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Datacolor

Datacolor ELREPHO
User's Guide



Datacolor ELREPHO User's Guide (August, 2005) Part No. 4230-0398M Rev 1

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Americas
+1.609.895.7465
+1.800.982.6496 (toll-free)
+1.609.895.7404 (fax)
NSASupport@datacolor.com

Europe
+41.44.835.3740
+41.44.835.3749 (fax)
EMASupport@datacolor.com

Asia Pacific
+852.2420.8606
+852.2420.8320 (fax)
ASPSupport@datacolor.com

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Datacolor has representatives in over 60 countries. For a complete list, visit www.datacolor.com/locations.

Manufactured by Datacolor
288 Shengpu Road, Suzhou Industrial Park, Suzhou, China

+86 512 625 80338

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Datacolor ELREPHO

About the Datacolor ELREPHO

The Datacolor ELREPHO is a color-measuring instrument designed specifically for use by the paper industry. It incorporates the state-of-the-art CMOS integrated circuit technology used in other Datacolor instruments, and employs a vertical mount design. It is intended for use as a device for measuring, specifying and evaluating color in both laboratory and production settings.

Below is a summary of the standard and optional features included with the Datacolor ELREPHO.

Standard features include the following:

- Pulsed xenon light source
- Multiple aperture sizes to accommodate samples of different sizes
- Automated zoom lens
- Automated, adjustable ultra-violet filter used to control the UV component in the light source
- Automated UV cut-off filters for three wavelengths



Please refer to Appendix, Instrument Specifications for complete instrument specifications.

Feature Summary

The Datacolor ELREPHO employs state-of-the-art features including the spectrometer, integrating sphere, light source, and optics. Below is a summary of those features:

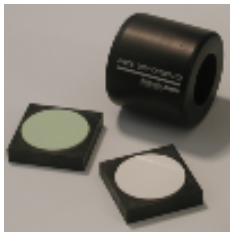
FEATURE	DESCRIPTION	PURPOSE/BENEFIT
Integrating sphere	Barium coated sphere.	Industry standard.
Measurement Geometry	Diffuse illumination, 0º viewing	Conforms to the instrument specification found in ISO 2469 standard.
SP2000 Spectral Analyzer	Proprietary dual-channel holographic grating. 256-photodiode linear arrays used for both the reference and sample channels.	Dual channel design provides continuous monitoring of sample illumination and compensates for changes. 256-photodiode array enhances the precision of the measurement.
Light source	Pulsed xenon flash lamp	Filtered to provide D65 illumination including UV component.
Effective Bandwidth	10nm	Reporting interval is 10nm. Maintains consistency with reporting interval.

Accessories

The Datacolor ELREPHO comes with the following standard accessories:



Cables



Calibration Accessories

- Six foot power cable
- Serial cable with connectors on either end
- USB cable
- Black trap
- White tile
- Green tile

Calibration Tiles

A black trap, white tile and green tile are provided with the instrument:

- The black trap and white tile are used each time the instrument is calibrated.
- The green tile is used to perform an optional diagnostic test during instrument calibration

Aperture Plates

Three aperture plates, with openings of different sizes, are included as standard accessories. The identification is engraved on each plate.



Aperture Plates Designations

- Extra-Large Area View (XLAV)
- Small Area View (SAV)
- Ultra Small Area View (USAV)

Below are aperture plate specifications:

Aperture Identification	Sample Area Measured	Sample Area Illuminated
XLAV	30mm	34.0 mm
SAV	5mm	9.0 mm
USAV	2.5mm	6.5 mm

NOTE
The area illuminated is always 4mm greater than the diameter measured, to reduce translucency errors.

Tips for Aperture Selection

- Always use the largest possible aperture size.
- Small (SAV) and ultra-small (USAV) plates should only be used for measurements of samples that do not completely cover the opening of the larger aperture plates.

Ultra-Violet (UV) Filters

The Datacolor ELREPHO is fitted with an adjustable UV filter to control the amount of ultra-violet light present in the light source, and with UV cutoff filters used to cutoff specific wavelengths. Refer to the Datacolor TOOLS User's Guide ***Instrument Menu, UV Calibration*** and ***Advanced Options, UV Calibration and Whiteness*** for detailed instructions on the calibration and use of these filters.

Electrical/Environmental Requirements

Power	85 to 264 VAC, 47 to 63 Hz, 80 VA peak, 35 VA typical
Absolute Operating Environment	5º to 40º C, 20-85% RH, non-condensing
Interfaces	**Serial:** RS232 9600/19200 baud **USB:** 1.1

N O T E S

Cable Installation

Overview

WARNING
*Read "Electrical and Environmental Requirements" section **before** connecting your Datacolor instrument.*

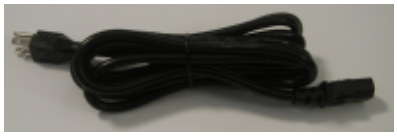
The Datacolor ELREPHO requires the use of two cables, a power cable and a communications cable (either serial or USB cable) to connect the instrument to the computer.



The connections for these cables are found on the back of the instrument.

Power Cable Installation

Power is supplied to the back of the unit via a 3-prong male connector. A six-foot power cable is provided with the instrument.



To connect the cable:

1. Plug the female end of the power cord into the power receptacle on the rear panel of the instrument.
2. Insert the plug into a standard AC outlet.

Serial Cable Installation

The serial cable is shown below:



1. Connect the 9-pin male connector on the serial cable to the RS-232C female connector on the rear panel of the instrument.
2. Connect the female connector on the serial cable to a serial communications port on the back of the computer.



3. If there is more than one serial port on the computer, make a note of the port being used. You may need to enter this information into the program.
4. Tighten each connection securely to ensure proper signal.

See the Appendix for a description of the RS-232C connector pin assignments.

USB Cable Installation

Instrumentsmanufactured by Datacolor can now be connected to a USB port on a desktop system. See *Appendix, System Requirements for USB Cable* Installation before you attempt to connect to a USB port.

Before You Begin

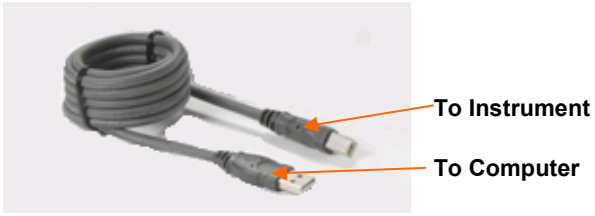
- Close all programs currently running on the system.
- You will need the accessories listed below to complete the installation:
  - **USB cable** (provided by Datacolor)
  - **Datacolor CD ROM disk** labeled *USB Drivers and Documentation* (Datacolor Part #2052-0330).
  - **Calibration diskette or CD** included with the instrument (this is required only when installing new instruments)

Three steps must be completed to enable the USB port for use with the instrument:

- Install the USB Driver.
- Identify the system assignment for the USB port. This is accessed through the ***Control Panel*** included with the Windows operating system.
- Change the com port assignment in the Datacolor applications software.

Cable Installation

The USB cable provided with the system is shown below:



One end of the cable connects to a USB port on the instrument. The other connects to a USB port on the computer. Connect the USB cable to the instrument and to the USB port on the back of the computer.

In order to activate the USB cable connection, you must also install a USB (software) driver.

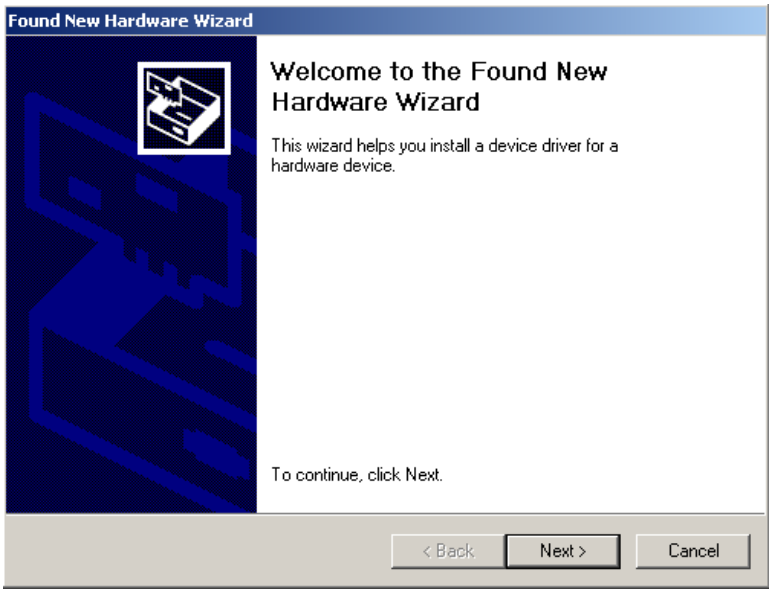
Driver Installation

To prepare your computer and the Datacolor programs to communicate with your instrument using a USB port, you must install software files onto the computer. When the instrument is connected to the computer using a USB cable, a Wizard displays on your computer screen.

1. Place the **USB Drivers and Documentation CD** into the CD-Rom drive.
2. Connect the USB cable to both the instrument and the computer. The window below displays automatically:



The ***New Hardware Wizard*** window will follow immediately:



3. Click the **Next** button at the bottom of the window. The wizard steps you through the installation of the USB software files. For most installations, you can accept the defaults selected by the Wizard.
4. Continue to click the **Next** button at the bottom of each window in the Wizard. The program will notify you when the procedure is completed.



CAUTION

Do not remove the USB Driver CD from the drive. The Wizard will close and then immediately reopen. You will have to repeat the procedure a second time to successfully copy the file.

5. When the “Welcome” screen appears again, click the **Next** button.
6. Repeat the steps above a second time.
7. When you reach the final wizard screen, click **Finish**. At this time, the Wizard closes and the installation is complete.

Viewing/Changing System Port Assignment

As part of the USB driver installation, a port number is assigned to the USB port. The default selection is the next available com port. Depending on the application you are running, you may need to know this port assignment to configure the Datacolor applications program(s) to recognize the USB port.

NOTES

Some Datacolor programs automatically configure the USB port assignment. Others require that you manually assign the port number. Refer to the program User’s Guide for information to assign/edit the instrument port number.

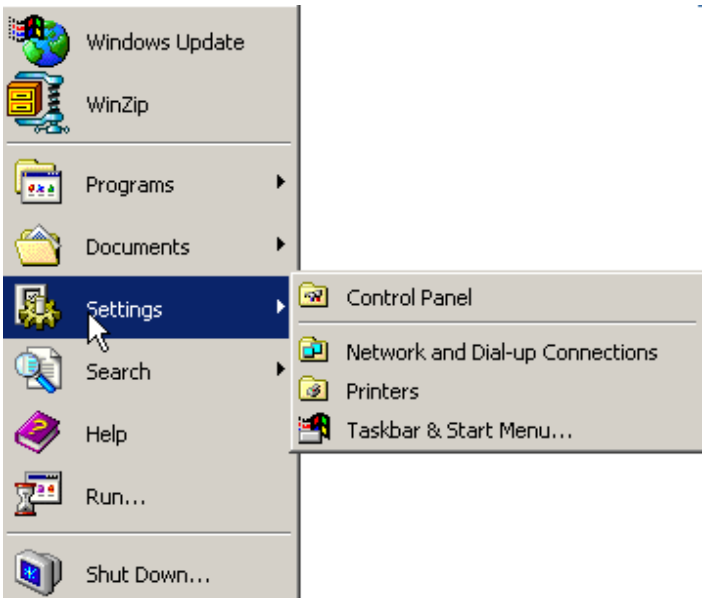
If the computer has more than one USB port, the program will default to the first one available. If you want to connect the instrument to a different USB port, you must assign the port manually in the applications software.

The com port assignment is accessed through the Windows Control Panel as follows:

1. Click the **Start** button at the bottom left of the screen.

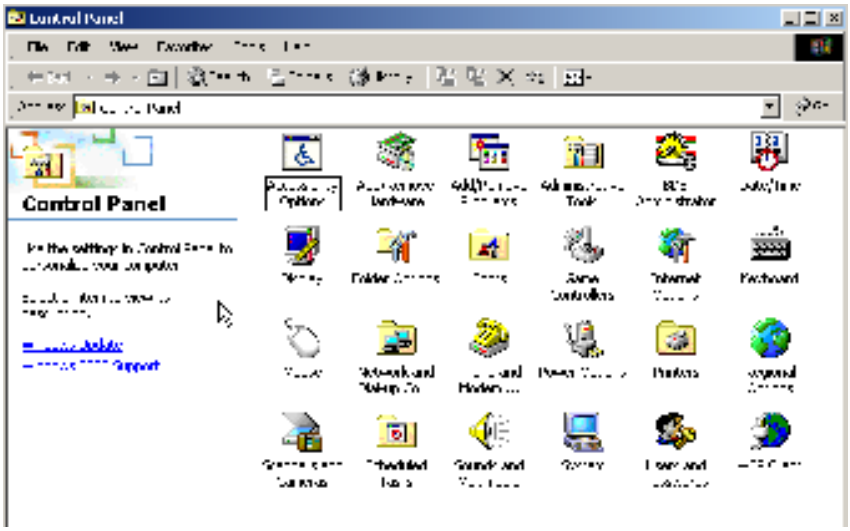


The Start menu displays.

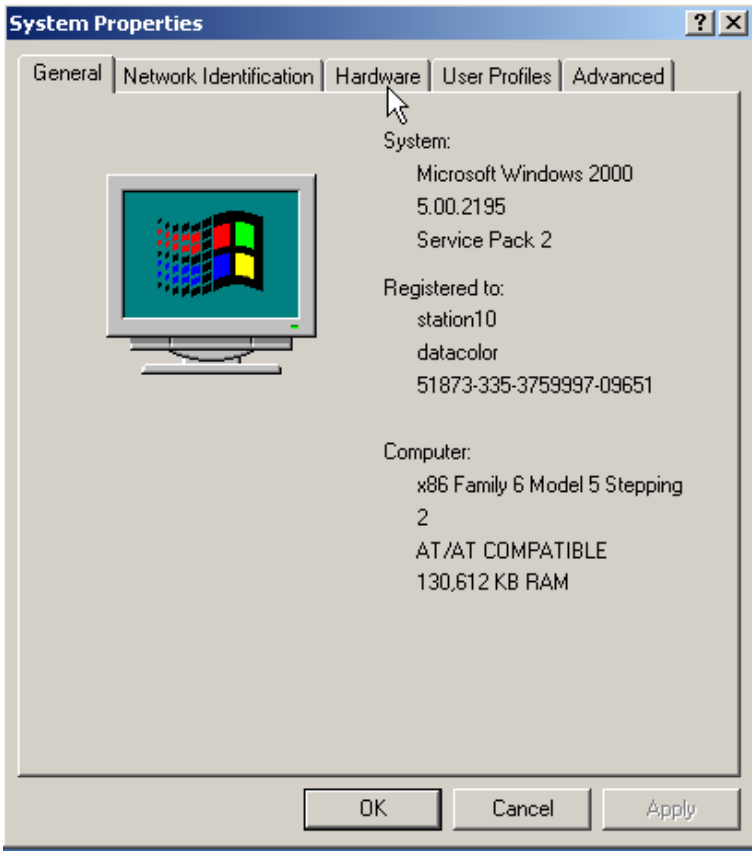


2. Place the cursor on *Settings* so that the program submenu displays, and click **Control Panel**.

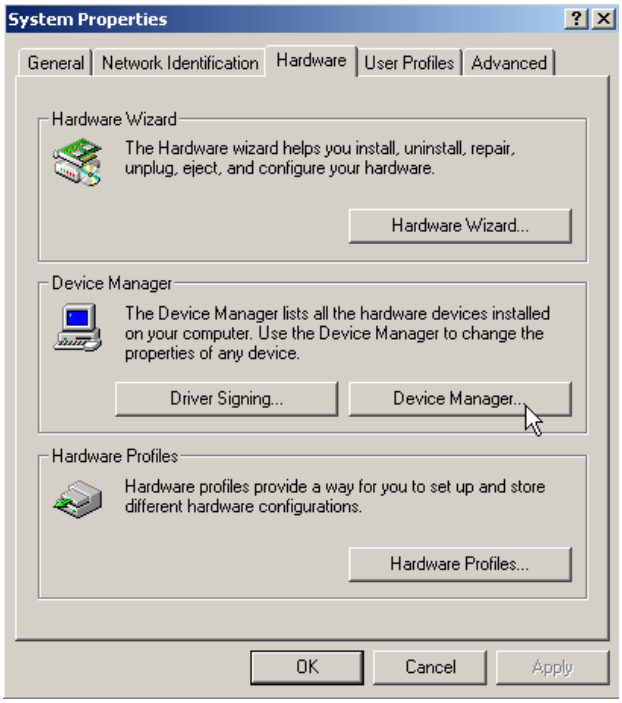
3. When the Control Panel window displays, double-click on **System**.



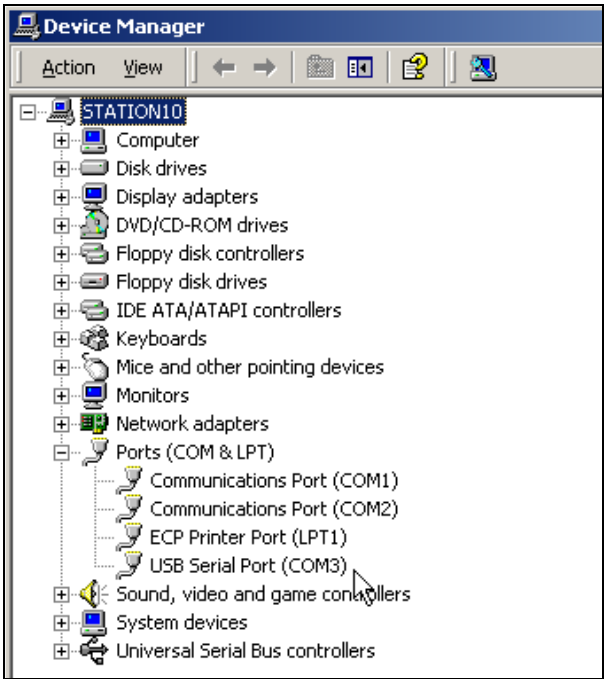
The Systems Properties dialog box displays.



4. Click the **Hardware Tab**. The dialog box below displays:

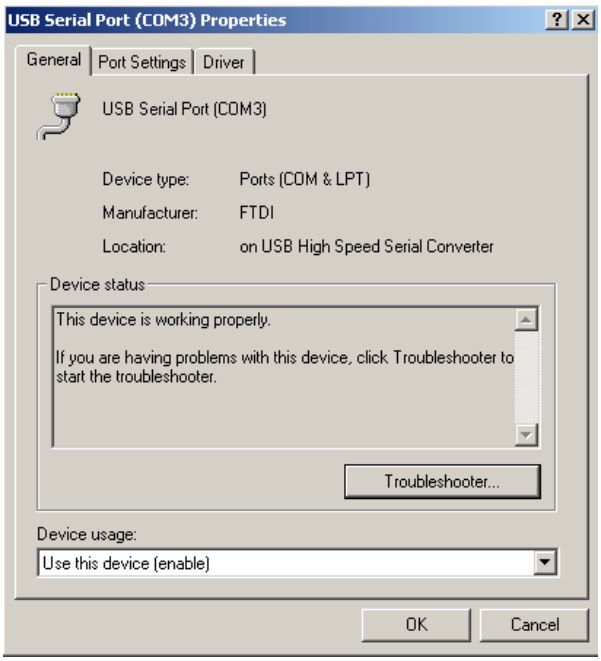


5. Click the **Device Manager** button. The Device Manager window displays.

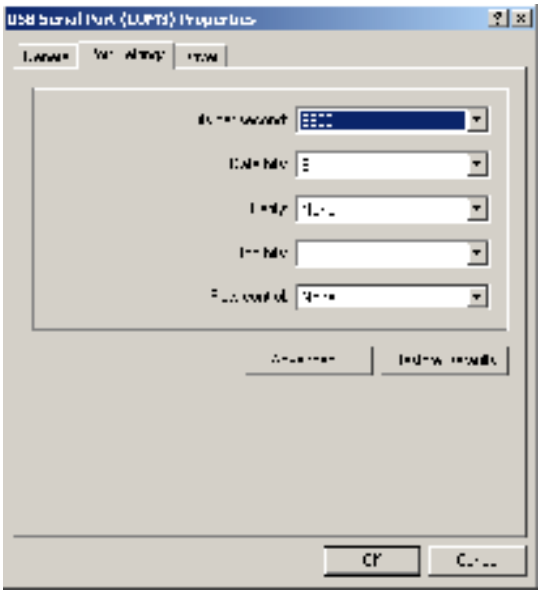


6. Go to the **Ports** heading. Click on the plus (+) to display the port selections.

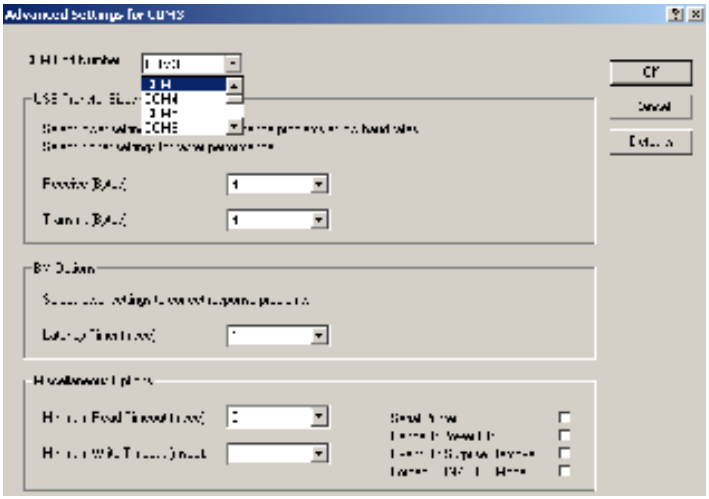
7. Click **USB Serial Port**. The USB Serial Port (COM3) Properties dialog box displays.



8. Click **Port Settings**. The dialog box below displays:



9. Click the **Advanced** button. The Advanced Settings for COM3 dialog box displays.



The field labeled *COM Port Number* displays the current assignment for the USB port. To change the port setting, click the drop-down list arrow. The list of COM ports is displayed.

10. Click on the port assignment to be used for the USB port.
11. When you have completed the changes, click **OK**.

Changing the 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 applications program. *Refer to the program documentation for the specific Datacolor applications program you are running, for instructions to configure the instrument.*

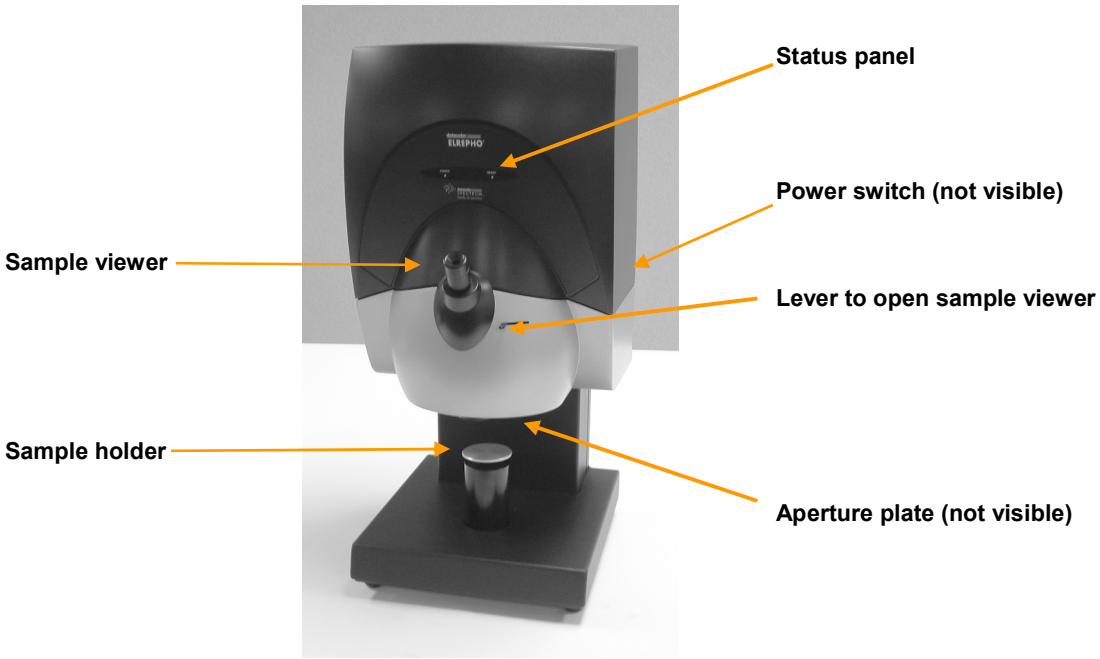
Installing Calibration Data

For new instruments, you will need to install the white tile calibration data. *See also **Instrument Calibration i**n this guide for instructions to install the data.*

N O T E S

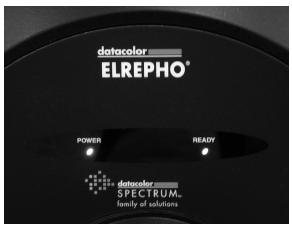
Controls and Indicators

Identification of Controls/Indicators



Status Panel

Below is the status panel for the Datacolor ELREPHO:

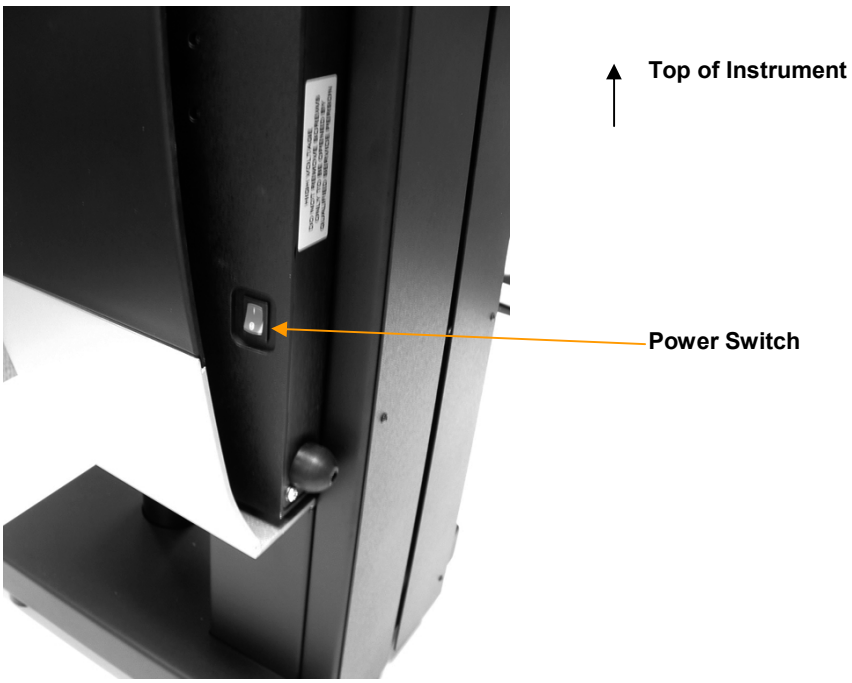


OPTION	DESCRIPTION
Power	Unit is connected to power supply, and power switch is on.
Ready	Instrument is ready for use.

Powering Up

Use this simple procedure to start using your Datacolor ELREPHO.

1. Verify all cable connections. The AC power cord should be plugged into an outlet. The serial cable should be attached to the instrument and host computer.
2. Turn on the host computer.
3. Turn on the power switch. This is located on the center right side, at the back of the instrument.



When power is applied, all mechanisms are automatically reset. The lights on the status panel will flash for several seconds. When the *Ready* light remains on, your instrument is ready to use.

NOTE
If the instrument power is not turned on before a Datacolor program is launched, you may receive an error message.

4. Launch a Datacolor program.
5. Prepare to calibrate the instrument. You will need the black trap and the white calibration tile.

NOTES
We recommend that you calibrate the instrument every 8 hours. *Please refer to your software documentation for specific calibration instructions.*

Your program may be configured to include an additional diagnostic test as part of the calibration procedure. The green tile is used to for this test. *Refer to the program User's Guide for instructions to complete this test.*

Instrument Calibration

Overview

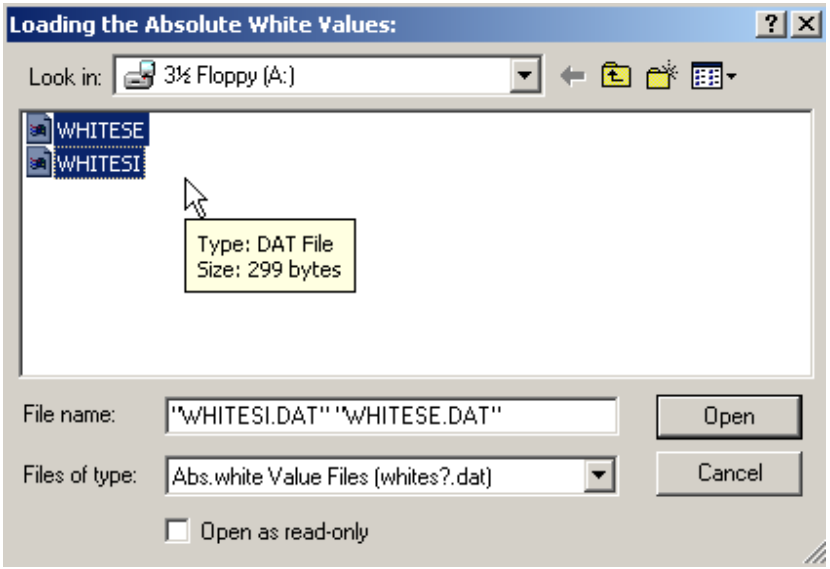
The instrument must be calibrated regularly to ensure that the measurements are accurate. This section provides instructions for performing the daily instrument calibration.

Installing Calibration Data

If this is a new instrument, or if you have received a new white tile, you will need to install the calibration data. The calibration data can be found on a diskette or CD, both of which are included with the calibration tiles.

NOTE
Depending on the program you are running, the screens shown below may not match those in your program. *See also the User's Guide for the program you are running to obtain detailed information on the instrument configuration options you will use to set up the instrument.*

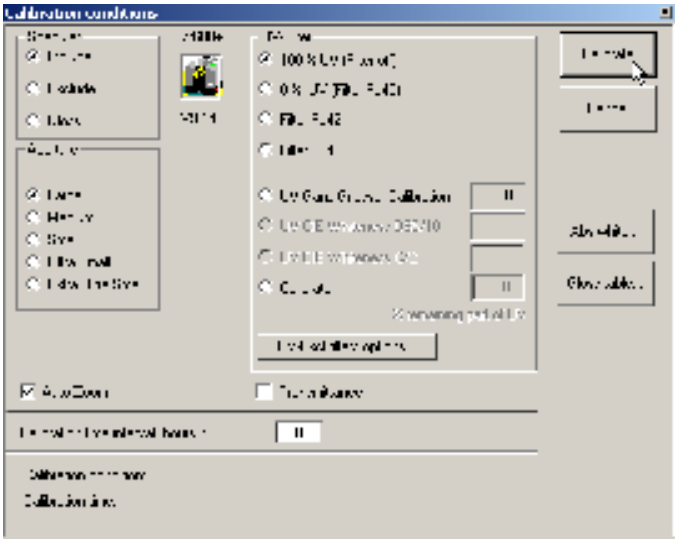
1. Access the instrument setup or instrument calibration option, and make the appropriate selections.
2. When you complete the instrument configuration and select ***Save Setup***, the program prompts you to place the diskette or CD containing the calibration data in the appropriate drive. When you do this, a screen similar to the one below will appear:



3. The file you are looking for is called **nnn whited0.dat**. Highlight the file, and click ***Open***. The files will be transferred to the system.

NOTE
The calibration data is provided on a diskette and a CD. If you use the CD, you may have to direct the system to the CD drive to find the folders containing the tile data.

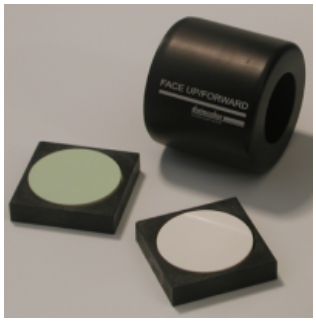
4. When the transfer is completed, the program will prompt you to calibrate the instrument. A calibration screen similar to the one below displays:



5. Click **Calibrate** to start the instrument calibration or **Cancel** to close the window.

Reflectance Calibration

The instrument should be calibrated every 8 hours to compensate for changes in the environment. A black trap, white tile and green tile are provided with all instruments to complete the calibration:



The black trap and white tile are used each time the instrument is calibrated. The green tile is used to perform an optional diagnostic test.

Reflectance Calibration Procedure

The software prompts for calibration vary from one program to another. All of the procedures include two measurements:

- The black trap
- The white tile

Before you begin, verify that the aperture plate at the port matches the aperture selection in the program you are running.

1. Access the calibration procedure in the program you are running. Instrument calibration may be accessed through a separate menu option or function button in the program window. The User's Guide for the program you are running contains detailed instructions to access the calibration options.
2. When you are prompted by the program, place the black trap at the instrument port.
3. When you are prompted by the program, place the white tile at the instrument port.
4. The program may prompt you for a diagnostic tile. If prompted, place the green tile at the instrument port, and start the measurement.
5. After these measurements are completed, the program will display a message that the calibration is successful. You can now start measuring samples.

The Datacolor Users Guide for the program you are running (e.g., Datacolor Tools, etc.) provides step-by-step instructions regarding the (instrument) software setup and calibration procedure.

UV Filter Calibration

The procedure for calibrating the adjustable UV filter is a separate calibration procedure, and requires the use of a fluorescent white tile, provided with the instrument. The Datacolor Tools User's Guide contains step-by-step instructions for calibrating the adjustable UV filter.

NOTES

This calibration procedure is critical to the accurate measurement of fluorescent samples.

If you are sharing reflectance data for fluorescent samples, the adjustable UV filter in each of the instruments must be calibrated regularly.

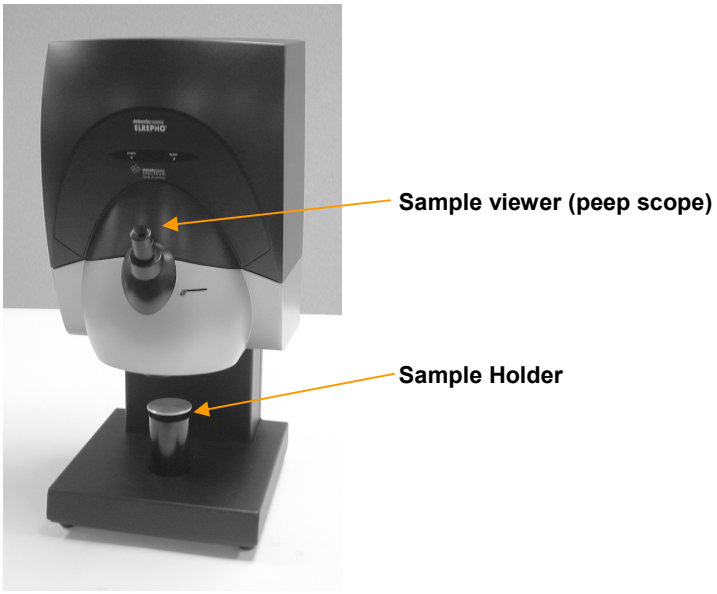
N O T E S

Sample Presentation/Measurement

About Sample Presentation/Management

You must pay close attention to the positioning of the sample to ensure an accurate measurement. The sample must completely cover the aperture opening, and is held in place by a sample holder. This sample holder is a spring-loaded, black cylinder located at the bottom of the instrument.

The instrument is also equipped with a sample viewer, referred to as a “peep scope.” By looking through the sample viewer, you can confirm that the sample is properly positioned and completely covers the aperture opening.



Sample Presentation

To position the sample for measurement, do the following:

1. Grasp the sample holder and pull down. The sample holder can be secured in the “down” position by turning it clockwise, ¼ turn.



2. Position the sample on top of the sample holder, and then carefully allow the sample holder to return to normal operating position. **Do not allow the sample arm to spring back.**



3. If you have secured the sample holder in the down position, turn it counterclockwise ¼ turn to disengage it. Be careful not to allow it spring back into position.

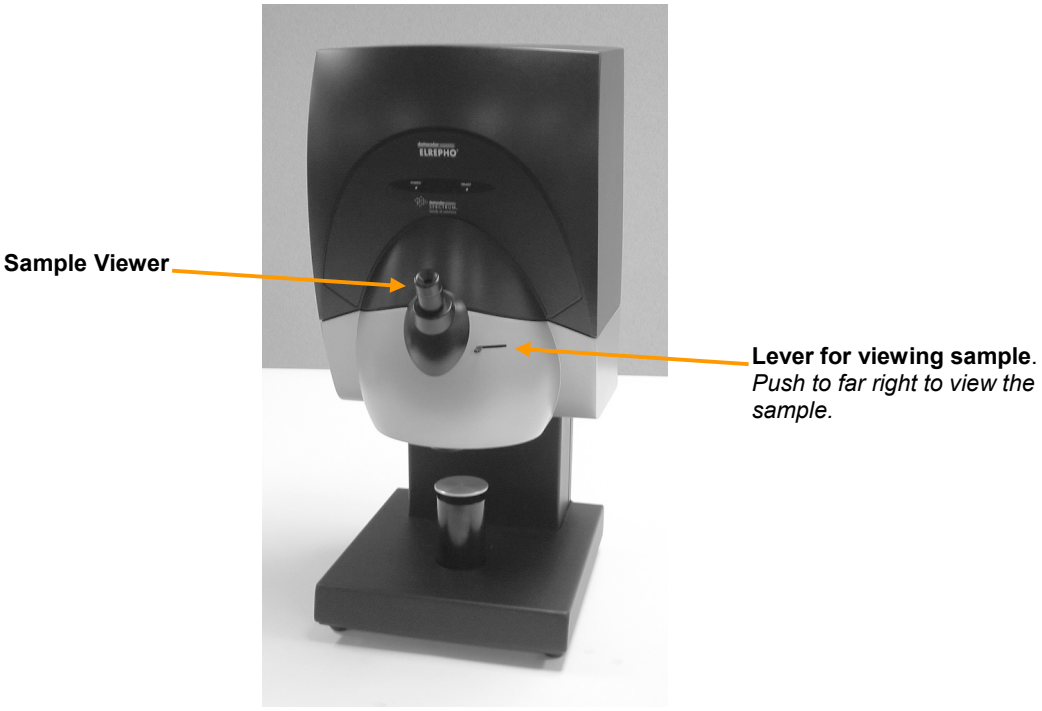
Sample Viewing Port

Before measuring samples, you should use the sample viewing port to check that the sample is properly positioned.

To verify that the correct area of the sample is being measured:

1. The sample should be positioned directly against the aperture plate.

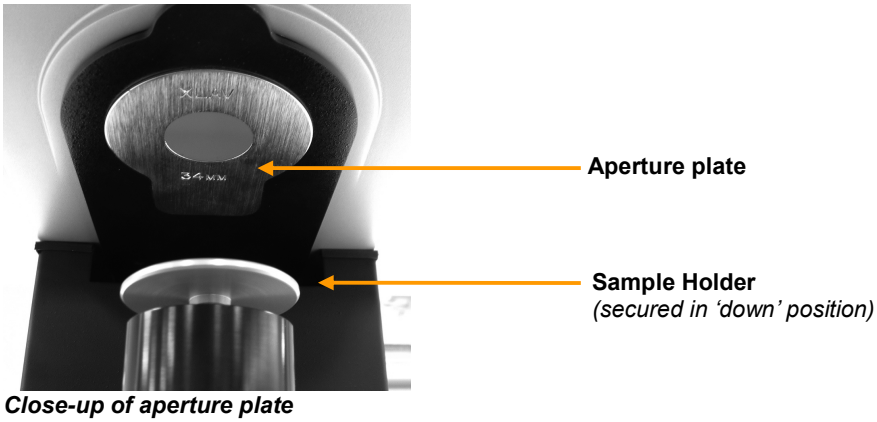
2. Push the black lever (to the right of the sample viewer), to the maximum right position. It is mechanically designed to engage at the far-right position.



3. Look into the sample viewer. You will be viewing the same area of the sample viewed by the lens. Adjust the position of the sample as necessary to completely cover the opening. Depending on the size of the sample, you may need to change the aperture plate used.
4. Once the sample is properly positioned, return the lever to the far-left position. You are now ready to make a measurement. *Refer to your software documentation for instructions to start the measurement.*

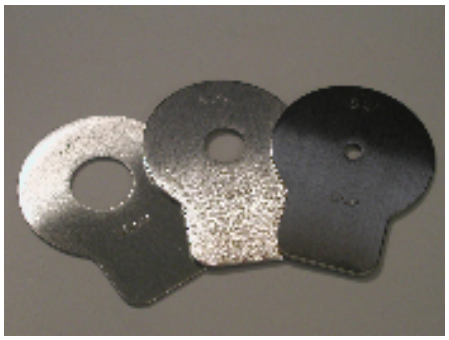
Changing Aperture Plates

The aperture plate is located under the main housing of the instrument.

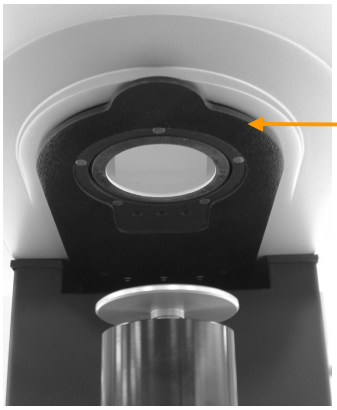


Close-up of aperture plate

If the sample to be measured does not completely cover the aperture opening, you must use a smaller aperture plate. Three aperture plates, each with openings of different sizes, are provided with the instrument. Depending on the size of the sample being measured, you may need to change the aperture plate used.



In the picture below, the aperture plate is removed. The housing containing the aperture plates is slightly recessed, and the metal aperture plates are machined to engage the recess for the plates. The plates are secured with magnets.



The aperture plate is not attached.

To remove the aperture plate:

1. Secure the sample holder in the 'down' position. To secure, turn holder counter-clockwise ¼ turn.
2. Pull on the silver aperture plate using slight force. The plate should separate from the instrument housing.
3. Replace it with the aperture plate appropriate for the sample size being measured.
4. Return the sample holder to the full, upright position.

NOTES

(1) When changing the aperture plate, you must also make a change to the lens selection in the software setting for the instrument. The user makes this change manually. *See the program documentation for instructions to change this software selection.*

(2) Because of the presence of magnets, keep all magnetic media away from the port opening.

Tile Maintenance

About Tile Maintenance

The sections that follow provide detailed instructions for maintaining the calibration tiles. These instructions and tips will help to insure that the instrument continues to perform properly over its life.

Handling Tiles

- Handle calibration tiles with extreme care. Do not drop them, or scratch the glazed surface.
- Always grasp the tile using its edges.

Cleaning Tiles

- 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

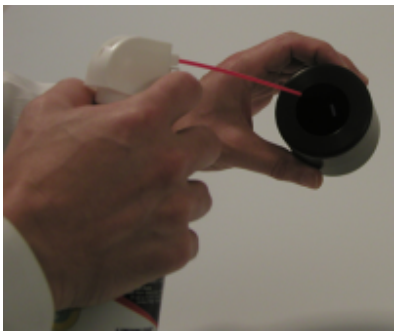
- Use a few drops of the detergent solution to moisten a soft, lint-free cloth, and gently wipe the tile surface. Rinse the detergent from the tile by wiping it with a cloth, moistened with clean water.
- NEVER use abrasive cleansers, razor blades, or other metal objects to remove dirt or foreign substances from the calibration tiles. This will damage the tile surface.
- NEVER immerse the tiles in water.
- 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.

Tile 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.

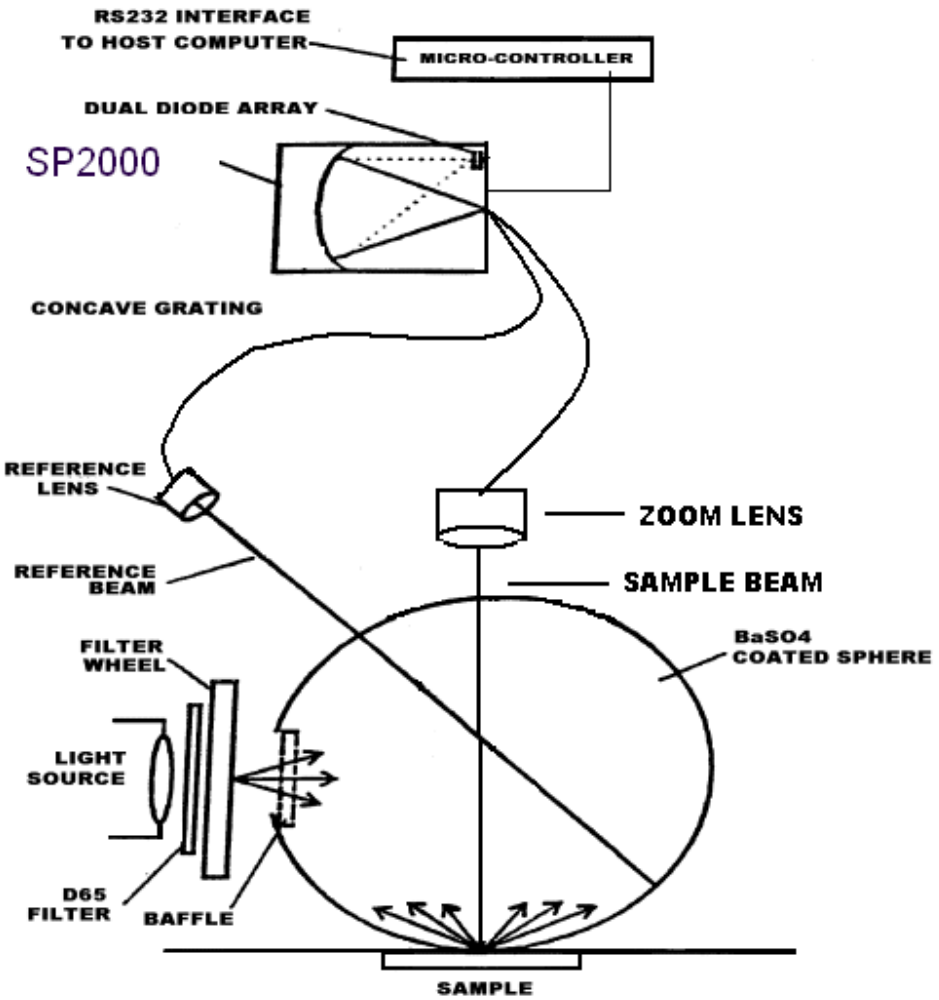
Cleaning the Black Trap

- The black trap should be kept dust-free. Dust accumulating in the black trap should be blown out with compressed air.



Appendix

Optical Block Diagram



Instrument Specifications

Specifications are subject to change without notice.

ITEM	DESCRIPTION
Instrument Type	Vertical mount, dual beam, barium-coated integrating sphere with xenon flash lamp. Includes peephole sample viewer and pedestal sample holder
Measuring Geometry	Diffuse illumination, 0º viewing in conformance with ISO 2469.
Illumination Source	Pulsed xenon, filtered to approximate D65.
Sphere Diameter	6.0 in/ 152 mm
Spectral Analyzer	Proprietary SP 2000 analyzer with dual 256-diode array and high-resolution holographic grating.
Wavelength Range	360 – 700nm
Effective Bandwidth	10nm
Reporting Interval	10nm
Photometric Range	0 to 200%
Photometric Resolution	0.003%
Repeatability	0.02 CIEL*a*b*(max). 20 reads on white tile, 2 flashes each.
Inter-instrument Agreement [1,2]	0.40 (max) CIEL*a*b* 0.20 (avg) CIEL*a*b*
Lens	3-position, auto zoom
Aperture Configuration	**X-Large Area View (XLAV)** 34mm illuminated/ 30mm viewed **Small Area View (SAV)** 9mm illuminated/ 5mm viewed **Ultra-Small Area View (USAV)** 6.5mm illuminated/ 2.5mm viewed
Aperture Plates	3 standard: XLAV, SAV, USAV
Aperture Detection	No
Black Trap	High performance
Automated, adjustable UV Calibration	Standard
UV Cutoff Filters	395nm, 420nm, 460nm
Power	85 to 264 VAC, 47 to 63 Hz, 80 VA peak, 35 VA typical
Absolute Operating Environment	5º to 40º C, 5-85% RH, non-condensing
Interfaces	RS232 - 9600/19200 baud - USB

Dimensions	**English**	**Metric**
Height	25.0”	635 mm
Width	12.3”	312 mm
Depth	14.25”	362 mm
Weight	42 lbs.	19.05 kg

1 Environmental conditions apply
2 Sample translucency may affect inter-lens agreement

Miscellaneous Technical Information

RS-232C Connector Pin Assignments

Pin #	Purpose	Direction
2	Transmit data	Out (to host)
3	Receive data	In (from host)
7	Signal ground	

CAUTIONS
(1) *DO NOT WIRE* to pins other than 2, 3, and 7.
(2) For all unused inputs, the default is active high.

Compliance Statements

FCC Compliance Statement

WARNING
Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this User's manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Compliance Statement

English
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Francais
El present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

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