



**Color Quality Controller System**

**CQCS3**

**USER MANUAL**

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# **1. Introduction**

## **1.1 Software Description**

Color Quality Controller System CQCS3 is a supporting software for PCE colorimeter which developed by PCE INSTRUMENTS. This software is high-tech software integrating colorimetry, modern optoelectronics and computer science. It provides professional normalization, standardization and data color management solution for modern enterprises.

CQCS3 software is connected to the colorimeter with USB cable. You can operate colorimeter through PC. It not only retains the existing functions of the colorimeter, but also extends its functions. CQCS3 can make color difference analysis, color difference cumulative analysis, color sample database management, chromaticity index analysis, simulated object color and print, etc. It is the right-hand man of color quality management.

### **CQCS3 functions include:**

- ◆ Performing color difference measurement and analysis, obtaining standard and sample data, calculating sample color difference and judge whether it is qualified or not, giving intuitive bias diagram of sample color difference and quantitative data analysis, giving color simulation of standard and sample.
- ◆ Providing color difference cumulative analysis; selecting different sample data under the same standard and obtaining color simulation comparison diagram; giving color difference distribution graph to help users to judge the variation trend of color difference. Then, the users can better control color changes.
- ◆ Chromaticity, Whiteness, Yellowness, Fastness Measurement
- ◆ Data Upload and Data Download
- ◆ Retrieve Database: can store the desired color data of the sample, and retrieve according to the need to find out the best matching color record.

## 1.2 System Requirements

Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8 operating systems

Computer processor speed is more than 500MHz.

Memory is more than 256MB.

Free disk space is at least 10MB for installation and operation.

## 2. Installing Software

### 2.1 Installing CQCS3 Software

Insert PCE Color Quality Control System (CQCS3) installation CD into CD-ROM drive. Copy the CQCS3 folder from the CD to your computer.

Click setup.bat file in CQCS3 folder, then it will pop up a dialog box as shown in Figure 1.



Figure 1

Click “Next”, then it will pop up a dialog box as shown in Figure 2.

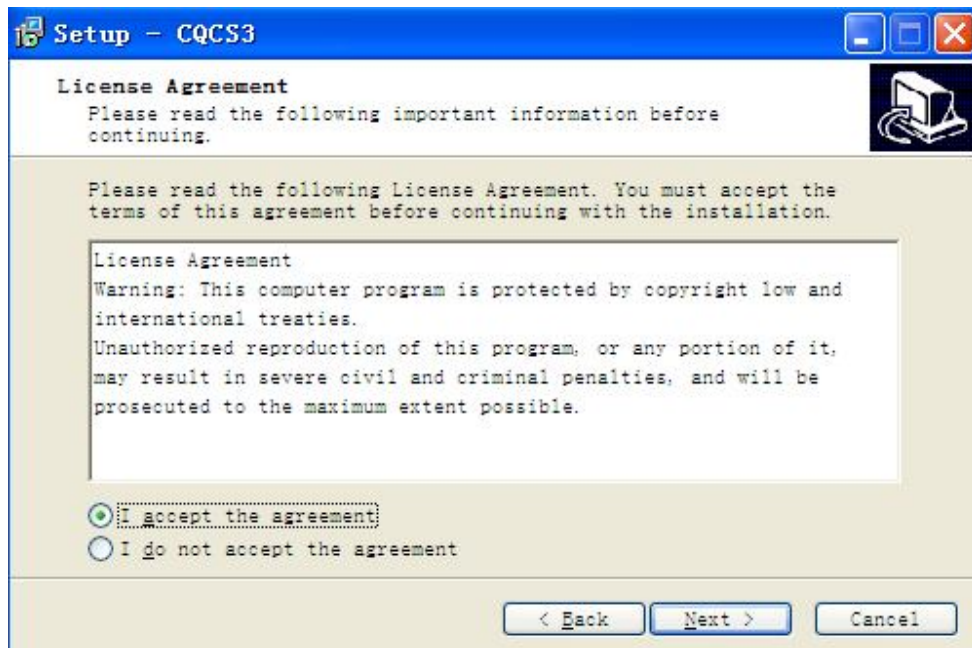


Figure 2

Select “I accept the agreement” and click “Next” to pop up a dialog box, as shown in Figure 3.

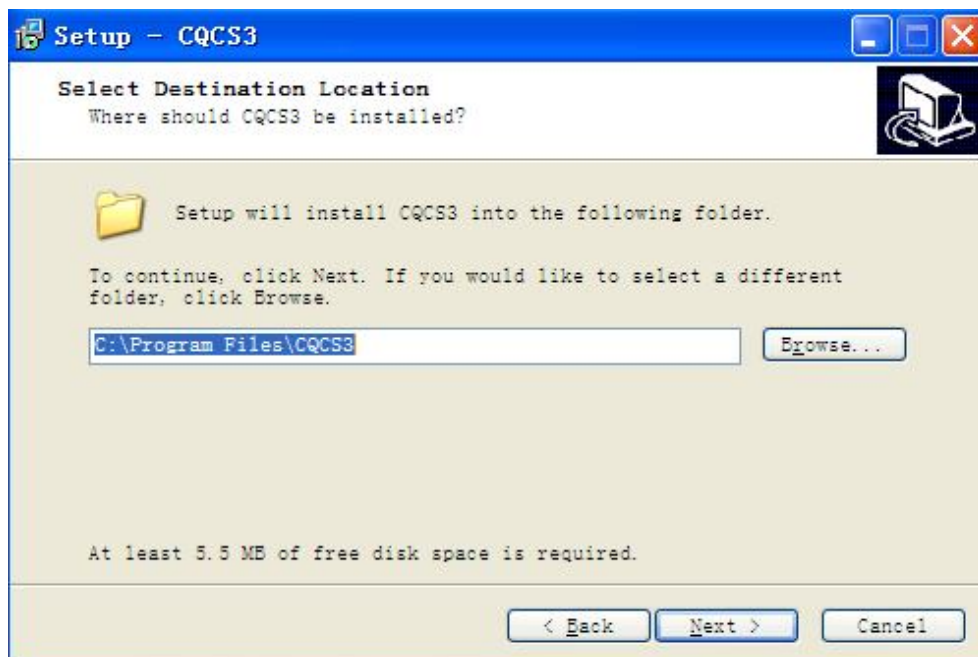


Figure 3

Click “Next” to pop up a dialog box, as shown in Figure 4.

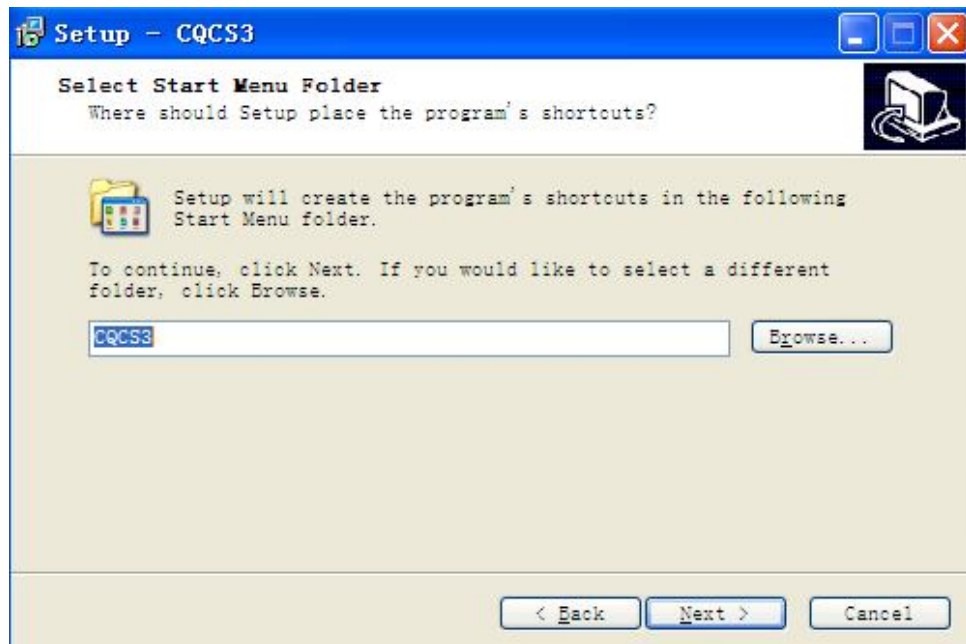


Figure 4

Click “Next” to pop up a dialog box, as shown in Figure 5.

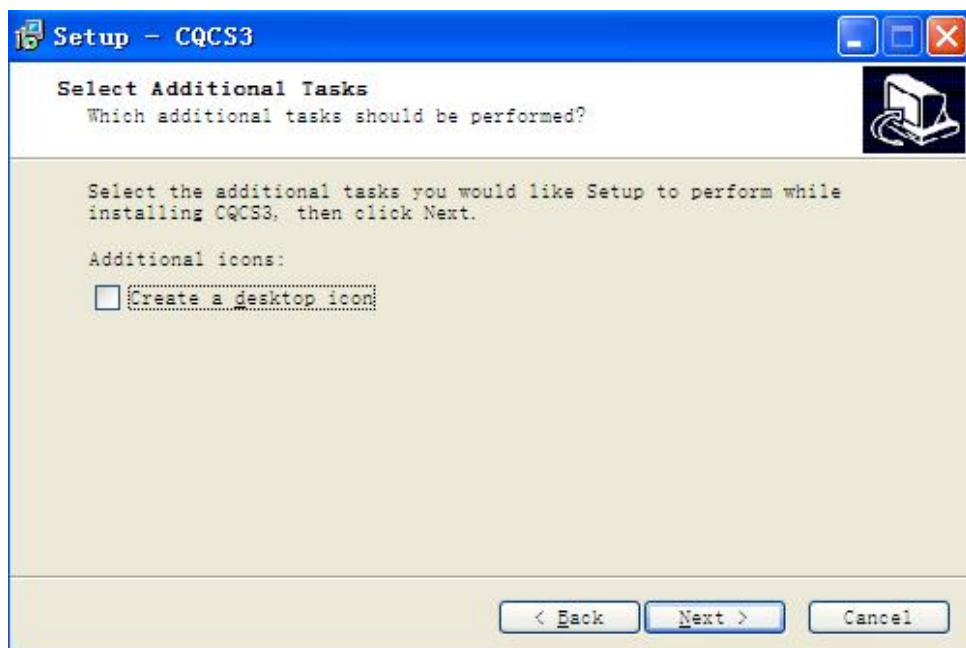


Figure 5

Select “Create Desktop Shortcut”, click “Next” to pop up a dialog box shown in Figure 6.

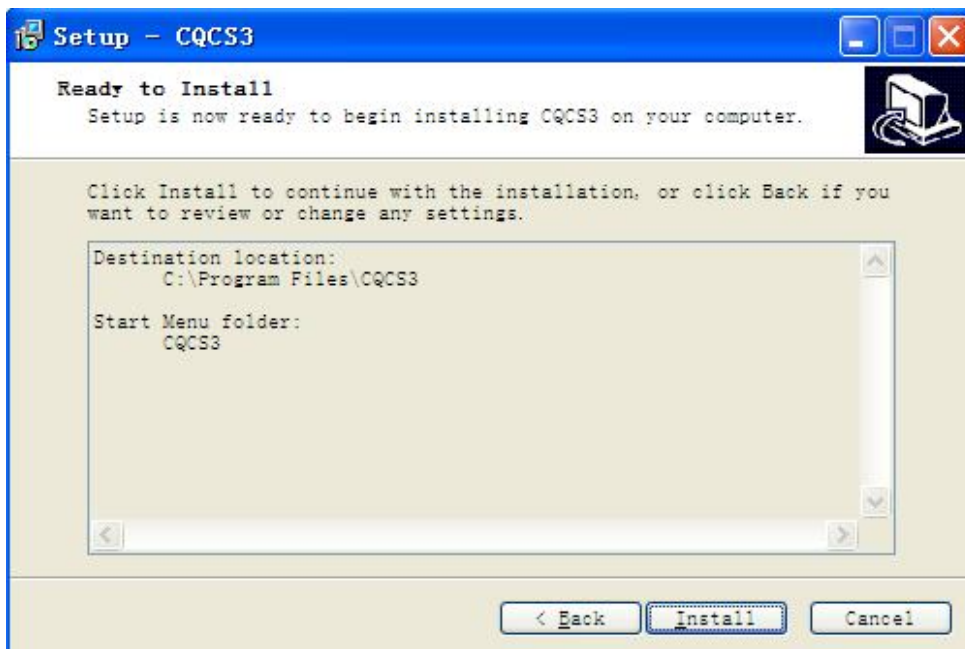


Figure 6

Click “Install”, a progress bar will appear. After completing the installation, it will pop up a dialog box, as shown in Figure 7. (USB driver will install automatically in this process. Please see Figure 7-1.

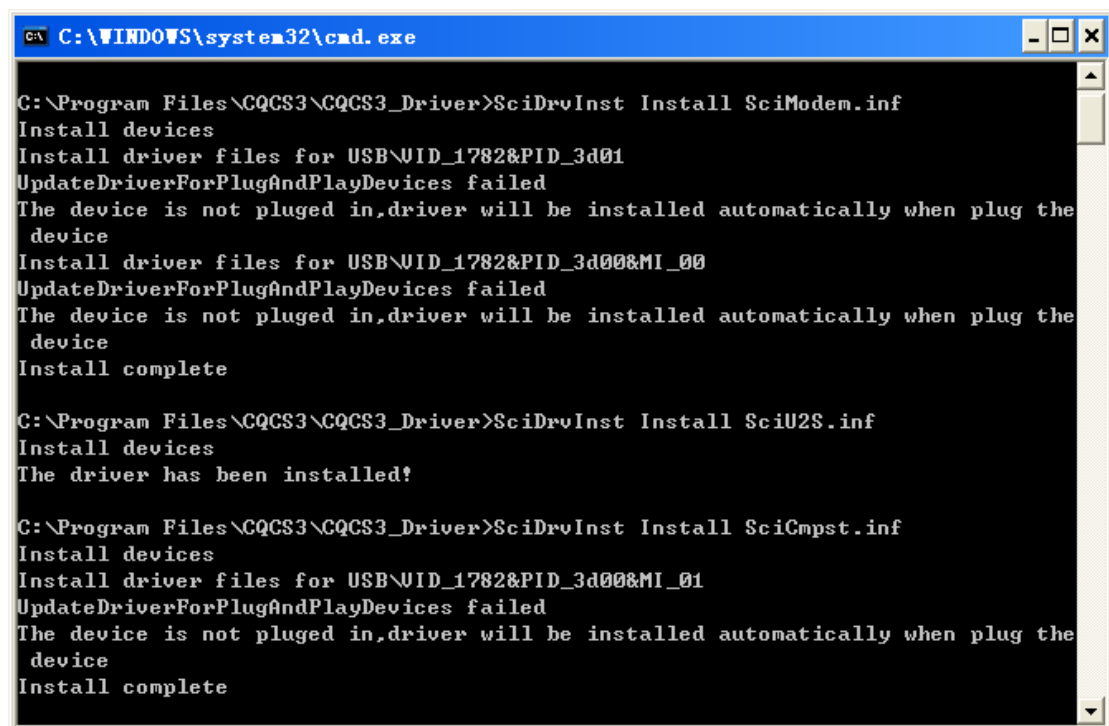


Figure 7-1



Figure 7

Then, CQCS3 software is installed.

## 2.2 Installing USB Driver Manually

In general, it will install USB drive automatically. But if you cannot find USB device in Device Manager or it shows the device has some problem after installing CQCS3 software, you need to install USB drive manually.

If the computer is 32-bit operating system, open CQCS3\USBDriver folder, click Install.bat file. If the computer is 64-bit operating system, open CQCS3\USBDriver\_x64 folder, click DPInst.exe file.

Then, the computer will install USB driver.

Open CQCS3\ USB\_Driver folder, click Install.bat file, the computer will install USB driver automatically.

After installing USB driver, turn on the instrument to enter main menu. Select “Comm” and make sure the instrument is connected to the PC with USB cable. Then press “Enter” key to start communication.

Right click on “My Computer” on the desktop to pop up a dialog box shown in Figure 8.





Figure 8

Click “Manage” to open “Device Manager”. If the computer displays an interface shown in Figure 9, it means USB driver is installed successfully.

**In the use of CQCS3 software, when you open “Communication Parameters” window to select serial port, you can check the serial port in Figure 10. Then fill in this effective serial port to COM selection box in “Communication Parameters” window.**

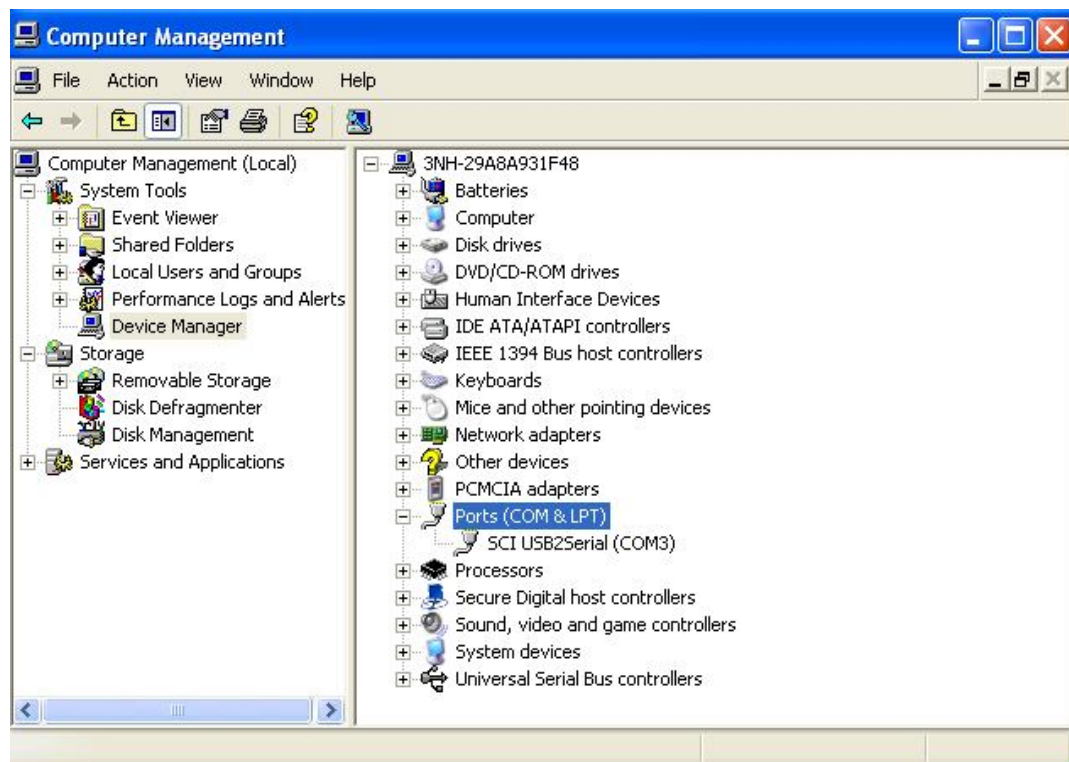


Figure 9

In Figure 8, click “Manage”. Click to open “Device Manager”. If the computer displays an interface shown in Figure 10, it means USB driver installation failed. You need to reinstall USB driver.

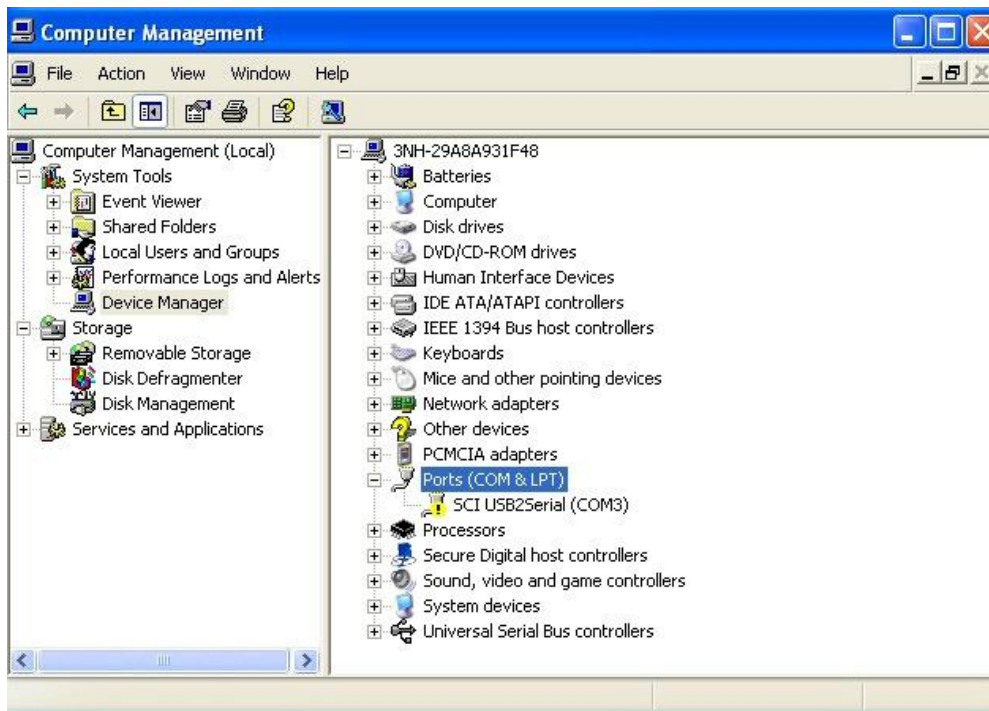



Figure 10

Right click on  SCI USB2Serial (COM3) . It will pop up an interface as shown in Figure 11.

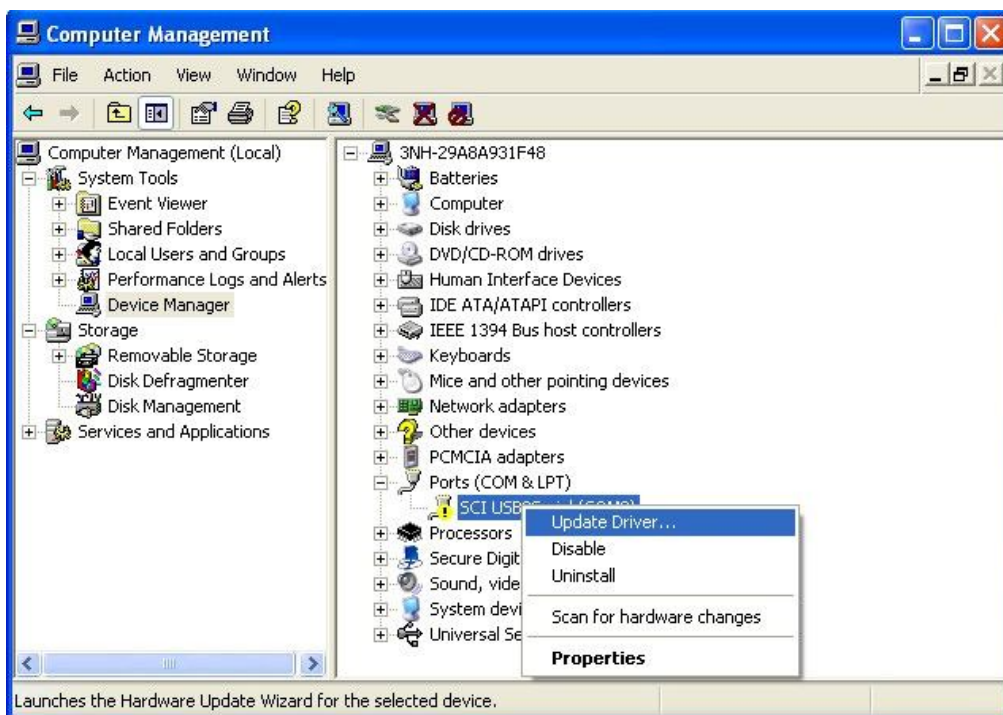


Figure 11

Click “Update Driver” to pop up a dialog box as shown in Figure 12.

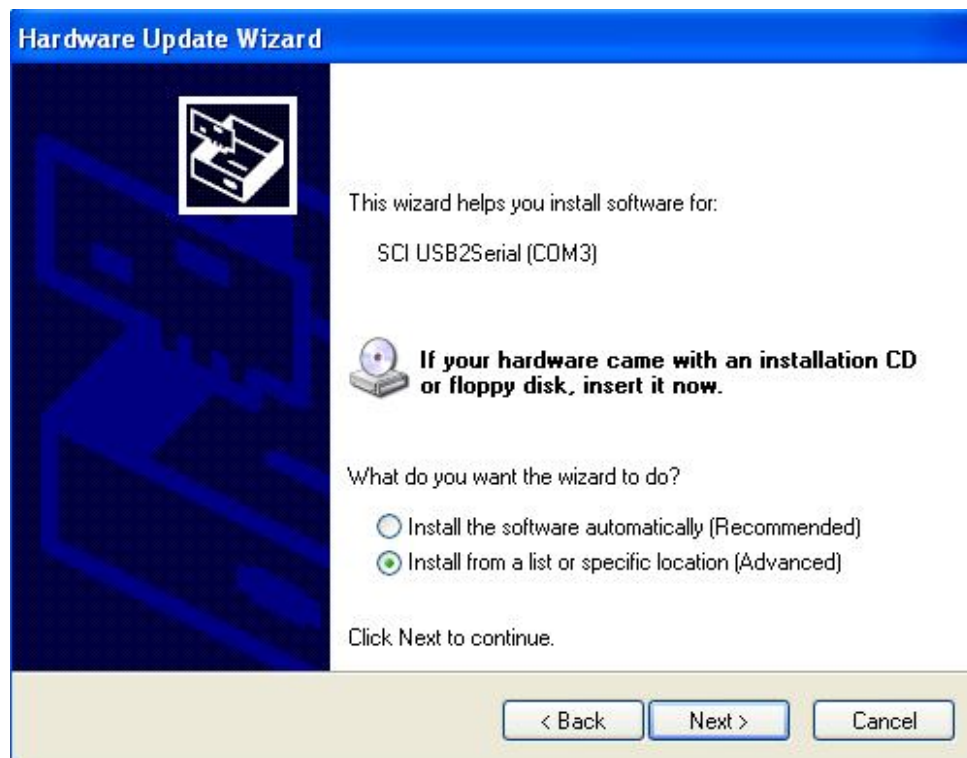


Figure 12

Select “Install from a list or specific location (Advanced)”, click “Next” to pop up a dialog as shown in Figure 13.

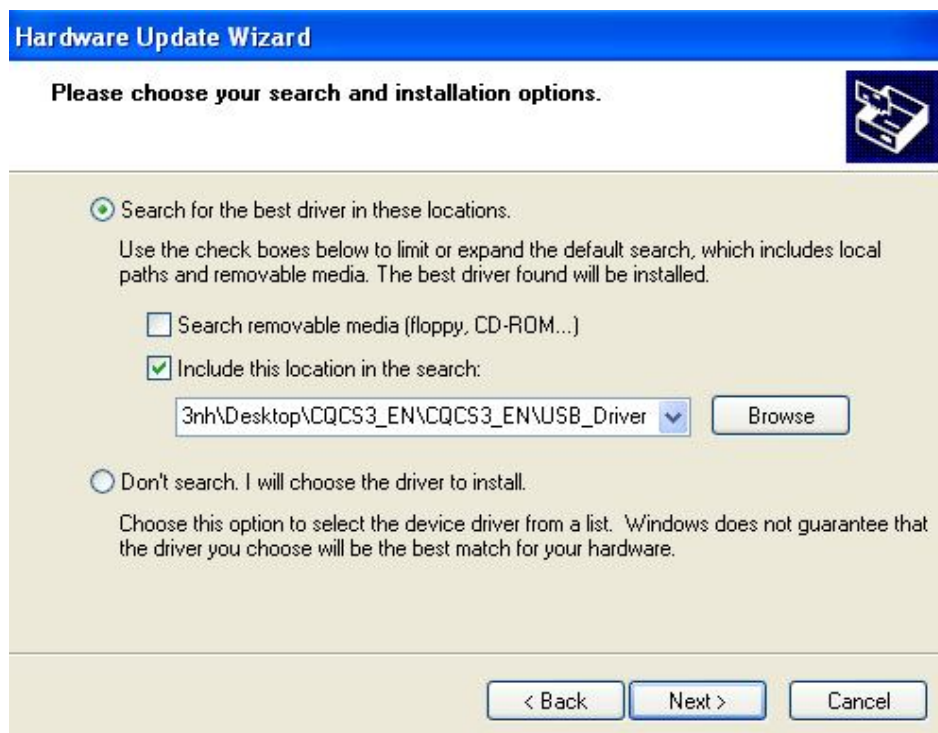


Figure 13

Select “Include this location in the search”, click “Browse” to find USB driver file. Click “Next”, the computer will install it automatically. After completing the installation, it will pop up a dialog box as shown in Figure 14, which means the USB driver is installed successfully.



Figure 14

Then, all drivers are installed. Click CQCS3 icon on the desktop, you can connect the colorimeter to use PCE Color Quality Control System.

### 3. Software Operation Instruction

#### 3.1 Interface Description

Main interface is shown in Figure 15

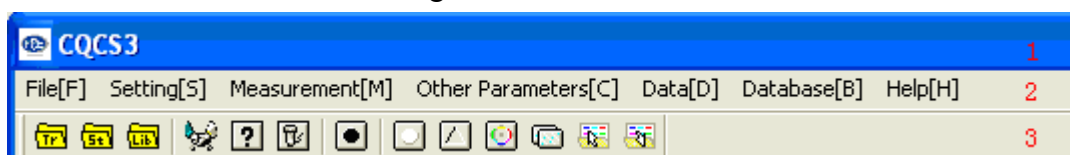


Figure 15

The display column marked by red “1” in Figure 15 is the system software name CQCS3.

The display column marked by red “2” in Figure 15 is the main menu.

The display column marked by red “3” in Figure 15 is the toolbar.

Toolbar icons are the shortcut icons. They, from left to right, are “Specify Standard File Name”, “Specify Sample File Name”, “Specify Database File Name”, “Communication Parameters”, “Instrument Status”, “Measurement Parameters”, “Black Calibration”, “White Calibration”, “Color Diff Measurement and Analysis”, “Chromaticity Index”, “Retrieve Database”, “Upload Sample Data to the PC”, “Download Standard Data to the Instrument”.

The main menu of software instructions includes: “File”, “Setting”, “Measurement”, “Other Measurement Parameters”, “Data”, “Database”, and “Help”. Following is a brief function introduction of each menu.

1. **File:** Mainly to realize functions of “Specify Standard File Name”, “Specify Sample File Name”, “Specify Database File Name” and “Print”. The specified file is used to store measurement data.
2. **Setting:** Mainly to realize functions of “User Profile Setting”, “Communication Parameters”, “Instrument Status” and “Color Space, Color Diff Formula and Tolerance Setting”. “User Profile Setting” is used to set company name and address in printing table. “Communication Parameters” is used to set communication port and baud rate.
3. **Measurement:** Mainly to perform “Black Calibration”, “White Calibration”, “Standard Measurement”, “Sample Measurement”, “Color Diff Measurement and Analysis” and “Color Diff Cumulative Analysis”.
4. **Other Measurement Parameters:** Mainly to realize functions of “Chromaticity Index”, “Whiteness Index”, “Yellowness Index” and “Fastness Index”.
5. **Data:** Mainly to realize functions of “Export Chromaticity Data”, “Export Color Diff Data”, “Upload Standard Data to the PC”, “Upload Sample Data to the PC” and “Download Standard Data to the Instrument”. “Export Chromaticity Data” and “Export Color Difference Data” are used to export measured data and generate EXCEL files.

6. **Database:** “Retrieve Database” is mainly to perform comparative analysis of sample data and the stored sample data. Then find out the stored sample data nearest the sample.
7. **Help:** Versions, Official Website, User Manual.

\*For more detailed description about the above menus, please see the later introduction.

## **3.2 Connect Colorimeter to the PC**

### **3.2.1 USB Communication**

Turn on the colorimeter to enter main menu. Select “Comm”. Make sure the colorimeter is connected to the PC with USB cable. Then press “Enter” key to start communication. Be sure the instrument is in communication status. Then, start CQCS3 software. In order to ensure the stability of the communication, please do not operate the colorimeter and do not press any button when the instrument is in communication status.

## **3.3 Specify Files**

The CQCS3 automatically creates the default Standard File, Sample File and Database File when first use. For later use, you can specify corresponding file name according to your need. Standard File is use to store standard measurement data. Sample File is used to store sample measurement data. Database File is used to store the measured data exported from sample records. The operation interface is shown in Figure 16.

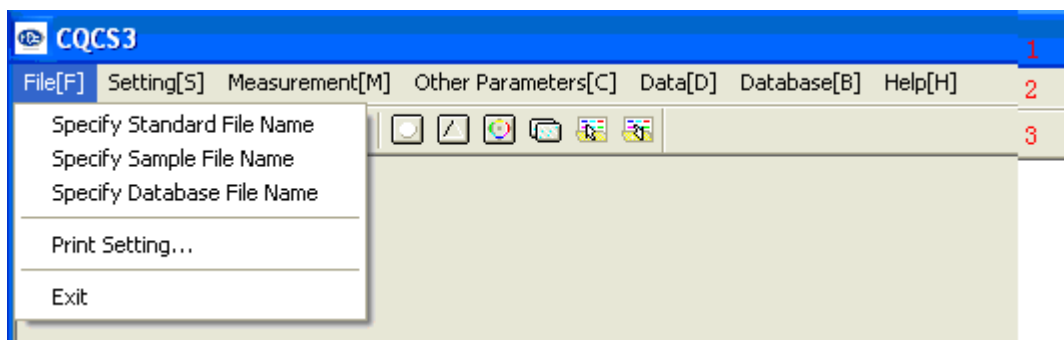


Figure 16

### 3.4 Setting

The settings menu is shown in Figure 17

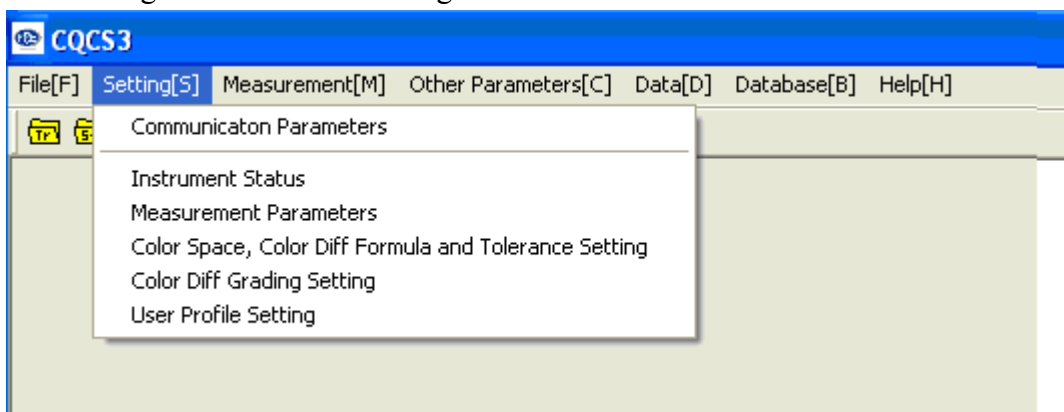



Figure 17

#### 3.4.1 User Profile Setting

Click “Settings->User Profile Setting” to activate user profile setting window, as shown in Figure 18. You can set user’s profiles. And it is used to print the titles of various reports, as shown in Figure 19.

**User Profile Setting** 

Print User Profile on Various Reports

Chinese Name:

English Name:

Chinese Address:

English Address:

Print Mode: ☐ B/W ☐ Color

Figure 18



# The Company

The Address

## Color Difference Analysis

No.	5-4-2015 10:52:52 Mon.								
Sample Information									
	Standard	Sample							
Name	ss.1	2							
From									
Batch No.									
Character									
Test Time	5-8-2014 0:15:30	1-1-2013 1:23:36							
Test Result									
<div><div><div>+db*(Yellow)</div><div>+24</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>-da*(Green)</div><div>+da*(Red)</div><div>-db*(Blue)</div><div>-24</div></div><div><div>+dL*(Light)</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>-dL*(Dark)</div></div></div>									
Chromaticity Index and Color Difference (D65/4)									
	L*/dL*	a*/da*	b*/db*	c*/dc*	h*/dh*	dE*DE20	Color Shade	Hue	Chroma
Standard	78.384	-0.708	3.892	3.956	100.286		Dark	Red+Yellow	Strong
Sample	26.043	7.751	15.608	17.427	63.592				
Color Diff	-52.341	8.457	11.716	13.471	5.227	53.874			
Result	Fail								
Remark	The result is only responsible for this test								

Instrument: PCE-CSM 7

Test:

Audit:

VFigure 19

### 3.4.2 Communication Parameters

Before setting the communication parameters, please connect the colorimeter to the PC to make sure the colorimeter is in communication status. Click “Settings->Communication Parameters” to activate “Communication

Parameters” Window, as shown in Figure 20. This window is used to set the serial port and baud rate. After setting communication parameter, click “OK”.

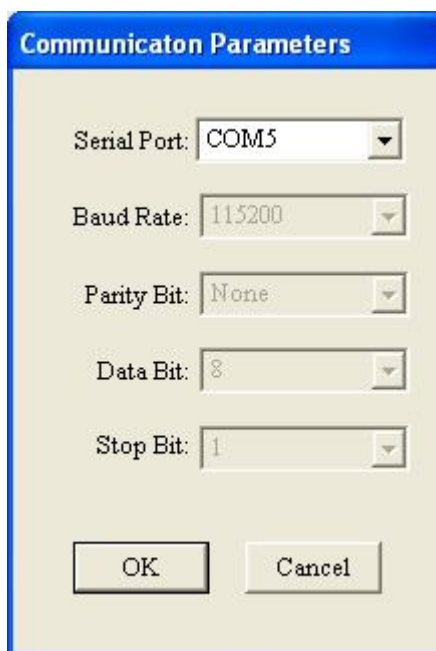


Figure 20

### 3.4.3 Instrument Status

After setting communication parameter and connecting the instrument to the PC successfully, click “Setting->Instrument Status” to activate the window as shown in Figure 21. You can check the instrument status through this window.

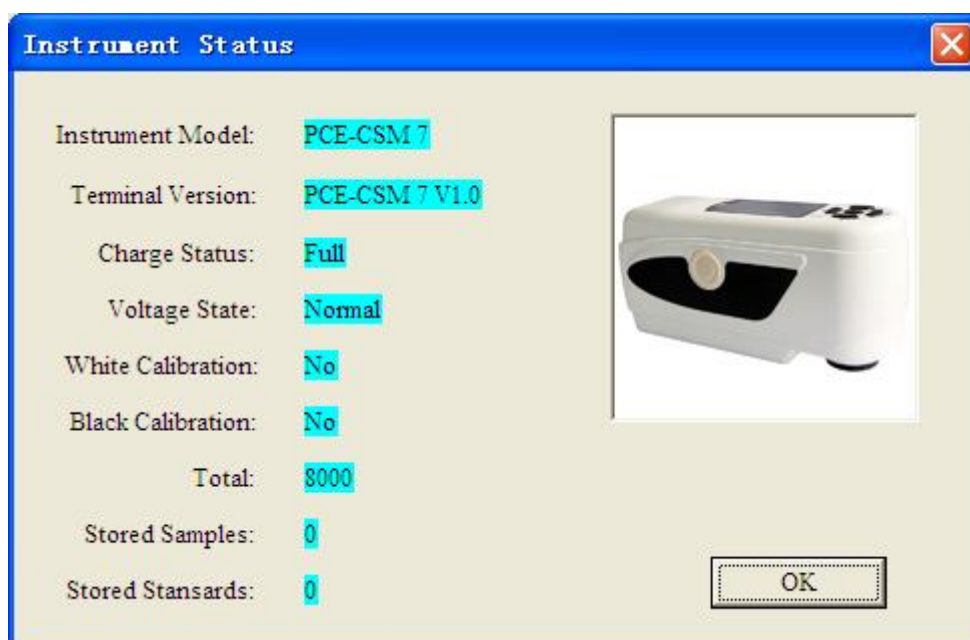


Figure 21

### 3.4.4 Measurement Parameters

Click “Setting->Measurement Parameters” to activate “Measurement Parameters” window, as shown in Figure 22. You can set the main light source, standard observer and SCI & SCE.

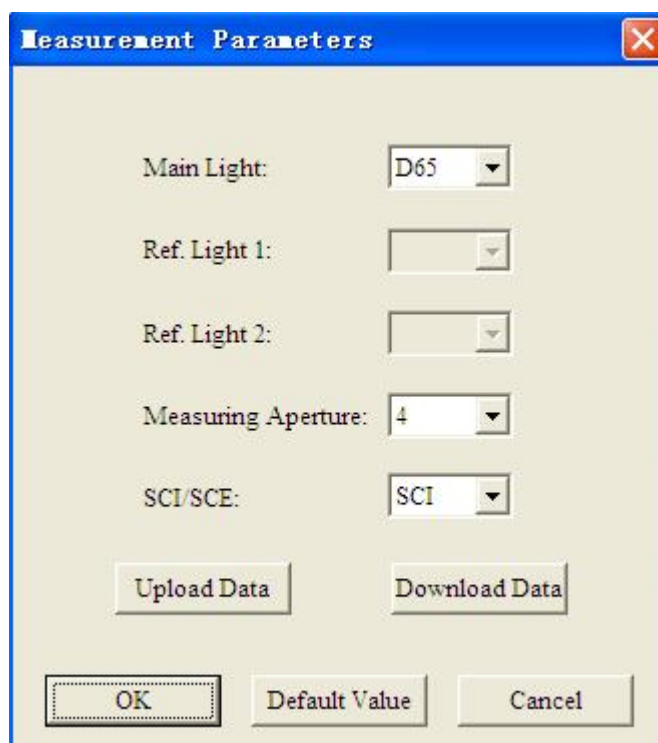


Figure 22

### 3.4.5 Color Space, Color Diff Formula and Tolerance Setting

Click “Settings-> Color Space, Color Diff Formula and Tolerance Setting” to activate a window as shown in Figure 23. Then you can make settings according to you need.

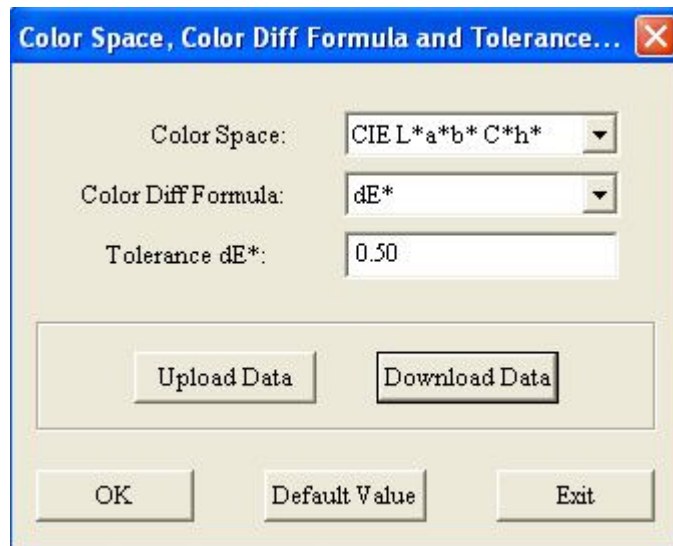


Figure 23

### 3.4.6 Color Diff Grading Setting

Click “Setting->Color Diff Grading Setting” to activate a window as shown in Figure 24. You can set color difference grading. The default is the grade of staining fastness.

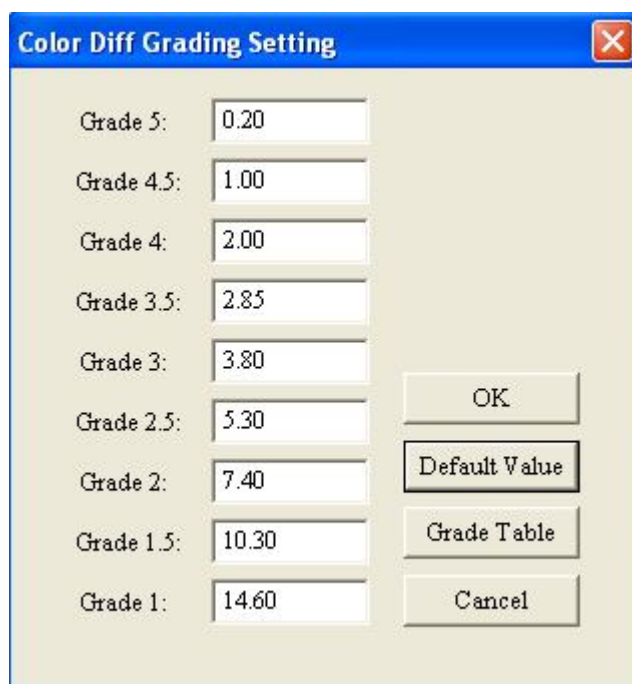


Figure 24

## 3.5 Measurement

The measurement Menu is shown as follows:

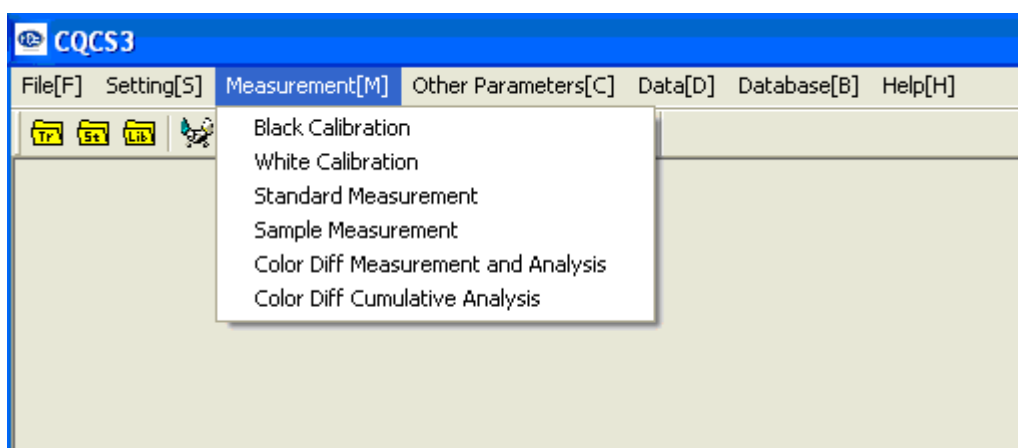


Figure 25

### 3.5.1 Calibration

After completing the above settings, you need to perform white and black calibration to make sure the accuracy of measurement. As shown in Figure 26, click "Measurement-> Black Calibration" to activate "Black Calibration"

window. Direct the measuring aperture to the air, then click “Start” to do black calibration.

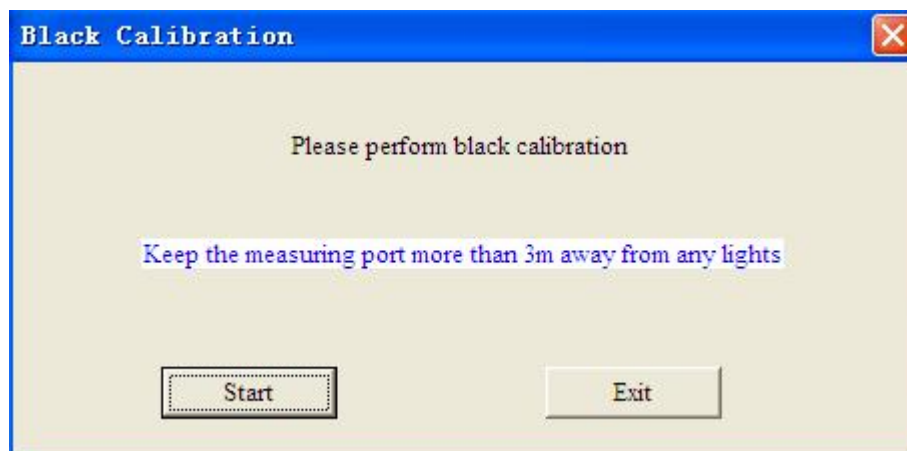


Figure 26

Click “Measurement->White Calibration” to activate “White Calibration” window, as shown in Figure 27. Make sure the white calibration cover is well installed on the colorimeter, then click “Start” to perform white calibration.

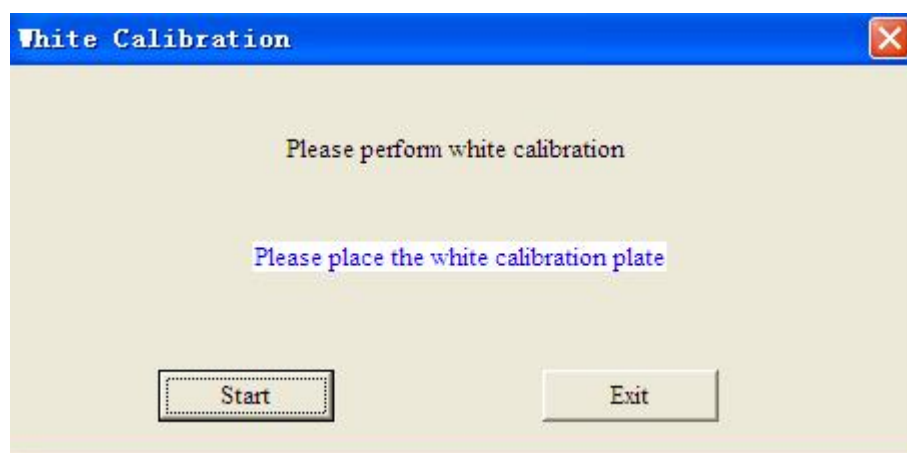


Figure 27

### 3.5.2 Standard Measurement and Sample Measurement

After completing white and black calibration, you can perform measurement. Click “Measurement->Standard Measurement” to activate “Standard Measurement” window, as shown in Figure 28. There are “Measurement”, “Store”, “Exit” and “Average Start” in measurement window. And you can customize the name of a standard measured value.

Stick the colorimeter to the measured object. Click “Measurement” to perform measurement. After completing the measurement, you can input a name and click “Store” to save data.

The dialog box titled "Standard Measurement" contains the following fields and controls:

- File Name: C:\CQCS3\data\SampleData
- Records: 14
- Date: 12-6-2013 11:26:0
- Prefix Name: (empty text box)
- Name: 15
- SCI/SCE: SCI (dropdown menu)
- ☐ Auto Store
- Buttons: Measure (highlighted with a dashed border), Store, Exit, Average Start
- Colorimetry Data Table:
 

L*	0.000
a*	0.000
b*	0.000
C*	0.000
h*	0.000

Figure 28

Click “Average Start” to start average measurement. The operating interface is shown in Figure 29.

The dialog box titled "Standard Measurement" contains the following fields and controls:

- File Name: C:\CQCS3\data\SampleData
- Records: 14
- Date: 12-6-2013 11:26:0
- Prefix Name: (empty text box)
- Name: 15
- SCI/SCE: SCI (dropdown menu)
- ☐ Auto Store
- Buttons: Measure, Store, Exit, Average End (highlighted with a dashed border)
- Colorimetry Data Table:
 

L*	0.000
a*	0.000
b*	0.000
C*	0.000
h*	0.000

Figure 29

The times of average measurement are not limited. Click “Average End” to end average measurement. Click “Store” to save the data of this average measurement. Or check “Auto Store” to save data automatically.

Click “Measurement->Sample Measurement” to activate “Sample Measurement” window, as shown in Figure 30. Stick colorimeter to the measured object. Click “Measurement” to perform measurement. After completing the measurement, you can input a name and click “Store” to save data or check “Auto Store”.

**Sample Measurement**

File Name: C:\QCS3\data\T5a.dat

Records: 4

Date: 12-6-2013 11:28:54

Prefix Name:

Name: 5

SCI/SCE: SCI

☐ Auto Store

L*	0.000
a*	0.000
b*	0.000
C*	0.000
h*	0.000

Please place the sample

Measure Store Exit Average Start

Figure 30

### 3.5.3 Color Diff Measurement and Analysis

Click “Measurement->Color Diff Measurement and Analysis” to activate “Color Diff Analysis” window, as shown in Figure 31. The user can select and search the needed sample and standard according to this window. And also you can perform real-time measurement through the “Measurement” key in the window. After selecting the sample, color difference of the sample under this standard will display in a table on the left side of this window. You can judge whether the color difference can meet the requirement according to the tolerance. There are sample chromaticity diagram and color simulation diagram of sample and standard on the right of this window.



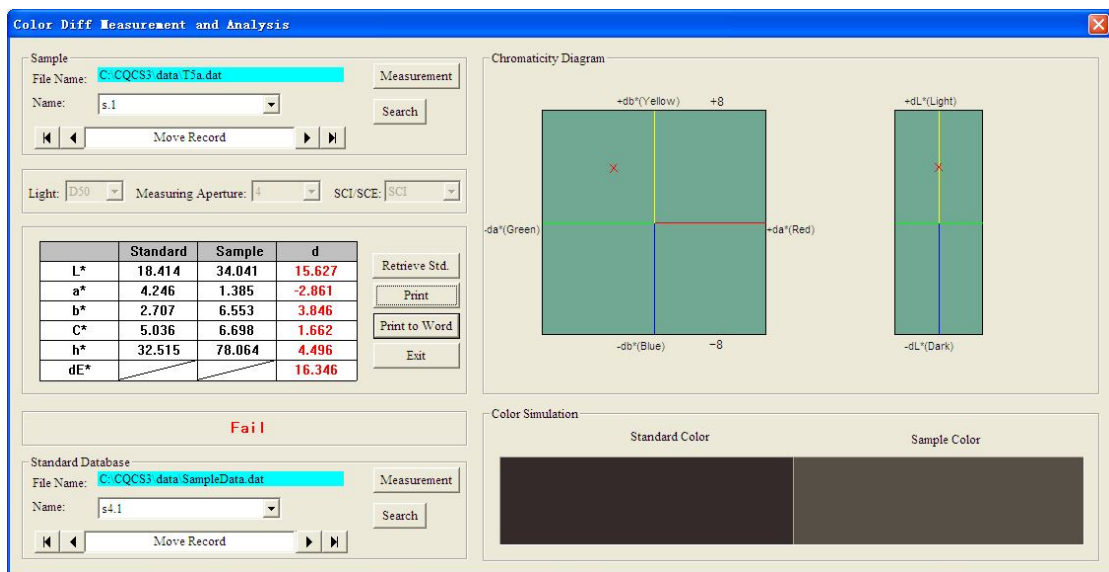


Figure 31

Click “Retrieve Database”. You can find the closest data to current sample from all standard records and can arrange them in order.

Click “Print”. You can print the current standard and sample data table.

Click “Print to Word”. You can save the current standard and sample data table to a WORD document (Be sure you have installed Office software in the computer).

### 3.5.4 Color Diff Cumulative Analysis

Color Diff Cumulative Analysis is used to analyze mass sample data. It can show color simulation diagram and color difference distribution graph, display color difference list and print color difference report.

Click “Measurement->Color Diff Cumulative Analysis” to activate “Color Diff Cumulative Analysis” window. In this window, the user must select a standard from the standard list on the left and select multiple samples from the sample list on the right.

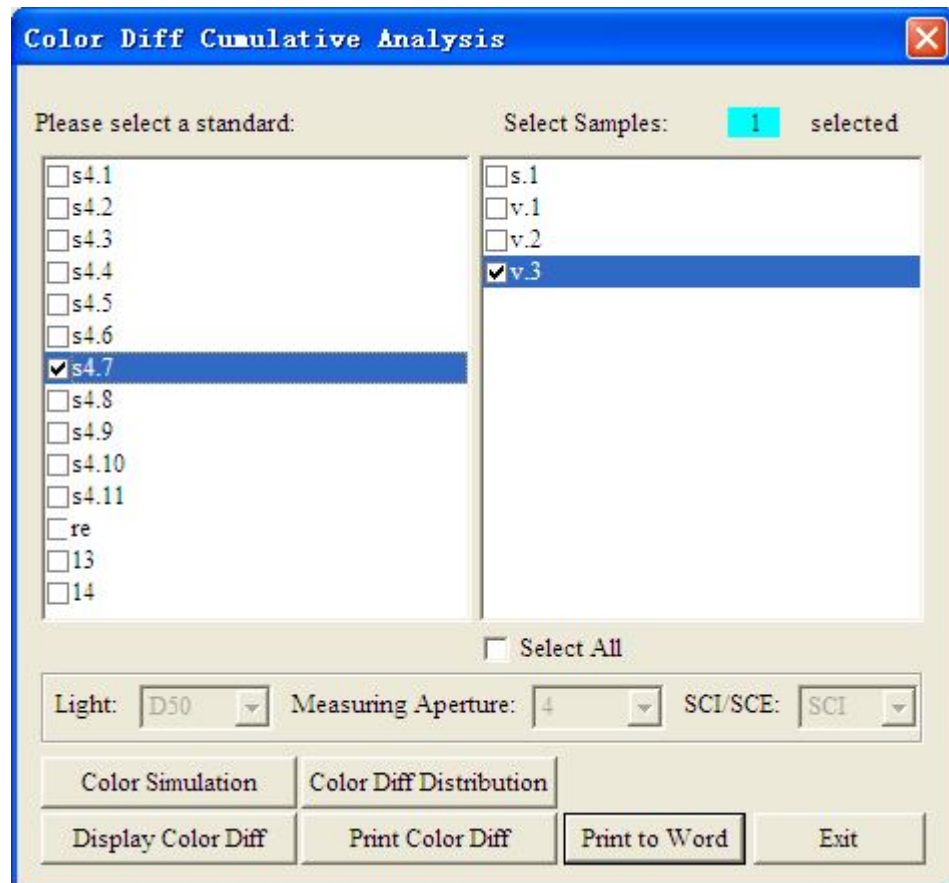


Figure 32

After completing the selection, you can start analysis. For example, click “Color Simulation”; you can obtain the simulation color difference between the standard and the sample, as shown in Figure 33.

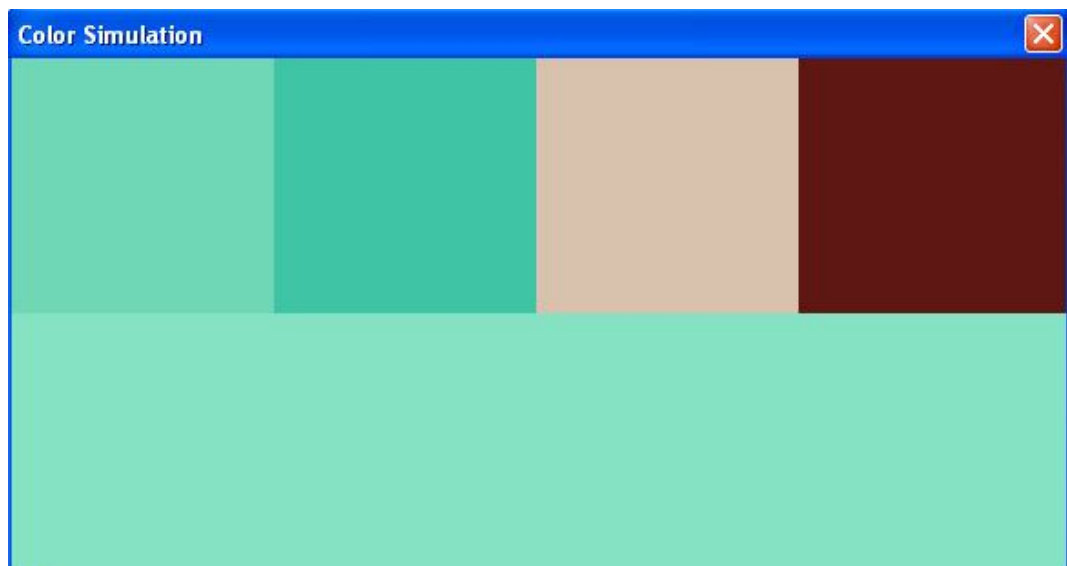


Figure 33

Click “Color Diff Distribution”, it will display color difference trend chart and distribution graph of multiple samples under this standard, as shown in Figure 34 and Figure 35.

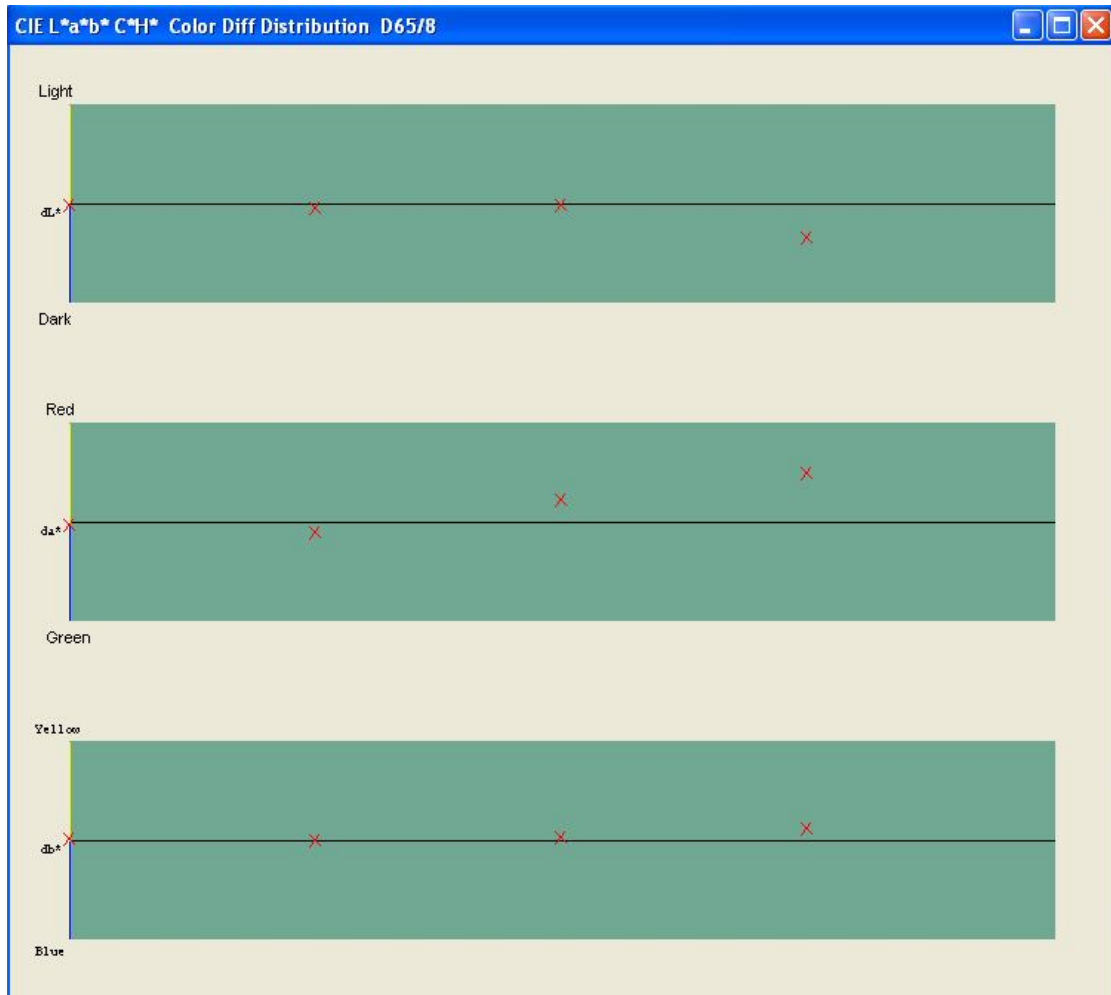


Figure 34

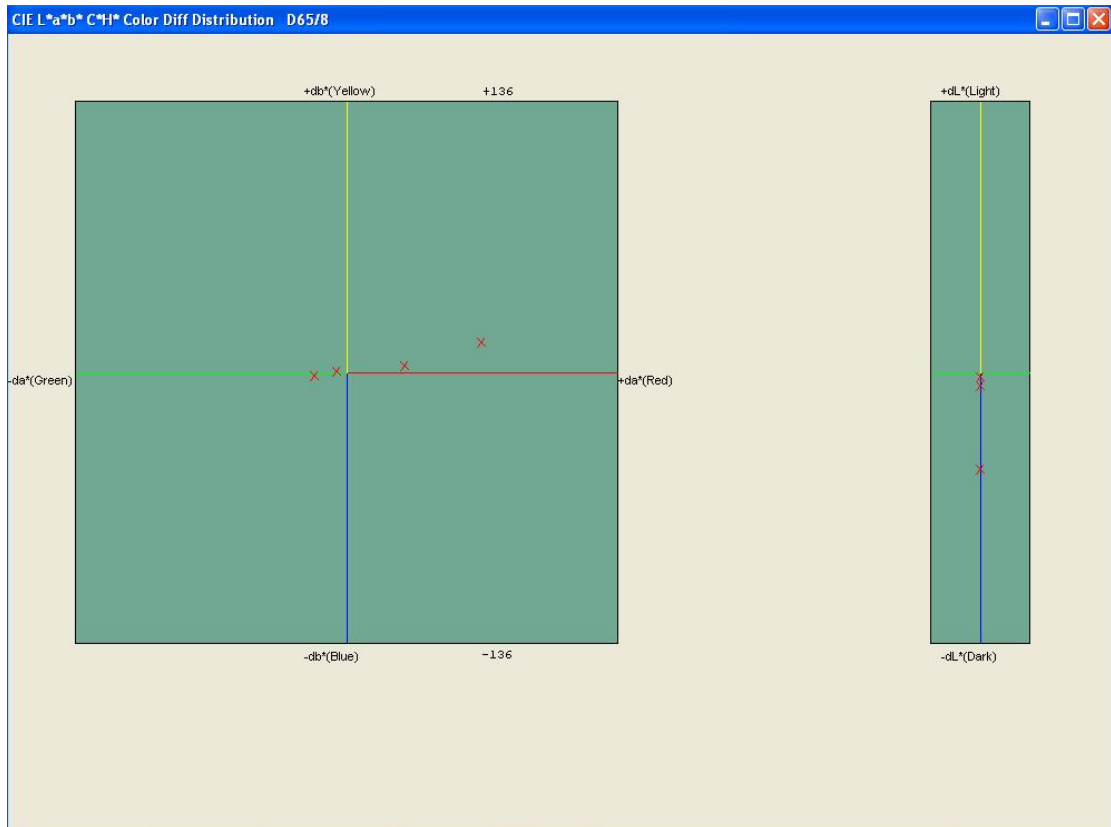


Figure 35

Click “Display Color Diff”, it will display color difference lists of multiple samples under this standard, as shown in Figure 36.

CIE L\*a\*b\* C\*H\* display color diff. D65/8

Next Page Prev Page Exit Page 1/Page 1

Standard Name: 1, L\*=92.568,a\*=-19.524,b\*=3.798,c\*=19.890,h\*=168.991 There are 4 records

No.	Sample Name	dL*	da*	db*	dc*	dh*	dE*
1	1	-2.311	-4.705	0.304	4.684	0.540	5.251
2	2	-6.749	-16.155	-1.823	15.843	3.645	17.602
3	3	-2.341	29.358	3.255	-7.788	28.493	29.630
4	4	-48.535	67.712	14.880	31.791	61.609	84.629

Figure 36

If it needs to print, please click “Print Color Diff” to print the report of multiple color differences. Also, you can click “Print to Word” to save as a WORD document (Be sure you have installed Office software in the computer).

## 3.6 Other Measurement Parameters

### 3.6.1 Chromaticity Index

Click “Other Measurement Parameters->Chromaticity Index” to activate “Chromaticity Index Calculation” window, as shown in Figure 37. You can select sample name or directly click “Measurement” key to obtain data. The chromaticity parameter data with corresponding index name (color space) will display in this window. The color simulation will display on the right side of this window and the lower part of this window will show chromaticity coordinate graph.

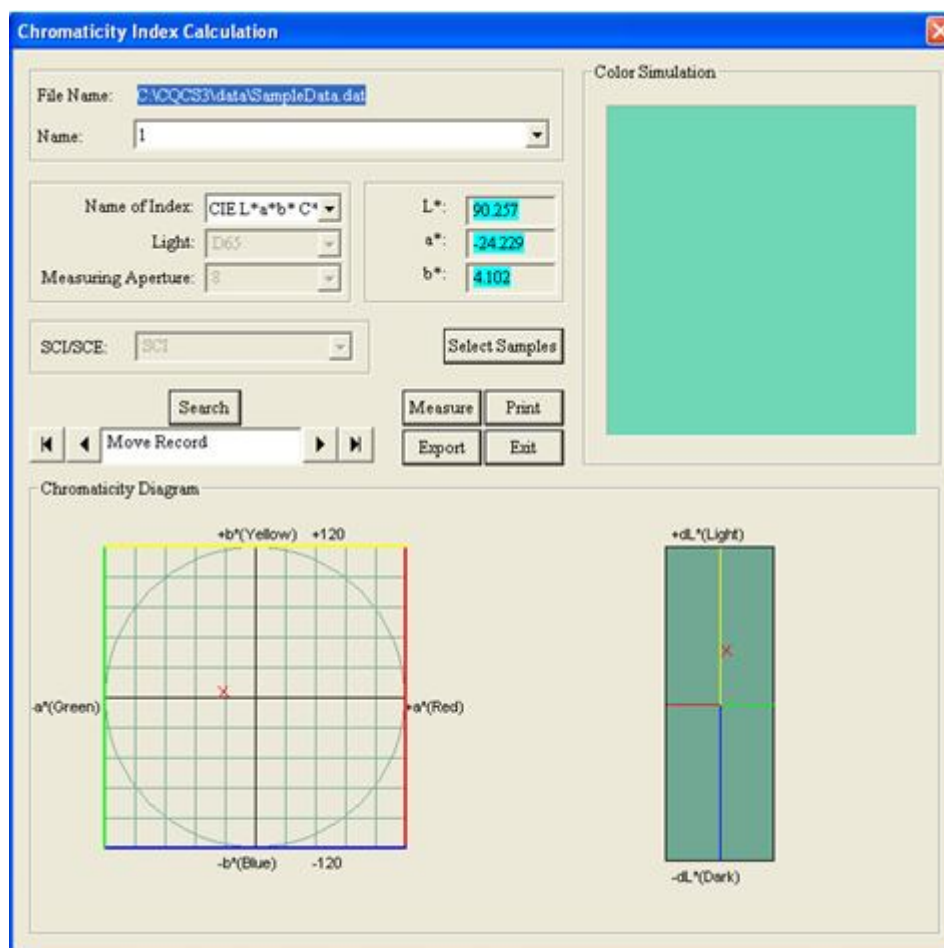


Figure 37

### 3.6.2 Whiteness Index

Click “Other Measurement Parameters ->Whiteness Index” to activate “Whiteness Index” window, as shown in Figure 38. You can select sample name or directly click “Measurement” key to obtain data. The whiteness parameter data of this sample will display in the window and the left side of this window will show color simulation.

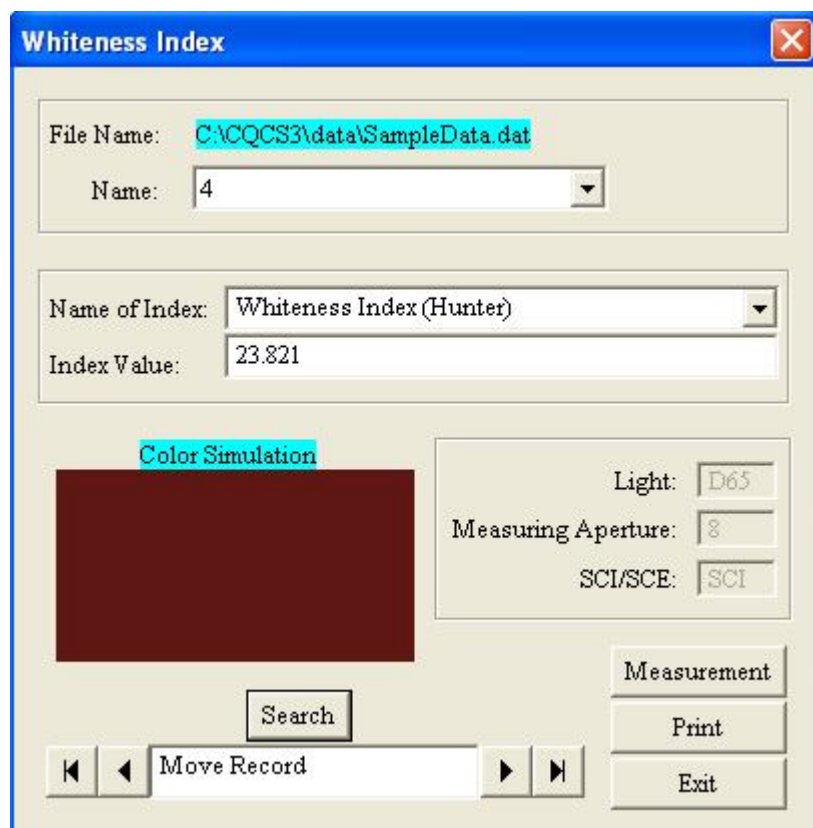


Figure 38

### 3.6.3 Yellowness Index

Click “Other Measurement Parameters->Yellowness Index” to activate “Yellowness Index” window, as shown in Figure 39. You can select sample name or directly click “Measurement” key to obtain data. Yellowness parameter data will display in the window and the left side of this window will show color simulation.

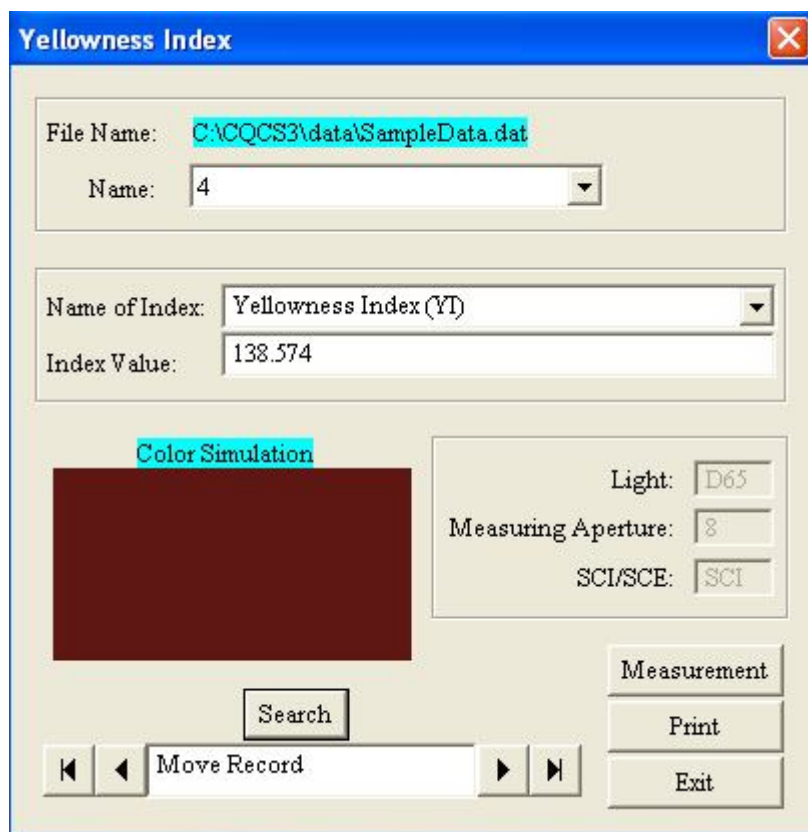


Figure 39

### 3.6.4 Fastness Index

Click “Other Measurement Parameters->Fastness Index” to activate “Fastness Index” window, as shown in Figure 40. You can select sample name or directly click “Measurement” key to obtain data. Fastness parameter data will display in the window and the left side of this window will show color simulation.

Figure 40

## 3.7 Data

### 3.7.1 Export Chromaticity Data

Click “Data->Export Chromaticity Data” to activate “Export Chromaticity Data” window, as shown in Figure 41. You can export the selected standards (multiple choice), the type of exported data, test status and output address.



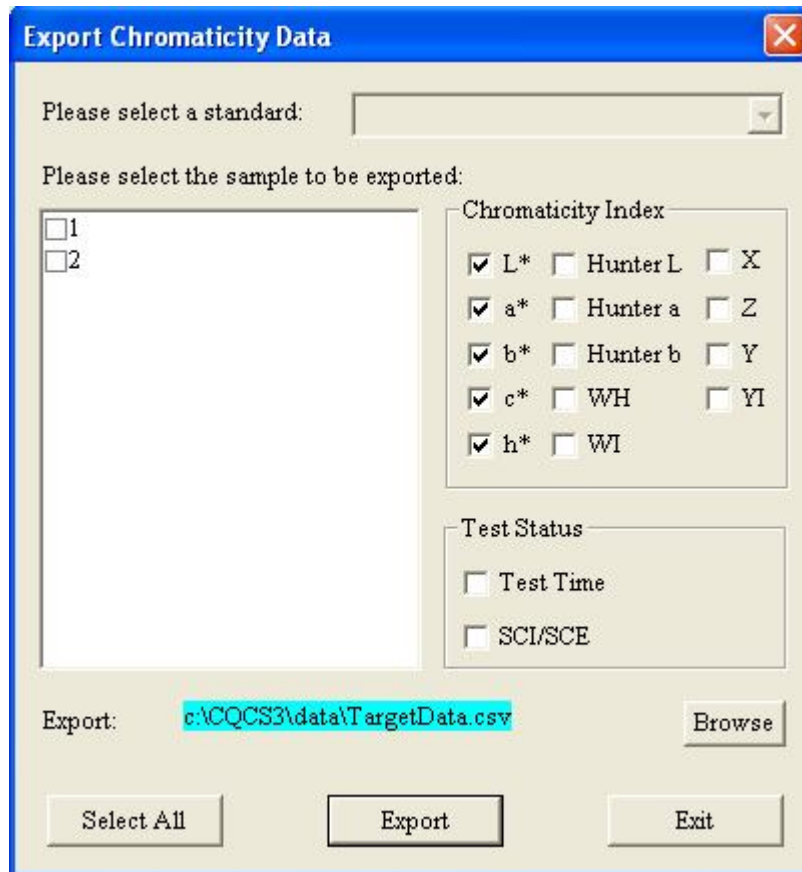


Figure 41

Click “Browse” to select output path and file name. Click “Export”, it will generate an EXCEL file which records the chromaticity.

### 3.7.2 Export Color Diff Data

Click “Data->Export Color Diff Data” to activate “Export Color Diff Data” window, as shown in Figure 42. You can export the selected standard and the samples (multiple choice), the type of exported data, test status and output address.

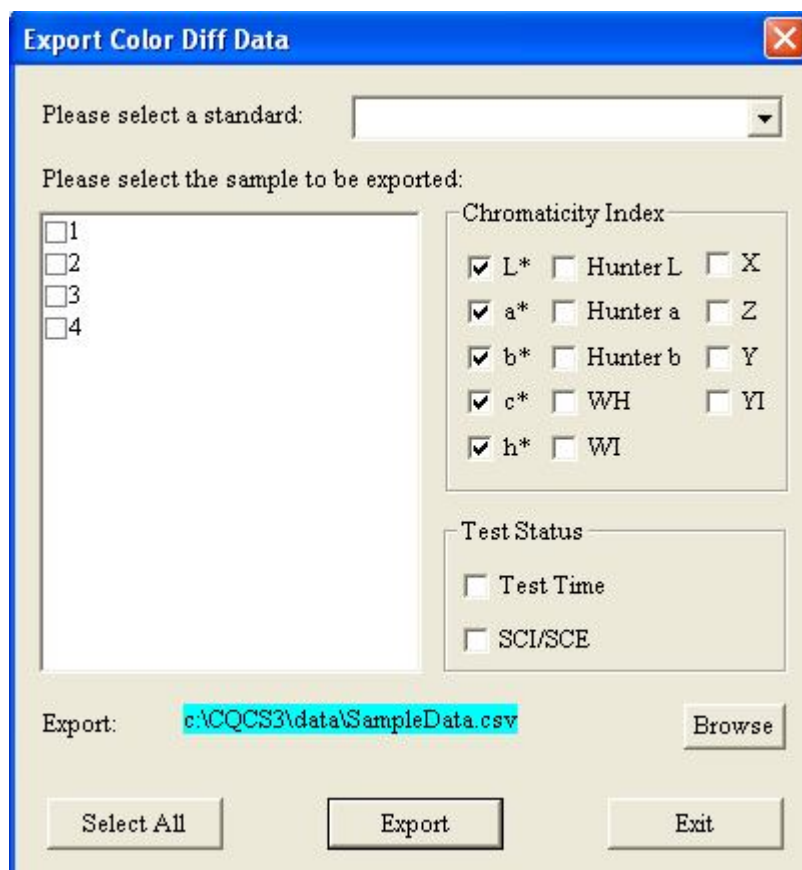


Figure 42

Click “Browse” to select output path and file name. Click “Export”, it will generate a color difference data EXCEL file of a standard and multiple samples.

### 3.7.3 Upload Instrument Data

Click “Data->Upload Standard Data to the PC” to activate “Read out or Delete Sample Data” window, as shown in Figure 43. You can choose to export standard data or delete data. Fill the initial sequence number in the “Starting Standard No.” box, start with 1. Fill the total number you want to read out in “Sample No.” box. Click “All Data Delete” to delete all standard data in the instrument. The characters filled in the “Name Prefix” box will be saved as the standard name prefix in standard file.

**Read out or Delete Standard Data**

File Name: C:\CQCS3\data\TargetData.dat

Records: 2 Starting Std. No.:

Name Prefix:  Std. Number:

Std. Name:

Figure 43

Click “Data->Upload Sample Data to the PC” to activate “Readout or Delete Sample Data” window, as shown in Figure 44. You can select and export sample data from the instrument or delete the data. The standard name is needed to be specified. Only when the standard name is specified, you can transfer sample data under the specified standard record. Click “Delete All Data” to delete all sample data under this standard record. Other operating methods are as above.

**Read out or Delete Sample Data**

File Name: C:\CQCS3\data\SampleData.dat

Records: 4 Starting Sample No.:

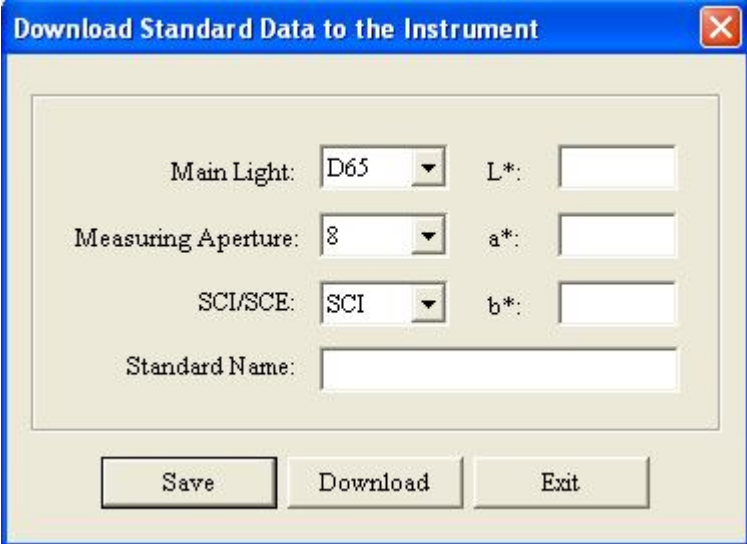
Name Prefix:  Sample Number:

Std. Name: 1

Figure 44

### 3.7.4 Download Standard Data to the Instrument

Click “Data->Download Standard Data to the Instrument” to activate “Download Standard Data to the Instrument” window, as shown in Figure 45. Input L\*a\*b\* value and click “Download Data” to write L\*a\*b\* value to colorimeter. This data will serve as a new standard record. Enter a name in “Standard Name” box and click “Save”. Then, the data will be saved in standard file in the PC.



Download Standard Data to the Instrument

Main Light: D65 L\*:

Measuring Aperture: 8 a\*:

SCI/SCE: SCI b\*:

Standard Name:

Save Download Exit

Figure 45

### 3.7.5 Delete Standard Record on PC

Click “Data-> Delete Standard Record on PC” to activate “Delete Standard Record” window, as shown in Figure 46. You can select standard records to be deleted and click “OK” to delete the selected records.

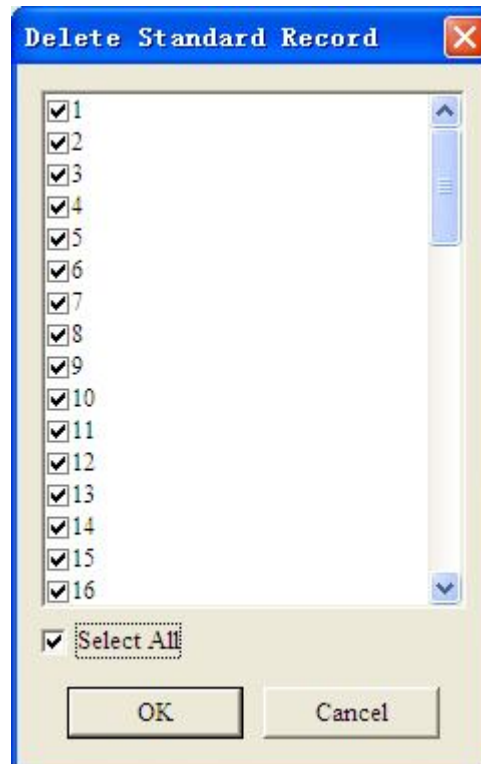


Figure 46

### 3.7.6 Delete Sample Record on PC

Click "Data-> Delete Sample Record on PC" to activate "Delete Sample Record" window, as shown in Figure 47. You can select sample records to be deleted and click "OK" to delete the selected records.

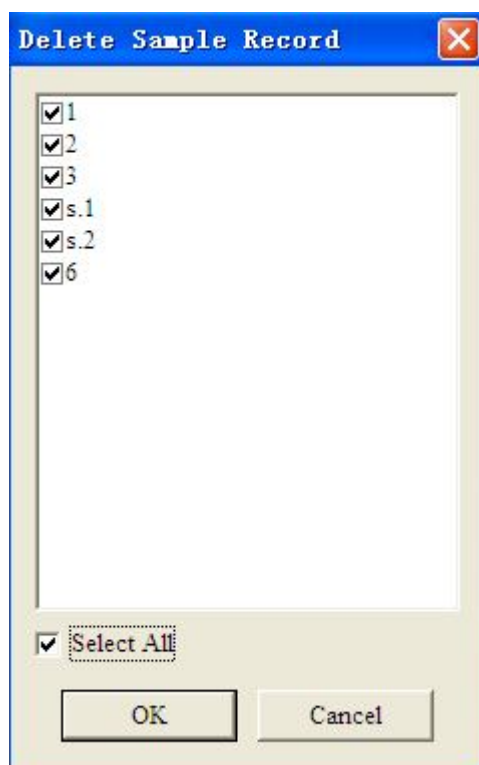


Figure 47

## 3.8 Database

### 3.8.1 Retrieve Database

Click "Sample Database->Retrieve Database" to activate "Retrieve Database" window, as shown in Figure 48. Click "Retrieve Database", you can search the stored sample which is best match with the sample. And it will display in "Stored Sample Name" box. The stored sample in down-drop list of the "Stored Sample Name" box is arranged in the order of the matching samples.

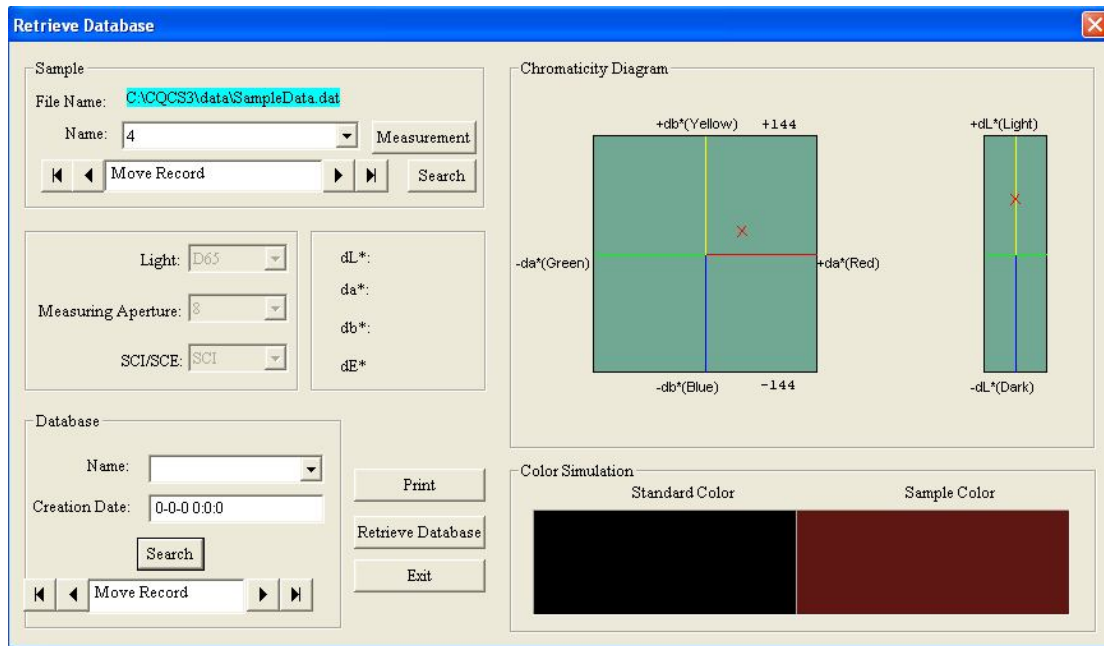


Figure 48

### 3.9 Help

Click “Help->User Manual” to open *User Manual*.

Click “Help->About CQCS3” to view the software version of Color Quality Control System.