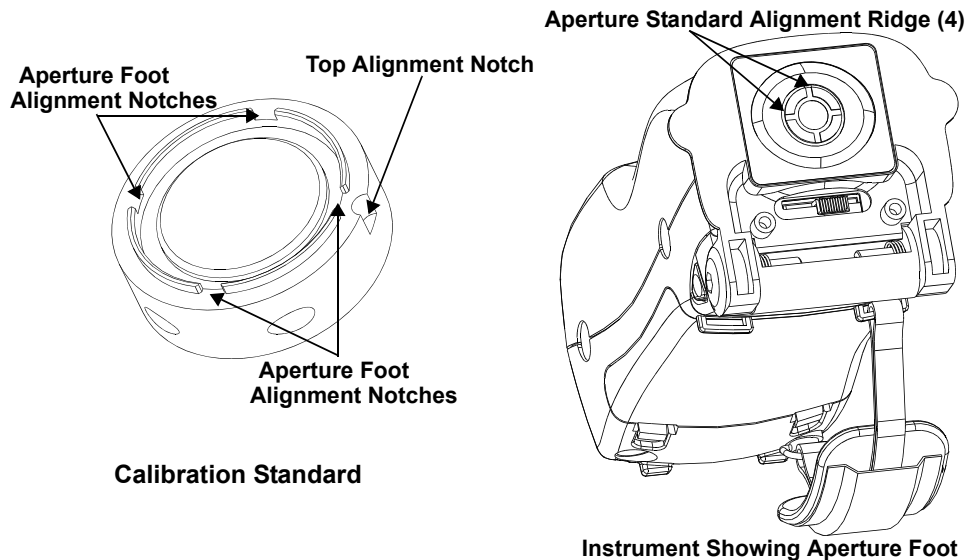
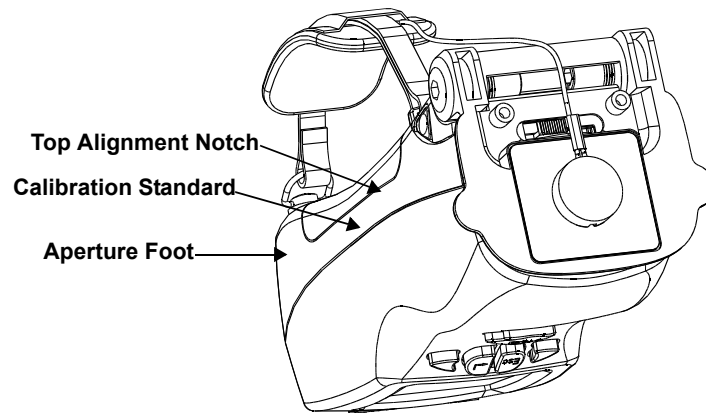


Figure 4-1. Calibration Standard Alignment





**Figure 4-2. White Calibration Standard At Aperture Opening**

6. Once the standard is properly aligned, press **Enter**.
7. The instrument makes a series of flashes. When the flashes stop, the calibration is complete. The following message appears briefly:

**CALIBRATION COMPLETE**

8. The instrument is ready for the open port calibration. The following message appears:

**OPEN PORT CALIBRATION**

**Prepare for OPEN  
PORT Measurement and  
Press the ENTER key**

9. Point the aperture in a direction where there are no mirrors, windows, or other bright surfaces.
10. Press **Enter**.
11. The instrument flashes. The following message appears briefly:

**CALIBRATION COMPLETE**

12. The calibration is finished.

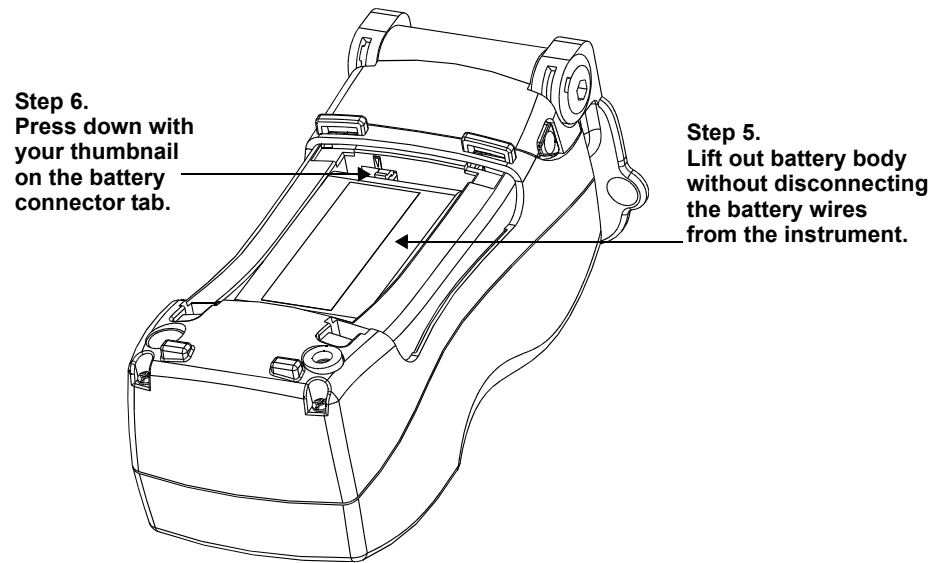
## Removing the Battery

You may need to replace the battery in the instrument. First you need to remove the battery, described below. Then you will need to follow the instructions to install the battery, following this procedure.

It is highly recommended that the instrument be in Sleep Mode prior to removing the battery. You can prompt the instrument to go to Sleep Mode using the “Go To Sleep” option in the Diagnostics Menu, described on page page 2-13.

To remove the battery, proceed as follows:

1. Unscrew the wrist strap from the instrument.
2. Apply downward pressure with your fingertips to loosen the back cover snaps.
3. Loosen the back cover and open the cover towards you.
4. Remove the back cover.
5. Lift out the battery body from the battery compartment without disconnecting the battery wires from the instrument.
6. Using your thumbnail, press down on the battery connector tab to release the connector from the instrument.



**Figure 4-3. Removing the Battery**

7. Carefully pull out the connector from the instrument.
8. The battery is removed.

## Installing the Battery

In the event that you must install a new battery, proceed as follows:

1. Unscrew the wrist strap from the instrument.
2. Apply downward pressure with your fingertips to loosen the back cover snaps.
3. Loosen the back cover and open the cover towards you.
4. Remove the back cover.

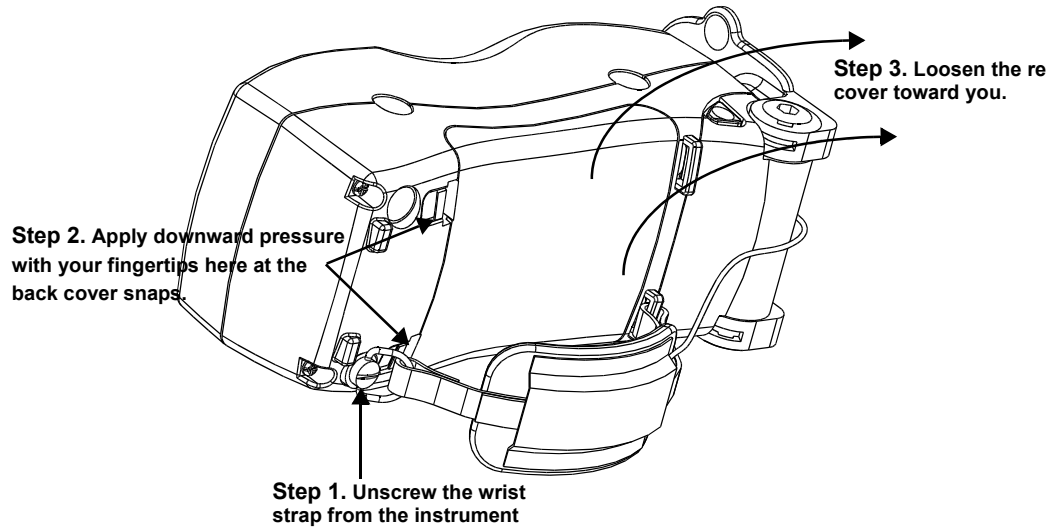


Figure 4-4. Battery Installation- Removing the Back Cover

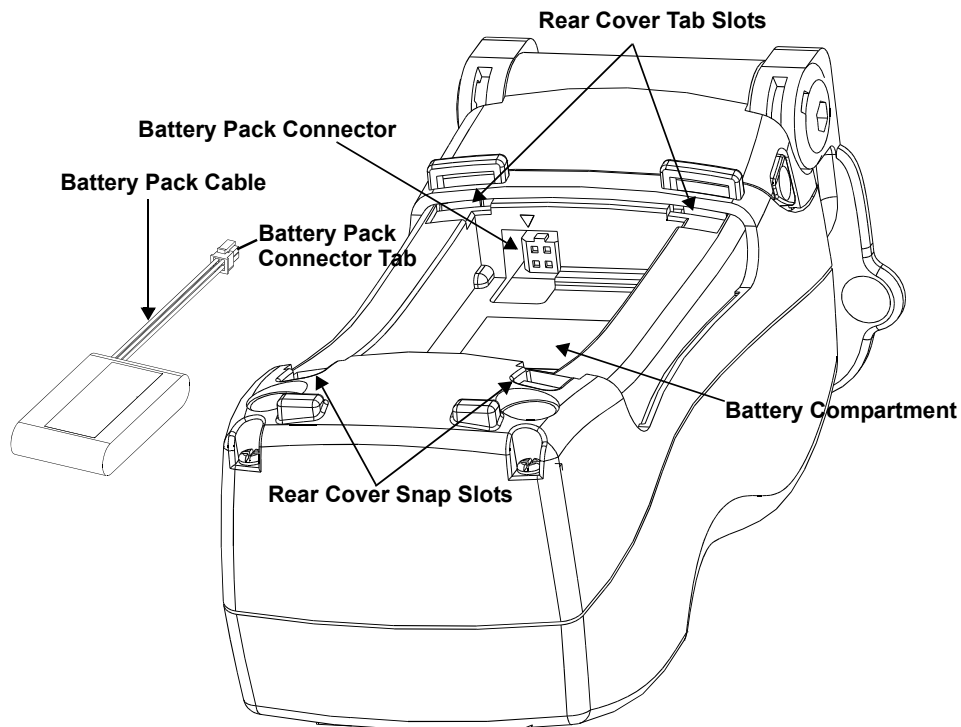


Figure 4-5. Battery Connection

5. Insert the Battery Pack Cable into the connector located inside the battery compartment. You should feel the connector snap into place. See Figure 4-5.

## MAINTENANCE

**Note:** *It is very important to align the yellow arrow decal on the battery pack cable connector with the decal at the connection in the battery compartment. Failure to do so could result in damage to the instrument and battery pack.*

6. Seat the battery pack inside the battery compartment. Be sure to tuck in any wires.
7. Insert the rear cover tabs into the tab slots and insert the rear cover snaps into the snap slots. The cover should be firmly in place.
8. The battery is installed. The Start Up display appears. If it does not appear, the battery may need to be re-charged. For more information, refer to “Charging the Battery” on page 1-5.

## Parts List

If you need to order parts and other optional accessories, please call your nearest service representative listed on page iii Please reference the part number you need below.

<b>Description</b>	<b>Part Number</b>
Spare Battery Pack	A-BAT/X
Carrying Case	GM52006550
Cleaning Kit	GM51802570

**ColorEye XTH 3-D Targeting RAV Template/Foot (Set 5), PN: ATGT/X3DRF**

Provides the ability to develop customized, quick change targeting fixtures for reproducible sample presentation to significantly reduce measurement error. Package includes five customized plastic templates and five target foot devices. Regular Area of View.

**ColorEye XTH 3-D Targeting SAV Template/Foot (Set 5), PN: ATGT/X3DSF**

Provides the ability to develop customized, quick-change targeting fixtures for reproducible sample presentation to significantly reduce measurement error. Package includes five customized plastic templates and five target foot devices. Small Area of View.

## MAINTENANCE

# Appendix

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## Initial Settings

Your instrument is shipped with initial settings and options. We encourage you to change the settings and options to match those of your color environment. However, in the event that you need a starting point from which to begin again after you have changed the settings, the following table is provided.

Initial Settings	
Display Mode:	Colorimetric
Area of View	Regular (RAV)
Specular Component	SCI
Color Equation	CIELAB
Illuminant	D65
Degree Observer	10
Index	(None)
Tolerances	± 1.0
CMC Ratio	1:1
Photo Range	120%
STD Avg.	1
Trial Average	1
Auto Print	Off
MI 2nd Illuminant	C
Date Format	m/d/y
Auto Naming	Off
Auto Saving	Off
Associations	No
Tolerances	Sys
Baud Rate	38400
Sleep Delay	1 Min
Language	English

## Color Check Procedure

The ColorEye XTH comes with a Color Check Calibration Cap that allows you to monitor the accuracy of your measurements and performance of your instrument.

You should perform the Color Check Procedure each day for the first 10 days of instrument operation. Then the Color Check Procedure should be performed at a regular interval such as every two weeks or every month.

Before you begin the Color Check Procedure, you should fill in the information at the top of the Color Check Record, shown below.

To perform the Color Check Procedure, proceed as follows:

1. Clean the Color Check Calibration Cap.  
Refer to “Cleaning the Calibration Standards” on page 4-1.
2. Calibrate the instrument.  
Refer to “Calibrating the Instrument” on page 4-2.
3. Select CIELAB as the Color Equation, D65 as the Illuminant, and 10° observer.  
Refer to “Using the Color Setup” on page 2-4.
4. Measure the Color Check Calibration Cap.  
Refer to “Taking Measurements” on page 1-12.
5. Record the L\*a\*b\* values in the Color Check Record.
6. Compare the measured values to the reference values listed in your Certificate of performance.
  - If values are off, clean the calibration standards (Color Check and White Calibration Standards).
  - Consistent L\*, a\*, and b\* differences or obvious trends away from the reference data on the certificate may require the unit to be serviced. Contact your X-Rite representative for advice.
  - Always verify color performance with the same aperture size and temperature.





## APPENDIX

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