Datacolor

Datacolor CHECK[™] Datacolor CHECK^{PLUS™} Datacolor CHECK^{PRO™} User's Guide



Datacolor CHECK™ User Guide (April 2005)

User's Guide Part No. 4230-0396M

Patent Information

Name of originator: Applied Color Systems, Inc.

Date: March 26, 2002

Title of patent document. Portable Color Measuring Device

Patent number: U.S. Patent No. 6,362,886

All efforts have been made to ensure the accuracy of the information presented in this format. However, should any errors be detected, Datacolor appreciates your efforts to notify us of these oversights.

Changes are periodically made to this information and are incorporated into forthcoming versions. Datacolor reserves the right to make improvements and/or changes in the product(s) and/or program(s) described in this material at any time.

Copyright © 2005 Datacolor. ALL RIGHTS RESERVED. This material may not be reproduced or duplicated, in whole or in part, without the express written permission of Datacolor.

Microsoft®, MS-DOS®, and Microsoft Windows® are registered trademarks of Microsoft Corporation. All other registered trademarks are the property of their respective owners.

To obtain information on local agents, contact either of the offices listed below, or visit our website at www.datacolor.com.

Manufacturer:

Datacolor, 5 Princess Road, Lawrenceville, NJ 08648 609.924.2189 www.datacolor.com

Americas (Lawrenceville, NJ)

Telephone: 1 (609) 924 2189 / 1 (800) 982 6496

Fax: 1 (609) 895 7472

Switzerland (Dietlikon)

Telephone: +(41) 1 835 3711 Fax: +(41) 1 835 3820

Asia (Hong Kong)

Telephone: +(852) 2420 8283 Fax: +(852) 2420 8320

Contents

Introduction	
About Datacolor CHECK	1
Datacolor Portables Desktop Program	2
Instrument Specifications	
Safety Warnings	4
Software Identification	4
Instrument	
General Information	
Power Source	
Operation	
Replacement Parts	
Labels	
Safety Warnings	8
Power Sources	8
Running from Power Adapter	8
Running from the Internal Battery	
Sleep and Active Mode	10
Instrument Controls and Indicators	11
Measure Button	12
Aperture Selections	13
Dual Aperture Units	
Changing the Aperture Selection	
Stapler Foot Installation	
Installing the Stapler Foot	18
Accessories	20
Calibration Tiles—Care and Handling	22
Instrument Cable	23
Cable Components	
Cable Assembly	
Cable Connections	
Battery Removal/Replacement	
Instrument Maintenance	
System Navigation	
Interface Features	
Display Screen	
Persistent Icons	
PDA Control Panel	
Routine Functions	
Instrument Calibration	
Calibration Requirements	38

Calibration Procedure	
Calibration IntervalAdjustable UV Filter Calibration (Datacolor CHECK ^{Pro} Only)	39
Adjustable UV Filter Calibration (Datacolor CHECK ^{Pro} Only)	40
Measuring Samples	40
Measure Standard/Measure Batch Buttons	41
Sample Type and Measurement Sequence	41
Sample Names	43
Storing and Retrieving Samples	45
Performing Color Evaluations	46
Overview	
Color Evaluation Results	
Other Types of Evaluations	
Additional Fields on the Evaluation Screen	52
Management Options	
About Management Options	55
General Operation	
Management Menu	
Folder Management	57
Standard Management	61
Batch Management	66
Tolerance Management	68
Tolerance Block Management	76
Display Set Management	
Measurement Setup	93
Search By Name	
Search for Closest Std	
Print Screen	
Setup Menu	105
Color Difference Setup	
Display Screen Setup	
Illuminant/Observer Setup	112
Strength Setup	114
UV Calibration	
Preferences	
Printer	_
Help Menu	
About Option	
Instrument Diagnostics	
Drift Test	
Green Tile Test	
Energy Level Test	
Purge All Deleted	
•	
Other Options	. 151
Gloss Compensation	
Implementing Gloss Features	152
Gloss Evaluations	155
Strength Option	162

Purpose	
Sample Preparation	162
Program Settings	163
Strength Calculation Selections	163
Enabling Adjusted Strength Option	167
Strength Evaluation Results	
Auto Standard (Auto Select Standard)	160
Required Program Settings	
Auto Standard Measurement Procedure	170
UV Calibration and Whiteness Options	
Purpose	174
What are Optical Brighteners?	
What is Fluorescence?	1/4
What is a UV Enhanced Spectrophotometer?	1/4
Factory Calibration of UV Filter	175
Program Options Used for UV Calibration Feature	175
Whiteness Evaluations	177
Fluorescent Tile Calibration Procedure	178
Performing a Whiteness Evaluation	183
Summary of Whiteness Results	184
Summary of Whiteness ResultsInstrument Configuration for Datacolor TOOLS™	186
UV Filter Calibration in "Tethered" Mode	186
Data Daaluus and Datriaval Everations	400
Data Backup and Retrieval Functions	109
About Data Backup and Retrieval Functions	189
Data Backup to the Memory Card	190
Data Retrieval from the Flash Card	
Flash Card Removal	192
Sharing Datacolor CHECK Data	193
About Synchronization, Export & Import Functions	193
Datacolor Portables Sync Wizard	193
Datacolor Portables Desktop Program	103
Datacolor Portables Sync Wizard	
What is Data Synchronization?	104
What is Import and Export?	105
Typical Data Transfer Routines	
Installing the Software	197
Preparing for Data Synchronization	
Running the Datacolor Portables Sync Wizard	199
Desktop Portables Program	201
About the Desktop Portables Program	201
Types of Datacolor CHECK Data	202
Managing Your Data	
Import/Export Features	204
Import/Export Features	204 205
Getting Started	204 205 206
	204 205 206

Preparing for Import and Export	.208
File Menu	.209
Overview of Import Features	.209
Overview of Export Features	.218
View Menu	.222
Toolbar and Status Bar Options	.222
Refresh	.223
Change User	
Wizard View	.223
Install	.224
HotSync Menu	.224
Custom	.224
View Log	
Setup	
Start Hot Sync Manager	.229
Deta Management Outland	004
Data Management Options	
Data Manager for Desktop Portables	
View Data	
Edit Data	
Delete Data	
Folder Data	
View Folder Data	
Delete Folder Data	
Archive Folder Data	
Standard Data	
View Standard Data	
Delete Standard Data	
Batch Data	
View Batch Data	
Delete Batch Data	
Tolerance Data	
View Tolerance Data	
Delete Tolerance Data	
Tolerance Block Data	
Delete Tolerance Block	
White Tile Data	
View White Tile Data	
Delete White Tile Data	
Delete Write Tile Data	.237
Appendix: Supplemental Information	259
Hardware Troubleshooting and FAQ's	.259
Configuring Datacolor CHECK for a USB Port	.263
Before You Begin	
USB Cable Connections	
USB Driver Installation	
Viewing/Changing System USB Port Assignment	
Changing the USB Com Port Assignment in Datacolor Program	

Evaluation Screen Legend	
Instrument Calibration Supplemental Information	277
Illuminant/Observer Supplemental Information	279
ASTM Table 5 vs. Table 6 Data	279
General Illuminant/Observer Information	280
Color Difference Equations	282
Interpreting the Numbers	
Comparing the Results from Different Equations	285
Supplemental Information—Whiteness Evaluations	
Interpreting Tint Values	286
Laboratories That Supply CIE Whiteness Standards	288
Indices	289
Yellowness Indices—Yellowness D1925	289
Yellowness E313	
Whiteness Indices—Berger Whiteness	290
Whiteness Indices—CIE Whiteness	291
Whiteness Indices—E313 Whiteness	291
Whiteness Indices—Ganz (GG) Whiteness	292
Whiteness Indices—Hunter Whiteness	292
Stensby Whiteness	
Gray Scale for Color Change	293
Gray Scale for Staining	
CIE Metamerism	
DIN 6172 Metamerism	
Optical Density	295
Contrast Ratio	
Tips for Measuring Samples	296
Measuring Translucent Samples	296
Summary of Evaluation Screens	
Spectral/Colorimetric Data	
Indices	302
Gloss Determination	305
Strength Evaluation	306
Desktop Program Glossary	307
Synchronization	307
Export	
Import	308
Optional Accessories	308
Stand-Alone Battery Charger	308
Automotive Adapter	309
Accessory Specifications	310
Selected References	
AV	212

Introduction

About Datacolor CHECK

Datacolor CHECK, a portable spectrophotometer, is among the newest generation of color measuring instruments produced by Datacolor. It incorporates state-of-the-art CMOS integrated circuit technology in the instrument design, and uses a PDA, customized with color management software, as its interface. Datacolor CHECK is intended for use as a device for measuring, specifying and evaluating color in both laboratory and production settings.

Datacolor CHECK is offered in three different configurations, Datacolor CHECK, Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}, which differ in hardware, software and storage capacity. Hardware options include multiple aperture sizes and UV filters.

Datacolor CHECK is a single aperture instrument and provides a basic software offering. The evaluation features include color difference equations and color tolerancing, colorimetric indices, and other options for data management.

Datacolor CHECK^{PLUS} is a dual aperture instrument, with expanded evaluation features. In addition to basic color difference evaluations and color tolerancing, it offers whiteness, yellowness and gray indices, colorant strength evaluations and color search capabilities.

Datacolor CHECK^{PRO} is a dual aperture instrument that also includes an adjustable UV filter, as well as UV cutoff filters required for the evaluation of optical brighteners. It also includes a comprehensive offering of software color evaluation features

In addition to its stand-alone functions, Datacolor CHECK can be connected, or "tethered" to a desktop pc to be used as the primary measuring instrument for other Datacolor programs. You can use either a serial cable or a USB cable to connect the instrument to the computer.

See Instrument, Instrument Cable in this user's guide for instructions to assemble and install the cables. See Other Options, Configuring Datacolor CHECK for Datacolor TOOLS TM , and Appendix, Configuring Datacolor CHECK for Use with a USB Port for detailed instructions connect the instrument to a USB port.



Datacolor Check is protected by US Patent # US636288682

Datacolor Portables Desktop Program

In addition to the portable instrument, the Datacolor Portables Desktop program is included as part of the Datacolor CHECK package. This program is used to transfer or "synchronize" data between a stand-alone instrument, and a Datacolor CHECK database created on the computer. It also provides data management functions. Refer to the Datacolor Portables Desktop Program documentation for detailed information regarding the features and operation of this program.

Instrument Specifications

ITEM	DESCRIPTION
Description	One-piece tower configuration portable spectrophotometer. Customized PDA interface
Size	9.7 cm x 9.5 cm x 24.6 cm 3.85 in x 3.75 in. x 9.7 in.
Display	320 x320 color screen 5.4 cm x 5.4 cm 2.125 in. x 2.125 in.
Weight	1 Kg/2.2 lbs.
Measuring Principle	Dual beam sphere Automatic specular port
Measuring Geometry	Diffuse illumination 8° viewing in conformance with CIE publication No. 15.2 Colorimetry
Light Source	Pulsed xenon Optional UV calibrator
Spectral Range	360nm – 700nm
Effective Bandwidth	10nm
Wavelength Bandwidth	2nm
Spectrometer Principle	Concave holographic grating

ITEM	DESCRIPTION			
Detector	Proprietary active pixel dual 256 element diode array			
Sphere Diameter	51mm/2 in.			
Measuring Range	0 – 200% reflectance			
Measurement Time	<2.5 seconds	<2.5 seconds		
Aperture Sizes	Type LAV SAV USAV XUSAV	Illuminated 15 mm 10 mm 6.5 mm 3 mm	Measured 11 mm 6.5mm 2.5mm 2.5mm	
Repeatability	0.03 CIELAB DE maximum (white tile, 2-flash measurement)			
Reproducibility	0.15 average CIELAB DE, 12 BCRA tiles 0.25 CIELAB DE maximum			
Battery	Replaceable lithium ion			
Battery Life	>2,000 measurements			
	low battery warning			
Battery Recharge Time	4 hours			
AC Power Pack	100-240 VAC, 50-60hz, 15 watt			
Input Power Requirements	6.5 VDC 2.3 Amperes max.			
Operating Environment	5° - 40°C maximum 20% -85% relative humidity Maximum altitude 2,000 meters			
Interface	PalmOne™ Tungsten™ Personal Digital Assistant 400MHz Intel processor 64 MB RAM Palm OS® 5.2.1 Built-in keyboard 320 x 320 color screen			

Safety Warnings

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

CAUTION

There are no user-serviceable parts for this equipment.

Light Source

Do not stare directly into the open port located in the front door panel when the measurement is in progress. Staring directly into the light source can result in eye discomfort similar to that of staring at a camera flash.

Power

CAUTION

Disconnect power before servicing.

The power cord supplied with the unit *must* be used.

Software Identification

The version numbers for the software and firmware on your unit are requested whenever you contact the manufacturer regarding technical support. The software and firmware version numbers are found on the PDA.

To access this information, do the following:

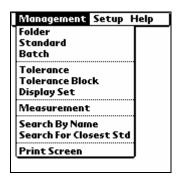
1. If you are not in the Datacolor CHECK software, tap the **Datacolor** icon on the PDA desktop.



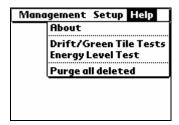
The Datacolor CHECK Main Menu displays.



2. Tap **Datacolor** at the top of the main menu. Three options display at the top: **Management**, **Setup**, and **Help**:



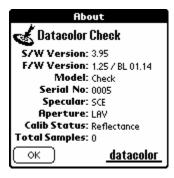
3. Tap **Help**. A drop-down menu displays.



 Tap About. A screen displays with details regarding the current instrument configuration, and the software and firmware versions contained on the unit.



If no information regarding the instrument displays on the *About* screen, this indicates that the instrument is not calibrated. When calibrated, all details about the instrument are displayed. *Refer to the Calibration Procedure found in this guide for calibration instructions.*



Instrument

General Information

Power Source

The only power sources that should be used with the unit are the power adapter or lithium ion batteries, both available only from Datacolor.

Power adapter (Datacolor part no. 4050-0065) has a maximum output of 6.5 volts DC, 1.5 amps.

The power cord supplied <u>must</u> be used.

Replaceable lithium ion batteries (Datacolor part. no. 1200-1299) are the only batteries compatible with Datacolor CHECK. Do not use any other rechargeable or non-rechargeable batteries.

Operation

This product is to be used only in a manner specified by the manufacturer, and according to the instructions for operation and maintenance provided herein.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Replacement Parts

This instrument uses high voltage during operation, and should only be serviced by qualified personnel.

Labels

There are several labels on the unit including the following:

The **WARNING** symbol indicates that the user should refer to the manual before using the instrument.

Datacolor CHECK instrument model and serial number.

Safety Warnings

Light Source: Do not stare directly into the open port located at the bottom of the instrument, when a measurement is in progress. Staring directly into the light source can result in eye discomfort similar to that of staring at a camera flash.

CAUTIONS

- (1) Disconnect all power before servicing.
- (2) The power cord supplied must be used.
- (3) There are no user serviceable parts for this system.

Power Sources

Datacolor CHECK can be powered from an internal battery, or plugged into an external power adapter. Whenever Datacolor CHECK is not connected to the power adapter, it is running from the battery. The battery is fully charged before it leaves the factory. However, it may lose some of its charge by the time it arrives at your location. We strongly suggest that you connect Datacolor Check to the power adapter as soon as you receive the unit. Refer to section entitled, "Instrument Cable" for instructions on how to attach the power adapter to the unit.

Running from Power Adapter

When Datacolor CHECK is connected to the power adapter, it automatically recharges the battery at the same time it is providing power to the unit. You can use Datacolor CHECK to make measurements while the battery is recharging. When the battery is totally discharged, it takes approximately 4 hours to fully recharge it.



When you connect Datacolor CHECK to the external power adapter, the instrument will not recharge if the instrument is asleep (the LED indicator on the front is not lighted). Press the **Measure** button on the back of the unit to activate the instrument.

Once activated, the instrument will never enter *Sleep* mode while it is connected to the external adapter. The PDA will time out, but the instrument will remain active (the LED indicator on the front of the unit will be lighted).

Running from the Internal Battery

When the battery icon contains a single bar, the battery level is low, and a text message (below) displays. This is your prompt to charge the battery.



This message will be displayed at 5-minute intervals. The first time it is displayed, you have battery power remaining for approximately 250 measurements.

If you continue to make measurements without charging the battery, and the remaining power drops to a critical level, a second "low battery warning" (below) displays, and the battery icon will not contain any bars.



This message displays at 2-minute intervals. This first time it is displayed you have battery power remaining for approximately 30 measurements. BACK UP your data NOW if you have not already done so. If you do not, you will not have enough power to complete the backup process.

When the LED indicator on the front of the unit *repeatedly* cycles through the green/red/amber color sequences the unit is ready to shut down. When this happens, you DO NOT have enough power to complete a backup. You should immediately connect the unit to the external power adapter.

If the battery has completely discharged, the unit must be connected to the power adapter for approximately one hour before the LCD becomes active.



When the battery is totally discharged, **everything on the PDA interface is lost!!!** It is important for you to back up your data regularly to the flash memory card so that you do not lose any important information.

If the LED indicator remains amber or red for an extended period of time, the instrument needs to be reset. To reset, press the **Measure** button on the back of the unit until the light goes out. You can then resume using the instrument.

Sleep and Active Mode

When the unit is being powered from the internal battery, both the instrument and the PDA are running from the same battery. To conserve the internal battery power, both the instrument and the PDA are programmed to timeout, or go into *Sleep* mode when no activity is detected over a specified time period.

The *Sleep* function is controlled separately for each component. As a result, the instrument can remain active ("awake") while the PDA is asleep, and the PDA can remain active ("awake") while the instrument is asleep.

Sleep Mode—Instrument

The LED on the front of the instrument indicates the status of the instrument. When the LED is lighted, the instrument is active. When it is not lighted, the instrument is *asleep*. When no measurements are made within a 20-second interval, the instrument enters *Sleep* mode. When the instrument is in *Sleep* mode, you must press the **Measure** button (on the back of the unit to complete a measurement.



If the Datacolor CHECK software on the PDA is not open, you must press the **Measure** button twice. This opens the Datacolor CHECK software on the PDA, and then completes the measurement.

With respect to the instrument, *Sleep* mode is only enabled when the instrument is running from the internal battery. When the instrument is connected to the external power adapter and not used, it will not re-enter *Sleep* mode unless it is disconnected from the adapter.

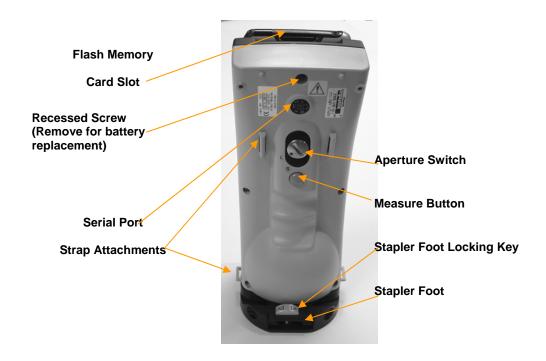
Sleep Mode—PDA

When the PDA fails to receive any input (tapping the screen, pressing the buttons on the Control Panel or receiving input from the graffiti pad) for the length of the interval, the PDA will go into *Sleep* mode, and the screen will go blank. Unlike the instrument, the PDA will go into *Sleep* mode regardless of the power source (internal battery or power adapter) you are using.

To activate the PDA without activating the instrument, press any of the red buttons on the Control Panel. The timeout interval for the PDA is controlled through the Datacolor CHECK software (*Management Options, Setup Menu, Preferences*). You can continue working with the software on the PDA while the instrument is in *Sleep* mode, retrieving samples, requesting color evaluations, and managing the data.

Instrument Controls and Indicators





Back View

Measure Button

When you press the **RED Measure** button on the back of the unit (see above photo) the instrument automatically makes a measurement without prompting you for any information.

Aperture Selections

Both single and dual-aperture units are fitted with an aperture plate covering the instrument port.



Bottom of Unit

Regardless of the type of instrument (single or dual aperture), or the aperture choices available (L, S, U), the port opening is always fitted with an LAV (Large Area View) port. Refer to the table below to review the switch, aperture plate and stapler foot assembly required to obtain accurate measurements for each aperture option.

Dual Aperture Units

There are three possible aperture sizes available on Datacolor CHECK. A dual aperture unit includes any two of the selections listed below:

Aperture Selection	Aperture Plate at Port	Switch Identification	Stapler Foot Assembly ID
Large Area View	LAV	L	LAV
Small Area View	LAV	S	SAV
Ultra-Small Area View	LAV	U	USAV
Extra-Ultra Small Area View*	LAV	U	XUSAV

^{*}Extra-Ultra Small Area View uses the same lens position as Ultra-Small Area View. The only difference is the size of the viewing area targeted by the stapler foot for XUSAV. The lens position used is U (Ultra-Small Area View), and the stapler foot used is XUSAV.

Dual aperture instruments have a switch on the back of the unit. This switch changes the position of the lens based on the aperture that you have selected.



If you have a single (fixed) aperture unit, there is no aperture switch on the back.



Stapler foot assemblies are standard accessories provided for each aperture size included on the unit. They are attached to the bottom of the unit.



This accessory is used to correctly position the sample for measurement. The difference between the stapler foot assemblies is the size of the targeted area. The aperture size is clearly identified on the stapler foot. The stapler foot assembly attached to the unit should always match the aperture setting you are using.



For the measurements of samples that are not flat, aperture "plates" are available as optional accessories to be used in place of the stapler foot. These plates are round disks that fit like a cap over the instrument port. Contact your sales representatives for information on these plates.

Changing the Aperture Selection

- Locate the stapler foot assembly that matches the aperture size you want to use. Install the stapler foot assembly, using the instructions provided in this guide.
- 2. Dual aperture units are fitted with a silver switch on the back of the unit that turns. There are two positions on the switch.



The positions are identified with a letter indicating the lens position (L, S, U). Using a small round disc (a washer or coin will work), turn the switch to the position that matches the aperture size you want to use. The dot on the switch indicates the current position.



- You must calibrate the instrument for each aperture selection being used. The calibration for each aperture setting remains valid for the calibration interval. Refer to Management Options, Management Menu, Measurement for instructions to set the calibration interval.
- 5. Following a successful calibration, the aperture icon displayed in the top right of the PDA screen should match the switch position on the back of the unit, and the aperture identification on the stapler foot assembly.

	Aperture Setting
8	Small Area View
L	Large Area View
U	Ultra-Small Area View



When you change the aperture selection, the aperture icon on the display is not updated until you make a measurement.

See also System Navigation, Interface Features, Persistent Icons for information on the aperture icon on the PDA display.

Stapler Foot Installation

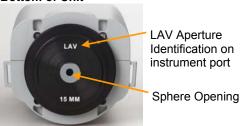
Included with the instrument is a stapler foot assembly for each aperture offered with the instrument. This is attached to the bottom of the unit to correctly position the sample for measurement.



Exercise caution when installing the stapler foot.

Below are pictures of the stapler foot assembly and the bottom of the unit where it is installed:

Bottom of Unit



Both single and dual-aperture units are fitted with an aperture plate covering the instrument port. Regardless of the type of instrument (single or dual aperture), or the aperture choices available (L, S, U, X), the port opening is always covered with an LAV (Large Area View) aperture plate.

Stapler Foot Assembly



Stapler foot assemblies are provided for each aperture size included on the unit. The difference between the stapler foot assemblies is the size of the targeted area. The stapler foot assembly attached to the unit should always match the aperture switch selection. The aperture size is clearly identified on the stapler foot.



Installing the Stapler Foot

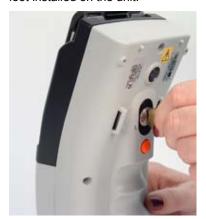
- Slide the locking key on the stapler foot to the right to close it.
- 2. Orient the stapler foot assembly so that the front of the stapler foot assembly is parallel to the front of the unit.
- On the front of the stapler foot there is a red dot. On the front of the instrument there are two dots. One is red and one is gray. Align the red dot on the stapler foot with the gray dot on the instrument.
- Twist the stapler foot clockwise to lock it into position. When it is properly installed, the red dot on the stapler foot will line up with the red dot on the instrument.



5. To remove the stapler foot from the unit, twist the stapler foot counterclockwise.



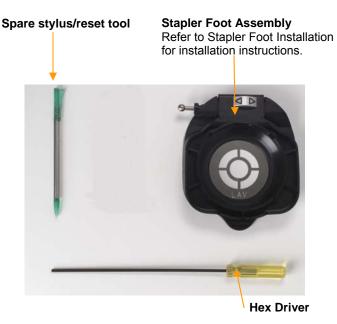
- 6. The aperture selection should match the stapler foot assembly being used. Dual aperture instruments have a silver switch on the back of the unit. Rotating the position of this switch changes the position of the lens.
- 7. Turn the switch to the aperture selection that matches the stapler foot installed on the unit.



Accessories

Datacolor CHECK is packaged in a soft-sided carrying case that contains all of the accessories required to use the instrument. Standard accessories include the following:





20 • Accessories Datacolor CHECK™

Power Adapter / Power Cord



Communications Cable

(Serial Cable)

(USB Cable)





In addition, you will find a Datacolor CHECK User Guide, and three CDs.

- Palm® CD. Contains the Palm® HotSync Manager software. You must load this to transfer data between the Datacolor CHECK and the Datacolor Portables Desktop software on a desktop pc.
- Datacolor Portables Desktop CD. This contains the Datacolor Desktop Portables software. You must load this to transfer data between the Datacolor CHECK ™and the desktop pc. It also contains the instrument firmware, and instructions to transfer it to the Datacolor CHECK unit, as well as electronic copies of the Datacolor CHECK User's Guide.
- USB Drivers and Documentation CD. If you will be connecting the Datacolor CHECK to a USB port, you will need to load additional software to the system. This disk contains the software to be added to enable the USB port, and electronic copy of the installation instructions

Calibration Tiles—Care and Handling

Handling

- Handle the tile by its edges, not by the face. Oils and dirt from the skin can affect the measurement.
- The temperature of the tile surface must be comparable to the temperature of the samples being measured. The tiles should be given time to acclimate before the calibration is performed.
- Place the tile gently against the instrument port. Do not slide or rotate
 it while in contact with the aperture plate to avoid abrasion of the
 surface.
- The orientation of the tile against the port should be consistent. Use the serial number on the back of the tile as a means of orientation. The tile should be presented with the label in the upright position, and centered over the port opening.

Cleaning

- The calibration tiles should be cleaned before each use. Wiping it clean with a soft, lint-free cloth can do this.
- A detergent, free of optical brighteners, fluorescent materials or photoactive dyes should be used as needed to clear any oils, fingerprints, or other deposits. Liquid dish detergent is a suitable detergent.

The detergent/water solution should be prepared as follows:

1 part detergent:250 parts water

Use a few drops of the detergent solution to moisten a soft, lint-free cloth, and gently wipe the tile surface. Rinse the detergent from the tile by wiping it with a cloth, moistened with clean water.

 NEVER use abrasive cleansers, razor blades, or other metal objects to remove dirt or foreign substances from the calibration tiles. This will damage the tile surface.

Care

- Do not allow the tiles to be immersed in any fluid. This can cause blotching or color changes.
- Tiles that have scratches, chips, abrasions or cracks must be replaced. Signs of wear on the tile surface will affect the accuracy of the calibration.

Storage

 Large temperature variations will affect the accuracy of your calibration, requiring more frequent calibration. The calibration tiles should be stored in an environment that simulates the temperature of the samples to be measured.

Prolonged exposure to sunlight or other sources of ultra-violet radiation will cause the color of the tiles to change. The tiles should always be stored in a protective case or container away from direct sunlight and environmental contaminants.

Instrument Cable

A custom cable is included with the instrument. This cable comes as 3 separate components (shown below) that you must assemble.

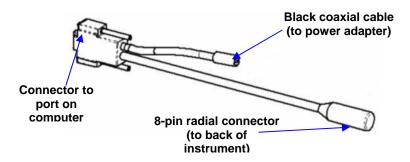


NOTE

You can connect Datacolor CHECK to either a serial port or a USB port on a desktop computer.

Cable Components

When assembled, the Datacolor CHECK cable has 3 connectors on it. One connects to the instrument, one connects to a port on the computer, and one connects to the power adapter.





NOTE

Two communications cables are supplied with the instrument. One is used to connect the unit to a serial port, and the other is used to connect to a USB port. You will only use one of these cables, based on the type of communications port available on your computer.

Serial Communications Cable

USB Communications Cable

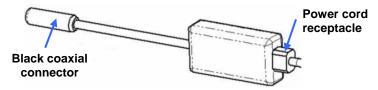




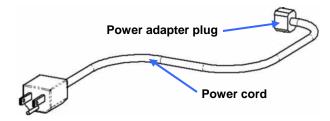


If you will not be connecting Datacolor CHECK to a computer for use with other Datacolor software products, it does not matter which communications cable you use. Either can be used for the purpose of connecting to the power adapter.

 Power Adapter. This component includes a black coaxial connector, and a power adapter with power cord receptacle.



 Power Adapter Cord that includes plug to power outlet and plug to power adapter.



CAUTION

The power cord supplied with the unit *must* be used.

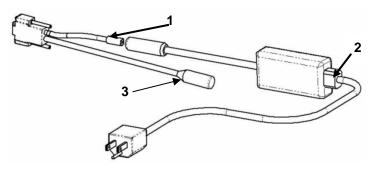
Cable Assembly

MARNING

Disconnect the power adapter from the wall outlet before connecting Datacolor CHECK to the adapter or PC.

- Plug the black coaxial connector from the Datacolor CHECK connector (1) into the black coaxial connector from the power adapter (1).
- 2. Insert the adapter power cord into the adapter (2).
- 3. Plug the radial connector (3) into the port on the back of the Datacolor CHECK.

When assembled correctly, your cable should look like the diagram below:

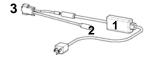


It is used for two functions:

- To connect the Datacolor CHECK ™to its power adapter. When connected to the adapter, the battery in the Datacolor CHECK is being recharged, while the unit is also available for measurements.
- To connect Datacolor CHECK to a port on a PC.

Cable Connections

DC adapter (1) Connector to instrument (2) Connector to port on PC (3)



The 8-pin radial connector (2) plugs into the port on the back of the instrument. The USB/Serial connector (3) connects to a port on a computer (3).

Serial Port Cables

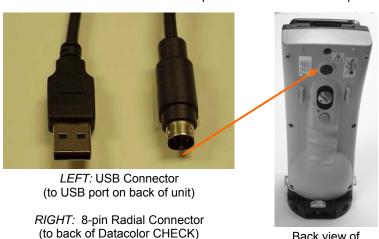
The serial D connector is used to connect to the serial port on a computer.



Back view of Datacolor CHECK

USB Port Cables

The USB connector is used with a USB port on the back of the computer.



Back view of Datacolor CHECK



To use Datacolor CHECK with a USB port, you must install software onto the system. For instructions to install the USB drivers, see **Configuring Datacolor CHECK for a USB Port** in the Appendix of this guide.

Connecting the Instrument to the Power Adapter

The cable must be completely assembled in order to run Datacolor CHECK from the power adapter.

- Insert the 8-pin radial connector into the port on the back of the instrument. This is a keyed connector and must be precisely oriented, so that the pins in connector are correctly aligned to fit the pin pattern of the serial port. Looking at the rear of the instrument, the cable should be oriented so that the flat edge of the connector shield is facing to the right.
- 2. Plug the power cord into an outlet.

Connecting the Instrument to a Desktop PC

The Datacolor CHECK can be connected to a desktop pc for use as the primary measuring instrument for other Datacolor programs, and for data synchronization. For this function, you must connect the instrument to either a serial or USB port.

Serial Port Connection

- Insert the radial connector into the port on the back of the Datacolor CHECK. This connector is a keyed connector and must be precisely oriented so that the pins in connector are correctly aligned to fit the pin pattern of the serial port on the instrument. Looking at the rear of the instrument, the cable should be oriented so that the flat edge of the connector shield is facing to the right.
- 2. Insert the serial D connector into the serial port on the back of the computer. You should carefully note the identification of the serial port you are using (i.e., Com 1, Com 2, etc.).

USB Port Connection

To connect Datacolor CHECK to the USB port, do the following:

- Insert the radial connector into the port on the back of the instrument.
- 2. Insert the USB connector into the USB port on the back of the computer. You should carefully note the identification of the serial port you are using (i.e., Com 1, Com 2, etc.).
- You must also install software to allow communication between the Datacolor CHECK and the USB port. See Appendix, Configuring Datacolor CHECK for a USB Port for software installation instructions.

Using **Datacolor CHECK** as the measuring device for another Datacolor program may require changes to the instrument setup. The User's Guide for the specific program will provide instructions regarding the instrument setup.

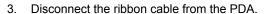
Battery Removal/Replacement



You do not have to remove the battery to recharge it. The battery can be recharged by connecting the unit to the power adapter. See Instrument, Power Sources for an explanation of this feature.

- 1. Wait for the PDA to go into Sleep mode.
- Using the hex driver (screwdriver with yellow handle in instrument bag), remove the recessed screw on the back of the unit. This screw secures the bezel housing the PDA (black) to the instrument cover (gray).

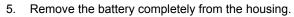






4. On the right side of the battery, there is a black switch. Press this switch down to release the battery.







- 6. Seat the new battery into the housing.
- 7. Reattach the ribbon cable to the PDA.
- 8. Check to be sure there is power to the PDA, and the unit is functioning before you re-secure the cover.

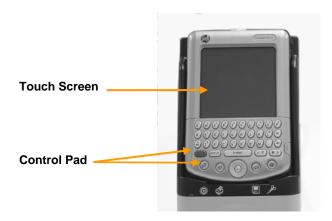
Instrument Maintenance

There are no user-serviceable parts for this equipment.

System Navigation

Interface Features

Below is the Datacolor CHECK user interface. It is composed of three sections:



Datacolor CHECK utilizes most of the navigation tools that are standard with a PDA, but some of these functions have been customized to accommodate features specific to Datacolor CHECK.

Display Screen



Input fields. Wherever the **▼** displays on the screen, several choices exist for that field. Touching the will display the choices.



To change your selection, tap a different choice in the list. The screen information will be updated immediately to reflect the change you have made.



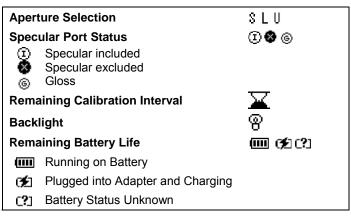
MARNING

Use the stylus provided with the unit or your finger to make screen selections. DO NOT APPLY ANY TYPE OF SHARP OBJECT TO THE **SCREEN**. Applying pen or pencil tip, or other similar implements can damage the screen.

Persistent Icons

Along the top right row of the screen are a series of icons that are continuously displayed. Each indicates the status of a particular instrument condition. The conditions are updated each time a measurement is made.





Aperture Selection. The letter indicates the current setting for the aperture. For single aperture instruments, this icon never changes. For dual aperture instruments, when you change the position of the switch on the back of the unit, this icon will also change.

L = Large Area View (L) S = Small Area View () **U** = Ultra Small Area View (U)



NOTE TO XUSAV USERS

To enable XUSAV, the lens should be in the USAV position, and the XUSAV stapler foot assembly should be attached to the instrument. There is no XUSAV icon.

Specular Port Status. This icon indicates the current position of the specular port.

- Specular Included. This icon indicates that the specular port is closed, and the specular component is included in the reflectance measurement.
- **Specular Excluded.** This icon indicates that the specular port is open, and the specular component is NOT included in the reflectance measurement.

• Gloss. © This icon indicates that two measurements are made for each sample, one SCI, and the other SCE. From these two measurements, gloss values are calculated and the color difference calculations are adjusted for gloss differences. Refer to Other Options, Gloss Compensation for a detailed explanation of the concept and operation of this feature.

When the top of the hourglass is black, there is time remaining before next calibration. When the top of the hourglass is white, the calibration interval has lapsed. The default calibration interval is 8 hours, and the user can change the calibration interval.



If you select a different aperture setting, the amount of time remaining before your next calibration may change.

Battery Icon. Indicates battery usage. When the unit is fully charged, four vertical lines appear in the battery. As the battery discharges, these lines start to disappear. The battery used by Datacolor CHECK is rechargeable. Each time you charge the battery pack, the unit is available for approximately 1,000 measurements.

- **12.** Datacolor CHECK is connected to the power adapter and the battery is charging. You can continue working with the unit and recharge the battery simultaneously.
- When a question mark displays in the battery icon, the battery status is unknown. This occurs when there is no communication between the instrument and the PDA. Refer to the **Appendix**, **Hardware Troubleshooting and FAQ's** for additional information.

When 3/4 of the battery life has elapsed, connect the power adapter to the instrument (🕰). The battery is fully recharged in 4.5 hours.

Backlight. The PDA comes with a backlight to illuminate the display. Touching this icon turns the light on/off.

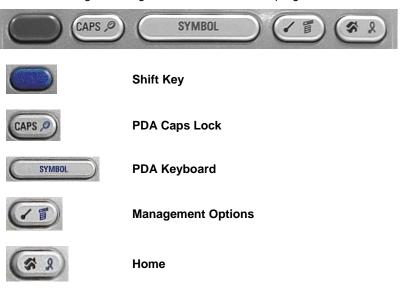


The backlight can only be seen when the screen is viewed in a dark room with no ambient light.

PDA Control Panel



Directly below the alpha-numeric keypad are additional function buttons that are used to navigate through the Datacolor CHECK program.





Some of the functions on the Control Panel require the Shift key to be depressed to activate the function.

The buttons are described below in order from left to right:

- Shift. This key is used to enable a function on one of the other buttons.
- Caps. Touch the Shift and Caps buttons to set the PDA keyboard to all caps.
- PDA Keyboard (Symbol). Touch the Shift and Symbol buttons to display a keyboard you can use to name your samples. The screen includes alphabetical, numeric, International and symbol keyboards.



The cursor must be flashing in a 'name' field (i.e., folder, standard, batch tolerance block or tolerance) to activate the keyboards.

- Management Options. Press the Shift and Management Options button at the same time to display the Management Options. This includes three menus that provide access to data management, Search, Strength, and UV evaluation options, instrument diagnostics, and other features used for data management and system configuration.
- Home. When the Datacolor CHECK software is open, touching this
 at any time will return the user to the Main Menu. This is the opening
 screen for the software.

At the bottom of the PDA are five (5) additional buttons.



Each performs the function identified by the icon below the button:





Select / Measure Standard (Target). Used to interrupt the current measurement sequence, specifically to retrieve or measure a standard. Also used to enter a standard name BEFORE measuring the sample.





Print. Prints the active evaluation screen. Refer to "Management Options, Setup Menu, Printer" for details on printer setup.



This button performs the following 2 functions:

Display Set Control. Tap the top and bottom section of the outside ring to move forward and backward through the pre-programmed display screens.

Last Active Evaluation. Tap the inside ring to display the last evaluation performed.





Save. Used to manually **save** the data. When you press this button, the program stores the ACTIVE STANDARD AND BATCHES. This is used to save data when the *Autosave* option is disabled. When *Autosave* is enabled, all standard and batch data are automatically saved.





Select/Measure Batch. Used to interrupt the current measurement sequence, specifically to retrieve or measure a batch. Also used to enter a batch name BEFORE measuring the sample.

Routine Functions

This section covers the functions you will run on a daily basis. They include instrument calibration, sample measurement, and performing color evaluations.

Instrument Calibration

The instrument must be calibrated regularly to ensure that the measurements are accurate. The recommended calibration interval is 8 hours for each aperture setting. The hourglass icon at the top of the screen indicates the elapsed time since the last calibration for the current aperture setting. When this interval has fully elapsed, the instrument *must be recalibrated to make a measurement*. Refer to Appendix, Calibration Supplemental Information for more information on calibration.

When calibrating, you must simulate the conditions under which you are making measurements. If you are not using the stapler foot when measuring the samples, you should remove it during calibration. If you are measuring with the stapler foot in place, it must be attached during calibration, and the black trap and white tile must be positioned against the bottom of the foot.



Refer to Management Options, UV Calibration for instructions to calibrate the adjustable UV filter included with the Datacolor CHECK^{PRO} model.

Calibration Requirements

- You will need the black trap and white tile to perform the calibration routine.
- If you will be using the stapler foot assembly to perform measurements, you must attach the stapler foot to the instrument before calibrating.
- The instrument should be calibrated at least every eight (8) hours for each aperture setting. The icon at the top of the screen indicates the elapsed time since the last calibration for the aperture selected.

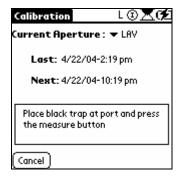
Calibration Procedure

To start the calibration routine, do the following:

 Tap the **Home** icon on the graffiti pad. The Datacolor CHECK Main Menu displays.



2. Tap the **Calibrate** option. The following screen displays:



3. With the black trap positioned over the port opening, press the **Measure** button. The instrument flashes multiple times. When it is finished, a message is displayed, prompting you to place the white tile (with the corresponding serial number) over the port.



The serial number on the screen should match the serial number of the white tile you are using.

 With the white tile positioned over the port opening, press the Measure button. The instrument flashes four (4) times. When finished, it displays a message that calibration was successful.

TIP

The **Calibrate** option is only available from the Main Menu.

Calibration Interval

The system keeps track of the calibration interval(s) and requires that you recalibrate periodically. The hourglass icon at the top of the screen indicates elapsed/remaining time for the calibration. The same information is also displayed in a text message when you select the calibration option from the *Main Menu*.

The information regarding the calibration interval refers to the aperture condition *currently selected*. If you have a dual aperture instrument and you change the aperture selection, the calibration interval may change. You may need to recalibrate the instrument for the new aperture selection before you can continue your work.



When the calibration interval has completely lapsed, YOU WILL NOT BE ABLE TO MAKE A MEASUREMENT UNTIL YOU RECALIBRATE THE

INSTRUMENT. If the calibration interval has elapsed, you will receive a recalibration request when you press the Measure button, and you will not be able to complete a measurement.

Refer to Management Options, Setup Menu, Preferences for explanations on setting/changing the calibration interval.

Adjustable UV Filter Calibration (Datacolor CHECK^{Pro} Only)

The Datacolor CHECK^{PRO} is fitted with a special UV filter. On the back of the instrument there is a scale that indicates the filter position:





During the fluorescent tile calibration, you may be instructed to adjust the position of this filter. The program will prompt you to turn the Allen Key clockwise, or counterclockwise to adjust the position of the filter:

Refer to Other Options, UV Filter Calibration for a detailed explanation of the procedure for calibrating the adjustable UV filter.

Measuring Samples

When you are in the Datacolor CHECK software, pressing the Measure button on the back of the unit at any time will immediately trigger a measurement, regardless of the program option currently active. If you have a dual aperture instrument, you must be sure that the aperture selection and the stapler foot assembly being used are the same. If they are not, the measurements will not be valid.



NOTE for XUSAV Aperture Selection

When this viewing condition is used, the lens should be in the USAV position, and the XUSAV stapler foot assembly should be attached to the instrument.

The measurement procedure is as follows:

- For flat samples, position the stapler foot over the area to be measured. The color must completely fill the circle in the center of the stapler foot.
- Press the RED Measure button on the back of the instrument.

Measure Standard/Measure Batch Buttons

The Measure/Select Standard o and Measure/Select Batch buttons on the Control Panel have several functions:

- To assign a name to the sample **before** the measurement is made. Refer to "Customer Sample Name" for details.
- To retrieve a standard/batch previously stored.
- To override the next sample type in the measurement sequence.
 Refer to "Sample Type" and "Measurement Sequence" for details.

Sample Type and Measurement Sequence

Whenever you measure a sample, the system must correctly identify it as a standard or a batch. Each time you press the **Measure** button, the system automatically assigns a sample type, standard or batch, to the measurement.

This sample identification is controlled through a setting in the software that identifies the 'measurement sequence' you are using. The measurement sequences include:

- STD/STD/STD. All measurements are labeled "Standards".
- STD/BAT/BAT/BAT. First measurement is a "Standard". All remaining measurements are "Batches", until the operator overrides the sample assignment (see below).
- STD/BAT/STD/BAT. The sample type assignment alternates between "standard" and "batch". The operator can override the sample type assignment at any time.

Based on the measurement sequence that is currently selected, the system keeps track of the samples you have measured, and identifies the sample type. An icon is displayed in the lower left corner of the screen to identify the sample type that will be assigned to the next measurement.



- If the icon is shown, the next sample will be a Standard.
- If the **v** icon is shown, the next sample will be a Batch.

Refer to "Management Options, Management Menu, Measurement" for details to change the measurement sequence.

Overriding the Measurement Sequence

You may need to interrupt the measurement sequence to re-measure a sample, or to measure a different group of samples. When the interruption is temporary, it is not necessary to select a different measurement sequence. You can simply use the **Measure/Select Std** and **Measure/Select Batch** buttons on the Control Panel to override the sequence. Below is an example:

- Standard-Batch-Standard-Batch is the current measurement sequence.
- System expects next measurement to be a Std. You want to remeasure the last batch to be sure it is correct.
- Press the Select Batch button on the Control Panel.
- Press the Measure button on the back of the instrument. When the Autonumbering feature is enabled, the sample just measured is identified as a Batch "N".

The system will then resume the measurement sequence. In this example, if you simply pressed the **Measure** button, the next measurement would have been identified as a standard. You can override it again by pressing the **Select Batch** button.

Sample Names

Every sample must have a name. If you do not automatically assign a name to the sample **before** the measurement, the system auto names it. *Autonaming* consists of assigning the label STD to a standard, and BAT to a batch. A number will follow the label to tell them apart (e.g., STD 1, BAT 1, etc.).

- Standards are numbered sequentially within a folder (STD 1, STD 2, STD 3, etc.).
- All batches assigned to a single standard are numbered in sequence (BAT 1, BAT 2, BAT 3, ...).

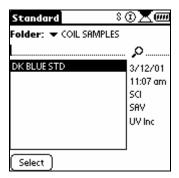
Customizing Sample Names

You can assign a custom name to a sample either before or after the measurement is made.

Naming Samples before Measurement

To name a Standard before measuring, do the following:

1. Press the **Measure/Select Standard** button on far left of the Control Panel.



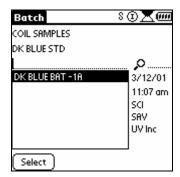
- 2. Activate the cursor on the name line by touching the line.
- When the cursor is flashing on the line, tap on the abc icon to display the keyboard, or start writing in the center of the graffiti pad to enter the name.



- 4. When the name is entered, press **Done**.
- Place the stapler foot over the sample, and press the Measure button to make a measurement. The display refreshes, and the custom name you entered will be displayed for the standard just measured.

To name a Batch before measuring:

1. Press the **Measure/Select Batch** ¶ on the Control Panel.



2. Repeat Steps 2 – 5 above.

Naming Samples After the Measurement

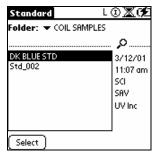
Sample names can be edited at any time through Management Options. Refer to "Management Options, Management Menu, Standard or Batch Management" for detailed instructions.

Storing and Retrieving Samples

Samples can be stored automatically or manually. The information stored includes:

- Name
- Sample type
- Date/time of measurement
- Instrument settings (aperture setting, measurement condition (SCI, SCE or Gloss), etc.)
- Spectral and colorimetric data
- Tolerances
- Autosave Feature. When Autosave is enabled, every measurement is stored in the folder that is *currently selected*. All batch measurements are attached to the standard that is active at the time of the measurement. The default setting for this feature is **On**. Refer to Management Options, Management Menu, Measurement for instructions to enable/disable this option.
- Manual Save. When Autostore is disabled, the user can selectively store standard data. Standard data is stored by pressing the Save button on the Control Panel. Once the standard is stored, all of the batches measured for the standard are automatically stored. All future batches will also be stored for this standard, regardless of whether Autosave is enabled or disabled.

Whenever a sample is retrieved using the **Select/Measure Standard** or **Batch** buttons on the Control Panel, the sample name, date/time of measurement, and instrument settings are displayed on the screen.



Performing Color Evaluations

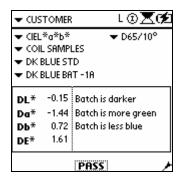
Overview

The evaluation screen is where you will do most of your work. The program has been designed so that you can complete routine color evaluations without leaving this screen.

TIP

If the evaluation screen is not displayed, press the inside ring of the **Display Set Control/Last Active Evaluation** button on the Control Panel to return to the last active evaluation screen.

Below is an example of a color evaluation screen displayed by Datacolor CHECK.



From this screen, you can do the following:

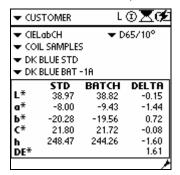
- Measure new samples. Simply press the Measure button. Each time you make a new measurement, the data on the screen will be updated to include the new measurement.
- Change the color evaluation being displayed. Tap the down arrow
 (*) next to CIELab for a list of selections. Tap on an evaluation in
 the list.
- Change the Illuminant/Observer combination. Tap the down arrow (▼) next to D65/10 for a list of selections. Tap on an Ill/Obs combination in the list.

Color Evaluation Results

You will use this instrument primarily to obtain color difference reports regarding the standard and batch. Below is a display containing color difference data

Color Coordinates/Differences

For each of the color difference equations offered, you can display a screen that reports the color coordinates and color differences for the standard and batch, based on the equation selected.



Each color coordinate is identified by a letter—e.g., L*, a*, b*, etc. In this example, the color difference calculation being displayed is CIEL*a*b*C*h. Most of the component color differences reported will indicate if the difference is positive (+) or negative (-). The exception is DE, which is always a positive number.



The Appendix includes a section called **Color Difference Equations**. Interpreting the Numbers, which explains how to translate the numerical output into visual properties/qualities of the samples.

- STD. The values under the column titled 'STD' are the coordinate values for the standard.
- BATCH. The values under the column 'BATCH' are the coordinates for the batch.
- **DELTAS**. The data under 'Deltas' are the color differences between the batch and the standard for each of the coordinate values. DE is 'Delta E', which refers to the overall, or composite, color difference between the batch and the standard.

Color coordinates and color differences are dependent upon the current Illuminant/Observer selection. When you change the Illuminant/Observer, the color coordinates for the standard and batch will change.



Color differences are only reported when both a Standard and a Batch are measured/selected.

When you select a new folder, both the standard and batch fields will display *None*.

When you select a new standard, the batch entry will default to *None*, and color difference values will not be displayed.

Refer to the Appendix, Summary of Evaluation Screens for a complete list of the colorimetric evaluations included.

Color Differences/Descriptors

For the CIEL*a*b* equation, there are several choices for the output display. Below is another example of CIEL*a*b* colorimetric output:



This screen includes color differences and color 'descriptors', but does not display the color coordinates. The descriptors convert the numerical values into text descriptors. Depending on the samples in the evaluation, you will see text such as 'lighter', 'redder', 'bluer', etc. In this example, the value for Da* is translated as "1.44 units more green".

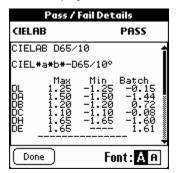
Pass/Fail

When the pass/fail evaluation is activated, a pass/fail text message displays at the bottom of the screen. This message indicates whether the batch falls within all of the color difference tolerances set for the standard.



Pass/Fail Details

Tap on the text (**Pass/Fail**), and the details of the tolerance being applied will be displayed.



Pass/Fail tolerances can be assigned to folders and standards. If the program finds a tolerance assigned to the current standard, it will apply that tolerance, and display a Pass/Fail text message.

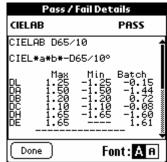
If the program does not find a tolerance assigned to the active standard, it will check the folder tolerance. If a default tolerance has been assigned to the folder, it will use that folder tolerance for the Pass/Fail evaluation.

If the program does **not** find a tolerance assigned to the current standard or the current folder, the pass/fail evaluation will be suppressed. Refer to "Management Options, Management Menu, Tolerances, Tolerance Blocks, Folders and Standards" for details regarding creating/changing/assigning pass/fail tolerances.

Font

This selection controls the size of the text displayed on the pass/fail 'details' screen. Tap on the font size you want to use.



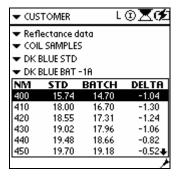


Other Types of Evaluations

Spectral Data

50 • Performing Color Evaluations

Spectral data, also known as "reflectance" data, is the information collected by a spectrophotometer. It is a record of the amount of light reflected by the sample at individual wavelengths across the visible spectrum, and is the basis of all of the color evaluations available in this system. Below is an example of the spectral data output:



The wavelengths of the visible spectrum, 400 – 700nm, are reported at intervals of 10nm. Next to each wavelength is the measured reflectance.

Indices

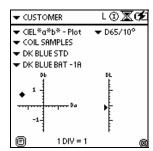
Datacolor CHECK includes a large choice of indices that are used by specific industries. Typically, an index will evaluate one aspect of a sample such as *whiteness*, and calculate a value based on that property. The index options include whiteness, yellowness and gray scales, metamerism indices, optical density and contrast ratio (opacity). Most of these indices are included in a standard evaluation procedure issued by internationally recognized bodies such as ISO, ASTM, etc.



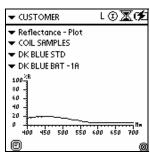
Most index options are defined for specific Illuminant/Observer combination(s). If you choose an Illuminant/Observer that is not valid for the index you are running, you will receive an error message. *Refer to Appendix, Indices for a detailed specification for each index option.*

Plots

Two types of plots can be displayed. Color difference plots demonstrate the color differences between the standard and batch.

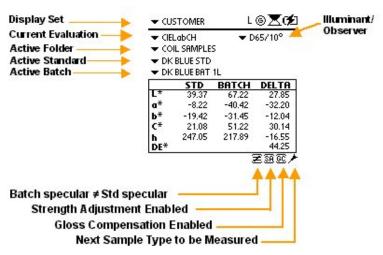


The reflectance plots provide a graphic display of the reflectance values of the standard and batch across the visible spectrum.



Additional Fields on the Evaluation Screen

This section provides a brief explanation of standard fields that appear on the evaluation screen. The selections in these fields can be changed without leaving the screen. Simply tap on the down arrow (**T**) to view the choices, and tap on the new selection. The screen will be updated immediately to reflect the new selection.



• **Display Set.** A display set is a group of preprogrammed evaluation screens. If you routinely perform the same functions you can program the screens in the order that you use them. After measuring the samples to be evaluated, simply press the top and bottom of the **Display Set Control/Last Active Evaluation** button on the Control Panel, to move through the display set.



- The top of the button moves forward through the display set
- The bottom of the button moves backward through the set.



You can interrupt a display set at any time to view a different screen. Simply touch the down arrow (▼) next to the current color evaluation, and select a different screen.

Interrupting the display set to make this selection does not affect the preprogrammed set. You can resume running the preprogrammed display set exactly where you left it, simply by pressing one of the silver buttons on the Control Panel.

- Current Evaluation. Identifies the evaluation currently displayed. Tap the down arrow to view the available choices, tap on the evaluation you want to see. The screen will refresh and the new evaluation will be displayed using the current standard and batch data.
- Active Folder. The folder containing the standard/batch data currently displayed. When you select a different folder, the standard and batch selections will be cleared.
- Active Standard. The standard used in the current evaluation.
 When you select a different standard, the batch selection will be
 cleared. If you are displaying color coordinates, the values for the new
 standard will be displayed. No color differences will be displayed until
 you select a batch.
- Active Batch. The batch used in the current evaluation. When you
 select a new batch, the color coordinates and color differences
 displayed are based on the new batch selection.



You can only display the evaluation data for one batch at a time.

- Illuminant/Observer. Identifies the Illuminant and Standard Observer data used for the evaluation displayed.
- Next Sample Type. This identifies the sample type, standard or batch to be assigned to the next measurement. This is defined by the Measurement Sequence selected. Refer to Management Options, Management Menu, Measurement.



Next sample will be labeled a standard.



Next sample will be labeled a batch.

You can override this assignment by pressing the Select/Measure Standard or Select/Measure Batch buttons on the Control Panel.

- Gloss Compensation Enabled. The evaluation is based on measurements corrected for gloss differences. This feature is enabled/disabled from *Management Options*, *Setup Menu*, *Color Difference*.
- Strength Adjustment Enabled. The evaluation is based on a batch measurement that has been adjusted for strength. The adjusted curve is corrected to match the strength of the standard. This feature is enabled/disabled through Management Options, Setup Menu, Color Difference, Apply Strength.
- Batch Specular ≠ Std Specular. The specular port settings (SCI/SCE/Gloss) for the standard and the batch must be the same in order for the color evaluation to be valid. When the specular port selection for both samples is not the same, this icon displays as a warning that the evaluation displayed *is not valid*.

Management Options

About Management Options

The Management Options are used to set most of the instrument features, and to manage the data collected.

• Tap the Datacolor icon on the main menu:



The Management Options menus will display:



They include three menus: Management Menu, Setup Menu and Help Menu

- Management Menu. This menu includes options used to manage your data. This includes folder, standard and batch data management, and creating, editing and changing pass/fail tolerances. It also includes the Search options and a print screen option.
- Setup Menu. Provides access to options controlling both hardware and software selections. It also provides access to the settings for the gloss compensation feature, strength evaluation, and the UV filter and calibration options (available only with Datacolor CHECK^{PRO}).
- Help Menu. Includes an option to display information about the instrument and software configuration, and provides access to the instrument diagnostics.

General Operation

- When you are creating, editing, and modifying information, tap the Done button to execute the change. When the Done button does not appear on the screen, the changes are automatically updated.
- To return to the management menus, tap the title bar in the upper left corner of the screen..
- To return to the Main Menu, press the Home button on the Control Panel.
- To return to the last active evaluation screen, press the inside ring
 of the Display Set Control/Last Active Evaluation button on the
 Control Panel.



Management Menu

This menu contains options that are used to manage the data. It also provides access to the Search feature and print function:



Folder Management

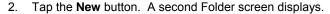
This option allows you to create, modify and delete folders, and to assign a pass/fail tolerance to a folder.

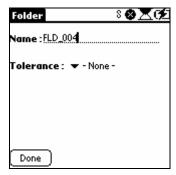
Creating a New Folder

Use this option for creating a new folder.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Folder. The Folder Management screen displays containing a list of all existing folders.



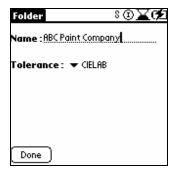




- 3. To change the default name, do the following:
 - If the flashing cursor is not shown, tap at the end of the displayed text so the flashing cursor displays.
 - Press the Shift and Symbol buttons on the Control Panel to display the keyboard.



- In the Keyboard screen, tap the backspace key to erase the current text.
- 4. Use the keyboard to enter the next text. When you have finished entering the text, press **Done** to exit the keyboard. To associate a tolerance to a folder, tap the down arrow (*) to display the list of available tolerances, and tap on the name of the desired tolerance.



TIPS—Tolerances

- * You must have at least one tolerance stored in order to assign a tolerance to a folder.
- * If you do not want a tolerance assigned to the folder, select 'none'.
- * If no tolerance is associated with a standard, the folder tolerance will be used for pass/fail evaluations.
- * If no tolerance is associated with a standard, and no tolerance is associated with a folder, the pass/fail evaluation will be disabled
- 5. Tap **Done** to ensure that the new folder name is retained, and the tolerance is associated with the folder.

Modifying the Folder Information

Use this function to change the name of an existing folder, or to assign a different tolerance to the folder.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Folder. The Folder Management screen displays containing a list of all existing folders.
- 2. From the list of folders shown, tap the folder you want to modify.



3. Tap **Modify**. A second folder screen displays.



- 4. To change the default name:
 - If the flashing cursor is not shown, tap at the end of the displayed text so the flashing cursor displays.
 - Press the Shift and Symbol buttons on the Control Panel to display the keyboard.
 - In the Keyboard screen, tap the Backspace key to erase the current text.
 - Use the keyboard to enter the next text. When you have finished entering the text, press **Done** to exit the keyboard.
- To assign or change the tolerance associated with the folder, move
 to the *Tolerance* field, tap the down arrow (*) to display the list of
 available tolerances, and tap on the name of the tolerance to be
 used.

TIPS—Tolerances

- * You must have at least one tolerance stored in order to assign a tolerance to a folder.
- * If you do not want a tolerance assigned to the folder, select **none**.
- * If no tolerance is associated with a standard, the folder tolerance will be used for pass/fail evaluations.
- * If no tolerance is associated with a standard, and no tolerance is associated with a folder, the pass/fail evaluation is disabled.
- 6. Tap **Done** to ensure that the new folder name is retained.

Deleting a Folder

Use this option to delete an existing folder.



Once a folder is deleted, all standards and batches stored in it are gone.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Folder. The Folder screen displays containing a list of all existing folders.
- 2. In the list of folders shown, tap on the folder you want to delete.



3. Tap **Delete**. A confirmation message box is displayed.



 To delete the folder, tap **OK**. Otherwise, tap **Cancel** to cancel the delete process.

Standard Management

Use these functions to move, copy, edit, and delete standards. The Standard Management function is also used to associate tolerances with individual standards.

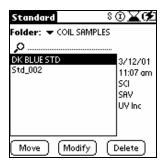
Moving/Copying a Standard

Use the option to either move or copy a standard.

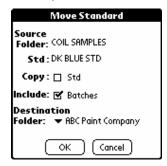


Standards must be moved or copied one at a time.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Standard. The Standard Management screen displays. The Folder field identifies the folder currently selected. To select a
different folder, tap the down arrow (*) to display the list of
existing folders, and tap on the desired one. The information on the
screen is updated to include all standards contained in the selected
folder.



3. From the list of standards, tap the standard you want to move/copy. Then tap **Move**. The Move Standard screen displays.

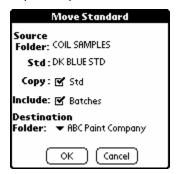


- 4. To **MOVE** the standard, do the following:
 - Verify that the Copy field IS NOT selected—i.e., no checkmark is shown.
 - If you want to move the batches for this standard, move to the Include field, and tap in the checkbox so a checkmark displays.
 - In the Destination Folder field, tap the down arrow (*) to display a list of available folders, and tap the name of the folder to receive this standard. The destination folder must be different from the origin folder.
 - Tap **OK** to perform the move/copy.



When you *MOVE* a standard and do NOT include the batches, the batches are deleted from the system.

- 5. To **COPY** the standard, do the following:
 - In the Copy field, tap in the checkbox so a checkmark displays.
 - If you want to copy the batches for this standard, move to the *Include* field, and tap in the checkbox so a checkmark displays.
 If you do not select this option, the batches are not copied.
 - In the Destination Folder field, tap the down arrow (*) to display a list of available folders, and tap the name of the folder into which you want to copy this standard. The destination folder must be different from the origin folder.
 - Tap **OK** to perform the move/copy.



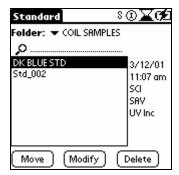
Modifying a Standard

Use this function for editing a standard name, or to associate a tolerance with a standard.

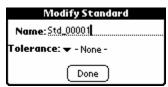


You associate tolerances, not tolerance blocks with a standard. Refer to "Tolerance Management and Tolerance Block Management" for details.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Standard. The Standard Management screen displays.
- The Folder field displays the folder currently selected. To select a
 different folder, tap the down arrow () to display the list of
 existing folders, and tap on the desired one. The information on the
 screen is updated to include all standards contained in the selected
 folder.



3. From the list of standards, select the standard you want to modify. Tap the **Modify** button. The Modify Standard screen displays.



- 4. To change the standard name, do the following:
 - If the flashing cursor is not shown, tap at the end of the standard name so the flashing cursor displays.
 - Press the **Shift** and **Symbol** buttons on the Control Panel to display the keyboard.



- In the Keyboard screen, tap the Backspace key to erase the current text.
- Use the keyboard to enter the next text.
- When you have finished entering the text, tap **Done** to exit the keyboard.

To change a tolerance assignment, move to the *Tolerance* field, tap
the down arrow (*) to display a list of existing tolerances, and tap
on the new tolerance.



6. Tap **Done** to save the modifications.

Deleting a Standard

Use this function to delete a standard.



Once a standard is deleted, all batches are lost.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Standard. The Standard Management screen displays.
- The Folder field identifies the folder currently selected. To select a
 different folder, tap the down arrow (▼) to display the list of
 existing folders, and tap on the desired one. The information on the
 screen is updated to include all standards contained in the folder
 selected.
- 3. From the list of standards, tap the standard you want to delete.



- 4. Tap **Delete**. A confirmation message box is displayed.
- 5. To delete the standard, tap **OK**. Otherwise, tap **Cancel** to cancel the delete process.

Batch Management

This option is used to rename or delete batches.

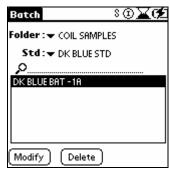


In the Datacolor CHECK PDA software, batches do not exist independently. They are always associated with a standard.

Modifying a Batch

Use the option to rename an existing batch.

1. Press the **Shift** and **Management Options** buttons on the Control Panel to display the **Management Options.** From the Management Menu, tap **Batch**. The *Batch Management* screen displays.



- 2. The *Folder* field identifies the folder currently selected. To select a different folder, tap the down arrow (**T**) to display the list of existing folders, and tap on the desired one.
- 3. The *Std* field displays the first standard in this folder. To select a different standard, tap the down arrow (▼) to display the list of existing standards, and tap on the desired one.
- 4. The batch list includes all batches associated with the standard displayed. Tap the batch you want to modify.
- 5. Tap Modify. The Modify Batch screen displays.



- 6. To edit the batch name, do the following:
 - If the flashing cursor is not shown, tap at the end of the batch name so the flashing cursor displays.
 - Press the **Shift** and **Symbol** buttons on the Control Panel to display the keyboard.



- In the Keyboard screen, tap the Backspace key to erase the current text.
- Use the keyboard to enter the next text.
- When you have finished entering the text, tap **Done** to exit the keyboard.
- Tap **OK** in the Modify Batch screen to store the change.

Deleting a Batch

Use this function to delete a batch.



Once a batch is deleted, it cannot be retrieved.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap **Batch**. The Batch Management screen displays.

2. From the list of batches shown, tap the batch you want to delete.



3. Tap Delete. A confirmation message box is displayed.



 To delete the batch, tap OK. Otherwise, tap Cancel to cancel the delete process.

Tolerance Management

Datacolor CHECK provides you the ability to establish tolerance limits using any of the color difference equations that are offered. A pass/fail tolerance sets an acceptability limit on the color difference between a standard and batch. The limit is expressed as a range (\pm) around the standard. The color difference is compared to the acceptability tolerances for that standard, and the program displays a Pass/Fail report.

Tolerance blocks are the building blocks of a tolerance. The minimum information required for the tolerance block includes:

- a color difference equation (e.g., CMC, CIEL*a*b*, etc.).
- an Illuminant/Observer combination (e.g., D65/10).
- a tolerance limit for at least one parameter defined in the equation (e.g., DE).

When additional limits on parameters, such as DL*, Da*, Db*, DC*, and DH, are added to the tolerance, the tolerance becomes more refined, and will yield instrumental pass/fail evaluations that more closely agree with your visual evaluation of the color.

Activating the Pass/Fail tolerancing feature is a 3-step process:

- First, create a tolerance block. At least one tolerance block must be created before a tolerance can be created. If your procedure includes tolerances for two Illuminant/Observer conditions, you must create two tolerance blocks.
- Second, create a tolerance by stringing together tolerance blocks.
- Third, assign the tolerance to either a standard or a folder.

In order for the batch to "pass", it must pass on every parameter included the tolerance. When you tap the Pass or Fail text on the evaluation screen, you can scroll through every tolerance block in the tolerance.



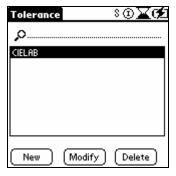
WARNING

Creating a tolerance or a tolerance block is an automatic function. When you select the New tolerance button, the tolerance record is created immediately. Although it does not contain any tolerance information, it appears on the list of tolerances until you delete it. The **Done** button serves only to store/update the custom name, and the tolerance information you have entered.

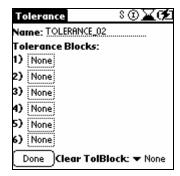
Creating Tolerances

To create a CIEL*A*B* tolerance that includes tolerances for both D65/10 and A/10, two (2) tolerance blocks need to be created.

- Create two (2) tolerance blocks, one containing the CIEL*A*B* tolerances for D65/10, and the other containing the CIEL*A*B* tolerances for A/10. Refer to "Tolerance Blocks" for instructions on creating each tolerance block.
- 2. Once the tolerance blocks are created, return to the Tolerance option (Management Menu, Tolerance menu option). The Tolerance Management screen displays.



3. Tap New. A second Tolerance screen displays.



- 4. To change the default name in the *Name* field, do the following:
 - If the flashing cursor is not shown, tap at the end of the tolerance name so the flashing cursor displays.
 - Press the **Shift and Symbol** buttons on the Control Panel to display the keyboard.

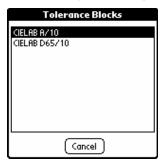


- In the Keyboard screen, tap the Backspace key to erase the current text.
- Use the keyboard to enter the next text.

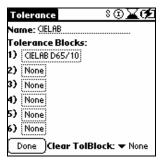
 When you have finished entering the text, tap **Done** to exit the keyboard.



- 5. To select a tolerance block, do the following:
 - In the first available field, tap None. The Tolerance Blocks screen displays containing a list of available tolerance blocks.



Touch the tolerance block you want to use—e.g., CIELAB D65.
 The screen refreshes, and the name of the tolerance block you have selected displays.



Move to Tolerance Block #2 and repeat the process to add the second tolerance block. In this example, select CIELAB A as the second tolerance block. 7. When you have selected all of the tolerance blocks to be used for the tolerance, tap **Done**.



Activating Tolerances

To activate the tolerance, it must be associated with either a standard or a folder.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. The Management Menu is displayed.
- 2. Use the **Folder Management** option to associate the tolerance with a Folder. *Refer to "Folder Management" for instructions.*
- 3. Use the **Standard Management** option to associate the tolerance with a Standard. *Refer to "Standard Management" for instructions.*

Modifying Tolerances

Use this option to change the tolerance blocks included in a tolerance.

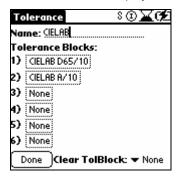


To modify the details of a particular tolerance (e.g., Min/Max range, Illuminant/Observer selection, etc.), refer to "Tolerance Block Management."

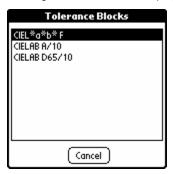
 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Tolerance. The Tolerance window displays.



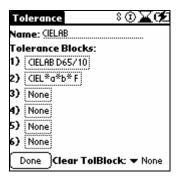
Highlight the tolerance to be edited, and tap Modify. A second Tolerance window displays.



3. Tap in the box of the tolerance block to be modified. A list of existing tolerance blocks displays.



4. Tap the name of the tolerance block to be substituted for the current tolerance block. The screen will refresh and the new tolerance block name will be displayed. In the example below, the tolerance block in #2 was changed:

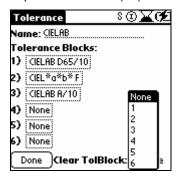


When all changes/selections have been made to the tolerance block(s), tap **Done**.

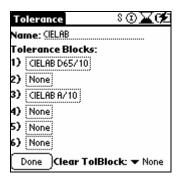
Clearing Tolerance Blocks

The Clear TolBlock option is used to remove a tolerance block from a tolerance.

1. Tap the down arrow () in the Clear TolBlock field.



2. Tap the number that identifies the tolerance block to be cleared. In the example below, *Tol Block 2* was cleared. The screen automatically refreshes, and the entry in the cleared block has changed to *None*.





Once you have cleared a tolerance block, the change is permanent regardless of whether you tap **Done**.

Deleting Tolerances

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options From the Management Menu, tap Tolerance. The Tolerance window displays.



- 2. Tap the tolerance to be deleted.
- 3. Tap **Delete**. The following screen displays:



4. Tap **OK** to delete the tolerance, or **Cancel** to cancel the action.



You cannot delete a tolerance that is associated with a folder or a standard. If you try to do this, you will receive the following message:



You must disassociate the tolerance from the folder(s) and/or standards to which it is attached. Refer to "Folder Management" and "Standard Management" for detailed instructions to enable /disable tolerances.

Tolerance Block Management

Tolerance blocks are the 'building blocks' of the tolerances you create. A tolerance block contains the numerical pass/fail tolerances for one color difference calculation, under a specific illuminant/observer condition. For example, a tolerance block may contain CIEL*a*b* tolerances on DL*, Da*, Db*, DC*, DH* and DE* for D65/10.

You can define a tolerance block for any of the equations supported. Each tolerance block has a unique name. The system assigns a default name to each block, which the user can customize. In the tolerance block option, the color space field identifies the equation, and the Illuminant field identifies the Illuminant/Observer combination to be used for the tolerance block.

You do not have to set a tolerance range for every parameter available in the color difference equation. For example, if you select CIEL*a*b* D65/10, you can assign a tolerance to DE* only. Most of the parameters request a min/max range to be defined and typically include a negative and positive value. DE, however, is always a positive value in a tolerance block.

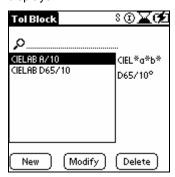


The same tolerance block can be used in more than one tolerance.

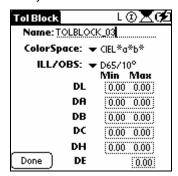
Creating Tolerance Blocks

In the steps below, two tolerance blocks are created. One is CIELAB D65/10, and the other is CIELAB A/10. The tolerance block CIEL*a*b* D65, contains a tolerance range for every CIEL*A*B* parameter under D65. The tolerance block CIELAB A/10 contains a tolerance range for every parameter under A/10.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. From the Management Menu, tap Tolerance Block. The TolBlock Management screen displays.



Tap New. A new tolerance block displays with a name assigned by the system.

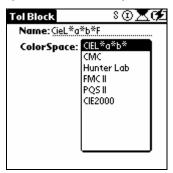


- 3. To change the default name in the *Name* field, do the following:
 - If the flashing cursor is not shown, tap at the end of the Tol Block Name field, so the flashing cursor displays.
 - Press the **Shift and Symbol** buttons on the Control Panel to display the keyboard.

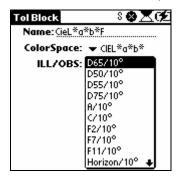


- In the Keyboard screen, tap the backspace key to erase the current text.
- Use the keyboard to enter the new name.
- When you have finished entering the text, tap **Done** to exit the keyboard.

4. In the *ColorSpace* field, tap the down arrow (▼) to display the color space choices, and tap CIEL*a*b*.

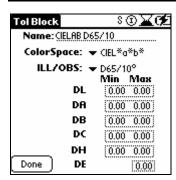


5. In the *Illuminants* field, tap the down arrow (▼) to display the Illuminant/Observer choices, and tap **D65/10**.

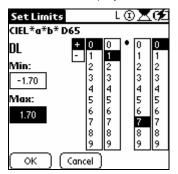




To move down the list of choices, tap the down arrow (\P) to scroll through the list.



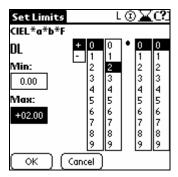
Tap in the *Min/Max* field for the parameter to be defined. The Set Limits screen displays.



- In the *Min* field, tap in the box to highlight it.
- Touch the minus (-) sign symbol in the first column.
- In the other four columns, tap in each column to select a value from 00.01 – 99.99. In the example below, 0 is already selected in the first column. In the second column, tap 2. In the third column, tap 0. In the forth column, tap 0. The minimum difference you have set for DL is –2.00.



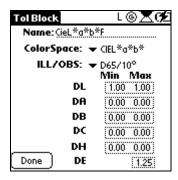
- 7. To specify the maximum difference, do the following:
 - In the Max field, tap in the box to highlight it.
 - Touch the plus (+) sign symbol in the first column.
 - In the other four columns, you select a value from 00.01 99.99. Tap in each column to select the maximum difference for DL. In the example below 0 is already selected in the first column. In the second column, tap 2. In the third column, tap 0. In the forth column, tap 0. The maximum difference you have set for DL is +2.00.



- 8. Tap **OK**. The TolBlock screen displays. Repeat this procedure for each parameter you want to include in the tolerance block.
- When you have input the parameters for this tolerance block, tap Done



Make sure you assign the correct sign to the *Min* and *Max* values for an individual parameter. The program allows you to select the same value for both the minimum and maximum limit for an individual parameter. For example, it will accept the value of +1.0, +1.0 for the L value (see the example, below).



However, because there is no difference between the *Min* and *Max* value for "L", the program will not use this parameter when running a Pass/Fail evaluation. When you inspect the tolerance by tapping the "Pass/Fail" instruction on the evaluation window, the "L" tolerances shown in this example will not be displayed, and are not considered in the "Pass/Fail" decision.

- To create the tolerance block for CIEL*A*B* A, repeat the entire procedure.
- 11. When the tolerance blocks are defined, tap **Done**.

Once a tolerance block has been defined, you can create a tolerance. Go to the tolerance screen, and follow the directions for creating a tolerance. Refer to "Management Options, Tolerance Management" for detailed instructions to create a tolerance.



Most of the parameters request a min/max range to be defined, and typically include a negative and positive value. However, there are situations in which a tolerance range will include 2 positive or 2 negative values. For example, you may have a requirement that the batch can always be lighter than the standard, but never darker. In this example, 2 positive numbers would define the acceptability range for DL.

Modifying Tolerance Blocks

Use this option to adjust any of the tolerance parameters, and to make other changes to existing tolerance blocks.



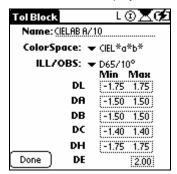
NOTE

The modifications made are applied to every tolerance using the tolerance block.

Press the **Shift** and **Management Options** buttons on the Control Panel to display the **Management Options.** From the Management Menu, tap Tolerance Block. The TolBlock screen displays.



2. Highlight the tolerance to be edited, and tap **Modify**. A second TolBlock screen displays.

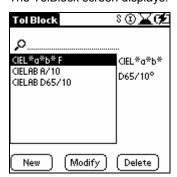


- 3. Tap in the box of the parameter to be changed. Make the desired changes/selections, referring to the instructions under the previous section entitled, "Creating Tolerance Blocks."
- 4. When all changes/selections have been made to the tolerance block, tap **Done**.

Deleting Tolerance Blocks

Use this option to delete tolerance blocks from the system.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. Tap Tolerance Block. The TolBlock screen displays.



Highlight the tolerance block and tap **Delete**. A confirmation message displays.



 Tap **OK** to delete the tolerance block, or **Cancel** to cancel the function.



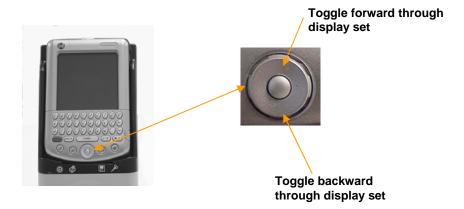
You cannot delete a tolerance block if it is being used in ANY tolerance. If the tolerance block is in use and you try to delete it, you will receive the message shown. In order to delete this tolerance block, you must return to Tolerance Management, and delete it from each tolerance that is using it.



Display Set Management

Use this function to create, modify or delete a display set. A display set is a preprogrammed sequence of evaluation screens that are usually viewed in the same order.

For example, you may run two color difference evaluations, CIEL*a*b* and CMC for every sample. You can create a display set that includes both of these evaluation screens, and select it as the active display set. After measuring a standard and batch, you can cycle through this set of screens simply by pressing the top and bottom sections of the **Display Set Control/Last Active Evaluation** button on the Control Panel.



This feature can speed routine color evaluations, and can reduce any user errors, since the user is not required to select the evaluation or the Illuminant/Observer condition to be used.

At any point in the sequence, you can interrupt the preprogrammed set by changing a selection on the evaluation display. For example, you can change the Illuminant/Observer selection simply by tapping the drop-down arrow () for that field, and making a new selection. The evaluation is immediately updated to reflect the change. Any changes to the evaluation made "on the fly" are temporary, and the user can resume running the display set sequence simply by pressing the up/down button on the Control Panel.



The system requires that at least one Display Set exists on the unit. The Display Set Management feature WILL NOT let you delete the last display set on the system.

Creating a New Display Set

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options. Tap Display Set. The Display Set screen displays, containing a list of all existing display sets.



Tap New. A second Display Set screen displays. It shows a list of the screens included in the selected display set:

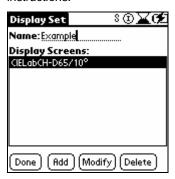


- 3. To change the default name in the *Name* field, do the following:
 - If the flashing cursor is not shown, tap at the end of the display set name so the flashing cursor displays.
 - Press the **Shift** and **Symbol** buttons on the Control Panel to display the keyboard.



- In the Keyboard screen, tap the backspace key to erase the current text.
- Use the keyboard to enter the next text.

- When you have finished entering the text, tap **Done** to exit the keyboard.
- In the Display Screens box, a list of screens currently included in the display set is shown. You can add, modify, or delete the items in this list. Refer to the sections Adding New Screens to a Display Set and Modifying Display Set Screens, below for detailed instructions.





Every display set must contain at least one evaluation screen. The default screen included in every new display set is *CIElabCH-D65/10*. Once a second screen is added, you can delete this screen.

Modifying the Screens for a Display Set

Use this function to modify the existing screens in a particular display set. This includes changing the order of the screens, adding screens, or deleting screens from a set.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. Tap Display Set. The Display Set management screen displays.
- From the list of existing display sets, highlight the one you want to modify.



3. Tap Modify. The Display Set screen displays.



- 4. Highlight the screen to be modified, and tap Modify.
- 5. Change the *Display* and/or *Illuminant/Observer* selections.

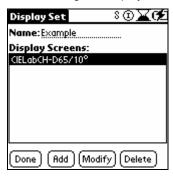


- Tap on the down arrow (*) to view the choices.
- Tap on the selection to be substituted.
- When you have finished, tap OK.
- 6. Repeat this procedure for all of the screens to be modified.
- Tap **Done** to execute all of the changes that you have made to the display set.

Adding New Screens to a Display Set

Use this function to create a new display set, and to add new display screens to an existing display set.

1. While viewing the Display Set screen, tap Add.



The Display Screen displays.



2. In the *Display* field, tap the down arrow (▼) and tap on the desired evaluation screen.



- In the III/Obs field, tap the down arrow (▼) and tap on the desired illuminant.
- 4. To move down the list of choices, tap the down arrow (♣) to scroll through the list.



5. When all selections are made, tap **OK**. The Display Set screen displays and includes the new screens.

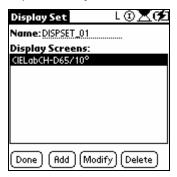


- 6. Repeat this procedure to add more screens.
- 7. Tap **Done** to execute the changes to the display set.

Deleting Display Set Screens

Use this function to delete individual screens included in a display set.

1. Tap the **Modify** button on the Display Set screen.



2. A list of all of the screens in the set displays:



3. Highlight the screen to be removed, and tap **Delete**.



4. In the confirmation message box, tap **OK** to delete the display set. Otherwise, tap **Cancel** to cancel the delete process.

5. When you select **Delete**, the list of screens in the display set will be updated to reflect the changes you have made.



6. Tap **Done** to complete the edit.

Deleting an Existing Display Set

Use this function to delete an entire display set.

- Press the Shift and Management Options buttons on the Control Panel to display the Management Options. Tap Display Set. The Display Set Management screen displays.
- 2. From the list of existing display sets, highlight the set you want to delete.



3. Tap Delete.



4. In the confirmation message screen, tap **OK** to delete the display set. Otherwise, tap **Cancel** to cancel the delete process. When you return to the Display Set screen, the display set name no longer displays in the list.



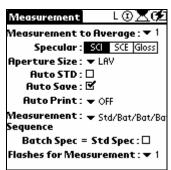
Once a display set has been deleted, it cannot be retrieved.

The software requires one display set to be stored. You cannot delete the last display set on the unit.

Measurement Setup

This option controls the selection of various features related to sample measurements, including the aperture selection, specular port selection, etc.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options menu. Tap Measurement. The Measurement screen displays.



Measurement to Average

The software can collect several reads for a single sample and average them. This feature is used when the surface of the sample being measured is not uniform (i.e., textiles, textured paint, embossed surfaces, etc.).

You can average a maximum of 9 reads to create a single spectral curve for a sample. Tap the down arrow (*) and select the number of reads to be included in the average measurement.

Specular

This option controls the position of the specular port when samples are measured. The position of the port (open or closed) changes the spectral data significantly.

- SCI (Specular Included). When this position is selected, the specular port is closed, and the measurement data includes the specular (gloss) component.
- SCE (Specular Excluded). The specular port is opened, and the measurement data excludes the specular (gloss) component. Typically, the specular condition is the same for a standard and batch being compared to one another.
- Gloss. When this condition is selected, two measurements (SCI and SCE) are made and stored for each sample. This provides the ability to calculate a color difference from measurement data corrected for gloss differences. For samples measured using this mode, the system can also determine the gloss value. There are several software settings that must be selected in order to properly enable this feature. Refer to "Other Options, Gloss Compensation" for a detailed explanation of the gloss compensation feature.

Tap in the box to select the desired specular port configuration.

Aperture Size

This option reports the aperture condition currently selected. For single aperture units, only one choice is available. For dual aperture units, two positions are available. The selection here matches the aperture icon displayed at the top of the screen.

 Tap the down arrow (▼) and select from the available aperture settings.



This option DOES NOT automatically set the aperture switch on the unit. It confirms the current setting of the switch.

Auto Std

When this option is enabled, the user measures a batch, and the program selects the standard closest to that batch from the folder. *Refer to "Other Options, Auto Std" for detailed instructions on using this feature.*

Auto Save

When this option is enabled, every measurement made with the instrument is stored. The default setting for Auto Save is **On**.

 When it is disabled, you must press the Manual Save button on the Control Panel to save the current standard. If you do not do this, the standard and batch measurements will be lost when a new standard is selected or measured.

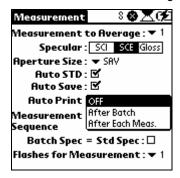


Batches are always attached to a standard. Once a standard has been stored, all batches subsequently measured for the standard will automatically be stored, regardless of whether *Auto Save* is enabled or disabled in the future.

To enable this option, tap in the checkbox so a checkmark displays.
 To disable this option, tap in the checkbox so the checkmark no longer shows.

Auto Print

If you are using a printer, you can set up the system to automatically print the results. There are 3 settings:



OFF. Auto Print is disabled.

After Batch. Results are printed after each batch measurement.

After Each Meas. Results are printed after each measurement.

Measurement Sequence

The *Measurement Sequence* identifies the work routine you are using. You can measure a sample from any point in the program simply by pressing the **Measure** button on the back of the instrument. The program needs to know whether the sample measured is a standard or a batch. When the user does not identify the sample type prior to measurement (e.g., pressing either the **Store Standard** or **Store Batch** button on the Control Panel), the selection made here determines the sample type assigned to the measurement (e.g., Std or Bat).

An icon is displayed in the lower right corner of the evaluation display, that identifies the next sample type to be measured.



A **Target** indicates the next sample in the sequence is a Standard.

A **Dart** indicates the next sample is a batch.

Available Measurement Sequences

The following measurement sequences are available:

- STD/STD/STD. All measurements are labeled "Standards".
- STD/BAT/BAT/BAT. First measurement is a "Standard". All remaining measurements are "Batches", until the operator overrides the sample assignment (see below).
- STD/BAT/STD/BAT. The sample type alternates between "standard" and "batch".

Tap the down arrow (*****) and select from the measurement sequences available.

TIP

The user can override the measurement sequence at any time.

Procedure to Override the Measurement Sequence

Assigning Sample Type "Standard". To override the measurement sequence and assign the sample type "standard", press the Measure Standard button on the Control Panel. The Standard screen displays. You can then press the Measure button.



You can enter a custom name from the keyboard before starting the measurement If you do not enter a name, the sample is autonamed as Std

Assigning Sample Type "Batch". To override the measurement sequence and assign the sample type "batch", press the Measure Batch button on the Control Panel. The Batch screen displays. You can then press the Measure button.



III NOTE

You can enter a custom name from the keyboard before starting the measurement If you do not enter a name, the sample is autonamed as Batch n.

Whenever you override the measurement sequence, the system resumes the current measurement sequence for the next measurement. For example, if the sequence is 'Std-Std-Std', and you have pressed the **Measure Batch** button, the next sample is a batch. However, if you then press the **Measure** button again, the following sample is a standard, and the measurement sequence resumes.

Batch Spec = Std Spec

This option forces the specular port position for the batch to be the same as that for the standard, regardless of the specular port selection currently selected/displayed.



Changing the position of the port (Included vs. Excluded) significantly changes the reflectance measurement. When this option is enabled, it is IMPOSSIBLE for the user to compare measurements of a standard and batch that do not have the same specular port setting.

The default setting for this feature is 'Off'.

- To enable this option, tap in the checkbox so a checkmark displays.
- To disable this option, tap in the box so the checkmark no longer shows.

Flashes for Measurement

This option controls the number of times the lamp flashes for a single measurement. Using multiple flashes enhances the illumination of the sample, and is typically used when measuring dark samples. The default setting is 1, and the maximum number of flashes/measurement is 9. Tap the down arrow (\P) and select the number of flashes to use.

Search By Name

This feature allows you to find all samples containing a similar group of characters in the name. It searches the entire Datacolor CHECK database, not simply a single folder.

To run this feature, do the following:

 Press the Shift and Management Options buttons on the Control Panel to display the Management Options Tap Management Options, Search by Name. The Search By Name screen displays.



Search Input

The cursor is flashing in the standard name field when the screen displays. Using the keyboard, enter part/all of a sample name. The program recognizes both alpha and numeric input.

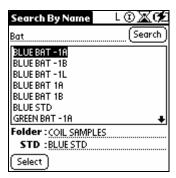
 To activate the keyboard, tap the Shift and Symbol buttons on the Control Panel.



- Tap the 123 icon to access number input. When finished, tap Done. The Search by Name screen re-displays.
- 3. Tap **Search** to execute the search.

Search Results

When the search is completed, the program will display a maximum of 20 names.



- **Folder**. This field identifies the folder containing the highlighted sample.
- STD. Batches cannot exist independently in the Datacolor CHECK database. All batches are associated with a standard. If the highlighted sample is a batch, this field identifies the standard with which it is associated.
- Select. Tap to select the highlighted sample. The screen will refresh and the evaluation will be displayed using the sample highlighted.

Search for Closest Std

This feature allows you to select a standard, and searches through all standards in the Datacolor CHECK database to find the colors closest to it. When you are matching colors visually, this feature can be extremely helpful in finding a formula to match a new color. If the system finds a color that is "close enough" to the new standard, you can look up the formula used to match the existing color and use it as a starting point for the new formula.

You can define the target sample three ways:

- · measuring a sample
- retrieving a sample from a folder
- entering CIEL*a*b* values from the keyboard.

You also have the option to limit the number of samples displayed from 5-25.



The Search feature only considers CIEL*a*b* color differences, under the Illuminant/Observer combination D65/10°.

Search Input

This feature requires you to define the target sample, and the number of samples to be displayed for the result.

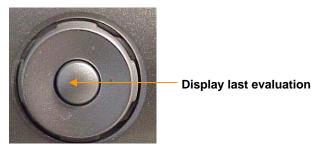
Defining Target Sample

The target color can be defined by measuring a sample, entering CIEL*a*b* values from the keyboard, or retrieving a sample previously stored.

Use Current Std/Bat. Tap on Std to use the current standard or Bat to use the current batch as the target color. The LAB values for the sample you have selected will be displayed.

Measure Target Sample. To search for the closest match to a physical sample, you must measure the sample using the following procedure:

Tap the inside ring of the Display Set Control/Last Active Evaluation button on the Control Panel, to display the last evaluation.



The Evaluation screen displays.

- Press either the Measure/Select Batch button on the Control Panel. The screen refreshes, and the new batch will be displayed on the evaluation screen.
- Press the Shift and Management Options buttons to display the Management Menu.
- 4. Tap Search for Closest Standard.
- 5. In the Use current: field, tap Batch.
- 6. Tap **Search**. When the search is completed, the names of the closest samples found will be displayed on the screen.

Retrieve Target Sample. If you want to use a stored sample as the target sample, you must retrieve it from a folder using the following procedure:

- 1. Return to the active evaluation.
- 2. Select the sample from the appropriate folder to retrieve it. You can retrieve either a standard or a batch. The screen will refresh, and the new sample will be displayed on the evaluation screen.
- 3. Press the **Shift** and **Management** Options buttons to display the Management Menu. Tap **Search for Closest Standard**.
- 4. In the *Use current* field, tap **Std** if you retrieved a standard, or **Batch** if you retrieved a batch.
- 5. Tap **Search**. When the search is completed, the names of the closest samples found will be displayed on the screen.

Keyboard Target Values. This option is used to enter CIEL*a*b* values to define the target sample.



NOTE

The system assumes the values are based on the Illuminant/ Observer condition D65/10.

 Press the Shift and Management Options buttons to display the Management Menu. Tap Search for Closest Standard.



 Tap in the field next to the "L", and the cursor will start flashing. Press the **Shift** and **Symbol** buttons on the Control Panel. The keyboard displays.



3. Enter the correct L value. Tap **Done.** The keyboard screen will close, and the L value will appear in the L field.



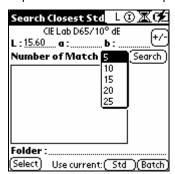
4. To change the sign of the L value, tap the **Sign icon**.

- Repeat this procedure to enter the "a" and "b" values for the target.
- When you have defined the target color, tap **Search** to execute the Search. When the search is completed, the names of the closest samples found will be displayed on the screen.

Number of Matches

This field indicates the number of samples you want to be displayed for the search.

Tap on the down arrow to display the choices:



2. Tap to select the number of samples to be displayed for the search.

Executing the Search

When you have made all of the necessary selections, tap **Search**. The program searches every standard stored in the system and displays the closest matches it finds.



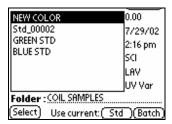
There is no color difference limit applied to the closest sample. The closest sample will be at the top of the list, regardless of the color difference from the target sample. In the case of a sample retrieved as the target, the sample itself will also appear in the list as the closest match to the target.

Search Results

1. When the search is finished, the results are displayed:



2. The names of the samples appear in the box. The top sample will always be highlighted.



Results Summary

0.00. The CIELab color difference between the target color and the highlighted sample. The data below the color difference are details about the sample measurement.

7/29/02. Date of the sample measurement.

2:16 pm. Time of the measurement.

SCI. Specular port selection (Specular Component Included).

LAV. Aperture/lens position used for the measurement.

UV Var. Setting for the adjustable UV filter. This will always be \it{UV} \it{Var} , except for Datacolor CHECK^{PRO} units.

Folder. The folder in which the highlighted sample is stored.

Select. The highlighted sample will be substituted into the current color evaluation.

Use Current. The active evaluation typically requires a standard and batch. You must identify which sample to retain from the current evaluation.

- Std. The current standard will be used, and the sample selected from this screen will be become the batch in the evaluation.
- Batch. The current batch will be used, and the sample selected from this screen will become the standard in the evaluation.
- 3. To highlight a different sample, simply tap the sample name. The color difference and measurement details on the right will change to correspond to the sample that has been highlighted.
- 4. To see the color evaluation based on one of the search results, tap Select. The last active evaluation screen displays, using the data from the highlighted sample.



Print Screen

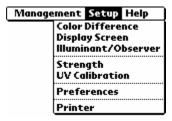
This feature activates the print function. The last active evaluation screen will be printed.

Setup Menu

This group of options controls hardware and software settings. This includes color difference selections, screen selections, and strength setup. It also provides access to the UV calibration options.

To access this menu, do the following:

 Press the Shift and Management Options button on the Control Panel to display the Management Options. Tap, Setup. The Setup Menu displays.



Below are detailed explanations of each feature on the Setup Menu.

Color Difference Setup

This option controls the factors used for CMC and CIE 2000 color difference calculations. It included selections to enable the gloss compensation and strength adjustment options

 From the Setup Menu, tap Color Difference. The Color Difference Setup screen displays.



CMC Color Difference

This option sets the I and c values to be used in the CMC equation. The default values are: L = 2.0 and c = 1.0.

- Tap in the field to be edited. For this example, the CMC "I:" value is selected.
- 2. In the Value screen, do the following:
 - Tap in the desired field to highlight it.
 - Tap the up/down arrows until the appropriate value is shown.



- Repeat the above procedure to change the value for any fields included on this screen.
- 4. Tap **OK**.

CIE 2000 Color Difference

This option sets the KI, Kc and Kh values to be used in the CIE 2000 color difference equation. The default values are 1.0 for each factor.

Refer to "CMC Color Difference" for instructions to change the factors used.



CIE 2000 is only available with Datacolor CHECK^{PLUS}™ and Datacolor CHECK^{PRO}. If you are using the Datacolor CHECK, this option will not appear in the *Color Difference Setup* screen.

Use Gloss Compensation

This product includes two evaluations related to gloss:

- Gloss Compensation. When enabled, this feature takes into account gloss differences between samples when calculating all color evaluations.
- Gloss Determination. The instrument can be used as a gloss meter to report the gloss of the samples. You must select the gloss geometry to be used.



 To enable Use Gloss Compensation, tap in the box. A checkmark displays:



Gloss Geometry

When samples are measured using the *Gloss* measurement condition, gloss values are calculated and displayed for the samples measured. Gloss values are associated with a specific gloss meter geometry that is defined in this field. Since gloss values change based on the geometry selected, the user must verify the gloss geometry selected.

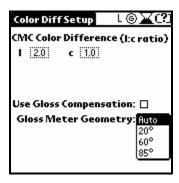


The Gloss Value screen can be displayed regardless of whether the gloss compensation option is enabled or disabled. However, if the active samples were not measured using the Gloss measurement condition, no gloss values will appear in the gloss fields:



To change the gloss geometry selection:

 Tap the down arrow in the Gloss Meter Geometry field to view the choices:



- **20°.** Gloss values are based on 20° geometry.
- 60°. Gloss values are based on 60° geometry. (This is the default geometry used.)
- 85°. Gloss values are based on 85° geometry.

- Auto. The program will determine the gloss geometry to be used, based on the sample measurements and the following quidelines:
 - 20° geometry is used when the sample gloss measures >70 using 60° geometry.
 - 85° geometry is used when the sample gloss measures
 10 using 60° geometry.
 - 60° geometry is used for all other cases.



Refer to "Other Options, Gloss Compensation" for a detailed explanation of the gloss compensation option. There are several conditions that must be fulfilled in order to use these options properly.

Apply Strength

This is a configuration option for the Strength evaluation, a feature used to evaluate the lot-to-lot consistency of incoming raw materials. *Refer to Other Options, Strength for a detailed discussion of sample preparation and procedures to be used for evaluating colorant strength.*

When evaluating the color difference between lots of colorant, it is useful to know the color difference between the samples both "before" and "after" a strength adjustment is made. The program has the ability to adjust the batch measurement for strength differences, and calculate the color difference that would exist if the strength adjustment were made. Below is an example of a strength evaluation.





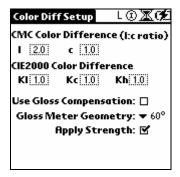
When the Apply Strength feature is enabled, the "adjusted" batch curve is used for all remaining evaluations made with the batch sample.

The batch measurement stored in the system is always the *unadjusted measurement*, regardless of whether this option is enabled.

When this option is disabled, the color difference between the "as Is' and "adjusted" samples are still reported. However, the measured batch curve is used for all other evaluations made using the batch sample.

To enable Strength Adjustment, do the following:

• Tap in the Apply Strength box. A checkmark displays.



 To disable the option, tap in the box again, and the check will disappear.

When this feature is enabled, the set displays at the bottom of the evaluation screen as a reminder that the batch data has been adjusted:

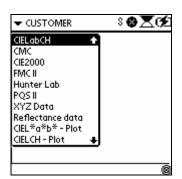




When CIE X, CIE Y or CIE Z is selected as the basis of the strength evaluation, and the Strength Adjustment feature is enabled, the illuminant selection on this screen is used to calculate the adjusted batch measurement. Refer to "Setup Menu, Strength Setup, Evaluation Type" for an explanation of the basis for comparison.

Display Screen Setup

Datacolor CHECK offers up to 29 quality control evaluation options, to cover the requirements of many industries. When the instrument leaves the factory, all of the evaluations available for the model are enabled. This option is used to enable/disable the display of individual evaluations. We strongly recommend that you disable all of the options that you do not use. This will reduce the choices that appear on the evaluation screen, and will help you to make quick and accurate selections.

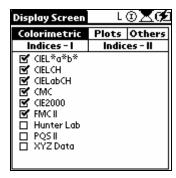




In the previous examples, the screen on the right contains a more manageable list of choices for the user to consider.

To enable/disable evaluation screens, do the following:

 Press the Shift and Management Options button on the Control Panel. The Management menus will display. Tap Setup Menu, Display Screen. The following screen displays:



The evaluations are divided into four (4) categories:

- Colorimetric. This tab contains all of the color difference and color coordinate evaluations.
- Plots. This tab contains all of the plot selections.
- Indices I and II. This tab contains all gray scales, whiteness and yellowness indices, as well as contrast ratio and optical density.
- Others. Contains evaluation options that do not fall into the other three (3) categories. This group includes the gloss value screen.
- A check in the box next to an option enables the option. Tap the appropriate box to add/remove a check mark.
- 3. Repeat the above procedure as required.
- 4. Tap **OK** when finished.

When an evaluation is enabled, it displays in the drop-down list on the main evaluation screen, and in the list of screens that appear in display set maintenance.

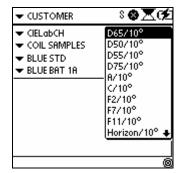


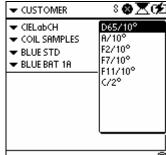
Any evaluation option that is disabled will **not** be available for use in creating a display set. However, if an evaluation screen is included in a display set and later disabled, it will continue to appear in the display set sequence.

Illuminant/Observer Setup

Datacolor CHECK offers 22 Illuminant/Observer conditions to cover the requirements of many industries. When the instrument leaves the factory, all of the Illuminant/Observer conditions are enabled. This option is used to enable/disable these options. We strongly recommend that you disable all of the options that you will not use. This will reduce the choice of options that display on the evaluation screen, and will help you to make quick and accurate selections.

112 • Setup Menu Datacolor CHECK™

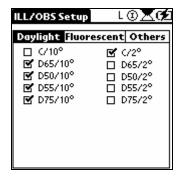




In the above examples, the screen on the right contains a more manageable list of choices for the user to consider.

To enable/disable Illuminant/Observer choices, do the following:

 Press the Shift and Management Options button on the Control Panel. The Management menus will display. Tap Setup Menu, Illuminant/Observer. The ILL/OBS Setup screen displays.



The evaluation screens are divided into three (3) Illuminant groups. Each Illuminant is combined with both 1964 (10°) and 1931 (2°) Standard Observer data.

- Daylight. This tab contains the daylight Illuminant/Observer combinations included in the Datacolor CHECK software.
- Fluorescent. This tab contains the fluorescent Illuminant/Observer combinations included.
- Others. Contains Illuminant/Observer combinations that do not fall into the other two categories. It includes Illuminant A, Horizon and Ultralume combinations. A check in the box next to an option enables the option. Tap the appropriate box to add/remove a check mark.
- 2. A check in the box next to an option enables the option. Tap the appropriate box to add/remove a check mark.

- 3. Repeat the above procedure as required.
- Tap **OK** when finished. When an Illuminant/Observer selection is enabled, it displays in the drop-down list on the main evaluation screen, and in the list of Illuminant/Observer selections that displays in display set maintenance.



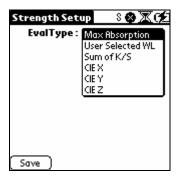
Any Illuminant/Observer selection that is disabled will **not** be available for use in creating a display set. However, if an Illuminant/Observer is included in a display set and later disabled, it will continue to be displayed in the display set sequence.

Strength Setup

This option includes settings that are used for the strength evaluation. They include the type of evaluation to use, the Illuminant/Observer and color space equation, correction values, and wavelengths to exclude from the evaluation. Refer to Other Options, Strength for a detailed discussion of sample preparation and procedures to be used for evaluating colorant strength.



Datacolor CHECK includes the following strength evaluations:



Evaluation Type

There are several different methods used to evaluate strength. Once selected, you should use the same method for future evaluations to create a valid history of the raw materials you are using.

EVALUATION TYPE	DESCRIPTION
Maximum Absorption	The evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. This is the wavelength with the lowest %R value (the highest K/S value), which identifies the area of the spectrum where the colorant absorbs the most light. The wavelength selection is made by the program, and is based on the reflectance curve of the standard. This is one of the most common methods used for strength comparisons.
User Selected WL	This method is also based on a single wavelength. When selected, the user determines the wavelength to be used for evaluation.
Sum of K/S	This method calculates strength based on the sum of the K/S values across the visible spectrum.
CIE X, CIE Y, CIE Z	This method calculates the strength by using a single tristimulus value (X, Y or Z) for the standard and batch. This method is often used when trying to compare the strength of similar, but not identical, materials. Colorimeters can only report tristimulus values, and this method is used when a
	history of strength evaluations generated from colorimeters has been collected for a colorant.
	The tristimulus value used in the evaluation should correspond to the band of the spectrum where the colorant has the greatest absorption. Typically, you would use X to evaluate blues and greens, Y to evaluate reds, and Z to evaluate yellows and some oranges.

EVALUATION TYPE DESCRIPTION



iii NOTE

Colorimetric data is specific for an Illuminant/Observer condition. You should verify that the Illuminant/Observer condition you are using matches the conditions used to collect comparable strength data from a colorimeter.

Color Space

A color difference calculation is included in the strength evaluation. You must select which color difference equation is to be used.

Illuminant

When CIE X, CIE Y or CIE Z is selected as the basis of the strength evaluation, and the Strength Adjustment feature is enabled, the illuminant selection on this screen is used to calculate the adjusted batch measurement. This is **not** the Illuminant/Observer condition used to calculate the color difference between the 'as is' and 'adjusted' batch. Refer to "Setup Menu, Color Difference Setup, Apply Strength" for an explanation of the Strength Adjustment feature.

Specular Ref

A factor used in an equation that adjusts the spectral data for index of refraction differences. The correction value for specular reflection represents the amount of light that is reflected at the sample surface and never penetrates the sample.

- For resin systems most commonly used in paint and plastics applications, a value of 4.0 may be used. This is true for both opaque systems and for translucent plastics measured using reflectance measurements.
- For evaluating dyes on a substrate (reflectance mode), a value of 0 is recommended.

Internal Ref

A factor used in an equation that adjusts for index of refraction differences. The correction value for internal reflection represents the amount of light that is scattered inside the sample and never emerges.

- For opaque paint and plastics applications using reflectance measurements, a value of 60.0 may be used.
- For dyes on a substrate, a value of 0 is recommended

Fixed Adj

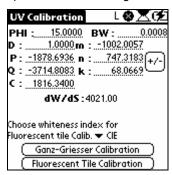
In addition to determining the batch strength, the program can adjust the batch measurement to represent the strength of the standard. Sometimes it is not possible or practical to adjust the strength of the batch to 100% of the standard. When this occurs you can enter a number less than 100%. The program will project the color difference between the samples, when the batch is adjusted to a value other than 100%. Enter a number representing the target strength you want to use as the basis for a strength adjustment.

Wavelengths to Omit

This option allows you to omit specified wavelengths for use in the strength calculation. For example, in pigment applications in which the samples are mixtures of colorant and white, the maximum absorption wavelength may occur at 400 nm. In this case, the absorption is due to the white pigment, not the colorant. For this situation, the evaluation of the strength of this colorant at 400nm is not valid. Enter the wavelengths to be omitted from this calculation. You can identify a maximum of four (4) wavelengths to be excluded.

UV Calibration

This selection provides access to the software options needed to calibrate the adjustable UV filter position. This includes options for storing/changing instrument-specific values, performing the UV calibration, and includes the option used for the original UV filter calibration.



- Ganz-Griesser Constants. These constants (PHI, BW, D, etc.) are the values displayed in the top half of the screen. They are generated before the instrument leaves the factory.
- Ganz-Griesser Calibration. This option is used to regenerate the Ganz-Griesser constants for the instrument. Standards of known Ganz whiteness are required to run this feature.

Fluorescent Tile Calibration. This option is used to adjust the UV filter position to account for changes in the instrument. It should be run on a weekly basis. You have a choice to use either the CIE Whiteness scale or Ganz Whiteness scale for this calibration.

TIPS

Refer to Other Options, UV Calibration and Whiteness Options in this guide for a detailed discussion of the adjustable UV filter, and the software options that are used with it.

Ganz-Griesser Setup

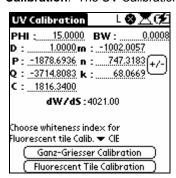
This screen is used to display and edit the Ganz-Griesser parameters used by the system. These are instrument-specific constants that are used to calculate Ganz-Griesser Whiteness.



You should verify the Ganz-Griesser factors the program is using. These values are displayed on the Ganz-Griesser Setup screen, and printed on the certificate provided with the instrument. If these factors are not identical, you must input the values from the certificate.

To access this option, do the following:

 Press the Shift and Management Options button on the Control Panel. The Management menus will display. Tap Setup Menu, UV Calibration. The UV Calibration screen displays.



Ganz-Griesser Instrument-Specific Calibration Values

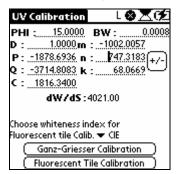
Nine (9) instrument-specific factors are used to calculate whiteness values when Ganz-Griesser Whiteness is used. These values are provided on a certificate provided with a Datacolor CHECK^{PRO}, and are entered into the program before the instrument leaves the factory. However, if they are lost or corrupted, you can re-enter the values from the PDA keyboard or graffiti pad.



These values are only applied to the Ganz-Griesser fluorescent tile calibration.

To change any of these values, do the following:

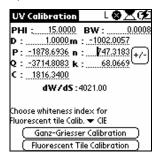
1. Tap on the value you want to edit. The cursor will start flashing.



 Tap the Shift and Symbol buttons on the Control Panel. The keyboard displays. Tap the 123 icon. The number pad displays. Tap in the correct values for the field you have selected.



3. Tap **Done**. The UV Calibration screen is still displayed.



If the value should be negative, tap the **Sign icon** + on the screen to change the sign.



Repeat this procedure for each value.



Refer to Other Options, UV Calibration and Whiteness Options for a detailed discussion of the adjustable UV filter, and the software options that are used with it.

Ganz-Griesser Calibration

This option is used when you choose to perform the original instrument calibration yourself, using standards of known whiteness and tint value, such as Hohenstein textile standards or CIBA plastic standards. It calculates the instrument-specific parameters used for the Ganz whiteness evaluation.



If you have a UV-enhanced instrument supplied by Datacolor, this step will have been done at the factory, and you will not need to perform it again. The data is provided on the Instrument Ultra Violet Calibration data sheet.

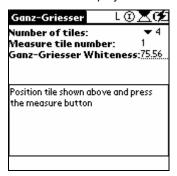
WARNING

This calibration option is based on standards of known whiteness and tint. You must use either Hohenstein textile standards, Ciba plastic standards or other recognized standards to perform this calibration.

- Obtain a set of samples of known whiteness and tint (typically either a current set of Hohenstein textile transfer standards or Ciba plastic transfer standards). You must use a minimum of 3 samples and a maximum of 12 samples.
- 2. If this is the first time that you are doing a Ganz-Griesser calibration, verify that the UV filter is set to the position indicated on the certificate. Use the Allen Key to adjust the filter position. Refer to "Other Options, UV Calibration and Whiteness Options,

Fluorescent Tile Calibration, Adjusting the UV Filter" for detailed instructions to read the UV filter scale and adjust the filter position.

- 3. Calibrate the instrument using the standard calibration.
- 4. To access this option, press the Shift and Management Options button on the Control Panel. The Management Menus will display. Tap Setup, UV Calibration, Ganz-Griesser Calibration. The screen below displays:



5. In the *Number of Tiles* field, tap the down arrow and select the number of samples you will be measuring.





You must have a minimum of 3 standards to complete this procedure.

6. The value in the *Ganz-Griesser Whiteness* field should match the value for the sample you are measuring.



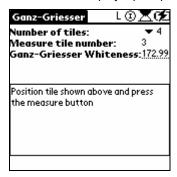
- 7. To change this value, tap in the Ganz-Griesser Whiteness field. The cursor will begin flashing.
- 8. Press the **Shift and Symbol** buttons on the Control Panel to display the keyboard. Then tap the **123 icon** to display the numeric keyboard:



Using the keyboard, enter the correct values, and then tap **Done.** The screen below displays:



10. Place the tile at the instrument port, and press the **Measure** button on the back of the unit. When the measurement is complete, the screen below displays, prompting you for the next standard.



- 11. Verify that the correct *Ganz-Griesser Whiteness* value for the next sample is entered. If it is not, edit the value. Place the next standard at the instrument port, and press the **Measure** button. The screen will refresh and prompt you for the next standard.
- 12. Repeat this process until you have measured all of the standards in the set. When you are finished the screen below displays:



 If the values are outside the acceptable limits, only the Recalibrate button displays. Tap Recalibrate. You will receive an instruction regarding the direction to turn the screw controlling the position of the filter. Make the adjustment and repeat the measurement of all of the samples.





When you recalibrate, the program prompts you for the standards *in the reverse order*. In the example above, the recalibration sequence starts with sample #4, not sample #1.

 When the Calculated dW/dS is within acceptability limits, an Accept button displays at the bottom of the screen. Tap Accept to complete the calibration.

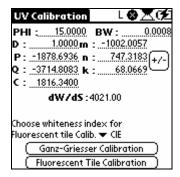


Whiteness Index for Fluorescent Tile Calibration

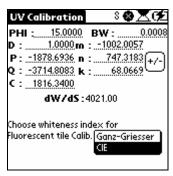
You can use either the CIE Whiteness scale or the Ganz Whiteness scale to run the weekly fluorescent tile calibration.

To select the calibration procedure:

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup Menu, UV Calibration. The UV Calibration screen displays.



2. Tap the down arrow in *Choose whiteness index for Fluorescent tile calibration* field. The choices below appear:



3. Tap on the Whiteness scale to use.

Whiteness Scale for UV Filter Calibration

The UV filter calibration performed at the factory uses standards of known Ganz Whiteness value, rather than standards of known CIE Whiteness value. Once this calibration procedure is successfully completed, the fluorescent tile used in the weekly calibration procedure is measured. Both Ganz Whiteness and CIE Whiteness values are calculated for the tile, and provided on the certificate included with the instrument.

It is important to understand that while a CIE Whiteness value is provided for the fluorescent tile, the value provided from the factory is based upon the Ganz-Griesser calibration technique. If the CIE Whiteness calibration were used to calibrate the instrument, the filter may be adjusted to a different position, and the CIE Whiteness value for the same tile could change.

While this is a subtle distinction in calibration technique, it is import to verify your internal procedures for performing a CIE Whiteness evaluation. If you are required to provide CIE Whiteness values based on a CIE Whiteness calibration, you will need to recalibrate the instrument using the CIE Whiteness procedure. This option is available in the software, but you will need to use standards with known CIE Whiteness values. *Datacolor does not provide these standards.* Refer to Appendix for a list of laboratories that supply CIE Whiteness standards.

Resetting the UV Filter Position Using CIE Standards

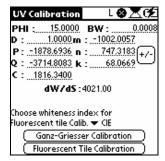
You can reset the filter position using CIE Whiteness standards. To do this:

1. Obtain fluorescent standards of known CIE Whiteness and tint.

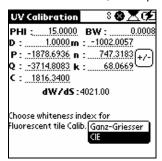


CIE Whiteness standards **are not** provided by Datacolor. You must obtain them from a standardizing laboratory. Refer to the Appendix for a list of the suppliers of these standards.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup Menu, UV Calibration. The UV Calibration screen displays.

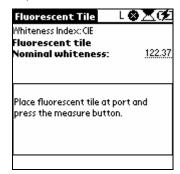


3. Tap the down arrow in the *Choose whiteness index for Fluorescent tile calibration* field, and tap **CIE**.



126 • Setup Menu Datacolor CHECK™

4. Tap Fluorescent Tile Calibration. The screen below displays:



5. In the *Nominal Whiteness* field, enter the known CIE Whiteness value for the tile.



This is not the CIE Whiteness value provided on the certificate from Datacolor. This value must be provided along with the CIE Whiteness standard you have obtained from a third-party laboratory.

6. Place the tile at the port and press the **Measure** button on the back of the instrument. The screen below displays:



- Adjust the position of the filter as instructed, and measure the tile again. Repeat this procedure until the calculated whiteness value matches the nominal whiteness value.
- 8. When the value is achieved, an **Accept** button displays at the bottom of the screen. Tap **Accept**.
- 9. Once this procedure is completed, you are ready to measure the samples to be evaluated.

Fluorescent Tile Calibration

This is a calibration option you must run regularly to adjust for changes in the UV content of the light source.

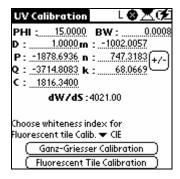
To adjust the UV filter properly, you need the following:

- The white fluorescent tile provided with the instrument
- The Allen key provided with the instrument. This is used to adjust the position of the UV filter, based on the measurement of the fluorescent tile.
- The certificate provided with the instruments, containing reference values for the fluorescent white calibration tile. These are used as targets for achieving an accurate calibration of the UV filter. This includes target whiteness values for the fluorescent UV tile, and a filter position specifically determined for your instrument.



Refer to Other Options, UV Calibration and Whiteness Options for a detailed discussion of the adjustable UV filter, the software options and the step-by-step procedure you must use to make valid UV measurements.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup Menu, UV Calibration. The UV Calibration screen displays.

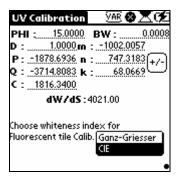




These constants are critical to the accurate calculation of Ganz Whiteness values. If you will be generating Ganz Whiteness evaluations and the values on the screen do not match the values on the certificate, you must enter the correct values. Refer to "Setup Menu, UV Calibration Ganz-Griesser Instrument-Specific Calibration Values" for detailed instructions to edit these values.

128 • Setup Menu Datacolor CHECK™

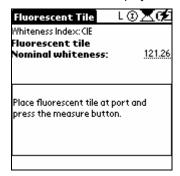
2. In the field *Whiteness Index to be used for Fluorescent Tile Calibration*, tap the down arrow. Select the whiteness index to be used for the calibration.



Using the Allen Key provided with the instrument, adjust the UV filter to the setting indicated on the certificate:



 On the UV Calibration screen, tap Fluorescent Tile Calibration. The screen below displays:





This procedure is basically the same regardless of the whiteness index selected.

- Enter the nominal whiteness value for your fluorescent tile.
 Depending on the whiteness index selected, this is either the CIE Whiteness value or the Ganz Whiteness value on the certificate.
 To enter this value:
 - Tap in the Nominal Whiteness field. The cursor will start flashing.
 - Press the **Shift and Symbol** buttons on the Control Panel to display the keyboard. Tap the 123 icon on the keyboard to display the numeric keypad:



6. When finished, tap **Done**. The *Fluorescent* Tile screen redisplays.



7. Place the fluorescent tile at the port and press the **Measure** button on the back of the instrument. Following the measurement, the *Fluorescent Tile* screen displays.



This screen displays the whiteness value for the fluorescent tile, based on the measurement just completed, and instructions regarding the adjustment of the UV filter.

 Direction. This line instructs you to turn the Allen key either "clockwise" or "counterclockwise", to adjust the filter position. This is based on the measurement just completed.



- Calc. Whiteness Value. This is the whiteness value calculated from the measurement.
- Target Whiteness Value. This is the nominal or target value for the tile.
- 8. After adjusting the UV filter, press the **Measure** button on the back of the unit to measure the tile again.

9. Repeat this procedure until the target value for the tile has been reached. When this happens, an *Accept* button displays at the bottom of the screen. Tap this button.

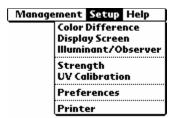


Return to the Datacolor CHECK Main Menu to perform a standard calibration.

Preferences

Use this menu to change features such as timeout intervals for the PDA and the instrument, the calibration interval, and the time and date.

 Press the **Shift** and **Management Options** buttons on the Control Panel to display the Management Menus. Tap **Setup.** The Setup Menu displays.



Tap Preferences. The screen below displays. Make your selections based on the guidelines provided below.



Calibration Interval

Specifies the maximum number of hours to elapse before instrument recalibration. Once the calibration interval has elapsed, you will NOT be able to make a measurement until you recalibrate. This interval is applied to both aperture conditions on dual-aperture instruments. Tap the down arrow (*) and select the calibration interval to use. The default is 8 hours.

PDA Timeout

Specifies the number of minutes of inactivity to elapse before the PDA goes into *Sleep* mode. The default is 2 minutes. Tap the down arrow (**T**) and select from the available options.

Instrument Timeout

Specifies the number of seconds to elapse between measurements before the instrument goes into *Sleep* mode. The default is 20 seconds. Placing the instrument in *Sleep* mode extends the life of the battery. Tap the down arrow () and select the number of seconds for the *Instrument* timeout.

Time—Current Time

This option is used to reset the clock in the PDA. When the battery totally discharges all information is lost.

1. Tap in the field to display the Select Time screen.

Make the selections in the hour, minute and AM/PM fields by tapping in the field, and tapping the up/down arrow until the desired value is shown.



3. To specify the format for this field, refer to the *Formats* instructions in step 9, below.

Date—Current Date

This option is used to reset the date in the PDA. When the battery totally discharges all information is lost.

• Tap in the field to display the Select Date screen.



- Year. Tap the left/right arrow until the desired year is shown.
- Month. Tap in the block for the desired month.
- Day. Tap on the day of the month. When you make this selection, the Select Date screen automatically closes.
- Today. To automatically use today's date, tap Today.
- To specify the format for this field, refer to the instructions below in step 9, below.

Language--Current Language

The Datacolor CHECK software on the PDA is available in six (6) languages. This option is used to change the language:

• Tap in the field to display the language selection screen.



- Tap on the language to be displayed.
- Tap on **Home** to load the correct language. The interface displays in the selected language.

Formats

This option is used to specify the time, date, number and week start formats used.

1. Tap the **Formats** button. The Setup screen displays:



- 2. Tap the down arrow (▼) for each field, and tap on the desired format option.
 - Time Format. You can specify the order of the information displayed (hour/minute), the symbol used to delimit the information, and whether the time will include an identification of morning or evening (am/pm). Below are the choices:



 Date Format. You can specify the order of the information (day/month/year) displayed, and the symbol used to delimit the information. This is applied to all of the applications programs included on the PDA, it is not limited to the Datacolor CHECK application. Below are the choices:



 Numbers Format. You can specify the symbol used to delimit the information. This is applied to all of the applications programs included on the PDA, it is not limited to the Datacolor CHECK ™application. Below are the choices:



 Weekstarts Format. You have the option to have all calendar information reflect the starting day of the week as either Sunday or Monday. This is applied to all of the applications

136 • Setup Menu Datacolor CHECK™

programs included on the PDA, it is not limited to the Datacolor CHECK application. Below are the choices:



3. When all selections are made, tap **Done**.

Printer

The software includes the option to print the evaluation screen currently active. This feature is activated through the Print button on the Control Panel, or the Print Screen option on the Management Menu (*Management Options, Print Screen*). The printer setup is accessed through *Management Options, Setup, Printer*.

Requirements

• Types: Serial Printer, IrDa

• Output Capability: Capable of printing plain ASCII text

• Minimum Number of Columns: 32

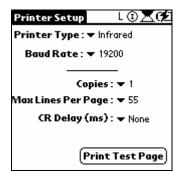
• Font: Fixed width font

• **Printer Adapter.** Both new users and upgraded users have received a printer adapter. **This adapter is required to connect to serial printers.** Attach the adapter to Datacolor CHECK cable.

Configuration

To access the printing options, do the following:

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup, Printer. The Printer Setup screen displays:



- **Printer Type.** Select the printer you will be using. Tap the down arrow to view the choices, and tap the printer type to be used.
 - Serial. This option configures the output to be sent to a standard serial printer.
 - Infrared. This option configures the output to be sent through a wireless transfer to a printer equipped to receive information via an infrared beam.
- **Baud Rate** (for serial printers only). Identifies the speed at which the data will be transferred. Tap the down arrow to view the choices, and tap the correct speed. Refer to printer documentation for printer capability.
- Copies. Identifies the number of copies to be printed. You can print multiple copies of the same evaluation with a single print command. Tap the down arrow to view the choices, and tap the number to be printed.
- Max Lines Per Page. Identifies the maximum number of lines to be printed on a single page. The minimum is 30, the maximum is 60. Tap the down arrow to view the selections, and tap the number to be used.
- CR Delay. Introduces a delay after each line. This allows the printer to keep pace with the application sending the data. To determine the correct delay:
 - Set the delay to 0, and print a screen. If some of the data is missing, a delay needs to be inserted.
 - If there is a problem, increase the delay by one step and try the print again.
 - Repeat this test until the print is correct.
- **Print Test Page.** Tap this option to test the data transmission to the printer. When the configuration is correct, the printer setup page will be printed.

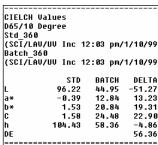
• Printing a Screen. You can access the printing function at any time. Tap the printer button on the Control Panel. The message 'Printing' will be displayed on the screen.



You can also start the printing function from the Management Menu. Press the **Shift** and **Management Options** buttons on the Control Panel to display the Management Menus. Tap Management, Print Screen to start the printing.

NOTES ABOUT PRINTING **SCREENS**

Complete CIEL*a*b* output is printed when the following screens are displayed: CIEL*a*b*, CIEL*a*b*C*H*, and CIEL*c h. The printer options only prints evaluation screens. However, plots *cannot* be printed. Management screens cannot be printed. Sample Output is shown at the right.



Help Menu

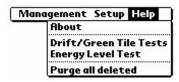
The Help Menu provides access to instrument diagnostics and information about the Datacolor CHECK PDA software.



Currently there is no on-line help available for the Datacolor CHECK PDA software.

To access the Help Menu, do the following:

• Press the **Shift** and **Management Options** button on the Control Panel to display the Management Menus. Tap on Help. The menu below displays:

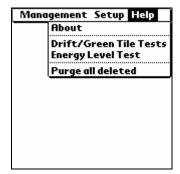


About Option

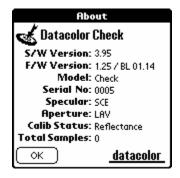
The version numbers for the software and firmware on your unit are requested whenever you contact the manufacturer regarding technical support. The software and firmware version numbers are found on the PDA.

To access this information, do the following:

- 1. Press the **Shift** and **Management Options** buttons on the Control Panel to display the Management Menus. Three options display at the top: *Management*, *Setup* and *Help*.
- 2. Tap Help. A drop-down menu displays.



Tap About. A screen displays with details regarding the current instrument configuration, and the software and firmware versions contained on the unit.



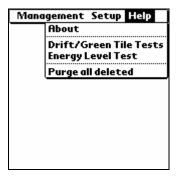


If no information regarding the instrument displays on the *About* screen, this indicates that the instrument is not calibrated. When calibrated, all details about the instrument are displayed.

140 • Help Menu Datacolor CHECK™

Instrument Diagnostics

The software includes three diagnostic tests that are used to evaluate and troubleshoot instrument performance. These tests are located on the Help Menu:



Drift/Green Tile Tests. This option provides access to two tests that evaluate the repeatability of the instrument.

- Drift Test. Tests the repeatability of the instrument over a short interval. Color differences between measurements made over a specified time interval are displayed. They are expressed in CIEL*a*b* units.
- Green Tile Test. Test the repeatability of the instrument over its lifetime.

Energy Level Test. Tests the following:

- · energy output of the light source
- · function of the spectrometer

This test is designed for use by Datacolor representatives, and should be run under the direction of Datacolor service personnel.

Instrument Setup for Diagnostic Options

For the test results to be valid, the instrument requires specific settings. The settings below should be used for all diagnostic tests. The selections are made from *Management Options*, *Management Menu*, *Measurement*.

- Aperture Selection: LAV. For those units that don't include LAV, the largest aperture available should be used.
- Specular Port Selection: SCI.
- Flashes for Measurement: 2.

To prepare the instrument for the diagnostic tests:

- The instrument should be recalibrated before any diagnostic tests are performed.
- Connect the instrument to its power adapter for all diagnostic tests.

Drift Test

The test is used to check the repeatability of the instrument over a short interval. The white tile is used as the sample, and the first scan of the tile is used as the Standard. Each scan that follows is treated as a batch, and the color coordinates/color difference between the standard scan and each of the subsequent scans is calculated.



D NOTE

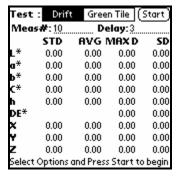
The results of the Drift Test are not stored. When the user exits the option, the test results are lost.

Drift Test Setup

Refer to Instrument Setup for Diagnostic Options for instrument settings to be used.

Running the Drift Test

Press the **Shift** and **Management Options** buttons on the Control Panel to display the Management Menus. Tap Help Menu, Drift and Green Tile Tests. The screen below displays:



- Test. The same screen is used for both the Drift and Green Tile tests. Tap "Drift" to run the Drift Test.
- **Meas**. Enter the number of reads to be performed. The default is 10. The first measurement will be the standard. and 10 "batch" scans will be compared to it.
- **Delay**. Time between reads. This is expressed as seconds.

2. Place the white tile at the instrument port, and tap **Start**.

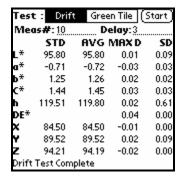


The Drift Test can be configured to run for several hours. For example, you can configure the test to make a measurement every 60 seconds for 4 hours by making the following selections:

Measurement #: 240

Delay: 60

Drift Test Results



- STD. Values for the standard.
- **AVG.** An average of the batch values for the parameter identified.
- MAX D. The largest delta value for the parameter identified, across all batches.
- SD. The standard deviation for the parameter identified, based on the batch measurements.

Green Tile Test

Tests the repeatability of the instrument over its lifetime. A measurement of the green tile is stored in the calibration file before the instrument leaves the factory. This test scans the green tile, compares it to the stored measurement of the tile, and reports the color difference between the stored measurement and the current measurement.



The results of the Green Tile Test are not stored. When the user exits the option, the test results are lost.

Green Tile Test Setup

Refer to Instrument Setup for Diagnostic Option, for instrument settings to be used.

Storing/Restoring Green Tile Values

New Datacolor CHECK users do not have to store green tile values into the calibration fie. If you are an existing Datacolor CHECK user that has received a software upgrade, you must store the reference measurement of the green tile in the calibration file.



1 WARNING

Consult the Datacolor Service Department before restoring new green tile

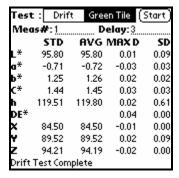
- 1. Select the **Green Tile** diagnostic option.
- Place the green tile at the instrument port.
- 3. Press the Measure button on the back of the instrument. You will receive the following message:



Press **OK** to proceed or **Cancel** to cancel. When you proceed, the instrument will immediately measure the tile and store the new tile values. No additional warning displays!

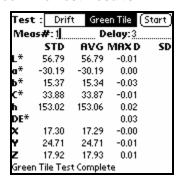
Running the Green Tile Test

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Help Menu, Drift and Green Tile Tests. The screen below displays:



- Test. The same screen is used for both the Drift and Green Tile tests. Tap "Green Tile" to run the Green Tile Test.
- Meas. Enter the number of reads to be performed. The default is 1. The current measurement will be compared to the green tile values stored in the calibration file.
- Delay. Time between reads. This is expressed as seconds.
- 2. Place the green tile at the instrument port, and tap **Start**.

Green Tile Test Results



- STD. Values for the standard. These are stored in the calibration file.
- **AVG.** An average of the batch values for the parameter identified.
- MAX D. The highest batch value for the parameter identified.
- **SD.** The standard deviation for the parameter identified, based on the batch measurements.

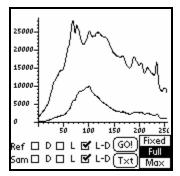


When you make a single measurement, not data displays in the SD column.

Energy Level Test

The Datacolor CHECK is a dual-beam spectrophotometer, and this test measures the energy detected through both the Reference channel and the Sample channel. It tests the following:

- · energy output of the light source
- · function of the spectrometer



All data can be displayed for the Reference channel, the Sample channel, or both.



This test is designed for use by Datacolor representatives, and should be run under the direction of Datacolor service personnel.

Energy Level Test Setup

For the instrument settings to be used, refer to Instrument Setup for Diagnostic Options.

Running the Energy Level Test

The test begins immediately when the option is selected. The white tile should be placed at the instrument port before you make any software selections.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Help Menu, Energy Level Test.

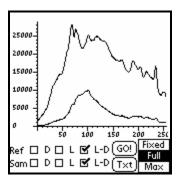
146 • Help Menu Datacolor CHECK™

Energy Level Test Results

The results of the energy level test can be displayed in either graphic or text format.

Graphic Display

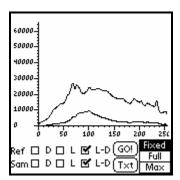
The graphic display is the default display. When the measurement is completed the screen below displays:



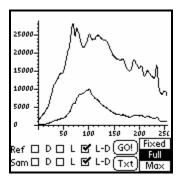
Tap to place a check in the box for the data to be displayed. Tap again to remove the check.

- **Ref.** Data on this line is read from the Reference channel.
- Sam. Data on this line is read from the Sample channel.
- D (Dark Level). Displays the energy output recorded when no light is present.
- L (Light Level). Displays the energy output recorded when the light source is active.
- L-D (Light energy level dark energy level). The value recorded when the measurement is corrected for noise.
- Txt. The results of this test are displayed in either graphic or text format. This display is interchangeable.
 - When the graphic display is active, the button is labeled "TXT".
 - When text display is active, the button is labeled "GR".
 - Tapping on this button will change the display format, and allows the user to quickly move between the displays to evaluate the test results.
- Go/Stop. Tap Go to start the measurement process. The instrument will continue measurements until the user taps Stop.

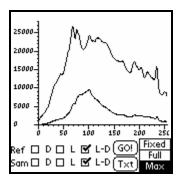
• Fixed. The x-axis displays the entire range of values for this test.



• Full. The x-axis values run from the minimum to the maximum values for the current measurement.

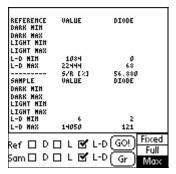


 Max. The x-axis values run from 0 to the maximum value for the current measurement.



Text Display

This view displays the values for each parameter measured.



- Reference. Displays the values for the Reference channel.
- Sample. Displays the values for the Sample channel.
- Value. Actual value recorded for each item.
- **Diode.** Identifies the diode associated with the value displayed.
- **Dark Min.** The lowest value recorded when no light is present.
- Dark Max. The highest value recorded when no light is present.
- Light Min. The lowest value recorded when the light source is active.
- Light Max. The highest value recorded when the light source is active
- L-D Min. The lowest value recorded when the measurement is corrected for noise.
- L-D Max. The highest value recorded when the measurement is corrected for noise.
- Fixed. N/A for text displays.
- Full. N/A for text displays.
- Max. N/A for text displays.

Purge All Deleted

When you delete information from the Datacolor CHECK database (standards, batches, folders, etc.) the records are "marked" for deletion. Because of the synchronization feature developed for Datacolor CHECK, the items are not deleted until the next synchronization is performed. If you are not using the synchronization feature, the records are never deleted.

This option deletes all records marked for deletion. It should be used to clean up the RAM on the PDA when you are not routinely performing the data synchronization.

NOTES

Other Options

Gloss Compensation

The lack of agreement between visual and instrumental evaluations of color samples having different glosses has been a major problem in making color appearance judgments. The human eye has much greater resolving power than most instruments and can distinguish very small appearance differences between objects. A human observer can easily change the viewing conditions and the viewing angles in order to make an appearance judgment, taking into account both color and gloss simultaneously. Color measuring instruments are not as versatile as the eye, since measurements are made at fixed illumination and viewing conditions that do not correspond to the way we see objects.

The basic problem encountered when viewing samples having different gloss can be illustrated in the following example:

Suppose we have two black samples: one with a high gloss surface and the other with a low gloss or matte surface. If these samples are measured with an integrating sphere instrument, specular included (type SCI d/8), the color difference will show that there is a small color difference between the matte sample and the high gloss sample. A visual assessment of these samples will indicate that there is a larger color difference. The high gloss sample appears to the eye to be much darker and more saturated than the low gloss sample. However the color difference based on the instrumental evaluation will report that the low gloss sample is "darker" than the high gloss sample.

Datacolor CHECK provides two gloss compensation software options:

 Gloss determination. The instrument can act as a gloss meter, and based on measurements of the samples, assigns a gloss value to a sample. The screen "Gloss Values" displays the gloss geometry and gloss values for the standard and batch as determined by the instrument. • Gloss compensation. Gloss compensation adjusts the spectral data for gloss differences, and reports color evaluations based on the adjusted data. This evaluation will have better agreement with a visual evaluation, than does the 'unadjusted' evaluation.

Implementing Gloss Features

To generate gloss determinations and color evaluations based on gloss compensated measurements, the user must configure three software settings:

- Activate the gloss compensation option (*Management Options*, Setup Menu, Color Difference).
- Select the gloss geometry (Management Options, Setup Menu, Color Difference).
- Activate the gloss measurement condition (Management Options, Management Menu, Measurement).

Activating the Gloss Compensation Option

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup Menu, Color Difference. The screen below displays:



 Use Gloss Compensation. Tap to add or remove a check in this box. A check indicates that gloss compensation is enabled, and available for use. When enabled, the GC icon classification of every screen.

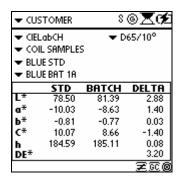


The circon also displays on every hard copy screen print, indicating that gloss compensation was enabled.



WARNING

The GC icon at the bottom of the screen indicates that the gloss compensation option is enabled. However, if either sample was not measured using "Gloss" as the specular port setting, evaluations made using "gloss compensation" are not valid. This is indicated by the display of the **\equiv** icon at the bottom of the screen.



Selecting Gloss Geometry

When gloss values are calculated, the gloss geometry must be selected. Several gloss geometries are used in industrial applications. The gloss geometry should always be specified with any reading. The user is offered a choice of three: 20°, 60° and 85°, and Auto.

- 20°. Gloss values are based on 20° geometry. Used for high gloss materials.
- 60°. Gloss values are based on 60° geometry. This is the most commonly used geometry and is the default selection.

- **85°.** Gloss values are based on 85° geometry. Used for low gloss or matte materials.
 - Auto. The system determines the gloss geometry to be used, based on the sample measurements and the following guidelines:

20° geometry is used when the sample gloss measures >70 using 60° geometry.

85° geometry is used when the sample gloss measures <10 using 60° geometry.

60° geometry is used for all other cases.

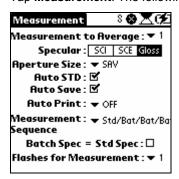
Activating the Gloss Measurement Condition

To measure and store sample data for use with the gloss options you must activate the 'gloss' measurement condition. This is done as follows:

1. Press the **Shift** and **Management Options** buttons on the Control Panel to display the Management Menus.



2. Tap **Measurement**. The following screen displays:



- 3. In the *Specular* field, tap **Gloss**. The measurement condition is changed to gloss.
- 4. The icon at the top of the screen that identifies the specular condition will change to ⑤. When the measurement condition is gloss, all measurements made are recorded as gloss. To deactivate this option, return to the Management Menu, Measurement, and select either Specular Included or Specular Excluded.



This option controls the method used to measure new samples. It does not indicate the type of measurement used for samples previously stored.

Gloss Evaluations

Gloss Values

This option reports the gloss value calculated from the measurements.



- **Geom.** Identifies the gloss geometry used to determine the gloss.
- Gloss. Identifies the gloss value calculated for the standard and batch. In the example above, the gloss of the Std is 58 on a 60° gloss meter, and the gloss of the Batch is 75 on a 60° gloss meter.

When is Gloss Compensation Applied to Color Evaluations?

The GC icon at the bottom of the screen indicates that the gloss compensation option is enabled. However, the display of this icon does *not* guarantee that the evaluation displayed is based on gloss-compensated measurements.

 When the specular port selection used to measure the standard and the batch are not the same, the Z displays. This indicates that the evaluation displayed is based on two different specular port settings and is not valid.

- When the samples are not measured using "Gloss" as the specular port setting, the color evaluation displayed is valid, but it is based on unadjusted data.
- When the specular port selection used to measure the standard and the batch is Gloss, and gloss compensation is enabled, the evaluations displayed are based on gloss compensated data for both samples and are valid.

There is a simple way to determine if the gloss compensation has been properly applied. You can display the *Gloss Value* screen to determine if gloss data is available for both the standard and batch samples.

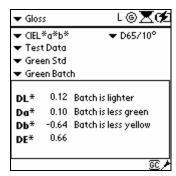
Gloss compensation enabled and properly applied

In the example below:

- Gloss compensation **©** is enabled.
- The Z is not displayed. The specular port settings are the same for the standard and the batch.
- Gloss data is displayed for **both** the standard and the batch.



The color difference displayed for this pair of samples is based on gloss adjusted measurements for both samples, and is valid:



Gloss Compensation Enabled, Gloss Adjustment Not Applied

• In the example below, gloss compensation is enabled, but gloss data is not available for either sample:



- · There is no gloss information for either sample
- The Z is not displayed. The specular port settings are the same for the standard and the batch.

The color differences based on these samples are valid, but are based on 'unadjusted' measurements.



Gloss Compensation Applied, Color Evaluation Not Valid

When gloss data is available for one sample (i.e., the standard), but not for the other (i.e., the batch), *gloss compensation is only applied to the sample having gloss data*. Below is an example of this situation:



In the above example, there is only gloss data for the standard, and the is displayed, indicating this is not a valid comparison.

The color difference report shown below is based on this pair of samples:



Note the following on this screen:

- Gloss compensation is enabled <u>§C</u>.
- The Z is displayed, indicating that the specular port setting was not the same for both samples.

Gloss compensation is activated and applied in this example. There is gloss information for the standard, so the standard measurement is compensated for gloss. However, the batch has no gloss data, and the batch measurement data used for the evaluations is not compensated for gloss.

This color evaluation is not valid.

Recovery

Remeasure the samples using the same specular port setting. If you want to apply gloss compensation, select the "Gloss" measurement condition before measuring both samples.

Printed Output

Below are examples of printed output from Datacolor CHECK. The sections below explain how to determine from the printed output, whether gloss compensation has been properly applied.

Gloss Compensation Enabled and Applied

CIELabCH Values					
D65/10 Dec	gree				
Std 00009					
(Gloss/LAU	J/UV	Inc	2:11	pm/	1/31/9
Batch 000	91			•	
(Gloss/LAU	J/UV	Inc	2:11	pm/	1/31/9
				-	
	5	STD	BATO	CH	DELTA
L	94.	.35	94.3	39	0.04
a*	- O	.35	-0.3	34	0.01
b*	1.	.34	1.3	36	0.02
C	1.	.39	1.4	40	0.02
h	104.	.57	104.0	92	-0.01
DE					0.04
					(GC)
=======	====			====	=====

In the example above:

- GC displays in the lower right corner, indicating gloss compensation is enabled.
- Both the Standard measurement method and Batch measurement method are Gloss. Because the measurement method is Gloss for both samples, gloss compensation is applied, and the color evaluation is valid.

Gloss Compensation Enabled, Gloss Adjustment Not Applied

```
CIELabCH Values
D65/10 Degree
Std 360
(SCI/LAU/UU Inc 12:03 pm/1/10/99
Batch 360
(SCI/LAU/UU Inc 12:03 pm/1/10/99
             STD
                    BATCH
                            DELTA
                           -51.27
           96.22
                    44.95
           -0.39
                    12.84
                            13.23
a*
b*
            1.53
                    20.84
                            19.31
C
            1.58
                    24.48
                            22.90
          104.43
                    58.36
                            -4.86
ĎΕ
                            56.36
                              (GC)
```

In the example above:

- "GC" displays in the lower right corner, indicating gloss compensation is enabled.
- Both the Standard measurement method and Batch measurement method is SCI.

Since the measurement method is not Gloss for either sample, gloss compensation cannot be applied for the evaluation. Although the gloss compensation option is enabled, it is not used for this pair of samples. *This color evaluation is valid, but it is based on unadjusted measurement data*.

Gloss Compensation Applied, Color Evaluation Not Valid

CIELabCH Values					
D65/10 Degree					
Std 00009					
(Gloss/LAV/UV Inc 2:11 pm/1/31/9					
Batch 00002					
(SCI/LAU/UV Inc 2:12 pm/1/31/99)					
-		•			
	STD	BATCH	DELTA		
L	94.35	95.98	1.63		
a*	-0.35	-0.33	0.02		
b*	1.34	1.32	-0.02		
C	1.39	1.36	-0.02		
h	104.57	103.88	-0.02		
DE			1.63		
			(GC)		

In the example above:

- "GC" displays in the lower right corner, indicating gloss compensation is enabled.
- The specular port setting is not the same for both samples. Since the standard was measured using the "gloss" measurement condition, the measurement can be corrected for gloss. However, the batch measurement is SCI, and cannot be corrected for gloss

This color evaluation compares one gloss-adjusted measurement and one 'unadjusted' measurement. The evaluation is not valid.

Recovery

Remeasure the samples, using the same specular port setting. If you want to apply gloss compensation, choose the *Gloss* measurement condition, and repeat the sample measurements.

Strength Option

Purpose

In the manufacture of a colored product, it is important to develop a formula that will reproduce the color accurately and efficiently each time. A production formula is reliable only if the raw materials used in the formula are consistent from lot to lot. A strength evaluation is based on the ability of the colorant to absorb light, and determines if the current batch of colorant is stronger or weaker than the material used in the original formula. The evaluation also projects the color difference between the two lots of colorant, when they are at equal strength. This information helps you to determine if the concentration of colorant(s) in a formula needs to be adjusted to reflect differences in the raw materials.

Sample Preparation

The strength of a colorant is defined only in reference to another colorant that has identical colorimetric and physical properties.

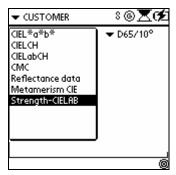
In order for the strength evaluation to be meaningful, you must prepare your samples in a uniform fashion, keeping in mind the following points:

- The samples are usually finished samples of your product, such as a dyed fabric or a coating applied to a substrate.
- Colorant strength should only be evaluated using samples that contain a single colorant.
- The samples prepared for a strength evaluation should contain a fixed percentage of the colorant. For pigments, it is mixed with a standardized white paste. For dyes, the solution used should be standardized.
- All of the ingredients in both the standard and the batch should come from the same lots of materials except for the colorant.

When this procedure is used, there can be only one source for the differences between the samples: the different lots of colorant.

Program Settings

The samples used for a strength evaluation are measured in the same way as other standards and batches. The standard sample contains the reference or master colorant, and the batch contains the current lot of colorant. After the samples are measured, "Strength" is selected from the evaluation options:



To run this option you need to:

- 1. Select the type of strength calculation to be performed (Management Options, Setup Menu, Strength).
- 2. Enable the strength evaluation as a display screen (*Management Options*, *Setup Menu*, *Display Screen*).

Strength Calculation Selections

The strength setup is found under Management Options, Setup Menu.

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup, Strength. The screen below displays:



When all of the Strength selections are made, tap Save to make the changes permanent.

Evaluation Type

There are several methods available in the program for evaluating strength. Some of the evaluation options use the spectral data of the samples to perform the calculation while others work from colorimetric data.

- Strength Calculations Using Spectrophotometric Data. These calculations are based on the spectral data for each sample at a single wavelength. When you are comparing identical raw materials, you should base the strength evaluation on spectral data.
- Strength Calculations Using Colorimetric Data. This approach is based on the tristimulus values of the samples, and is often used when trying to compare the strength of similar, but not identical materials. For example, if you must substitute one colorant for another, you can examine the materials available for substitution for both strength and color difference. You can then decide which material can be substituted with acceptable results.

Since the materials in this situation are not identical, you examine the strength of the materials by evaluating their absorption behavior across a wavelength band represented by the tristimulus values X, Y, or Z. Typically, you would use X to evaluate blues and greens, Y to evaluate reds, and Z to evaluate yellows and some oranges. The tristimulus value used should correspond to a wavelength band where the colorant exhibits the greatest absorption.

Datacolor CHECK includes the following strength evaluations:



Evaluation Type	Description
Maximum Absorption	The evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. This is the area of the spectrum where the colorant absorbs the most light and is a valid indicator of strength. It is the wavelength with the lowest %R value (the highest K/S value). The wavelength selection is made by the program, and is based on the reflectance curve of the standard. This is one of the most common methods used for strength comparisons.
User Selected WL	This method is similar to the wavelength of maximum absorption, except that the user determines the wavelength to be used for evaluation.
Sum of K/S	This method calculates strength based on the sum of the K/S values across the visible spectrum.
CIE X, CIE Y, CIE Z	This method calculates the strength by using a single tristimulus value (X, Y or Z) for the standard and batch. This method is often used when trying to compare the strength of similar, but not identical, materials. Colorimeters can only report tristimulus values, and this method is used when a history of strength evaluations generated from colorimeters has been collected for a colorant. The tristimulus value used in the evaluation should correspond to the band of the spectrum where the colorant has the greatest absorption. NOTE Colorimetric data is specific for an Illuminant/Observer condition. You should verify that the Illuminant/Observer condition you are using matches the conditions used to collect comparable data from a colorimeter.

Color Space

A color difference calculation is included in the strength evaluation. You must select which color difference equation is to be used.

Illuminant

You must identify the Illuminant/Observer condition to be used for calculating the adjusted batch strength, when CIE X, CIE Y or CIE Z is chosen as the basis for comparison. This is *not* the Illuminant/Observer condition used to calculate the color difference between the 'as is' and 'adjusted' batch.

Specular Ref

A correction factor used in an equation that adjusts the spectral data for index of refraction differences. The specular reflectance value represents the amount of light that is refracted at the sample surface and never penetrates the sample.

For resin systems most commonly used in paint and plastics applications, , a value of 4.0 may be used. For evaluating dyes on a substrate (reflectance mode), a value of 0 is recommended.

Internal Ref

A correction factor included in the strength equation that adjusts for index of refraction differences. The internal reflectance value represents the amount of light that is scattered inside the sample and never emerges.

- For opaque paint and plastics applications using reflectance measurements, a value of 60.0 may be used.
- For dyes on a substrate, a value of 0 is recommended

Fixed Adi

In addition to determining the batch strength, the program can adjust the batch measurement to represent the strength of the standard. Sometimes it is not possible or practical to adjust the strength of the batch to 100% of the standard. When this occurs you can enter a number less than 100%. The program will project the color difference between the samples, when the batch is adjusted to a value other than 100%. Enter a number representing the target strength you want to use as the basis for a strength adjustment.

Wavelengths to Omit

This option allows you to omit specified wavelengths for use in the strength calculation. For example, in pigment applications in which the samples are mixtures of colorant and white, the maximum absorption wavelength may occur at 400 nm. In this case, the absorption is due to the white pigment, not the colorant. For this situation, the evaluation of the strength of this colorant at 400nm is not valid. Enter the wavelengths to be omitted from this evaluation.

Enabling Adjusted Strength Option

The program has the ability to adjust the batch measurement for strength differences. When "Apply Strength" is enabled, the measurement data for the batch is the 'adjusted' measurement. *This is a theoretical measurement; it is not the actual sample measurement.* All other color evaluations made using this batch data will be based on the theoretical data adjusted for strength, not the actual measurement. When this option is enabled, the $\mathfrak M$ icon is displayed at the bottom of the evaluation screen:



In the above example, the color difference is based on an adjusted batch measurement.



The batch measurement stored in the system is always the *unadjusted measurement*, regardless of whether this option is enabled.

To enable/disable this option, do the following:

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup Menu, Color Difference. The screen below displays:



2. **Apply Strength.** Tap in the box. A check displays, indicating the feature is enabled. Tap in the box again to remove the check, and disable the option.

Strength Evaluation Results

Below is an example of the strength output. In this example, the evaluation is based on *Wavelength of Maximum Absorption*.



- Max Abs. Identifies the wavelength of maximum absorption used for the evaluation of these samples. In the example above, the evaluation was done at 630nm.
- As Is. The differences between the standard and batch based on the actual measurement.
 - Strength. The strength of the batch based on the measurement.
 - Color Differences. The differences between the standard and batch based on the batch measurement.

Adjusted. The differences between the standard and batch based on a theoretical batch measurement adjusted for strength. When the differences between the standard and batch are due simply to strength, the adjusted strength should be close to 100%, and the adjusted color differences should be very small.

Auto Standard (Auto Select Standard)

The Datacolor CHECK software includes an option that automatically matches a standard to a batch. The batch is measured, and the program looks through the active folder and finds the standard that has the smallest color difference from the batch.

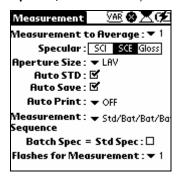
This feature is designed for use when evaluating several *different* colors that appear in a pattern. For example, in textile printing or wall covering applications, a floral pattern may be printed on a substrate. The pattern may include several different petal colors (i.e., red, yellow, etc.), and other colors that are used in the pattern, and these standards are stored in a folder. When Autostandard is enabled, the operator does not need to recall each standard before measuring each color in the pattern to make a comparison. The batch is measured and the program finds the standard that matches it. By eliminating the need to recall each standard, this feature reduces the time required to evaluate the colors in the pattern. This is especially helpful in a production environment.

Where does the tolerance come from and can it be changed?

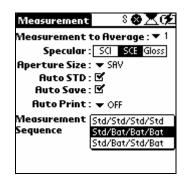
This feature is not designed to select a standard from among several samples that are close in color. It is meant to be used to select from a series of standards with distinctly different colorimetric properties. For example, a folder used with Auto Std may be limited to the colors in a particular pattern, and may include red, yellow, blue, green and brown. In contrast, if you have several white standards in a file that vary slightly from one another, this feature may not select the correct standard and is not meant to be used in this situation.

Required Program Settings

Two options must be selected from the Measurement screen (**Management Options**, **Measurement**):



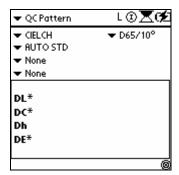
- Auto Std. This feature must be enabled. Tap in the box to enable the feature. A check displays. Tap again to remove the check and disable the option.
- **Measurement Sequence.** Three measurement sequences are provided:



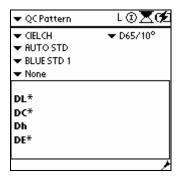
We recommend that you use Std/Bat/Bat/Bat for the Autostandard feature.

Auto Standard Measurement Procedure

 Select the appropriate folder for use. In the example below, the active folder is AUTO STD.



A standard must be selected in order to start the process. The program will not let you measure a batch until there is a standard available.



3. Check the icon in the far lower right corner to verify the type of sample the program expects to measure next. It should be a dart.



Program is expecting the next measurement to be a standard.



Program is expecting the next measurement to be a batch.

4. Position the sample at the instrument port, and press the **Measure** button on the back of the instrument.



In the example above, the program:

- Autonamed the batch = Batch 0001.
- Selected a new standard = DK GREEN STD 5. This is the standard that is the closest match to the batch just measured.



The dart icon in the lower right corner indicates that the program is expecting a batch as the next sample. You can measure the next sample and the program will select the appropriate standard for it.

 In the example below, a target icon displays in the lower right corner. This indicates that the program is expecting a standard as the next sample. You must override the measurement sequence to measure a batch.



6. To override the measurement sequence, press the **Measure/Select Batch button** on the Control Panel. The screen below displays:



 Place the sample at the instrument port and press the Measure button. The program will autoname the batch, and select the appropriate standard for it:



TIPS

You should create a pass/fail tolerance to further speed the process of batch evaluation.

You can name any batch *before* measuring it, using the keyboard, by doing the following:

- 1. Press the **Measure/Select Batch** button on the Control Panel.
- 2. Press the **Shift** and **Symbol** buttons on the Control Panel to display the keyboard.
- 3. Enter the sample name, and tap **Done**.
- 4. Press the Measure button.

UV Calibration and Whiteness Options

Purpose

Whiteness indices are available in Datacolor CHECK, which are mainly used by the textile and paper industries where whiteness is important, particularly when optical brighteners are included in the product.

What are Optical Brighteners?

Optical Brightening Agents (OBA's), also referred to as Fluorescent Whitening Agents (FWA's), are chemicals containing molecules that fluoresce. When they are applied to white materials they give the material the appearance of being "whiter than white."

What is Fluorescence?

The energy present in natural daylight is not limited to the wavelengths of the visible spectrum (400-700nm). It includes radiation from the entire electromagnetic spectrum. When radiation strikes a fluorescent molecule, it excites the molecule and is absorbed by it. As the molecule returns to its normal state, it emits the absorbed energy as visible light, rather than heat. In the case of OBA's, energy in the ultra-violet region of the visible spectrum is absorbed by the molecule and re-emitted in the blue region of the visible spectrum, around 450nm.

In the case of white materials, any increase in the energy reflected in the blue region results in the white appearing 'bluer'. A 'bluer' white is perceived as 'cleaner', while a white that has aged or become dirty appears to be yellow, and is less acceptable to the eye than a 'blue-shade' white. As a result, OBA's are commonly added to white fabrics and other white materials to make them appear 'bluer' or 'cleaner'.

What is a UV Enhanced Spectrophotometer?

Because the amount of fluorescence exhibited by a sample is directly related to the amount of energy absorbed by the fluorescent molecule, a UV-enhanced spectrophotometer must have a light source that emits ultra-violet light. In spectrophotometers that use a quartz-halogen light source, the amount of ultra-violet light contained in the source is small, making the detection of the fluorescent material difficult. In contrast, xenon sources emit a large amount of UV light, and are commonly found in instruments used to detect fluorescent materials.

Since the goal is to simulate the spectral energy distribution of daylight, the amount of UV radiation coming from the light source must be controlled so that it remains constant over time. In a spectrophotometer that utilizes a pulsed xenon light source, the source emits more UV light than is present in Illuminant D_{6500} . The light in the source is controlled through a variable-position UV cut-off filter. The filter is placed in front of the beam before it

enters the sphere of the instrument to simulate the energy output of daylight, as defined by the CIE.

As the instrument ages, the barium sulphate coating in the sphere absorbs the ultra-violet light emitted from the source. Because of this, you must be able to adjust the filter to control the amount of ultra-violet light in the source. This ensures that you consistently simulate the spectral energy distribution of CIE Illuminant D65. Adjusting the UV filter involves a calibration procedure that is separate from the daily calibration routine.

IMPORTANT

Once the UV filter is adjusted, it does not have to be re-adjusted to measure non-fluorescent samples. However, you must recalibrate the UV filter regularly to adjust for changes in the UV light emitted from the light source. We recommend that the UV filter be recalibrated on a weekly basis.

Factory Calibration of UV Filter

Datacolor has selected the Ganz-Griesser procedure to be used to determine the correct position for the adjustable UV filter. This calibration procedure uses standards of known Ganz Whiteness value, rather than standards having a known CIE Whiteness value. Following the calibration of the UV filter the fluorescent tile is measured, and both Ganz Whiteness and CIE Whiteness values are calculated and recorded for the instrument. They are provided on the certificate included with the instrument.

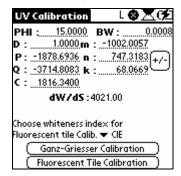
It is important to understand that while a CIE Whiteness value is provided for the fluorescent tile, the value provided from the factory is based upon the Ganz-Griesser calibration technique. If the CIE Whiteness calibration were used to calibrate the instrument, the filter may be adjusted to a different position and the CIE Whiteness value for the same tile could change.

While this is a subtle distinction in calibration technique, it is import to verify your internal procedures for performing a CIE Whiteness evaluation. If you are required to provide CIE Whiteness values based on a CIE Whiteness calibration, you will need to recalibrate the instrument using the CIE Whiteness procedure. This option is available in the software, but you will need to use standards with known CIE Whiteness values. **These standards are not provided by Datacolor.** Refer to the Appendix for a list of laboratories that supply CIE Whiteness Standards.

Program Options Used for UV Calibration Feature

Datacolor CHECK includes three options that are used in conjunction with the UV filter option. They include options to calibrate the UV filter positions, and whiteness evaluation options used to determine the presence of fluorescent materials in a sample. The UV filter options are accessed through **Management Options**, **Setup Menu**, **UV Calibration**. They include:

• Ganz-Griesser Constants. These values are included on the screen displayed when UV Calibration is selected.



They are instrument-specific constants that are used in the Ganz-Griesser equation. You must enter these values when you receive your instrument. These values are entered once, unless your instrument has undergone a major repair, or you have changed instruments.

• Fluorescent Tile Calibration. This is the calibration option that you will use regularly to adjust the UV filter. It must be performed **before** you run a UV whiteness evaluation.

This calibration option uses the fluorescent white test tile (also referred to as the "Illuminant Checker") supplied with the instrument. The Illuminant Checker contains a reference value that is used to adjust the UV filter. You adjust the filter position until the current value of the Illuminant Checker matches the value printed on it.

TIP

You should perform a fluorescent tile calibration on a weekly basis to account for changes in the lamp. This ensures the accuracy of the whiteness evaluations you perform.

Ganz-Griesser Calibration. This is the calibration routine through which Ganz-Griesser parameters, specific to your instrument, are generated. If you have purchased your instrument from Datacolor, this procedure is completed and the values are entered before the instrument leaves the factory. You will never perform this calibration yourself, unless you have standards of known Ganz whiteness values that are required to perform this calibration successfully. CIE Whiteness Calibration. To reset the UV filter position based on a CIE standard, select Fluorescent Tile Calibration option, and use the CIE standard as the sample measured. You must enter the CIE whiteness value provided with the standard in the Nominal Whiteness field, and measure the CIE standard.

The process for performing a whiteness evaluation to identify the presence of OBA's consists of several steps:

- 1. Perform the normal instrument calibration (*Main Menu*, *Calibrate* Option).
- Calibrate the UV filter position, using the fluorescent tile provided with the unit (Management Options, Setup Menu, UV Calibration).
- Repeat the normal instrument calibration (Datacolor CHECK Main Menu, Calibrate Option).



The instrument must be recalibrated after the correct filter position is found. If it is not, the whiteness evaluations you run will **not** be valid.

- 4. Select **Specular Excluded** as the specular port setting (Management Menu, Measurement).
- 5. Measure fluorescent samples and perform whiteness evaluation.

Whiteness Evaluations

Two whiteness indices are provided in the Datacolor CHECK software to determine the presence of fluorescent materials. They are:

- CIE Whiteness
- Ganz Whiteness

Once the fluorescent tile calibration is performed, you can evaluate your samples for fluorescent agents using one of these evaluations.



CIE Whiteness is available for evaluating optical brighteners. However, since the instrument is calibrated at the factory using the Ganz-Griesser calibration, the CIE Whiteness evaluation may not be valid for your uses. Refer to Other Options, UV Calibration and Whiteness, Factory Calibration of UV Filter for a detailed explanation of the standard procedure used by the factory to calibrate the adjustable UV filter, and its impact on CIE Whiteness evaluations.

Whiteness options offered with Datacolor CHECK include *Hunter Whiteness*, *Berger Whiteness*, and *Stensby Whiteness*, among others. Some of these evaluations were specifically developed to evaluate optical brightening agents, and others were developed to evaluate the whiteness of non-fluorescent samples. You should refer to the published standards that include these evaluations to determine if you are using them correctly.

Refer to Management Options, Setup Menu, Display Screen, Indices to enable/disable these evaluations.

Fluorescent Tile Calibration Procedure

To adjust the UV filter properly, you will need the following:

- White fluorescent tile provided with the instrument.
- Allen key provided with the instrument. This is used to adjust the
 position of the UV filter, based on the measurement of the
 fluorescent tile.
- Certificate provided with the instruments, containing the target whiteness values for the fluorescent UV tile.

Adjusting the UV Filter

The Datacolor CHECK^{PRO} is fitted with a special UV filter. On the back of the instrument there is a scale that indicates the filter position:



During the fluorescent tile calibration, you may be instructed to adjust the position of this filter. The program will prompt you to turn the Allen Key clockwise, or counterclockwise to adjust the position of the filter:

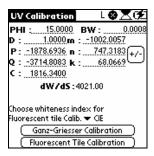


This is based on the difference between the target value and the measured value for the fluorescent tile. Once the target value is achieved, you can evaluate your samples for whiteness.

Fluorescent Tile Calibration Procedure

The procedure for performing the weekly fluorescent tile calibration is basically the same, regardless of whether you choose the CIE or Ganz Whiteness index. To perform the fluorescent tile calibration:

 Press the Shift and Management Options buttons on the Control Panel to display the Management Menus. Tap Setup Menu, UV Calibration. The screen below displays:



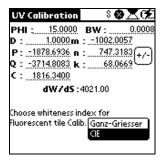
Using the Allen Key provided with the instrument, adjust the UV filter to the setting indicated on the certificate:





You do not need to reset the filter position if it has not been changed since the last UV filter calibration.

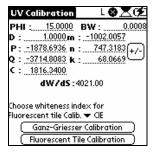
 From the UV Calibration screen, you must make two selections. In the field Whiteness Index to be used for Fluorescent Tile Calib, tap on the down arrow. Tap on the Whiteness Index, CIE or Ganz, to be used.



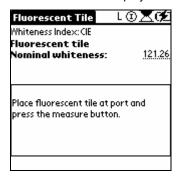


If the constants at the top of the screen are set to 0.0 and you have selected Ganz-Griesser as the whiteness index, the "Fluorescent Tile Calibration" button will not appear. You must enter the constants from the UV calibration certificate to enable the calibration button.

4. On the UV Calibration screen, tap Fluorescent Tile Calibration.



The screen below displays:



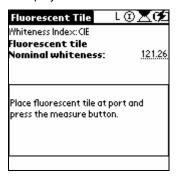
Enter the nominal whiteness value for your fluorescent tile.
 Depending on the whiteness index selected, this is either the CIE

Whiteness value or the Ganz Whiteness value on the certificate. To enter this value:

- Tap in the *Nominal Whiteness* field. The cursor will start flashing.
- Press the **Shift** and **Symbol** buttons on the Control Panel to display the keyboard. Tap the **123 icon** to display the numeric keypad.



When finished, tap **Done**. The Fluorescent Tile screen redisplays.



6. Place the fluorescent tile at the port and press the **Measure** button on the back of the instrument. Following the measurement, the screen below displays:



This screen displays the whiteness value for the fluorescent tile, based on the measurement just completed, and instructions regarding the adjustment of the UV filter.

 Direction. This line instructs you to turn the Allen key either "clockwise" or "counterclockwise", to adjust the filter position. This is based on the measurement just completed.



- Calc. Whiteness Value. This is the whiteness value calculated from the measurement.
- Target Whiteness Value. This is the nominal or target value for the tile.
- 7. After adjusting the UV filter, press the **Measure** button on the back of the unit to measure the tile again.
- 8. Repeat this procedure until the target value for the tile has been reached. When this happens, an **Accept** button displays at the bottom of the screen. Tap this button.



Return to the Datacolor CHECK Main Menu to perform a standard calibration.

Performing a Whiteness Evaluation

Once the fluorescent tile calibration is completed, you are ready to run a whiteness evaluation on your fluorescent samples. The procedure is as follows:

1. Calibrate the instrument using the normal calibration routine.



If you do not recalibrate the instrument after the fluorescent tile calibration is successfully completed, any whiteness evaluations you perform will NOT be valid!

- 2. Set the specular port setting to Specular Component Excluded (SCE).
- 3. Press the **Shift** and **Management** buttons on the Control Panel to display the Management Options.
 - Select Management Menu, Measurement.
 - Set Specular selection to SCE.
- Measure the fluorescent samples, and run either CIE whiteness or Ganz-Griesser (GG) whiteness.



NOTES

The CIE Whiteness evaluation is enabled/disabled from Management Options, Setup, Display Screen.

CIE Whiteness is available for evaluating optical brighteners. However, unless the instrument was calibrated using the CIE Whiteness calibration, the result may not be valid. Refer to Other Options, UV Calibration and Whiteness, Factory Calibration of UV Filter for a detailed explanation of the standard procedure used to calibrate the adjustable UV filter, and its impact on CIE Whiteness evaluations.

Summary of Whiteness Results

Once you have successfully completed the UV calibration, you can perform a whiteness evaluation. The whiteness evaluations that are most commonly used to evaluate the presence of OBA's include the following:

Ganz Whiteness. This whiteness equation is based on the measurement of standards having a known Ganz whiteness. Instrument-specific constants are calculated based on these standards, and are used in the calculation of Ganz Whiteness. This allows measurements from different instruments to be compared. It assumes that the standards used for the setup of the instruments are neutral with respect to hue. The standard values can be used as references, and do not have to be measured at the same time as the batch.

This index can also report a tint deviation, either in the red or the green direction. The notation consists of a letter and a number. R1 indicates that the sample has the smallest deviation in the red direction, while G5 indicates the largest deviation in the green direction.



- **WI.** Ganz whiteness value for the sample. The evaluation uses the instrument-specific parameters displayed on the UV calibration screen in the calculation.
- **Tint.** Indicates the magnitude and direction of the shift away from "white". Refer to Appendix, Supplemental Information, Interpreting Tint Values from Whiteness Evaluations for directions to interpret tint values.

CIE Whiteness. This is similar to the Ganz Whiteness index. However it uses standard constants rather than instrument-specific constants to calculate whiteness.



- WI. CIE Whiteness value calculated for the sample.
- Tint. Indicates the magnitude and direction of the shift away from "white".

Refer to Appendix, Supplemental Information, Interpreting Tint Values from Whiteness Evaluations for directions to interpret tint values.



CIE Whiteness is available for evaluating optical brighteners. However, unless the instrument was calibrated using the CIE Whiteness calibration, the result may not be valid. Refer to Other Options, UV Calibration and Whiteness. Factory Calibration of UV Filter for a detailed explanation of the standard procedure used to calibrate the adjustable UV filter, and its impact on CIE Whiteness evaluations.

The whiteness options also available for use include Hunter Whiteness. Berger Whiteness, and Stensby Whiteness, among others. Some of these evaluations were specifically developed to evaluate optical brightening agents, and others were developed to evaluate general whiteness. You should refer to the published standards that include these evaluations to determine if you are using them correctly.

Instrument Configuration for Datacolor TOOLS™

When you connect Datacolor CHECK to a computer used as the measuring instrument for Datacolor TOOLS™, or other Datacolor programs, this is referred to as 'tethered' mode. You must assemble the Datacolor CHECK cable (refer to Instrument/ Cable for assembly and connection instructions). and attach one end to the instrument and the other to a port on the back of the PC. You must also have available the diskette containing the calibration data for the Datacolor CHECK you are using (part of Datacolor CHECK shipment).

Datacolor CHECK can be connected to either a serial port or a USB port. For Datacolor CHECK to communicate successfully with Datacolor TOOLS™, the instrument selection in Tools must be "Datacolor CHECK." Refer to the Datacolor TOOLS User's Guide for details regarding software and instrument installation related to that program.



When you are running in 'tethered' mode, use the power adapter as the Datacolor CHECK power source. This will limit conflicts that occur if the instrument is in Sleep mode when you attempt a measurement from Datacolor TOOLS.

Two cables are provided to connect Datacolor CHECK to a computer. The serial cable is used if you are connecting to a serial port, and the USB cable is used to connect to the USB port. See Instrument Cables for instructions to make the cable connections.

If you are using a USB port, you must also install software onto the system, before you make the instrument selection in Datacolor TOOLS. Instructions for installing this software and configuring the instrument selection in Datacolor TOOLS are provided in the Appendix, Configuring Datacolor CHECK for a USB Port.

UV Filter Calibration in "Tethered" Mode



D NOTE

This information applies to Datacolor CHECK PRO only. The Datacolor CHECK^{PRO} can be used as the measuring instrument to evaluate materials treated with Optical Brightening Agents (OBA's). Refer to Other Options, UV Calibration and Whiteness Options for a complete explanation of the standalone UV calibration procedure and method for evaluating whiteness.

If you want to use the Datacolor CHECK^{PRO} as the measuring device to perform a CIE Whiteness evaluation in Datacolor TOOLS, we recommend that you use the following procedure:

- Connect the Datacolor CHECK^{PRO} to a communications port on the instrument, and make the necessary software changes to configure Datacolor TOOLS to recognize Datacolor CHECK.
- Perform the UV filter calibration for the Datacolor CHECK^{PRO} in 'stand-alone' mode, until you achieve the target value for the fluorescent white tile.
- 3. Run Datacolor TOOLS, and perform a standard instrument calibration using the Datacolor CHECK^{PRO} as the instrument.
- 4. Set the specular port selection in the desktop program to SCE.
- From the Datacolor TOOLS desktop, measure the sample containing the optical brightening agent, and select either the CIE Whiteness or Ganz Whiteness evaluation.

NOTES

Data Backup and Retrieval Functions

About Data Backup and Retrieval Functions

For everyday operation, all of the programs and data you use are located on the PDA. However, a removable memory card is provided with each instrument.





The memory card on the right is fitted with a "write protect" device. When enabled, it prevents you from copying information to the card.

This offers a simple, fast means of backing up the data that you collect. We recommend that your data be backed up daily. If you are running multiple shifts, you should back up the data following each shift.

The memory card can also be used to restore the program, in the unlikely event that the program on the handheld unit becomes corrupted.

Data Backup to the Memory Card

1. If the memory card is not in the unit, insert it into slot provided for it. The label faces front you as you insert the card.



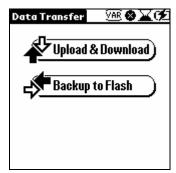
Re-enter the Datacolor CHECK software by tapping on the Datacolor icon.



The Datacolor CHECK main menu displays. Tap Data Transfer option.



4. When the Data Transfer screen displays, tap **Backup to Flash**.



- A new screen displays. Tap BACKUP (to flash). This copies files from the PDA to the removable memory card. While the copy is in progress, a confirmation dialog box is displayed with the message, "Copying databases." When the copy is complete, the dialog box displays.
- 6. Tap **Exit**. The Datacolor CHECK Main Menu displays.



Do not remove the memory card while the data transfer is in progress. Doing this will corrupt the data.

Data Retrieval from the Flash Card



Using this procedure will overwrite all data on the PDA. This procedure should ONLY BE USED if you have lost or corrupted the data on the PDA.

- 1. Install the memory card in the unit.
- 2. Repeat steps #1 #4 from the **Backup to Memory Card** procedure.
- 3. At step #5, select **Retrieve**. This copies files from the memory card to the PDA. If the databases already exist on the PDA, the program displays a dialog box, informing the user that the file already exists on the handheld unit.



There are 11 data files specific to the Datacolor CHECK program.

4. Tap **Yes** to overwrite the data in the folder on the RAM. Or, tap **Yes to All** to overwrite all of the existing Datacolor CHECK data on the RAM with the data from the card.

While the copy is in progress, a confirmation dialog box is displayed with the message, "Copying databases." When the copy is completed, the dialog box displays.

5. Tap Exit. The Datacolor CHECK Main Menu displays.

Flash Card Removal

The flash card in the unit is spring loaded. To remove it:

 Press down on the card with your finger, and then immediately remove it.



The card will spring out of the memory card slot.

Sharing Datacolor CHECK Data

About Synchronization, Export & Import Functions

The Datacolor Portables Desktop Program is provided with the Datacolor CHECK spectrophotometer. When it is installed, two 'shortcuts' are added to the Windows Desktop:





The Datacolor Portables Sync Wizard and Datacolor Portables Desktop program together provide a powerful tool for transmitting data between the stand-alone Datacolor CHECK, the computer and many third party software programs that are installed on it, such as Datacolor TOOLS.

Datacolor Portables Sync Wizard

This features steps the user through the process of transmitting, or "synchronizing" data between a standalone Datacolor CHECK and a computer. When the process is complete, there is an identical copy of the Datacolor CHECK data on each device.

Datacolor Portables Desktop Program

Once the Datacolor CHECK data is transferred to the desktop computer, this program provides options to edit, import and export the Datacolor CHECK data stored the computer. Using the import and export features, data can be transferred between other Datacolor programs and the stand-alone Datacolor CHECK unit.

Data synchronization, export and import are independent functions. For example, you can perform synchronization and then exit the Wizard. At a later time, you can use the Datacolor Portables Desktop program to export the data for use with other computer programs, and/or import data from the Datacolor TOOLS™ desktop for transfer to the stand-alone unit. To enable these features you must install two programs, the Palm® HotSync Manager™ and Datacolor Portables Desktop program, onto your computer.

Datacolor Portables Sync Wizard

The Datacolor Portables Sync Wizard handles the data synchronization function with minimum of input from the user. The Wizard is a separate program, but it can be launched from within the Desktop Portables program.



In the Datacolor Portables Desktop program, the View Menu includes an option, Wizard View, which switches to the Wizard without requiring the user to exit the program.

What is Data Synchronization?

Synchronization is a process by which a computer and the Datacolor CHECK PDA exchange information.

The Datacolor Portables **Sync Wizard** performs the synchronization procedure. The synchronization can also be performed manually running the Palm® HotSync Manager™ as a stand-alone program.

The process of synchronization updates the data on both the stand-alone Datacolor CHECK unit, and the Check database the computer. When the synchronization is completed, the Datacolor CHECK data on both devices is identical. Changes made to the data in the computer are updated the Check PDA. and vice-versa.

What happens when changes are made to the same data record on each device?

There is a setting in the software that directs the program regarding how to handle changes that have been made to the same data record on both devices. Refer to Hot Sync Menu/Custom/Precedence for information on this option.

What is Import and Export?

Once the Datacolor CHECK is synchronized with a computer, its data can be transferred to Datacolor TOOLS™ and other third-party programs. Data from Tools can also be transferred to the Datacolor CHECK database for transfer to the stand-alone Check unit during the next synchronization. The Desktop Portables program includes two options, *Export* and *Import* that are used to transfer the Datacolor CHECK data to other programs the computer.

- Export. This feature is used to format the Datacolor CHECK data and transfer it to a file for use with third party software such as Datacolor TOOLS™.
- Import. This feature is used to format Datacolor TOOLS™ data and transfer it to the Datacolor CHECK database. This data is then transmitted to the stand-alone Datacolor CHECK during the next synchronization.

Typical Data Transfer Routines

Below is a summary of the common data transfer routines for Datacolor CHECK data, and the programs that are included in each procedure.

Transferring Data from Datacolor CHECK to Datacolor TOOLS ™

To transfer data from the Datacolor CHECK unit to Datacolor TOOLS for more advanced quality control evaluations, you need to perform a single data synchronization. This can be considered a 'one way trip' that starts from the Datacolor CHECK unit and ends at the Datacolor TOOLS desktop.

The programs and features you will use include:

- Datacolor Portables Synch Wizard. Transfers the data from the Datacolor CHECK unit to the Check database the computer.
- Datacolor Portables Desktop Program. The Export Data option (File Menu/Export Data from Datacolor CHECK) formats the Check data in the computer, and exports it to a QTX file that can be read by other Datacolor programs. There are also options to export the Datacolor CHECK data to either CSV or TXT format for use with other third-party software.



NOTE

When data is moved between the *Datacolor CHECK* database and the Datacolor TOOLS desktop, tolerances are not currently included in the data transfer.

Transferring Data from Datacolor TOOLS ™ to Datacolor CHECK

To transfer samples stored in Datacolor TOOLS to the Datacolor CHECK unit, you use the same features needed in the 'Datacolor CHECK to Datacolor TOOLS transfer. However the procedure is reversed. You start from the Tools desktop and end at the Datacolor CHECK unit:

The features used include:

- Datacolor TOOLS Program. Exports from the Datacolor TOOLS desktop to a QTX file
- Desktop Portables Program. The Import Data option (File Menu, Import Data to Datacolor CHECK) is used to import the QTX file to the Check database the computer.
- Datacolor Portables Sync Wizard. Transfers the data imported from Datacolor TOOLS to the stand-alone Datacolor CHECK.

Datacolor CHECK to Datacolor TOOLS to Datacolor CHECK Data Transfer

There may be situations in which data is transferred from the Datacolor CHECK unit to the Datacolor TOOLS desktop for further evaluation, and then returned to the Datacolor CHECK. For example, you may want to verify that the standards stored on the Datacolor CHECK PDA are identical to the standards stored in Datacolor TOOLS. Any differences can be updated on the Datacolor TOOLS desktop, and the corrected data transferred back to the Datacolor CHECK PDA. The procedure would be as follows:

- Datacolor Portables Sync Wizard. Used to transfer data from the stand-alone Datacolor CHECK to the Desktop Portables database on the computer.
- Datacolor Portables Desktop Program. The Export Data option (File Menu/Export Data from Datacolor CHECK) is used to export the data from the Datacolor CHECK User to a QTX file that can be read by Datacolor TOOLS.
- Datacolor TOOLS Program. The Import Desktop button in Datacolor TOOLS is used to import the Datacolor CHECK data (QTX file) to the Tools desktop. You can then compare the standards from the stand-alone Datacolor CHECK to the standard stored in Tools. If there is a discrepancy, you can edit the standard data the desktop.
- Datacolor TOOLS Program. The Export Desktop button in Datacolor TOOLS is used to export the data from the Datacolor TOOLS desktop to a QTX file.

- Datacolor Portables Desktop Program. The Import Data option (File Menu, Import Data to Datacolor CHECK) is used to import the QTX file from Datacolor TOOLS to the Datacolor CHECK database the computer.
- Datacolor Portables Sync Wizard. Perform a second data synchronization to update the data on the stand-alone Datacolor CHECK.

Installing the Software

The Datacolor Portables Sync Wizard is installed along with the Datacolor Portables Desktop program. You must install the following programs:

Palm HotSync Manager. This is a program provided by Palm® and was included with the Datacolor CHECK unit. It is found on a CD labeled Palm. **THIS MUST BE INSTALLED FIRST!**

 Place the Palm CD in the drive. A wizard will be launched to guide you through the installation procedure.

Datacolor Portables Desktop Program. This program is found on the Datacolor CHECK CD.

 Place the CD in the drive, and select Setup. A wizard will guide you through the installation.

Preparing for Data Synchronization

The synchronization procedure requires specific configurations for the instrument, hardware and software.

Cable Connections

You must use the custom cable provided with the stand-alone Datacolor CHECK to connect the instrument to the computer. It is the same cable that is used to connect the Datacolor CHECK to its power adapter. Refer to the Instrument Cable section in this guide for instructions on cable assembly.

Connect the instrument to the desktop computer using the custom instrument cable.

- The 8-pin radial connector plugs into the back of the Datacolor CHECK unit.
- The other end plugs into a communications port on the back of the computer.

NOTES

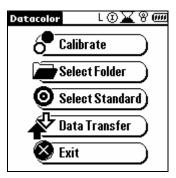
You can connect Datacolor CHECK to either a serial or a USB ort on the computer. This selection determines which communications cable you will use, and whether you need to load additional software onto your computer to enable the communications. Refer to Instrument Cable, and Appendix, Configuring Datacolor CHECK for Use with a USB Port in this guide for additional information.

We recommend that you connect the *Datacolor CHECK* to its power adapter for the synchronization procedure.

Datacolor CHECK PDA

Backup the data the Datacolor CHECK PDA *before* beginning the synchronization. The Datacolor CHECK program must be active on the Datacolor CHECK PDA.

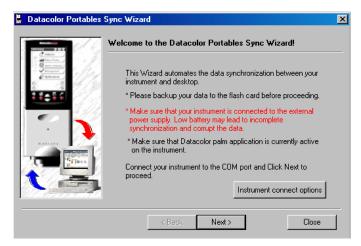
 From the Datacolor CHECK Main Menu, select Data Transfer, Backup to Flash.



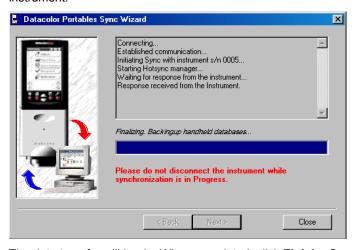
See Data Backup and Retrieval Functions in this guide for instructions to perform the backup.

Running the Datacolor Portables Sync Wizard

 From the Windows desktop, click the Datacolor Portables Sync Wizard icon. The dialog box below displays.



Click Next. The program will establish a connection to the instrument.



 The data transfer will begin. When completed, click Finish. Once the data is synchronized, you can use the Datacolor Portables Desktop Program to edit, import, or export the Datacolor CHECK data on the computer.

NOTES

Desktop Portables Program

About the Desktop Portables Program

The **Desktop Portables** program provides the user with access to the Datacolor CHECK data stored on the computer, and provides the following functions:

View, edit, delete and archive data that is transferred from the Datacolor CHECK portable spectrophotometer to the Desktop Portables database on the computer.



The editing function is currently limited to editing record names.

- Format Datacolor CHECK data for export to other Datacolor programs. This is the *Export* function.
- Format Datacolor CHECK data for export to 3rd party programs. The data can be formatted for both CSV and TXT output. This is another export function.
- Format data imported from the Datacolor TOOLS desktop. This data can later be transferred to the stand-alone Datacolor CHECK. This is the Datacolor CHECK Import function.
- Transfer white tile data (included on a diskette from Datacolor) to PDA software on the Datacolor CHECK. This is another import function.

This program resembles the Windows Explorer program, using similar formats and navigation devices. It is provided on a CD included with the Datacolor CHECK unit.

Types of Datacolor CHECK Data

The Datacolor CHECK database includes six data types:

- Folders
- Standards
- Batches
- Tolerance Blocks
- Tolerances
- · White Tile Data

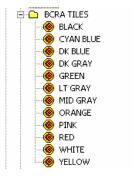
Folder

A Datacolor CHECK folder is similar to a conventional folder in a file cabinet. It contains standard, batch and tolerance data. The folders are created on the stand-alone Datacolor CHECK. The user can either store all of the Datacolor CHECK data in a single folder, or create multiple folders to organize the data into smaller groups that have common characteristics.



Standard

Standards are the reference samples stored in a folder:



Batches are always associated with a standard:

BatchName	StandardName	FolderName
batch ct1	PINK	BCRA TILES
Batch_00002	PINK	BCRA TILES
Batch_00003	PINK	BCRA TILES
Batch_00004	PINK	BCRA TILES

Individual batches can be deleted. However, when a standard is deleted, all batches associated with the standard are also deleted.

Tolerance Blocks

A tolerance block contains the actual numerical values used to determine if a batch 'passes' or 'fails.' A tolerance block is restricted to one color difference equation for one illuminant/observer calculation (i.e. CIEL*a*b* under D65/10).

ToleranceBlockName	IlluminantName	ColormetricEquationID
CIELAB A/10	D75/10	None
CIELAB D65	D65/10	CIEL*a*b*

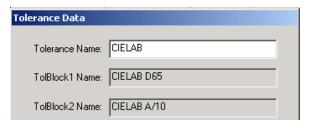
Tolerance blocks are usually attached to a tolerance(s). You cannot delete a tolerance block if is included in a tolerance.



From the Desktop Portables program you can only view and edit summary data for the tolerance block. The actual numerical limits stored in each tolerance block can only be edited from the Datacolor CHECK PDA.

Tolerances

The program feature that performs a "Pass/Fail" evaluation uses tolerances. A tolerance is a collection of tolerance blocks. It consists of a name, and a list of the tolerance blocks included in the tolerance.



It must contain a minimum of 1 tolerance block, and a maximum of 6 tolerance blocks
Tolerances are assigned to individual standards and to folders. They can be associated with multiple standards and/or multiple folders.



The tolerance does not contain the numerical pass/fail values.

They are stored in the tolerance block.

White Tile Data

These folders contain 31-point reflectance data for a white calibration tile, provided by Datacolor. You can import this data from a diskette or another type of media, and transfer it to the Datacolor CHECK during data synchronization.

Managing Your Data

The program includes the following data management features:

- View. The user can view the details regarding, folders, tolerances and tolerance blocks, and spectral data for individual standards and batches. White tile spectral data can also be viewed and edited.
- Edit. The editing feature is limited to editing names. This is true for folders, standards, batches, tolerances and tolerance blocks. The exception to this is white tile (calibration) data. White tile values can be edited through the Desktop program after they are imported to a Datacolor CHECK user.

It may happen that the same piece of data is edited on both the stand-alone Datacolor CHECK and the computer. During the next data synchronization, the default software configuration instructs the program that changes to the Datacolor CHECK database on the computer override changes made the Datacolor CHECK PDA. For example:

Original std name	New std name (Datacolor CHECK PDA)	New std name (computer)	Name on both devices after synchronization
Std 1	Tan Std	Beige Std	Beige Std

This is true for any type of Datacolor CHECK data edited.



NOTE

This default instruction can be changed. Refer to Hot Sync Menu, Custom, Datacolor Portables Conduit, Change, Precedence for details on this setting.

- **Archive.** This option can be a valuable data management feature deactivates a folder. Archived folders are ignored during data synchronization. You can move inactive/obsolete data from the Datacolor CHECK to the desktop, and archive it. Folders archived on the computer are deleted from the Datacolor CHECK PDA during the next synchronization. At a later time, the archived data can be reactivated, and transferred to the Datacolor CHECK during synchronization.
- **Delete.** The program allows the user to delete folders, standards. batches, tolerances and tolerance blocks. When data is deleted from one device, during the next synchronization it will be deleted from the other device. For example, if a folder is deleted from the Datacolor CHECK PDA, it will be deleted from the Datacolor CHECK database the computer during the next synchronization.



WARNING

You should regularly back up the Datacolor CHECK data to the flash memory card provided with it. This becomes very valuable if you accidentally delete a folder from the Datacolor CHECK PDA. If you can retrieve it from the flashcard before the next synchronization, the folder will not be deleted from the computer.

Import/Export Features

The Desktop Portables program also provides import and export functions. These options allow data to be exchanged between Datacolor CHECK and other Datacolor programs, and with 3rd party programs that can use data in CSV or TXT format. The import/export options are found on the File Menu.

Import Data

The Import options provide the ability to format and transfer data from the Datacolor TOOLS desktop to the Desktop Portables database. This data is transmitted to the stand-alone Datacolor CHECK during the next synchronization.

• Import White Tile Data. If the white tile originally provided with the Datacolor CHECK is lost or damaged, Datacolor will provide a replacement tile and a new calibration file. "Import White Tile data" (File Menu, Import White Tile Data) is used to convert this data for transfer to the stand-alone unit.

If you have received a new white tile, it is essential that you replace the white tile data in the Datacolor CHECK PDA before calibrating the unit using the new white tile.



During the calibration of the Datacolor CHECK in stand-alone mode, the program identifies the white tile data it is using. This number must match the number the back of the white tile. When incorrect white tile data is used in the calibration procedure:

- * It is not possible to compare the absolute data measured by two different instruments.
- * It is not possible to compare measurements made by the same unit, before and after the calibration data is changed.

Export Data

The Desktop Portables program includes options to export Datacolor CHECK data to QTX file(s), which are used to transfer data between Datacolor programs. The user can also export Datacolor CHECK data to either CSV or TXT formats for use with 3rd party software programs.

Getting Started

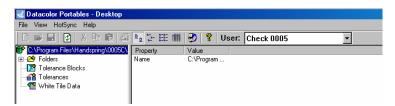
You must run the Datacolor Portables Sync Wizard before you can access the program options in the Desktop Portables program. This creates the Datacolor CHECK User on the computer, and transfers the data from the Datacolor CHECK to the desktop computer. See Datacolor Portables Sync Wizard, Preparing for Data Synchronization, Running the Wizard in this guide for directions to run the wizard.

To launch the Desktop Portables program, do the following:

• Double click the **Desktop Portables** icon.



The Desktop Portables main window displays.

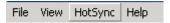


Navigation Conventions

Windows programs typically offer the user more than one way to execute a function. These include selecting options from the drop-down menus, clicking on screen icons, or using shortcut keys.

Menus

The Desktop Portables program uses a menu bar similar to those found in other Windows programs:



When you click the menu headings, a drop-down menu displays. When a drop-down menu displays, click the option you want to use.

Functions that are 'grayed out' are not currently available.

Mouse Keys

To activate some menu options, you must click the *left button* on the mouse. Others require you to click the *right button*. Similarly, some functions are executed with a single mouse click, while others require two clicks. In this documentation, when you are instructed to click the mouse, click the left mouse key once, unless the instructions are explicit regarding the mouse button to use.

Desktop Portables Database

The data transferred from the Datacolor CHECK PDA to the computer is stored in a database created for Datacolor CHECK data. Since it is possible to have multiple Datacolor CHECK units, a separate database is assigned to each instrument, and is identified by the serial number of the unit.

Be sure to select the correct user before beginning the data transfer. If the folder you want to export does not appear in the list of folders displayed in the Desktop Portables program, you may have the wrong Datacolor CHECK User selected. Verify that the user selected matches the Check unit from which the folder was transferred.

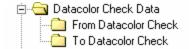


If the Datacolor CHECK you are using does not appear in the list, it has not been synchronized with the computer you are using. Use the Datacolor Portables Sync Wizard to perform the synchronization. The new instrument should then appear in the *User* list.

Preparing for Import and Export

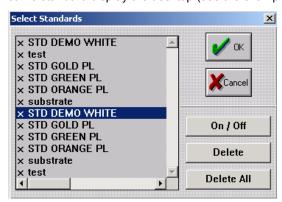
To better manage the data you import and export, you should create two folders on the computer, and the folder name should identify the contents:

- One holds the files exported from Datacolor CHECK—e.g., From Datacolor CHECK.
- The other holds files imported to Datacolor CHECK—e.g., To Datacolor CHECK.



Datacolor TOOLS Users

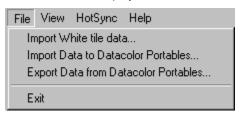
- To exchange data between the stand-alone Datacolor CHECK and the Datacolor TOOLS desktop, you must add two buttons: Import Desktop and Export Desktop, to the Tools button bar. Refer to Datacolor TOOLS User Guide, System Menu, Edit Button Bars for instructions.
- 2. Clear the Datacolor TOOLS desktop of all data. Store standards and batches in the appropriate folders in the Tools database. We recommend this because when you import data from the Datacolor CHECK to the desktop, the data is added to the samples already on the desktop. If any standards from the Datacolor CHECK are duplicates of standards already the desktop, two copies of the same standard display the desktop (see the example, below).



File Menu

The File Menu includes the import and export options offered by the program. These options allow you to move data between the Datacolor CHECK unit, the Datacolor CHECK User the desktop computer, Datacolor programs and other third party programs.

To access the File Menu, move to the menu bar, and click File.
 The menu below displays.



Overview of Import Features

Two import options are used to transfer data to the Datacolor CHECK User currently selected.

- Import White tile data imports white tile data from a diskette to user in the Desktop Portables database the computer.
- Import Data to Datacolor CHECK imports data from a *.QTX file generated by a Datacolor program to the Datacolor CHECK user.

Import White Tile Data

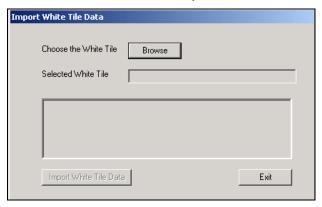
This option is used to transfer white tile data from a diskette to a Datacolor CHECK PDA. If the calibration tile for the Datacolor CHECK PDA has been lost you must use this feature to replace the white tile data the Datacolor CHECK PDA.

Before You Begin

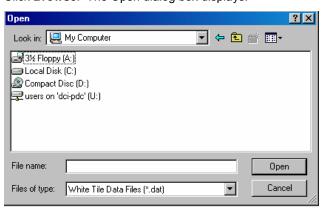
You need to check the *User* currently selected in the Desktop Portables program before you begin importing white tile data. The *User* that is currently selected identifies which Datacolor CHECK will receive the imported data. If the User selected does not match the Datacolor CHECK that should receive the new white tile data, the data will not be transferred to the correct Datacolor CHECK during the next data synchronization.

Import Procedure

- Insert the diskette containing the white tile data into the diskette drive.
- 2. From the menu bar, select File, Import White Tile Data.



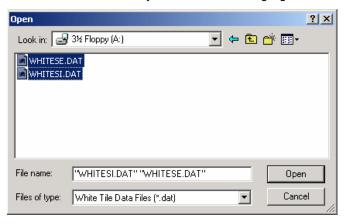
3. Click Browse. The Open dialog box displays.



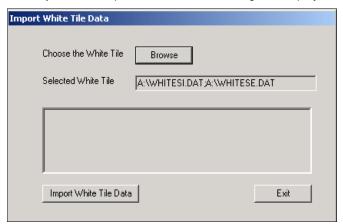
4. Highlight **Floppy A**. The window refreshes, and the files the diskette are displayed.



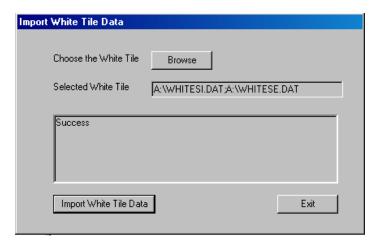
- 5. You must import both files. To select both files, do the following:
 - Click to highlight one of the white tile files.
 - When the file is highlighted, press the CTRL key.
 - With the CTRL key depressed, click the 2nd white tile file.
 - Release the CTRL key. Both files will be highlighted.



6. Click Open. The Import White Tile Data dialog box displays.



7. Click *Import White Tile Data*. The message "success" will be displayed, and the files are displayed in the Desktop program.



The new white tile has been stored in Datacolor CHECK User. This data will be transmitted to the stand-alone Datacolor CHECK during the next data synchronization.

Both files *must* be imported from the diskette to the Datacolor CHECK user, and transferred to the stand-alone unit. If both files are not transferred to the Datacolor CHECK, when you try to calibrate the stand-alone unit, you will receive the following error message:



The instrument will complete the calibration successfully, but the calibration will not be accurate!

Import Data to Datacolor CHECK

QTX files are used to transfer data between Datacolor programs. For the Datacolor CHECK application, a QTX file is imported from a Datacolor program, such as Datacolor TOOLS, to the Datacolor CHECK database on the computer. This procedure consists of two steps:

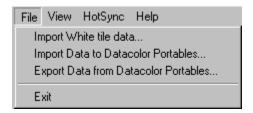
- Export samples from the Datacolor TOOLS desktop to a *.QTX file (Datacolor TOOLS).
- Import the *.QTX file to a Datacolor CHECK User (Datacolor Portables Desktop Program).

Once the data is imported to the Datacolor CHECK database on the computer, it will be transferred to the designated Datacolor CHECK during the next data synchronization.

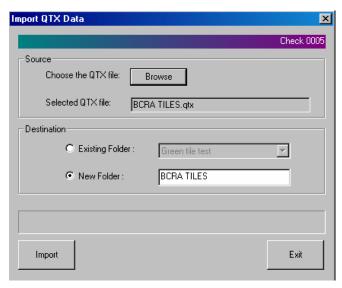


If you are a Datacolor TOOLS user, refer to the *Datacolor TOOLS User's Guide* for a detailed explanation for adding export and import functions to the Tools button bar.

- 1. Double-click on the **Desktop Portables icon** to open the program.
- 2. From the menu bar, select File, Import Data to Datacolor Portables.

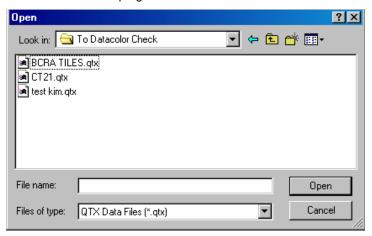


The Import QTX Data dialog box displays.

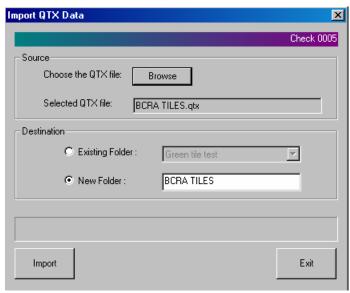


The QTX file containing the data from other Datacolor programs is stored in a folder of your choice.

Click Browse to find the QTX file exported from Datacolor TOOLS, or another Datacolor program.



4. Highlight the file to be imported, and click **Open**. The Import QTX Data dialog displays.



- Destination. Identifies the name that will be assigned to the file in the Desktop Portables database.
- Existing Folder. If you are updating a folder already stored in the database, click Existing Folder. Click the down arrow to view the folders in the Desktop Portables database, and highlight the folder to be updated. Refer to Importing Data to an Existing Datacolor CHECK Folder for details on this procedure.
- New Folder. If this data has never been stored in the Datacolor CHECK database, click New Folder.

The default name for the folder is the name of the QTX file.

You can rename this file by entering a name in this field. The name can contain a maximum of 20 characters.

5. When you have made the destination file selection, click Import. The import process will begin. When it is finished, 'success' will be displayed in the status bar at the bottom of the window. To verify that the folder has been imported to the Datacolor CHECK User, display the folders in the user. In the example below, BCRA Tiles displays in the folder list.



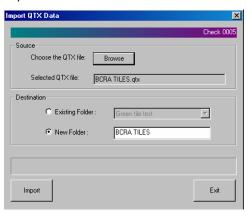
To transfer this data to the stand-alone Datacolor CHECK, perform data synchronization.



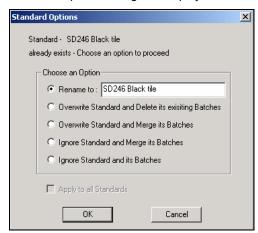
The imported folder will be stored in the Datacolor CHECK User currently selected. If you have selected the wrong user, the data will not be transferred to the correct Datacolor CHECK during the next synchronization. Verify that the User selected matches the unit that is to receive the data, before you begin the import.

Importing Data to an Existing Folder

When you import data to an existing Datacolor CHECK folder, the program may discover duplicate records in the existing Datacolor CHECK folder. This option provides the program with instructions to use when it finds duplicate records.



- Select Existing Folder. Click the down arrow to view the folders in the Datacolor Portables database, and highlight the folder to be updated
- 2. Click **Import**. When the program finds a duplicate record, the Standard Options dialog box displays.



Click in the radio button to activate the preferred action, and then click OK.

OPTION	DESCRIPTION
Rename To	If you want to assign the duplicate standard a different name, enter a new name.
Overwrite Standard and delete its existing batches	The imported data will overwrite the existing standard data, and the existing batches will be deleted. The name will remain the same.
Overwrite standard and merge its batches	The existing standard data will be overwritten. The existing batch data will be retained, and any new batches from the imported standard will be added to the standard in the existing Datacolor CHECK folder.
Ignore standard and merge its batches	The existing standard data is retained. Any new batches from the imported standard are added to the standard in the Datacolor CHECK folder.

Ignore standard and its batches	None of the imported standard or batch data is stored in the existing Datacolor CHECK folder.
Apply to all Standards	The selection made in this window is applied to all duplicate standards found during the import process. Click in the box to add or remove the check.

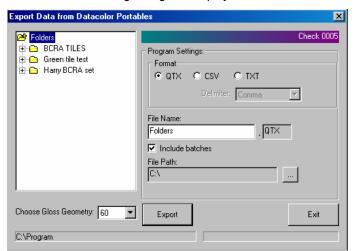
Overview of Export Features

Three types of files can be exported from the Datacolor CHECK user:

- QTX File. This is a proprietary file format used to exchange data between the stand-alone Datacolor CHECK and another Datacolor program, such as Datacolor TOOLS. QTX files are exported from the Datacolor CHECK User to a QTX file. Once in the QTX format, the data can be imported to the Datacolor TOOLS desktop.
- **CSV File Export.** This is a file format used by many third-party software programs. A comma is used to delimit, or separate the data. The Datacolor CHECK data is exported to a *.CSV file, and can then be imported to another program.
- TXT File Export. Many third-party software programs also use this file format. The difference between this format and *.CSV is that the character to be used as the data delimiter is customized by the user.

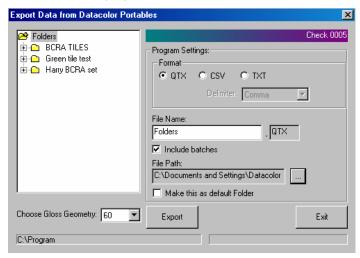
QTX File Export

 Double-click the Desktop Portables icon to open the program. From the menu bar, select File Menu, Export Data from Datacolor CHECK. The following dialog box displays.



218 • File Menu Datacolor CHECK™

- Select the file format. This field indicates the type of file to be exported.
 - To select the QTX file format, click the QTX radio button.
- 3. In the left pane, highlight the Check folder to be exported.



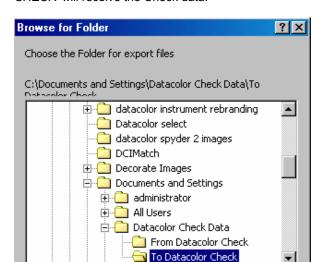


If the folder you want to export does not appear in the list of folders displayed by the Desktop Portables program, you may have the wrong *Datacolor CHECK User* selected. Verify that the *User* selected matches the unit from which the folder was transferred.

- 4. Identify a File Name. This is the name that will be assigned to the QTX file receiving the Datacolor CHECK data. The default is the name of the folder selected. You can rename this file by entering a name in this field.
 - Include batches. If standards and batches are to be exported, click in this box to place a check. If standards only are to be exported, this check should be removed. Click a second time to remove the check.
 - File Path. This field indicates where the QTX file will be stored.
 - To browse the system, click the Browse button.



 The Browse dialog box displays. Highlight the folder that will receive the QTX file. In this example, the folder 'To Datacolor



CHECK' will receive the Check data.



When the folder is selected, the path to it is displayed in the *File Path* field.

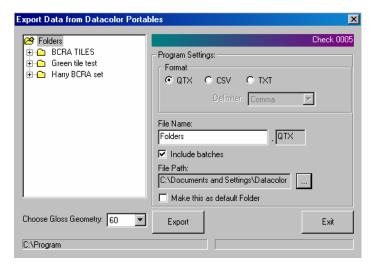
OK.

Cancel

 Identify a Gloss Geometry. If any samples were measured using Gloss as the specular selection, the program must identify the gloss geometry selected for the measurement.



Refer to Other Options, Gloss Compensation for an explanation of the gloss determination and gloss compensation options available on the stand-alone Datacolor CHECK.



6. When the correct selections have been made, click the **Export** button to start the export. The message "Success" displays at the bottom of the screen when the export is completed.



You must repeat this procedure for each folder that you want to convert to a *.QTX file.

CSV File Export

 Select File, Export Data from Datacolor Portables. The following dialog box displays.



- 2. Click the radio button to select CSV file format.
- 3. Go to QTX Export, step #2, to complete the export procedure.

TXT File Export

1. Select File, Export Data from Datacolor Portables.

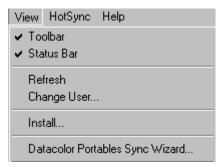


- 2. Click the radio button to select TXT file format.
- 3. **Delimiter**. Enter the character used to separate the values.
 - To view a list of choices, click the drop-down list arrow.
 - To enter a custom character, type it in the field.
- 4. Go to QTX Export, step #2, to continue the export procedure.

View Menu

The View Menu provides options that configure the screen display and data display for the program.

• Move to the menu bar, and select **View**. The View menu displays.



Toolbar and Status Bar Options

A check next to either of these options indicates that the bar(s) are currently displayed. To remove either bar from the display screen:

- Place the cursor over the option, and press the left mouse key once.
 The check will disappear.
- To add the bar to the display screen, place the cursor over the option, and press the left mouse key once. The check displays.

Toolbar. The Toolbar is the bar directly below the Menu Bar at the top of the screen. It contains icons that access specific program options.

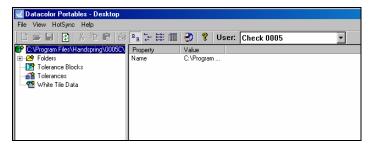


Status Bar. The Status Bar is found the bottom of the screen, immediately above the Taskbar. It contains information about the current date and time, the contents of the active folder, and indicates the settings of various hardware and software conditions.



Refresh

This option will refresh the screen display, and restore the data display to the default view.



Change User

When you have several Datacolor CHECK units, you will need to match the Datacolor User selected in the program to the stand-alone unit that you are using. Select this option to display the dialog box for changing the Datacolor CHECK User:



- 1. Click the drop-down list arrow to display a list of choices.
- 2. From within the displayed list, click on the desired user.

Wizard View

This option opens the Datacolor Portables Sync Wizard. You can launch the wizard without leaving the program.

Install

This option is used to add software applications to the Datacolor CHECK PDA during the next synchronization. It is not currently used by the Datacolor CHECK application.

Refer to the Visor Handspring[™] documentation for details on this feature.

HotSync Menu

The HotSync Menu provides access to the settings in the Palm HotSync Manager program.



When the Hot Sync Manager program is **not** open, all options except "Start HotSync Manager" are grayed out and not available for use. To open

Close HotSync Manager
ger"
Start HotSync Manager
pen
Janager The remaining

HotSync Help

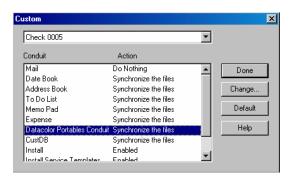
Custom... View Log...

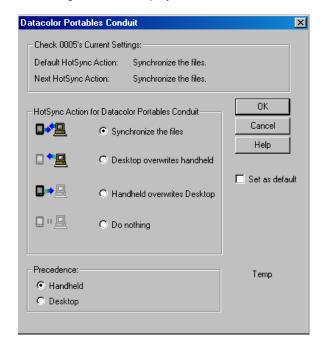
the Hot Sync Manager, click **Start HotSync Manager**. The remaining options on the menu then become active.

Custom

This option customizes the data synchronization process for each conduit available for the selected user.

 In the Custom dialog box, highlight Datacolor Portables Conduit, and click the Change... button.





The dialog box below displays.

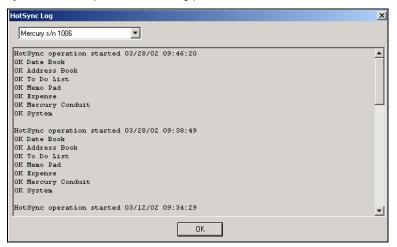
2. Click the radio button that corresponds to the setup to be used.

OPTION	DESCRIPTION
Synchronize the files	The Datacolor CHECK data on the computer and the PDA will be synchronized. When the process is completed, the data on both devices will be expanded to incorporate all of the data found on each device. This is the default setting for Datacolor CHECK synchronization.
Desktop overwrites handheld	During the synchronization process, changes made to the Datacolor CHECK data on the computer will overwrite changes made to the data the PDA.
Handheld Overwrites Desktop	During the synchronization process, changes made to the Datacolor CHECK data on the PDA will overwrite changes made to the data on the computer.
Do Nothing	Datacolor CHECK data will not be updated during the synchronization.

OPTION	DESCRIPTION
Precedence	When the same record has been edited in the Desktop Portables database and the Datacolor CHECK PDA, the system must know which edited record is correct.
	 Handheld. The changes made to the Datacolor CHECK PDA will be stored in both locations. Desktop. The changes made the computer will be stored in both locations.
Set as default	Place a check in this box to make the current selection for Datacolor Portables Conduit the default selection.

View Log

Each time data is synchronized, notes are added to the log regarding the outcome of the synchronization. This records information regarding the synchronization process, including problems that occurred.

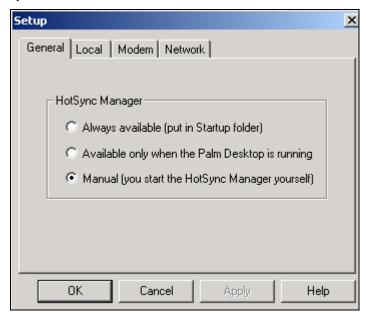




A log is kept for each conduit on the system.

Setup

This option controls the configuration of the hardware and software for data synchronization.





These options can be also be accessed from the Hot Sync Manager program.

General Tab. This group of options controls whether the Hot Sync Manager is opened automatically.

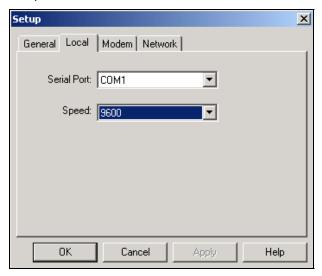
- Always available. Whenever you start your computer, the Hot Sync Manager is automatically started as part of the Startup procedure.
- Available only when the Palm Desktop is running. The Hot Sync Manager is automatically opened when the Palm Desktop application is running. This results in the serial port being reserved for data synchronization whenever the Palm Desktop is running.



When you are running Datacolor TOOLS, or other Datacolor applications, you will not be able to use the instrument to measure samples when the HotSync Manager is open, even if data synchronization is not in progress.

• **Manual.** The user is required to open the HotSync Manager to perform data synchronization. When the HotSync Manager is not open, the port is available for other uses. *This is the default selection for the Datacolor CHECK synchronization setup.*

Local Tab. This tab identifies the port to be used for the synchronization, and the speed at which the data will be transferred.



- Port. Click the down arrow to view the list of ports on your computer, and select the port connected to the Datacolor CHECK. This list includes both serial and USB ports.
- Speed. Baud rate refers to the speed at which the data will transfer between the Datacolor CHECK and the desktop computer. For the Datacolor CHECK data synchronization, the baud rate must be set to 9600. Click the drop-down list arrow to view the baud rate choices, and select 9600.

Modem Tab. For a typical Datacolor CHECK synchronization, no changes are made to these defaults. They control advanced synchronization features offered by the Palm Hot Sync Manager. *Refer to the Visor Handspring documentation for further information.*

Network. For a typical Datacolor CHECK synchronization, no changes are made to these defaults. They control advanced synchronization features offered by the Palm Hot Sync Manager. *Refer to the Palm documentation for further information.*

Start Hot Sync Manager

Launches the HotSync Manager. This allows you to run the data synchronization manually. When the Hot Sync Manager is running, its icon displays in the system tray.





When the Hot Sync Manager is running the port is occupied. You must close the Hot Sync Manager to make a measurement.

NOTES

Data Management Options

Data Manager for Desktop Portables

In the Datacolor Portables Desktop Program, you can view, edit, delete, and/or synchronize data. The types of data you can work with include the following:

- · Folders, which contain Standard and Batch Data
- Tolerances
- Tolerance Blocks
- White Tile Data

View Data

For any of the data types, there are several techniques you can use to view the details for each data type:

 A plus (+) sign next to a data type (e.g., Folder, Standard, Batch, Tolerance, Tolerance Block, White Tile Data) indicates there are multiple entries in each category.



Place the cursor over the plus (+) sign, and left-click the mouse button. More detail regarding the entries in the data type you selected displays in the left pane.

 If you place the cursor over the folder icon and left click the mouse, the detailed view displays in the *right* pane:



Edit Data

Editing functions in this program are limited to editing names. The only exception to this is the white tile data. Refer to the particular data type (e.g., folders, standards, tolerances, etc.) for editing instructions.

Data Editing and Synchronization

When data is edited on one device (for example the computer database), the change is updated on the other device, (the Datacolor CHECK PDA), during the next data synchronization. When the synchronization is completed the data on both devices are identical.

Delete Data

All data types except white tile data can be deleted using this program.

- **Delete Folders.** When a folder is deleted, all sample data is lost. Refer to Data Management, Folder Management for a additional information.
- Delete Standards. When a standard is deleted from a folder, all batches associated with the standard are also deleted. Refer to Data Management, Standard Managements for additional information.
- **Delete Batches.** Individual batches associated with a standard can be deleted. Refer to Data Management, Batch Management for additional information.
- **Delete Tolerances**. Tolerances can be deleted. Refer to Data Management, Tolerance Management for additional information



If a tolerance is assigned to a standard or a folder, you cannot delete it. You must first disassociate it from every folder and/or standard it is assigned. Refer to Data Management, Tolerance Management for a detailed explanation of associating tolerances to standards and folders.

Delete Tolerance Blocks. Tolerance blocks can also be deleted. Refer to Data Management, Tolerance Block Management for additional information on tolerance block management.



If a tolerance block is assigned to a tolerance, you cannot delete it. You must first delete it from each tolerance that uses it. Refer to Data Management, Tolerance Block Management for a detailed explanation of associating tolerances to standards and folders.

Data Deletion and Data Synchronization

Because data synchronization is a two-way process, you must pay special attention to data that is deleted. If a piece of data is stored on both devices (PDA and computer), and then deleted from one of them, it will be deleted from the other device during the next synchronization.

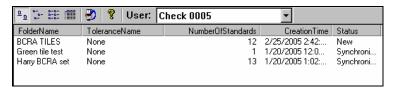
Folder Data

Maintenance options for the folder data include View, Delete and Archive functions.

View Folder Data

This option allows you to view the details of the folder. To view all of the folders stored in the active Datacolor CHECK user:

 Place the cursor over the folder icon in the left pane, and click the left mouse button. The names of each folder displays in the right pane.

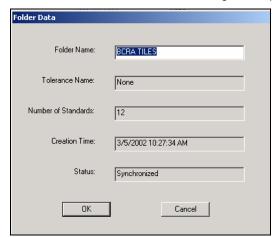


To view the details for a specific folder, do the following:

 Place the cursor over an individual folder entry in the right pane, and right-click the mouse. The Folder shortcut menu displays.



2. Click View Data. The Folder Data dialog box displays.



OPTION	DESCRIPTION
Folder Name	This is the name of the folder. To edit, place the cursor in the <i>Name</i> field, and left-click the mouse. Enter a new name for the folder. NOTE Changes made to the folder name will be updated to the Datacolor CHECK PDA during the next data synchronization. If changes are made to the folder name on both the PDA and the computer, the 'Precedence' setting identifies which change will be recorded on both devices. <i>Refer to Hot Sync Menu, Custom/Datacolor Portables Conduit, for information regarding this option.</i>
Tolerance Name	This identifies the tolerance associated with the folder. If no tolerance is associated with the folder, this field will be empty. This information cannot be edited.
Number of Standards	This indicates the number of standards currently stored in the folder.
Creation Time	This indicates the date and time the folder was created.

234 • Folder Data Datacolor CHECK™

OPTION	DESCRIPTION
Status	This field indicates whether any folder data has been changed.
	 New. A record has been added to the Desktop Portables database on the computer since the last synchronization. It will be added to the Datacolor CHECK PDA during the next synchronization. Modified. The folder data in the computer database has been changed since the last synchronization. During the next synchronization, the changes to this
	folder will be updated on the Datacolor CHECK PDA.
	 Synchronized. No changes have been made to the folder data on the computer.

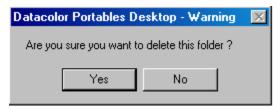
Delete Folder Data

This option allows you to delete an entire folder. To delete a folder:

1. Right click on a specific folder. The Folder shortcut menu displays:



From this menu, click **Delete**. A warning dialog box displays, confirming that you want to delete the folder.



Click Yes to delete the folder. Otherwise, click No to cancel the delete function.

Data Deletion and Data Synchronization

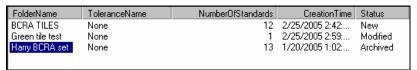
Because data synchronization is a two-way process, you must pay special attention to data that is deleted. If a piece of data is stored on both devices (PDA and computer), and then deleted from one of them, it will be deleted from the other device during the next synchronization.

Archive Folder Data

This option allows you to "deactivate" a folder with respect to the data synchronization process. When you perform synchronization, the data on each device are compared and updated. When the synchronization is completed, the Datacolor CHECK data on each device (the computer and the Datacolor CHECK PDA) is identical.

The archive feature can be used to manage inactive data. When you archive a folder, it is deleted from the PDA during the next synchronization, making the space available. You can re-activate the folder and access the data at a later time.

An archived folder displays 'archived' in the status field.



IMPORTANT

During the next synchronization, the archived folder is deleted from the Datacolor CHECK PDA.



Only folders can be archived. You cannot archive individual standards, batches, tolerances, tolerance blocks, or white tile data

To archive a folder, do the following:

- 1. Archive the folder on the computer.
- Perform a data synchronization. The folder will be deleted the Datacolor CHECK PDA.

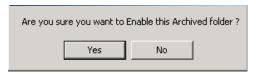
You can access the archived folder at any time, by activating it in the Desktop Portables database the computer. When the folder is activated, it will be restored to the Datacolor CHECK PDA during the next data synchronization.

To restore an archived folder:

- 1. In the Desktop Portables program, choose the correct user.
- 2. Display the folders for the user in the right pane of the window.
- Highlight the archived folder to be activated.
- 4. Place the cursor over the highlighted folder, and click the right mouse key once. The following menu displays.



5. Place the cursor over *Restore Archived Folder*, and left-click the mouse. The following dialog box displays.



- Click Yes to enable the folder. Otherwise, click No to cancel the function.
- To restore this folder on the stand-alone Datacolor CHECK, run a data synchronization. The folder will be restored to the standalone unit.

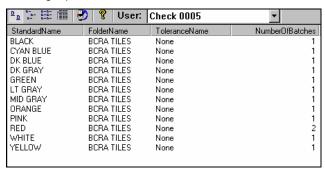
Standard Data

The maintenance options for standard data include viewing and deleting data

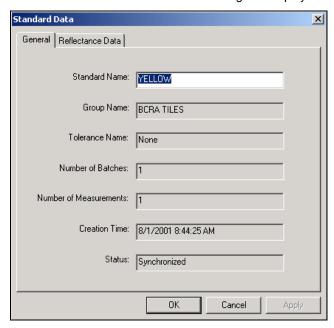
View Standard Data

To view all of the standards stored in a folder:

 Place the cursor over a folder in the left pane, and left-click the mouse. The names of each standard in the selected folder displays in the right pane.



- 2. Place the cursor over an individual standard in the right pane, and right-click. The Standard menu displays.
- 3. Click View Data. The Standard Data dialog box displays.



General Tab

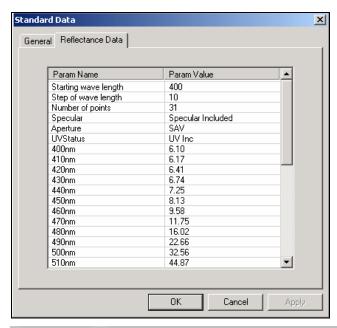
This is the default display for viewing Standard data.

OPTION	DESCRIPTION
Standard Name	The name of the standard. To edit:
	 Place the cursor in the name, and left-click the mouse.
	Enter a new name for the standard. Use the backspace or delete key to remove characters from the old name.
	₽ NOTE
	Changes made to the standard name will be updated on the Datacolor CHECK PDA during the next data synchronization. If changes are made
	to the standard name on both the PDA and the computer, the <i>Precedence</i> setting identifies which
	change will be recorded on both devices. Refer to Hot Sync Menu, Custom/Datacolor Portables Conduit for information regarding this option.

OPTION	DESCRIPTION
Group Name	The name of the folder that contains the standard.
Tolerance Name	Identifies the tolerance associated with the standard. If no tolerance is associated with the standard, "none" displays in this field.
Number of Batches	Identifies the number of batches associated with the standard.
Number of Measurements	Identifies the number of measurements used to generate the standard reflectance data. It indicates whether measurement averaging was used to collect the data.
Creation Time	This field identifies the date and time the standard was originally created.
Status	Indicates whether the data has been changed since the last synchronization.
	 New. A record has been added to the computer database since the last synchronization. It will be added to the Datacolor CHECK PDA during the next synchronization. Modified. The standard data in the computer database has been changed since the last synchronization. During the next synchronization, the changes to this folder will be updated the Datacolor CHECK PDA. Synchronized. No changes have been made to the standard data on the computer.

Reflectance Data

This tab reports the instrument parameters at the time of the standard measurement, and the reflectance values at 10nm intervals across the spectrum.



OPTION	DESCRIPTION
Starting Wavelength	Different wavelength ranges are offered with Datacolor instruments. The typical ranges are either 400nm–700nm or 360nm–700nm, although occasionally a different range displays. The range depends on the instrument used for the original spectral measurement.
Step of Wavelength	The wavelength interval used for the reflectance report. It is always 10nm.
Number of points	The number of points reported in the spectral data. The maximum number is 43.
Specular	Reports the position of the specular port at the time of the measurement. SCI. Specular Included. The specular port was closed during the measurement. SCE. Specular Excluded. The specular port was open during the measurement. Gloss. Two measurements of the sample were made, using both SCI and SCE conditions. Unknown. When data is input through the keyboard, specular port information is not available for the record.
Aperture	Reports the aperture selection used for the

OPTION	DESCRIPTION
	measurement. For dual aperture instruments, one of two apertures will be reported. LAV. Large Area View. SAV. Small Area View USAV. Ultra-Small Area View. Unknown. When data is input through the keyboard, specular port information is not available for the record. NOTE If you are using the XUSAV stapler foot, the aperture setting is recorded as USAV.
UV status	 Indicates if the ultra-violet filter was used to filter the light source. UV Inc. The UV energy in the light source was not filtered. UV Exc. The UV energy in the source was filtered. (Datacolor CHECK^{PRO}). Unknown. When data is input through the keyboard, UV filter information is not available for the record.
400nm – 700nm	Reports the reflectance value measured at the specified points across the spectrum.

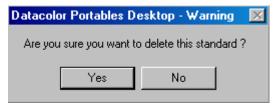
Delete Standard Data

This option allows you to delete the record for the standard. To delete a standard:

1. Right-click on a standard to display shortcut menu.



- 2. Place the cursor over **Delete** and click once.
- 3. A dialog box displays confirming that you want to delete the standard information.



 Click Yes to go forward with the delete function. Otherwise, click No to cancel the delete function.



All batches will be deleted with the standard.

Data Deletion and Data Synchronization

Because data synchronization is a two-way process, you must pay special attention to data that is deleted. If a piece of data is stored on both devices (PDA and computer), and then deleted from one of them, it will be deleted from the other device during the next synchronization.

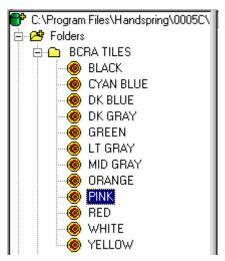
Batch Data

Maintenance options for the batch data include view and delete functions.

View Batch Data

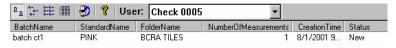
Batches are always attached to a standard. To view all of the batches stored with a standard:

1. Double-click on a standard listed in the left window pane:

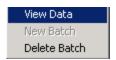


242 • Batch Data Datacolor CHECK™

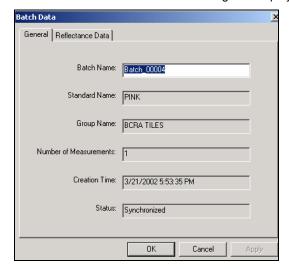
The names of each batch associated with the standard displays in the right pane.



To view the details of a specific batch, place the cursor over the highlighted batch, and right-click the mouse. The Batch shortcut menu displays.



3. Click View Data. The Batch Data dialog box displays.



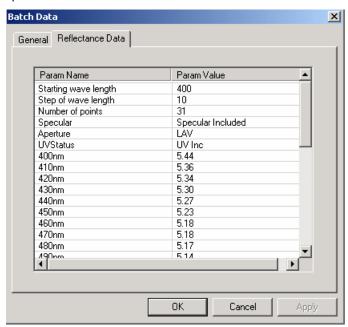
General Tab

This is the default display for viewing batch data.

OPTION	DESCRIPTION
Batch Name	The name of the batch. To edit the name: 1. Place the cursor in the name field, and left-click the mouse. 2. Enter a new name for the standard. NOTE Changes made to the batch name will be updated on the Datacolor CHECK PDA during the next data synchronization. If changes are made to the batch name on both the PDA and the computer, the 'Precedence' setting identifies which change will be recorded on both devices. Refer to Hot Sync Menu/Custom/Datacolor Portables Conduit for information regarding this option.
Standard Name	The name of the standard to which the batch is attached.
Group Name	The name of the folder containing the batch.
Number of Measurements	Identifies the number of measurements used to generate the batch reflectance data. It indicates whether measurement averaging was used to collect the data.
Creation Time	Identifies the date and time the batch was originally created.
Status	Indicates whether the batch data has been changed. New. This record has been added to the computer database after the last synchronization. It will be added to the Datacolor CHECK PDA during the next synchronization. Modified. The folder data in the computer database has been changed since the last synchronization. During the next synchronization. During the next synchronization, the changes to this folder will be updated the Datacolor CHECK PDA. Synchronized. No changes have been made to the folder data the computer.

Reflectance Data

This tab reports the instrument parameters at the time of the batch measurement, and the reflectance values at 10nm intervals across the spectrum.



OPTION	DESCRIPTION	
Starting Wavelength	Different wavelength ranges are offered with Datacolor instruments. The typical ranges are either 400nm–700nm or 360nm–700nm, although occasionally a different range displays. The range depends on the instrument used for the original spectral measurement.	
Step of Wavelength	The wavelength interval used for the reflectance report. It is always 10nm.	
Number of points	This is the number of points reported in the spectral data. The maximum number is 43.	

OPTION	DESCRIPTION
Specular	Reports the position of the specular port at the time of the measurement. SCI. (Specular Included) The specular port was closed during the measurement. SCE. (Specular Excluded) The specular port was open during the measurement. Gloss. Two measurements of the sample were made, using both SCI and SCE conditions. Unknown. When data is input through the keyboard, specular port information is not available for the record.
Aperture	Reports the aperture selection used for the measurement. For dual aperture instruments, one of two apertures available will be reported. • LAV. Large Area View. • SAV. Small Area View • USAV. Ultra-Small Area View • Unknown. When data is input through the keyboard, aperture information is not available for the record. NOTE If you are using the XUSAV stapler foot, the aperture setting is recorded as USAV.
UV status	Indicates whether the ultra-violet filter was used to filter the light source. • UV Inc. The ultra-violet energy in the light source was not filtered. • UV Exc. The ultra-violet energy in the source was filtered. (Datacolor CHECK ^{PRO} only) • Unknown. When data is input through the keyboard, UV filter information is not available for the record. NOTE The UV filter is an optional feature on the instrument.
400nm – 700nm	Reports the reflectance value measured at the specified wavelength.

246 • Batch Data Datacolor CHECK™

Delete Batch Data

You can delete the record for the batch. To delete a batch:

Move to the right pane, and right click on a batch name. The Batch shortcut menu displays.



2. Click **Delete**. A warning dialog box displays, confirming that you want to delete the standard information.



Click **Yes** to delete the record. Otherwise, click **No** to cancel the delete function.

Data Deletion and Data Synchronization

Because data synchronization is a two-way process, you must pay special attention to data that is deleted. If a piece of data is stored on both devices (PDA and computer), and then deleted from one of them, it will be deleted from the other device during the next synchronization.

Tolerance Data

The maintenance options for tolerance data include viewing and deleting data.



The tolerance does not contain the numerical pass/fail values. The actual pass/fail tolerance units can only be viewed and edited on the stand-alone Datacolor CHECK.

View Tolerance Data

To view data specific to an individual tolerance:

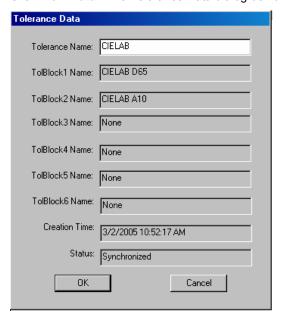
1. Left-click the tolerance folder in the left pane. A list of all tolerances stored for the user displays in the right pane.



Place the cursor over one of the tolerance names, and right-click the mouse. The Tolerance shortcut menu displays.



3. Click View Data. The Tolerance Data dialog box displays.



This dialog box displays the details of the tolerance selected.

OPTION

DESCRIPTION

Tolerance Name

The current name of the tolerance. To edit the name, do the following:

- Place the cursor in the name field, and left-click the mouse once.
- 2. Enter a new name for the tolerance.



Changes made to the tolerance name will be updated on the Datacolor CHECK PDA during the next data synchronization. If changes are made to the tolerance name on both the PDA and the computer the 'Precedence' setting identifies which change will be recorded on both devices. Refer to Hot Sync Menu/Custom/Datacolor Portables Conduit for information regarding this option.

TolBlock 1-TolBlock6 Name

These fields itemize the individual tolerance blocks included in the tolerance.



To view the numerical tolerances, you must view each individual tolerance block on the Datacolor CHECK PDA.

Creation Time

The date and time the tolerance was created.

Status

Indicates whether any tolerance data has been changed.

- New. This record has been added to the computer database after the last synchronization. It will be added to the Datacolor CHECK PDA during the next synchronization.
- Modified. The tolerance data in the computer database has been changed since the last synchronization. During the next synchronization, the changes to this folder will be updated the Datacolor CHECK PDA.
- Synchronized. No changes have been made to the tolerance data on the computer.

Delete Tolerance Data



Tolerances can be associated with folders and/or individual standards. You cannot delete a tolerance, until it has been disassociated from every folder and standard to which it is attached.

To delete a tolerance, do the following:

 In the right window pane, right-click on a tolerance to display the shortcut menu.



2. Click Delete. A warning displays:



3. In the warning dialog box, click **Yes** to delete the batch. Otherwise, click **No** to cancel the function.

Data Deletion and Data Synchronization

Because data synchronization is a two-way process, you must pay special attention to data that is deleted. If a piece of data is stored on both devices (PDA and computer), and then deleted from one of them, it will be deleted from the other device during the next synchronization.

Tolerance Block Data

A tolerance block contains the actual numerical values used to determine if a batch 'passes' or 'fails.' A tolerance block is restricted to one color difference equation for one illuminant/observer calculation (i.e., CIEL*a*b* under D65/10). A tolerance is created from a series of tolerance blocks.

View Tolerance Block Data

This option allows you to view the details of the tolerance block. This includes the name, color difference equation, and Illuminant/Observer condition.



The numeric limits for each parameter in the tolerance block can only be viewed and edited from the Datacolor CHECK PDA.

To view the details of a specific tolerance block:

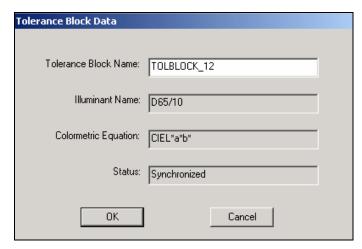
1. From the left pane, highlight the **Tolerance Blocks** folder. A list of all tolerance blocks stored for the user displays in the right pane.



Place the cursor over one of the tolerance blocks in the right pane, and right-click the mouse. The Tolerance Block shortcut menu displays.



3. Click View Data. The Tolerance Block Data dialog box displays.



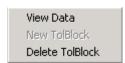
This dialog box displays the details of the tolerance block selected.

OPTION	DESCRIPTION	
Tolerance Block Name	The current name of the tolerance block. To edit the displayed name, double-click in the field (to highlight the current entry), and enter the new name (overwrites the existing text). NOTE Changes made to the tolerance block name will be updated to the Datacolor CHECK PDA during the next data synchronization. If changes are made to the tolerance block name on both the PDA and the computer, the 'Precedence' setting identifies which change will be recorded on both devices. Refer to Hot Sync Menu, Custom/Datacolor Portables Conduit for information regarding this option.	
Illuminant Name	The Illuminant/Observer data used for the tolerance block.	
Colorimetric Equation	Identifies the color difference equation used in the tolerance block.	

Delete Tolerance Block

To delete a tolerance block, do the following:

 Right-click on a tolerance block to display the Tolerance Block Menu. From the Tolerance Block Menu, place the cursor over Delete TolBlock and click once.

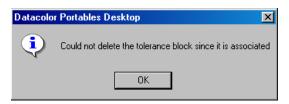


A dialog box displays confirming that you want to delete the tolerance block information.



Click Yes to delete the tolerance block. Otherwise, click No to cancel the action.

Tolerance blocks can be used in more than one tolerance. Because of this, you cannot delete a tolerance block until it is deleted from each tolerance that includes it. When you try to delete a tolerance block that is currently active, you will receive the following message:



The tolerance block must be deleted from the tolerance on the Datacolor CHECK PDA. You must go to Tolerance Maintenance, and delete this tolerance block from every tolerance that uses it. Once this is done, you can return to tolerance block maintenance and delete the tolerance.

Refer to Management Options, Management Menu, Tolerances and Tolerance Blocks for details on Tolerance and Tolerance Block management functions.

Data Deletion and Data Synchronization

Because data synchronization is a two-way process, you must pay special attention to data that is deleted. If a piece of data is stored on both devices (PDA and computer), and then deleted from one of them, it will be deleted from the other device during the next synchronization.

White Tile Data

Sometimes the white tile used for the instrument calibration is lost and must be replaced. When this happens, you must transfer the new white tile data to the Datacolor CHECK PDA. This option is used to import the new white data from a diskette (or another media type such as a CD) to the Desktop Portables database on the computer. It is then transferred to the standalone Datacolor CHECK during the next synchronization.

White tile data is stored in two files, each containing a single measurement of the tile. One file contains a measurement made, "Specular Included" (SI), and the other is made "Specular Excluded" (SE). Both files must be transferred to the stand-alone instrument, in order for the new calibration data to be valid.



NOTE

White tile data is provided on both a diskette and a CD shipped with the Datacolor CHECK.

View White Tile Data

The tile name and spectral data can be viewed. To view the white tile data:

1. Highlight the **White Tile** folder in the left pane. A list of the files containing white tile data displays in the right pane.

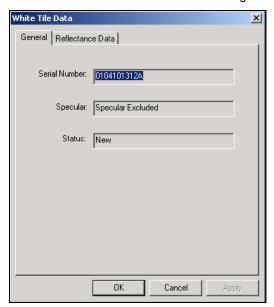


Place the cursor over one of the files in the right pane, and rightclick the mouse. The White Tile Data shortcut menu displays.



Two files must be present. One contains the white tile measurement made *Specular Included*. The other contains the measurement made *Specular Excluded*.





General Tab

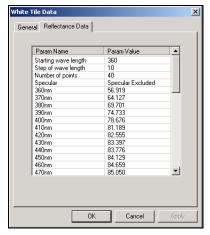
This is the default display for viewing white tile data.

OPTION	DESCRIPTION
Serial Number	The serial number for the white tile. It must match the number of the white tile used for calibration.
Specular	Indicates the position of the specular port when the white tile data in the file was measured. White tile data is stored in two files, and each contains one measurement of the tile. One file includes the measurements made Specular Included, and the other made Specular Excluded.

OPTION	DESCRIPTION
Status	Indicates whether the data has been changed since the last synchronization.
	 New. This record has been added to the computer database after the last synchronization. It will be added to the Datacolor CHECK PDA during the next synchronization. Modified. The folder data in the computer database has been changed since the last synchronization. During the next synchronization, the changes to this folder will be updated on the Datacolor CHECK PDA. Synchronized. No changes have been made to the folder data on the computer.

Reflectance Data Tab

This tab reports the instrument parameters at the time of the white tile measurement, and the reflectance values at 10nm intervals across the spectrum.



OPTION	DESCRIPTION
Starting Wavelength	Identifies the starting wavelength for the spectral data. Different wavelength ranges are offered with Datacolor instruments. The typical ranges for are either 400nm–700nm or 360nm–700nm, although occasionally a different range displays. The range depends on the instrument used for the original spectral measurement.

Step of Wavelength	The wavelength interval used for the reflectance report. It is always 10nm.
Number of points	This is the number of points reported in the spectral data. The maximum number is 43.
360 nm – 750nm	This identifies the wavelength associated with each reflectance value displayed. NOTE The wavelength range for calibration data is 360 – 750nm regardless of the wavelength range of the instrument.

Delete White Tile Data

You cannot delete folders containing white tile data.

NOTES

Appendix: Supplemental Information

Hardware Troubleshooting and FAQ's

Problem	Solution
Instrument isn't responding. Cannot measure standalone or from PC.	If the instrument (NOT the PDA) is not responding (i.e., the LED stays RED and/or you can not measure or calibrate, either as a stand-alone unit, or from Datacolor TOOLS or another Datacolor program), hold down the Measure button on the back of the instrument until the LED goes OFF (takes about 7 seconds). This is equivalent to physically removing the battery. This method does not cut the power to the PDA.
Receiving communications error messages when using the Datacolor CHECK tethered to a Datacolor PC application.	Use the power adapter with the Datacolor CHECK to prevent the Datacolor CHECK from going into 'Sleep' mode while connected to the pc.
The PDA is "dead". There are flashing lines across the screen. The application displays an error and hangs.	These three problems are the result of the PDA becoming unstable. This can happen due to a low battery, but a bug in the software or a data corruption may also cause it. Resetting the PDA
	 Remove the screw that holds the PDA cassette, and tilt the cassette forward. Do NOT detach the ribbon cable. We would strongly suggest that you run from the power adapter.
	On the back of the cassette toward to the right, there is a small hole. This is the reset button for the PDA. Use the reset

Problem Solution

tool provided with the stylus to "poke" the hole.



This should reset the PDA.



If the screen refreshes and the PDA desktop is displayed, tap on the Datacolor CHECK icon.

If the software hangs again:

- 1. Reset the PDA again.
- 2. From the PDA Desktop, choose App/Delete from the menu.
- 3. Delete all the items that start with MER (you will lose all your data).
- Return to the Datacolor CHECK Main
 Menu
- Select Data Transfer, Restore. The data on the flash memory card will be copied to the PDA Ram.

Problem	Solution
	If this solves the problem, the data became corrupted. If following the reset, you enter the Datacolor CHECK application and receive an error, do the following: • Repeat the reset instruction with the following change: Press/hold the up arrow (top silver button on the Control Panel in the front) while pressing the reset with the paper clip.
	 If this does not work, disconnect the ribbon cable and remove the battery for at least 3 hours.
Aperture Icon reporting VAR	The application shows (VAR) when the aperture switch is between the two positions. Datacolor CHECK to be sure the aperture switch on the back of the unit is secured in either the "top" or "bottom" position, and then press the Measure button. The aperture icon should update and indicate one of the aperture settings.
Aperture report is 'none'.	The battery power has dropped so low that the PDA cannot check the instrument status. You must recharge the battery.
Battery status unknown	When a question mark displays in the battery icon, the battery status is unknown. This occurs when there is no communication between the instrument and the PDA. Try to calibrate the instrument. If a connection is established, the normal battery icon will be displayed. Recharge the batteries. After charging for 4.5 hours, remove adapter and check battery status. If battery status remains 'unknown', contact
	Datacolor.
The Led on the front of the instrument changes colors constantly. Instrument does not work.	The battery is low. Connect the power adapter.

Problem	Solution	
During measurement the LED flashed briefly and then the instrument died.	The battery level is too low to complete a measurement. Charge the battery. IMPORTANT! If this happens after you have charged the battery it may be an indication that your battery is defective. Contact technical support.	
Lines appear across the PDA when instrument is activated for the first time.	The battery discharged during storage/shipping making the PDA unstable. 1. Connect the instrument to the power adapter. 2. While connected to power reset the PDA. 3. Unit should remain connected to the adapter for 4 hours to allow the battery to charge.	
Unit displays "communication failures" after working for some time	The battery is low, but not completely discharged. After some use, the instrument stops responding (LED cycles red-green-yellow-red-green-yellow, etc.), and a 'communication error' is displayed on the screen. Charge the battery.	
When connected to Datacolor TOOLS as the measuring instrument, Datacolor CHECK stopped working for no apparent reason. The PC software reported communication error. The instrument is still working fine standalone	The problem maybe a hardware defect within the specific unit. Have the unit serviced.	
Datacolor CHECK will not hold a charge, but will run from the power adapter.	Either the battery or the battery charging circuit in the unit is defective. The unit must be serviced.	

Problem	Solution
The calibration screen shows "******* for white tile.	The PDA has lost its memory, either because the battery has fully discharged or you have performed a "Hard Reset."
	You need to restore the white tile data from flash.
	WARNINGS The flash card supplied with each instrument contains the white tile data specific to the unit. If you exchange flash cards between instruments and perform backup/restore operations, you will end up with the wrong white tile data on the unit.
The instrument does not allow me to do a backup or restore.	If the battery level is too low, the software will not allow you to retrieve from or back up to flash. Charge the battery.
I have the Datacolor CHECK application on a PDA with no instrument. The Datacolor CHECK software takes a very long time to load.	The software is looking for an instrument. Simply wait. The same thing happens if you try to go to the calibration screen.

TIPS

You should backup your data regularly *Data Transfer, BackUp to Flash, Backup.* When the battery is fully discharged, the PDA can loose its data.

The flash card supplied with each instrument contains the white tile data specific to the unit. If you exchange flash cards between instruments perform backup/restore operations, you will end up with the wrong white tile data on the unit.

Configuring Datacolor CHECK for a USB Port

The Datacolor CHECK can be connected to a USB port on a desktop system. Three software changes must be made to enable the USB port for use with the instrument:

- A USB driver must be installed.
- The system assignment for the USB port must be identified. This is accessed through the *Control Panel* included with the Windows operating system.
- The com port assignment in the Datacolor applications software may need to be changed.

Below are detailed instructions to configuring the system to use a USB port.

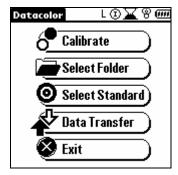
Before You Begin

- Close all programs currently running on the system.
- You will need the accessories below to complete the installation:
 - USB cable (provided by Datacolor)
 - Datacolor CD-Rom disk labeled USB Drivers and Documentation
 - Calibration diskette or CD included with the instrument (this is required only when installing new instruments)
 - Firmware Upgrade. You must be running firmware v.1.19/1.13 to connect the Datacolor CHECK to a USB port. See the instructions below to confirm the firmware currently installed on your unit.
 - The latest firmware is included on the Datacolor CHECK CD, along with instructions to upgrade the firmware.
 - Hardware Upgrade. Upgrading a Datacolor CHECK currently "in use" to enable USB capability also requires a hardware upgrade. Contact Datacolor Service for information on this upgrade.

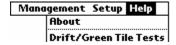
Verifying Datacolor CHECK Firmware Version

To identify the firmware version on the Datacolor CHECK follow the instructions below:

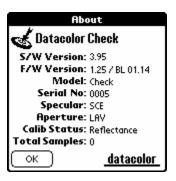
1. If you are not in the Datacolor CHECK software, tap the icon on the PDA desktop. The Datacolor CHECK Main Menu displays.



2. Tap the **Management Menu** key on the graffiti pad. Three options display at the top: **Management, Setup,** and **Help**.



Tap **Help/About**. A screen displays with details regarding the current instrument configuration, and the software and firmware versions contained on the unit.



- S/W Version. Identifies version of software installed on the Datacolor CHECK PDA.
- F/W Version. Identifies the firmware installed. Two programs are identified.

USB Cable Connections

Connect the USB cable to the instrument, and to the USB port on the computer. See *Instrument Cables* in this guide for instructions to assemble the cable.



NOTE

<u>**Do not**</u> install the cable into the USB port on the instrument until you have placed the CD containing the USB Drivers into the CD drive.

USB Driver Installation

Install the CD labeled *USB Drivers and Documentation* into the CD Rom drive.

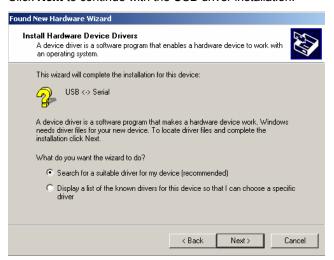
Connect the USB cable to the instrument, and to the USB port on the computer. When this connection is made, the system detects a new piece of hardware, and the screen below automatically displays:



This screen is automatically replaced by the New Hardware Wizard:



3. Click Next to continue with the USB driver installation.



4. Accept the default selection and click Next.



A check displays in the box for a selection. There should be a check in both the *CD-Rom drives* box and the *Specify a location* box.

- To add a check, place the cursor in a blank box and click the mouse. A check displays. To remove a check, place the cursor over the box, and click the mouse. The check will disappear.
- 5. When you have completed your selections, click Next.



A default location displays in the *Copy manufacturer's files from* field.

- If the driver software is in a different location click Browse, and identify the correct location.
- If the correct location is identified, click *OK*. The program will search for the driver file. When the correct file is found, the

window below displays:



6. Click Next. The Wizard will begin copying the files to the computer.



When the copy is complete, the window below displays:



- Click Finish. <u>Do not remove the USB Driver CD from the drive</u>.
 The Wizard will close, and then immediately reopen and repeat the procedure. You must complete it a second time to successfully copy the file. Click **Next** on each screen that displays, and click **Finish** on the last screen.
- 8. When the last screen appears a second time, click **Finish**. You can now remove the CD from the drive.

Viewing/Changing System USB Port Assignment

As part of this process, a port number is assigned to the USB port. The default selection is the next available com port. You will need to know this port assignment to configure the Datacolor applications program(s) to recognize the USB port. The procedure for viewing/editing this assignment follows:

To view or change the com port assignment for the USB port, you must open the *Control Panel*.

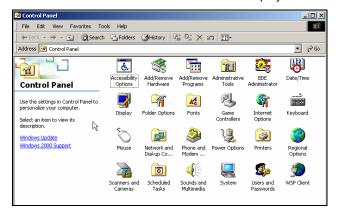
 To access the Control Panel, click on the Start icon at the bottom left of the screen.



The menu below displays:



2. Place the cursor on **Settings**. The menu on the right displays. Click on **Control Panel**. The window below displays:



3. Click on **System**. The Systems Properties window displays:



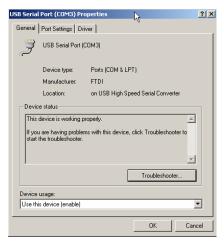
4. Click on the **Hardware** tab at the top of the window.



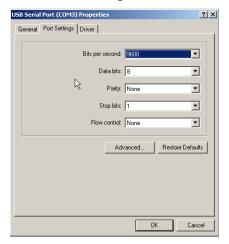
5. Click on **Device Manager**. The window below displays:

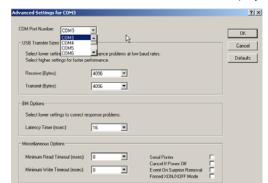


Go to the *Ports* heading. Click on the + to display the port selections. Click on *USB Serial Port*. The window below displays:



7. Click on **Port Settings**. The window below displays:





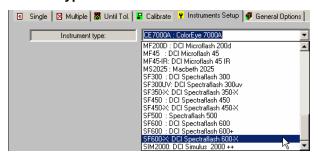
8. Click on Advanced. The window below displays:

The field labeled *Com Port Number* displays the current assignment for the USB port. To change the port setting, click on the down arrow. The list of com ports is displayed. Click on the port assignment to be used for the USB port. When you have completed the changes, click *OK*.

Changing the USB Com Port Assignment in Datacolor Programs

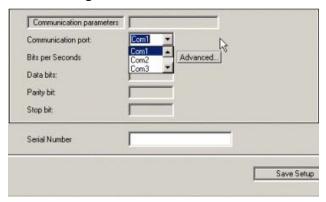
To enable the USB port for color measurements, you may need to change the com port assignment in the Datacolor applications program. While this procedure varies depending on the particular program, It is typically accessed through an *Instruments Menu*, or *Instrument Setup* icon. Below are instructions for configuring the USB port for Datacolor TOOLS. *Refer to the user's guide for the individual application program you are running for instructions to configure the instrument.*

Instrument Type



 If you are installing a new instrument, you need to select the correct instrument type. Click on the down arrow, and scroll through the instrument listing to find the instrument you are using. If you are connecting an existing instrument to a USB port, this selection does not need to be changed.

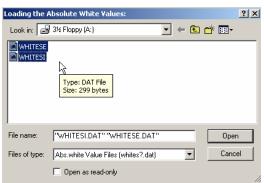
Com Port Setting



- In the Communication port field, select the com port assigned to the USB port (this port assignment must match the assignment in the Windows Control Panel). Click on the down arrow, and highlight the com port that has been assigned to the USB port.
- When the changes are completed, click Save Setup.

Installing Calibration Data

If this is a new instrument, you will need to load the calibration data. When you select **Save Setup**, the program will prompt you to place the diskette containing the calibration data in Drive A. Place the diskette in the drive. The screen below displays:



You must load <u>both</u> files. Highlight both file names, and click **Open**. The files will be transferred to the desktop system. When the transfer is completed, the calibration screen displays.



You can calibrate the instrument by clicking *Calibrate*, or *Cancel* if you will not be using the instrument immediately.

Evaluation Screen Legend

This section identifies each field displayed on the Datacolor CHECK evaluation screen. Below is an example of an evaluation output. It contains every field that can be displayed for a color evaluation:

The table below includes each entry as it displays in the above example, identifies the field, and includes additional information as needed. Refer to Summary of Evaluation Screens to review the color evaluations provided in the software.



Current Entry	Field ID	Comments
CUSTOMER	Display Set	Identifies the display set that is currently active. Refer to Management Options, Management Menu, Display Set for an explanation of this feature.
SLU ①� ∑ ❷	Status Indicators	Indicate status of various hardware features including aperture selection, specular port selection, calibration interval, and

Current Entry	Field ID	Comments
Ⅲ %		battery life. See System Navigation, Persistent Icons in this guide for a detailed explanation of these indicators.
CIELab	Current Color Evaluation	The color evaluation currently displayed on the lower portion of the screen. See Appendix, Color Difference Equations for more information on this topic.
D65/10	Illuminant/ Observer Combination	The Illuminant/Observer selection used in the color evaluation currently displayed. See Appendix, General Illuminant/Observer Information for more information on this topic.
COIL SAMPLES	Active Folder	The folder containing the standard/batch data currently displayed
BLUE STD	Active Standard	The standard used in the evaluation.
BLUE BAT 1L	Active Batch	The batch used in the current evaluation. NOTE: The program can only display the evaluation data for one batch at a time.
DL*, Da*, Db*, DE	Color Differences	Each color space includes a minimum of 3 axes of color space. Color differences are calculated for each axis. Depending on the color evaluation selected, the axis identification changes. See Appendix, Color Difference Equations for more information on this topic.
STD	This column contains data for the standard	
ВАТСН	The column contains data for the batch	
DELTAS	The differences between the standard and the batch on each color coordinate. These are the color difference values. DE is the composite color difference between the samples. See Appendix, Color Difference Equations for more information on this topic.	

Current Entry	Field ID	Comments
PASS	This is the pass/fail evaluation for the batch. This evaluation is based on a tolerance stored either for the standard, or for the folder.	
	NOTE: The particular color tolerance, and evaluation currently	ass/fail message is based on the d may not reflect the color difference of displayed.
<i>></i>	on the Measurementhis example, the notation 'batch'. See Manage	sample type to be measured based int Sequence currently selected. In ext measurement will be labeled a gement Menu, Measurement Setup nation of the measurement

Instrument Calibration Supplemental Information

ITEM	DESCRIPTION
What happens when the instrument is calibrated?	The measurements made by the spectrophotometer can be affected by changes in its environment including temperature, humidity, dust, etc. When an instrument is calibrated regularly, the measurements from that instrument remain consistent over time.
	During the calibration procedure, the system compares the current measurement of the white tile, to a measurement of the same tile made before the instrument left the factory. From this comparison, it calculates factors that account for changes in the performance of the instrument. These factors are applied to new measurements to adjust for any changes to the instrument that affect the measurement. Performing an instrument calibration allows you to compare measurements of the same sample made at different times. It also enables you to compare measurements of the same sample made by different instruments.
What is a 'black trap' and why do I have to measure it?	A black trap is a small cylinder or rectangular box that is completely black on the inside. When it is placed over the instrument port properly, no light escapes from it. Ideally, when the black trap is measured, no light is reflected back from it and no light escapes from its edges. In theory, no sample will have a lower reflectance than the black trap. This sets the lower limit

ITEM	DESCRIPTION
	for every measurement and takes into account the electrical noise of the instrument.
Why do I measure a white tile?	The white tile measurement performs two functions. First, it accounts for any changes in the condition of the instrument. The tile itself is made from a highly durable material that is not sensitive to light or heat, and is resistant to environmental forces that may otherwise cause the surface to break down over time. This tile produces the highest (non-fluorescent) reflectance value you will measure across the visible spectrum, and sets the upper measurement limit for the instrument.
	The white tile is also the link between your instrument and a master white standard used internationally. This link is established in the procedure used to calibrate the instrument at the factory, and allows you to compare your measurements to those made by other instruments around the world.
How often must I calibrate the instrument?	We recommend that the instrument be calibrated every 8 hours for each aperture you use. The calibration you perform is specific to the conditions of the instrument at the time of calibration. If you have calibrated with the Large Area View mask in place, and you need to change the mask to Small Area View, you must calibrate the instrument for Small Area View. You must calibrate the instrument for every condition that you change, such as aperture selection.

Illuminant/Observer Supplemental Information

ASTM Table 5 vs. Table 6 Data

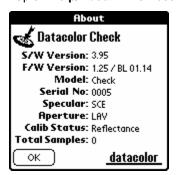
The programs use the Illuminant/Observer tables published by the ASTM. Recently a new set of data, Table 6, was released, and that is the default data used by the Datacolor CHECK software. The differences in the data from each table may create small differences in the calculated color difference. Table 5 data is also available for use with Datacolor CHECK. If you are working with standards whose tolerance history is based on Table 5 data, you should configure Datacolor CHECK to use Table 5 data.

To switch the Illuminant/Observer data:

1. Tap on Management Options, Help.



2. Tap on Help/About. The About screen displays.



3. Tap on **Datacolor** at the bottom of the screen. The following screen displays:



 Tap on the down arrow (▼) to display the Illuminant/Observer table selections.



5. Tap on the table selection to be used. The program will be updated immediately.

General Illuminant/Observer Information

All color coordinates and color difference data displayed are calculated for a specific Illuminant/Observer condition. Changing this selection will change the data on the display, and may change the outcome of an evaluation.

You can view the Illuminant/Observer selections simply by touching the ▼ in the field. You can change the selection at any time by tapping a different selection in the list. When you change the Illuminant/Observer selection, the screen will refresh and the data displayed for the Standard and Batch will be recalculated to reflect the new Illuminant/Observer selection

The default selection is Illuminant D65/ 10° Standard Observer data.

What is Illuminant/Observer Data? Whenever you visually evaluate a color, your evaluation is influenced by two factors:

- The light under which you are viewing the sample
- The way that your eyes respond to color stimuli

Changes to the Illuminant/Observer selection can change a color evaluation.

- Illuminants. The Illuminant data is a numerical description of the
 amount of energy emitted from the light at every wavelength in the
 visible spectrum. There are many illuminants commonly used in
 industrial color matching, and each has a unique energy output.
 Because of this, you must select the correct Illuminant data in order
 to calculate a color difference.
- Standard Observer. In order for an instrumental color evaluation
 to simulate a visual evaluation, the system must have information
 about how the eye responds to color stimuli across the visible
 spectrum. The Standard Observer data describes the response of
 the human eye to color.

There are 2 sets of Observer data: 1931 (2°) and 1964 (10°) data. The 1964 Standard Observer data is most commonly used in instrumental color evaluations, and is preferred for large samples. The 2° (1931) is sometimes preferred for small samples.

Illuminant/Observer tables integrate the spectral power distribution of the illuminant and the Standard Observer data into a single table that is used in the calculation of colorimetric coordinates.

TIPS About Illuminant/Observer Data

The Illuminant and Standard Observer information are combined in the tables. You are only required to make a single selection.

When you change the Illuminant/Observer selection, the output data appearing on your display will change, even when you HAVE NOT changed the Standard or Batch selections.

If you are communicating color coordinates or color differences to someone in a different location, it is important to specify the Illuminant/Observer data you are using.

The 2° (1931) and 10° (1964) Standard Observer data have no connection to the instrument geometry (0° - 45° or diffuse/8°).

Refer to the sources included in Selected References for more detailed treatment of the Illuminant/Observer topic.

Color Difference Equations

All color difference equations include a calculation of the differences between the batch and standard for each three dimensions, or axes, although the identification of these axes change from one equation to another. Most equations report differences between the standard and batch along a *red-green axis*, a *yellow-blue* axis and a *lightness-darkness* axis.

Some equations report color differences using an alternate system that expresses the 3 dimensions of color space as *hue* (differences in color shade), *chroma* (differences in color intensity or saturation) and *lightness*. Finally every color difference equation calculates a DE value, which represents the overall color difference between the samples.

Interpreting the Numbers

Regardless of the color difference equation you use, color difference components between the standard and batch are expressed as negative or positive distances from the batch to the standard. However DE, the total color difference, is always a positive number.

Below is a table containing all of the color difference equations included in the Datacolor CHECK software. It includes the name of the equation, and details of the color difference calculation it displays.

CIELab

Color Space Model	Based on CIELAB color space model	
Red-Green Difference	Da (+Da*) batch is redder than std. (-Da*) batch is greener than std.	
Yellow-Blue Difference	Db (+Db*) batch is yellower than std. (-Db*) batch is bluer than std.	
Lightness-Darkness Difference	DL (+DL*) batch is lighter than std. (-DL*) batch is darker than std.	

Other Differences Displayed	DC = Chroma (+DC*) batch is more saturated than std. (-DC*) batch is less saturated than standard. DH. This represents the hue component of the color difference. Its sign (±) indicates the direction of the hue shift, which is dependent upon the color of the standard. Generally, the magnitude of the hue difference (rather than the direction) is typically a key indicator of the quality of the color match. Small DH values generally correspond to acceptable visual matches.	
Overall Color Difference	DE* . This is always a positive number.	
*C*H*		
Color Space Model	CIELAB color space model	
Red-Green Difference	N/A	
Yellow-Blue Difference	N/A	
Lightness-Darkness Difference	DL (+DL*) batch is lighter than std. (-DL*) batch is darker than std.	
Other Differences Displayed	C(chroma) and H(hue) differences described under CIELab.	
Overall Color Difference	DE	
ColorSpace Model	CIE LAB color space model	
Red-Green Difference	N/A	
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.	
Other Differences Displayed	C (chroma) and H (hue) differences described under CIELab.	
Overall Color Difference	DE	
	Overall Color Difference *C*H* Color Space Model Red-Green Difference Yellow-Blue Difference Lightness-Darkness Difference Other Differences Displayed Overall Color Difference ColorSpace Model Red-Green Difference Lightness-Darkness Difference Other Difference Other Difference Displayed Overall Color Other Differences Displayed Overall Color	

CIE2000

Color Space Model	CIE LAB color space model
Red-Green Difference	N/A
Yellow-Blue Difference	N/A
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.
Other Differences Displayed	C (chroma) and H (hue) differences described under CIELab.
Overall Color Difference	DE

Hunter

ColorSpace Equation	Based on transformation of CIE tristimulus space, using Hunter Lab equation.
Red-Green Difference	Da (+Da) batch is redder than std. (-Da) batch is greener than std.
Yellow-Blue Difference	Db (+Db) batch is yellower than std. (-Db) batch is bluer than std.
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.
Other Differences Displayed	No
Overall Color Difference	DE

FMCII

Color Space Model	Based on CIE tristimulus space.
Red-Green Difference	DCRG (+DCRG) batch is redder than std. (-DCRG) batch is greener than std.
Yellow-Blue Difference	DCYB (+DCYB) batch is yellower than std. (-DCYB) batch is bluer than std.
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.
•	(+DL) batch is lighter than std.

Comparing the Results from Different Equations

Below is an example of a CIEL*a*b* color difference report:



- The DL is negative (-), making the batch DARKER than the standard (-0.15)
- The Da* is negative (-), making the batch GREENER (or less red) than the standard (-1.44)
- The Db* is positive (no sign), making the batch yellower (or LESS BLUE) than the standard (0.72)

Below is an evaluation of the same samples made using Hunter Lab, rather than CIEL*a*b*. Text descriptors are not available for Hunter Lab. However, from the data provided, you could make the following qualitative evaluation using the differences between the samples:

▼ (U	STOMER	L	$\odot \mathbb{Z}$ 12
▼ (0 ▼ DK	nter Lab IL SAMPLE: BLUE STD BLUE BAT	s	65/10°
	STD	BATCH	DELTA
L	32.62	32.49	-0.13
a	-5.50	-6.43	-0.94
ь	-17.17	-16.43	0.74
DE			1.20
			,

- The batch is darker than the standard (-L)
- The batch is greener than the standard (-a)
- The batch is yellower than the standard (+b)

As you can see the equation uses similar labels for the three axes (L, a, b), and the results are similar, but not identical to the CIEL*a*b* evaluation

TIPS

If you are communicating Lab values, be sure to verify what equation you are using. For example, Hunter Lab and CIEL*a*b* use the same notations, but the numerical values are NOT the same.

Refer to the sources included in Selected References for more detailed treatment of Color Space/Color Difference equations topic.

Supplemental Information—Whiteness Evaluations Interpreting Tint Values

Tint values are included with the CIE Whiteness evaluation and the Ganz Whiteness Evaluation. Below is an explanation of those values for each evaluation.

Ganz Whiteness Evaluation

The Griesser/Ganz formula calculates the tint value using the formula:

(Tint value) $TV = (m^*x) + (n^*y) + k$ (m, n, and k are whiteness parameters)

The 'Tint' value displayed in the evaluation refers to the deviation between the batch and standard. These generally correspond to the visual evaluations itemized below:

Tint value TV	Tint deviation TD	Visual Assessment	
< -5.5	RR	Tinted in red direction	
-5.5 to -4.51	R5	Very markedly	More red than the white scale
-4.5 to -3.51	R4	markedly	
-3.5 to -2.51	R3	Appreciable	
-2.5 to -1.51	R2	Slightly	
-1.5 to -0.51	R1	trace	-
-0.5 to 0.49		No appreciable deviation in tint from the White Scale (Hohenstein)	
0.5 to 1.49	G1	Trace	More green than the white scale
1.5 to 2.49	G2	Slightly	
2.5 to 3.49	G3	Appreciable	
3.5 to 4.49	G4	markedly	
4.5 to 5.49	G5	Very markedly	
>= 5.5	GG	Tinted in green direction	

CIE Whiteness

The CIE Whiteness tint value generally characterizes the differences between batch and standard, and generally corresponds to the visual assessments as itemized below:

Tint Value	Visual Assessment
Positive value	Greenish hue
Negative value	Reddish hue
Equals 0.0	Bluish hue with a dominant wavelength of 466nm

Laboratories That Supply CIE Whiteness Standards

Below is the contact information for laboratories that supply CIE Whiteness Standards:

Physikalisch-Technische Bundesanstalt Postfach 3345 D-38023 Braunschweig Germany

http://www.ptb.de/ Contact: Dr. W. Müller

National Institute for Standards and Technology Spectrophotometric Group Gaithersburg, Maryland 20899

U.S.A.

http://www.nist.gov/

Contacts: Dr. J. Hsia; Dr. E. Early; Ms. Y. Bames

National Research Council of Canada Physics Division - Radiation Optics Montreal Road Ottawa, Ontario K1A 0R6

Canada

http://www.nrc.ca/ Contact: Dr. J. Zwinkels

Indices

Included in the Datacolor CHECK software are a series of indices used in specific industrial applications. In some cases, such as yellowness and whiteness indices, they are based on a single color coordinate, and are used to evaluate a single aspect of a product. In other cases such as metamerism indices, the evaluation summarizes sample differences in terms of a single number.

Many of the index selections are part of a procedure issued by a standardization body such as ISO, ASTM or another universally recognized organization. The procedure defines the conditions under which the sample is prepared, measured and evaluated. Below is a complete listing of the indices offered in the software, the procedure that is associated with it, and any conditions you must satisfy to make the index evaluation valid.



Index options are only offered with Datacolor CHECK $^{\rm PLUS}$ and Datacolor CHECK $^{\rm PRO}.$

Yellowness Indices—Yellowness D1925

Procedure ASTM D1925

Discontinued 1995, and replaced with E313

Illuminants C

Observers 2° (1931) Standard Observer



Yellowness E313

Procedure ASTM E313. Replaced D1925

Illuminants C; D65

Observers 2° (1931) Observer; 10° (1964) Observer



Whiteness Indices—Berger Whiteness

Procedure Ganz, Ernst, "Whiteness: Photometric Specification

and Colorimetric Evaluation", Applied Optics, Volume

15, Sept. 1996

Also found in: Hunter Richard, The Measurement of

Appearance (second edition), Wiley & Sons, New

York, 1987

Illuminants D55; D65; 75; Equal Energy; A; C

Observers 2° (1931) Observer; 10° (1964) Observer



290 • Indices Datacolor CHECK™

Whiteness Indices—CIE Whiteness

Source(s) CIE Publication 15.2, 1986 (corrected reprint 1996)

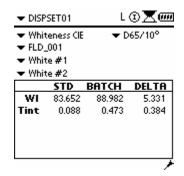
Illuminants D65

Observers 2° (1931) Observer; 10° (1964) Observer

Comments Uses the same equation as E313 Whiteness.

The UV filter is calibrated at the factory using the Ganz-Griesser technique. While a CIE Whiteness value can be calculated for a sample or a reference tile containing optical brightener, it is based on a filter position achieved using the Ganz-Griesser calibration technique. It is not a CIE whiteness value obtained after calibrating the filter position using the CIE

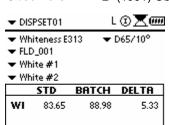
whiteness calibration technique.



Whiteness Indices—E313 Whiteness

Procedure ASTM E313 Illuminants D50; D65; C

Observers 2° (1931) Observer: 10° (1964) Observer



Whiteness Indices—Ganz (GG) Whiteness

Source Status of Instrumental Whiteness Assessment with

Particular Reference to the Illumination, Rolf Griesser, Ciba-Geigy publication (translation from Textilveredlung 18 (1983), No. 5, 157 – 162).

Textilverediung 18 (1983), No. 5, 157 – 162

Illuminants D65



Whiteness Indices—Hunter Whiteness

Source(s) Ganz, Ernst, "Whiteness: Photometric Specification

and Colorimetric Evaluation", Applied Optics, Volume

15, Sept. 1996

Also found in: Hunter Richard, <u>The Measurement of</u> Appearance (second edition), Wiley & Sons, New

York, 1987

Illuminants D55; D65; D75; Equal Energy; A; C

Observers 2° (1931) Observer; 10° (1964) Observer

Comments 1960 Hunter equation



292 • Indices Datacolor CHECK™

Stensby Whiteness

Source(s) Ganz, Ernst, "Whiteness: Photometric Specification

and Colorimetric Evaluation", Applied Optics, Volume

15, Sept. 1996

Also found in: Hunter Richard, <u>The Measurement of Appearance (second edition)</u>, Wiley & Sons, New

York, 1987

Illuminants D55; D65; D75; Equal Energy; A; C

Observers 2° (1931) Observer; 10° (1964) Observer



Gray Scale for Color Change

Procedure ISO-105, Part A05; AATCC Evaluation Procedure 7

Illuminants D65; C

Observers 2° (1931) Observer; 10° (1964) Observer



Gray Scale for Staining

Source(s) ISO 105-A04 Part A04

Illuminants D65; C

Observers 2° (1931) Observer; 10° (1964) Observer



CIE Metamerism

Procedure CIE Publication 15:2

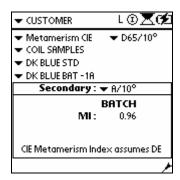
Illuminants Suggested reference illuminant is D65. Test

illuminant is defined by user

Observers No restrictions

Comments Assumes a perfect tristimulus match in the reference

illuminant.



294 • Indices Datacolor CHECK™

DIN 6172 Metamerism

Procedure Din 6172:1993 – 03. Special Metamerism Index for

Pairs of Samples at Change in Illuminant.

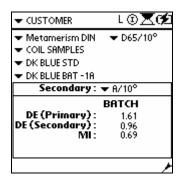
Illuminants Reference illuminant not defined. Test illuminant

defined by user.

Observers No restrictions.

Comments Does not assume a perfect tristimulus match under

the reference illuminant.



Optical Density

Procedure ANSI/ISO 5/3 1984 (also referred to as ANSI Status T)

Illuminants Illuminant A. User will always receive results for

Illuminant A.

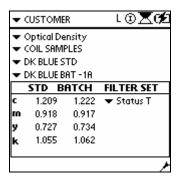
Observers Not applicable.

Comments

 Values for c, m and y are based on the filter tables included in the procedure.

 Value for k is derived from the ISO procedure for Visual Density.

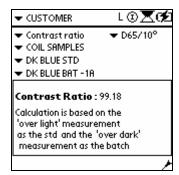
Assumes 0/45° geometry.



Contrast Ratio

Comments

The calculation is based on the assumption that the standard is the sample measured over a light background; the batch is the sample measured over a dark background.



Tips for Measuring Samples

Measuring Translucent Samples

You must take care to present the sample to the instrument correctly. The sample being measured must be large enough to cover the entire opening. The stapler foot attachment is provided to help you align the sample correctly.

If you are measuring translucent samples, you must closely control the following aspects:

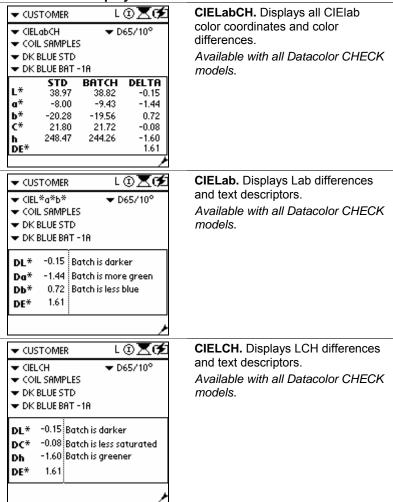
- Sample Thickness. When you are comparing translucent samples for color, the thickness of the samples should be the same.
 Differences in sample thickness may result in an inaccurate color evaluation
- Background Color. The background shows through a translucent sample. You need to present the translucent samples being compared over the same background. If you do not, any color differences may be due to differences in the background.

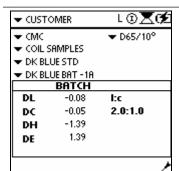
Summary of Evaluation Screens

Below is a complete list of the evaluation screens included in the Datacolor CHECK software, and a summary of the information displayed by each.

Spectral/Colorimetric Data

Color Difference Displays





CMC. Displays CMC color differences.

Available with all Datacolor CHECK models.



CIE 2000. New color difference equation developed/adopted by CIE.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



Hunter Lab. Displays Hunter Lab coordinates and differences.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



FMC-II. Displays FMC-II color differences.

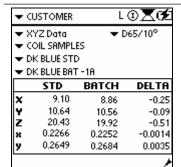
Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



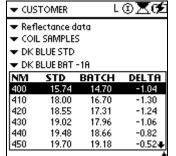
PQS-II. Displays PQS-II color differences (2 screens) (GE Plastics equation).

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.





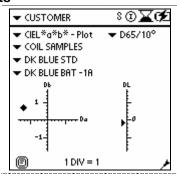
XYZ. Displays X,Y,Z coordinates. Available with all Datacolor CHECK models.



Reflectance Data. Displays standard and batch reflectance data for the visible spectrum (400–700nm) at 10nm increments.

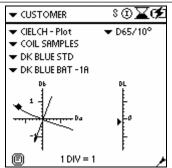
Available with all Datacolor CHECK models.

Plots



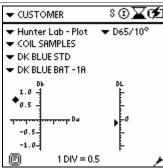
CIEL*a*b* Plot. Standard and batch are plotted based on DL*, Da* and Db* values.

Available with Datacolor CHECK^{PRO}.



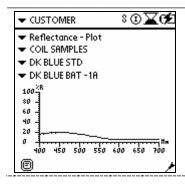
CIELCH. Standard and batch are plotted based on DL*, DC* and DH* values.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



Hunter Lab Plot. Standard and batch are plotted based on Hunter DL, Da and Db values.

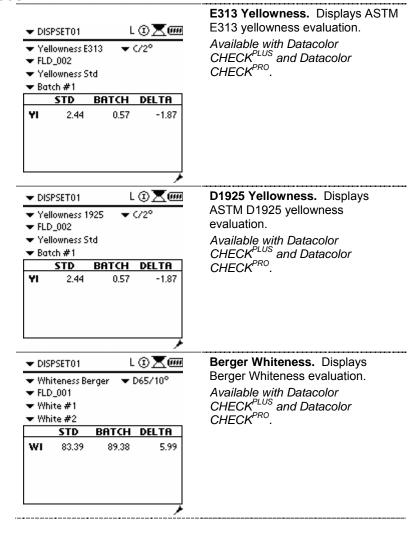
Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.

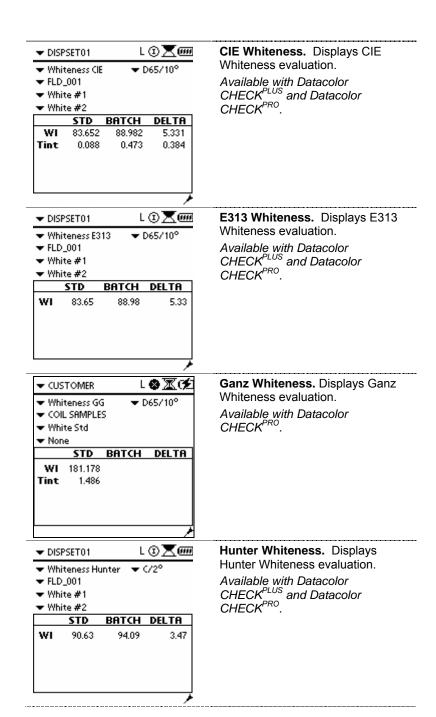


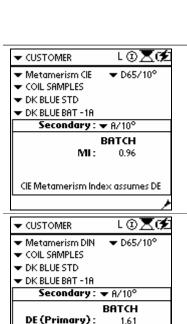
Reflectance Plot. Reflectance values vs. wavelength (across the visible spectrum) is plotted for the standard and batch.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.

Indices







CIE Metamerism. Displays CIE Metamerism index.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.

DIN 6172 Metamerism. Displays DIN 6172 Metamerism index.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.

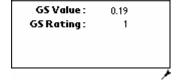


0.96 0.69

DE (Secondary) :

ISO/AATCC Fastness. Displays results of ISO/AATCC Gray Scale for Color Change evaluation.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



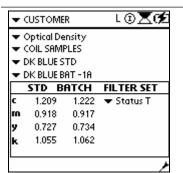
▼ DISPSET01 L®**X**@ ▼ ISO Staining ▼ D65/10° ▼ FLD_001

1-2

▼ Grey #1 ▼ Grey #2

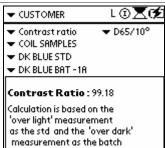
BATCH GS Value: 1.50 GS Rating:

ISO Staining. Displays ISO/AATCC staining (gray scale for color change) evaluation. Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



Optical Density. Displays ANSI Status T optical density.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.



Contrast Ratio. Displays contrast ratio (opacity) value.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.

Gloss Determination



Displays gloss value and gloss geometry for the samples.

Available with all Datacolor CHECK models.

Strength Evaluation

▼ CUSTOMER		L⊚⊠n≇
▼ Strength		D65/10°
COIL SAMPL	.ES	
▼ BLACK STD		
▼ BLACK BATC	:H	
Man Oher	420.00	420.00

Max Abs:	630.00	630.00
BATCH	As Is	Adjusted
Strength	99.55	100.00
DL*	0.02	-0.03
Da*	-0.01	-0.02
Db*	0.02	0.02
DE*	0.03	0.04

Displays tinting strength evaluation for the batch sample.

Available with Datacolor CHECK^{PLUS} and Datacolor CHECK^{PRO}.

Desktop Program Glossary

You will encounter several terms that are used frequently to describe the functions included in the Datacolor Portables Desktop program, the Desktop Portables program and the HotSync Manager. Below are some definitions that may be useful:

Synchronization

Synchronization is the process by which the computer and the Datacolor CHECK PDA exchange information. This is performed by the Datacolor Portables Sync Wizard, and is also referred to as 'hot sync', or 'sync.'

During synchronization, data is exchanged between the Datacolor CHECK PDA and the Desktop Portables database on the computer. When this process is completed, the data on the computer is exactly the same as the data the Datacolor CHECK PDA.

Export

Data stored in the Desktop Portables database must be formatted before it can be read by other programs such as Datacolor TOOLS™.

Export is the term used to refer to this formatting procedure. The data in the Datacolor CHECK folder is formatted and exported to another file. The export function includes three file formats: QTX, CSV and TXT.

- QTX. This is a proprietary file format used to exchange data between Datacolor programs and the Desktop Portables database.
- CSV (Comma Separated Values). This is a standard ASCII file format that uses commas to delimit the data.
- TXT (Text). This is a standard ASCII file format that allows you to specify the character to delimit the data



NOTE

When you send data from Datacolor TOOLS to the Desktop Portables database, it is also exported. In this case, you use the export function on the Datacolor TOOLS desktop.

Import

Data transferred from another program (e.g., Datacolor TOOLS) to the Datacolor Portables database is imported to the Datacolor CHECK database. This option converts the data to the Datacolor CHECK data format, and stores it in a user in the Desktop Portables database. The next time synchronization is run, the data is transferred to the stand-alone Datacolor CHECK unit.

When you send data from the Desktop Portables program to the Datacolor TOOLS desktop, it is also *imported*. In this case, you use the import function on the Datacolor TOOLS desktop. The import option is also used to import white tile data from a diskette to the Datacolor Portables database. It is then transferred to the stand-alone Datacolor CHECK through the synchronization option.

Optional Accessories

Two optional accessories are available for the Datacolor CHECK, a standalone battery charger, and an automotive adapter.

Stand-Alone Battery Charger

The stand-alone battery charger has the capacity to charge two Datacolor CHECK batteries. If you are making a high volume of measurements using the Datacolor CHECK, this allows you to have a fully charged battery onhand at all times.

Connecting Power Cord to Power Adapter



Connecting Power Adapter to Battery Charger



Multiple Battery Charger

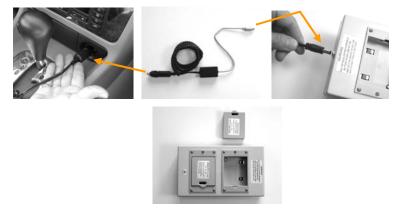


Automotive Adapter

Another accessory is an adapter that allows you to charge the Datacolor CHECK battery using the lighter outlet in the car. The battery in the Datacolor Check can be recharged directly, or you can connect a standalone battery charger to the outlet.



Automotive Adapter Connected to Datacolor CHECK Unit



Automotive Adapter with Stand-Alone Battery Charger

Accessory Specifications

, ,	Stand-Alone Battery Charger	Automotive Adapter
Datacolor Part #	1200-1364	1200-1367
Description	Dual battery charger for Portable Battery Pack Part No. 1200-1299	12 Volt DC automotive adapter for Datacolor portable spectrophotometer product family (Datacolor CHECK, Datacolor CHECK ^{PLUS} , Datacolor CHECK ^{PRO} , Datacolor 110 P) and also for Portables battery charger, part no. 1200-1364
Output Power	4.1v DC	6.5 Volts DC
Requirements	0.500 Amperes	1.8 Amperes
	2 Watts Maximum	10 watts, maximum via the 8-
	Used only to charge	pin MINI-DIN connector
	Portable Battery Pack Part No. 1200-1299	
Input Power	6.5V DC	10 –15 Volts DC
Requirements	1.5 Amperes	1.8 Amperes
•	10 Watt maximum	18 Watts maximum via the
Operating	Use only approved power source containing an approved disconnect device that is within easy reach of operator's position. Power Adapter Part No. 4050-0065 or Datacolor Portable Automobile Adapter Part No. 1200-1367 5°C to 40°C	automotive adapter connector 5°C to 40°C
Operating Environment		
	Maximum relative humidity is 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C, altitude up to 2000 meters	Maximum relative humidity is 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C, altitude up to 2000 meters
Battery Recharge	4 hours	N/A
Time	This product contains a 4.5	This product contains a 240
Fuse	This product contains a 1.5 ampere, 15 Volt DC non-replaceable fuse	This product contains a 3AG, 5 Ampere replaceable fuse in the automotive adapter connector

Case Size	188mm x 112mm x 40mm	60mm x 35mm x 21mm
	7.4 in x 4.4 in x 1.6 in.	2.4 in x 1.4 in x 0.8 in
Miscellaneous	This product to be used	This product to be used only
	only in the manner	in the manner specified by
	specified by the	the manufacturer. There are
	manufacturer. There are	no operator-replaceable
	no operator-replaceable	parts. Remove all power
	parts. Remove all power before servicing.	before servicing

Selected References

Berns, Roy S. <u>Billmeyer & Saltzman's Principles of Color Technology</u>, Third Edition. John Wiley & Sons, Inc. New York; 2000.

CIE Technical Report: Improvement to Industrial Colour-Difference Evaluation. CIE Pub No 142-2001. Vienna: Central Bureau of the CIE; 2001.

Hunter, Richard S. & Harold, Richard W. <u>The Measurement of Appearance</u>, Second Edition. John Wiley & Sons, Inc. New York; 1987.

McDonald, Roderick ed. <u>Colour Physics for Industry</u>, Second Edition. Society of Dyers and Colourists; West Yorkshire, England. 1997.

Volz, Hans G., Industrial Color Testing, VCH, New York, 1995.

Index

Α	С
Accessory Specifications, 310 Active Batch, 53 Active Folder, 53 Active Mode, 10 Active Standard, 53 Aperture Selection, 13, 33 Aperture Setting Changes, 15 Aperture Size, 94 Apply Strength, 109 ASTM Table 5, 279 Auto Print, 95 Auto Save, 95 Auto Select Standard, 169 Auto Standard, 169 Auto Standard Measurement procedure, 171 Auto Std, 95 Automotive Adapter, 309, 310 Autosave, 45	Cable Connections, 197 Calibration Interval, 34, 133 Calibration Tiles, 22 care, 22 cleaning, 22 handling, 22 storage, 23 Caps, 36 Case Size, 311 Change User, 223 Check Data, 202 CIE 2000 Color Difference, 107 CIE Metamerism, 294, 304 CIE Whiteness, 287, 291, 303 CMC Color Difference, 106 Color Coordinates differences, 47 Color Difference, 48 equations, 282
В	setup, 106 Color Evaluation
Backlight, 34 Batch Data, 242 Batch Management, 66 Batch Spec, 97 Batch Specular, 54 Battery, 28	performing, 46 results, 47 Color Space, 116 Communications Cable, 21 Contrast Ratio, 296, 305 Current Evaluation, 53
removal, 28 Battery Charger, 310	D
Battery Icon, 34 Battery Recharge Time, 310 Berger Whiteness, 290, 302 Black trap, 20	D1925 Yellowness, 302 Data Backup, 189, 190

Data Deletion, 233, 235, 242, 247, 250, 254	Evaluations indices, 51
Data Editing, 232	other types, 50
Data Management, 204, 231	plots, 51
Data Retrieval, 191	spectral data, 50
Data Synchronization, 194, 197	Export, 193, 195, 205, 208, 218, 307
Data Transfer Routines, 195	CSV file, 221
Datacolor CHECK, 1	data, 206
Datacolor CHECKPLUS 1	QTX file, 218
Datacolor CHECK ^{PRO} , 1	TXT file, 222
Datacolor Portables	.,, ===
Desktop Program, 193	_
Sync Wizard, 193	F
Datacolor Tools	Factory Calibration, 175
instrument configuration, 186	File Menu, 209
Date, 134	Firmware Version, 264
Delete Batch Data, 247	Fixed Adj, 117
Delete Data, 232	Flash Card, 191
Delete Folder Data, 235	removal, 192
Delete Standard Data, 241	Flashes for Measurement, 98
Delete Tolerance Block, 253	Fluorescence, 174
Delete Tolerance Data, 250	Fluorescent Tile
Delete White Tile Data, 257	calibration, 128
Descriptors, 48	Fluorescent Tile Calibration
Desktop Portables	procedure, 178
database, 207	Folder, 202
Desktop Program Glossary, 307	Folder Data, 233
DIN 6172 Metamerism, 295, 304	archive, 236
Display Screen, 32	Folder Management, 57
Display Screen Setup, 111	Font, 50
Display Set, 52	Formats, 135
Display Set Control, 37	Fuse, 310
Display Set Management, 84	
Drift Test, 142	G
Dual Aperture Units, 13	G
,	Ganz (GG) Whiteness, 292
E	Ganz or Ganz-Greisser Whiteness, 303
L	Ganz Whiteness Evaluation, 286
E313 Whiteness, 291, 303	Ganz-Griesser
E313 Yellowness, 302	calibration, 120
Edit Data, 232	instrument-specific calibration values,
Enabling Adjusted Strength, 167	118
Energy Level Test, 146	setup, 118
Evaluation Screen	Gloss, 34
additional fields, 52	Gloss Compensation, 151
Evaluation Screen Legend, 275	Gloss Compensation Enabled, 54
Evaluation Screens, 297	Gloss Determination, 305
Evaluation Type, 115	Gloss Evaluations, 155
- :	·

314 • Index Datacolor CHECK™

Gloss Features	assembly, 25
implementing, 152	components, 23
Gloss Geometry, 108, 153	connections, 25
Gloss Measurement Condition, 154	Instrument Calibration, 277
Gray Scale for Color Change, 293	Instrument Diagnostics, 141
Gray Scale for Staining, 294	Instrument Maintenance, 30
Green Tile Test, 143	Instrument Setup
	diagnostic options, 141
11	Instrument Specifications, 2
Н	Instrument Timeout, 133
Hardware, 259	Interface Features, 31
FAQ's, 259	routine functions, 37
Troubleshooting, 259	Internal Battery, 9
Help Menu, 56, 139	Internal Ref, 116
About option, 140	Interpreting Tint Values, 286
Hex Driver, 20	Introduction, 1
Home, 35, 36	ISO Staining, 304
Hot Sync Manager	ISO/AATCC Fastness, 304
custom, 224	100/1/1/1/00 1 43(1)(33, 004
setup, 227	
starting, 229	L
view log, 226	Labels, 7
HotSync Manager, 224	Language, 135
Hunter Whiteness, 292, 303	Last Active Evaluation, 37
Tranter ************************************	Light Source, 4
ı	Light Coaroo, 1
ı	М
Illuminant, 116	•••
Illuminant/Observer, 54, 279, 280	Management Menu, 56, 57
setup, 112	Management Options, 35, 36, 55
Import, 193, 195, 205, 208, 308	general operation, 56
data, 205	Management Setup, 93
data to Check, 213	Manual Save, 45
data to existing folder, 216	Measure Batch, 37, 41
procedure, 210	Measure Button, 12
white tile data, 209	Measure Standard, 36, 41
Indices, 289, 302	Measurement Sequence, 41, 42, 96
Input Power Requirements, 310	Measurement to Average, 94
Install, 224	Measuring Samples, 40, 296
Stapler Foot, 18	Memory Card, 190
Instrument, 7	
calibration, 37	N
calibration interval, 39	
calibration procedure, 38	Next Sample Type, 54
calibration requirements, 38	
controls, 11	Ο
indicators, 11	
Instrument Cable, 23	Operating Environment, 310

Operation, 7	customizing, 43
Optical Brighteners, 174	Sample Preparation, 162
Optical Density, 295, 305	Sample Type, 41
Optional Accessories, 308	Samples
Output Power Requirements, 310	naming, 43, 44
,	retrieving, 45
Р	storing, 45
•	Save, 37
Pass/Fail, 49	Search By Name, 98
details, 49	Search for Closest Std, 100
PDA Caps Lock, 35	Search Input, 98, 100
PDA Control Panel, 35	Search Results, 99, 104
PDA Keyboard, 35, 36	Select Batch, 37
PDA Timeout, 133	Select Standard, 36
Persistent Icons, 33	Serial Cable, 21, 24
Portables Desktop Program, 2	Serial Port Cables, 26
Portables Program, 201	Serial Port Connection, 27
Portables Sync Wizard, 194, 199, 206	Setup Menu, 56, 105
menus, 207	Sharing Data, 193
mouse keys, 207	Shift, 36
navigation, 207	Shift Key, 35
Power, 4	Sleep Mode, 10
Power Adapter, 8, 21, 24, 27	Software Identification, 4
Power Adapter Cord, 24	Software Preferences, 132
Power Cord, 21	Spectral/Colorimetric Data, 297
Power Source, 7	Specular, 94
Power Sources, 8	Specular Excluded, 33
Print, 37	Specular Included, 33
Print Screen, 105	Specular Port Status, 33
Printer, 137	Specular Ref, 116
Program Settings, 163	Stand-Alone Battery Charger, 308
Purge All Deleted, 149	Standard, 202
	Standard Data, 237
R	Standard Management, 61
IX.	Stapler Foot
References, 311	accessories, 20
Refresh, 223	installation, 17
Removing	Status Bar, 222
Flash Card, 192	Std Spec, 97
Replacement Parts, 7	Std Specular, 54
Results from Different Equations, 285	Stensby Whiteness, 293
Retrieval Functions, 189	Strength
Return to last evaluation, 37	setup, 114
·	Strength Adjustment Enabled, 54
S	Strength Calculation Selections, 163
J	color space, 166
Safety Warnings, 4, 8	evaluation type, 164
Sample Names, 43	fixed adj, 166

316 • Index Datacolor CHECK™

illuminant, 166 internal ref, 166 specular ref, 166 Strength Evaluation, 306 Strength Evaluation Results, 168 Strength Option, 162 Synchronization, 193, 232, 233, 235, 242, 247, 250, 254, 307 System Navigation, 31

Т

Table 6 Data, 279
Target Sample, 100
Tethered, 186
Time, 133
Tolerance Block Data, 251
Tolerance Block Management, 76
Tolerance Blocks, 203
Tolerance Data, 247
Tolerance Management, 68
Tolerances, 203
Toolbar, 222
Transferring Data, 196

U

USB Cable, 21, 24
USB Cable Connections, 265
USB Com Port Assignment, 273
USB Driver Installation, 265
USB Port
configuration, 263
USB Port Assignment, 269
USB Port Cables, 26
USB Port Connection, 28
Use Gloss Compensation, 107
UV Calibration, 117, 174, 175
UV Enhanced Spectrophotometer, 174

UV Filter, 175 UV Filter Calibration, 40, 186

V

View Batch Data, 242 View Data, 231 View Folder Data, 233 View Menu, 222 View Standard Data, 237 View Tolerance Block Data, 251 View Tolerance Data, 248 View White Tile Data, 254

W

Wavelengths to Omit, 117
White calibration tile, 20
White Tile Data, 204, 254
Whiteness Evaluation, 183
Whiteness Evaluations, 177, 286
Whiteness Index, 124
Whiteness Indices, 290, 291, 292
Whiteness Options, 174
Whiteness Results, 184
Whiteness Scale, 125
Wizard View, 223

Χ

XUSAV Aperture Selection, 40

Y

Yellowness D1925, 289 Yellowness E313, 290 Yellowness Indices, 289