

basicColor  
*Reference*

# basicColor *DISCUS*

Reference Manual

## Contents

---

<b>1. PREFACE .....</b>	<b>4</b>
<b>2. INSTALLATION .....</b>	<b>6</b>
2.1. Minimal System Requirements .....	7
2.2. Installation .....	8
2.3. Product Registrierung And Licensing .....	9
<b>3. OPERATING CONTROLS AND MEASUREMENT TYPES .....</b>	<b>14</b>
3.1 Operating Controls And Functions .....	15
3.2 Measurement Types And Instrument Settings .....	17
3.2.1 <i>Calibration</i> .....	17
3.2.2 <i>Object- / Monitor Measurement</i> .....	18
3.2.2.1 <i>Contact Measurement</i> .....	19
3.2.2.2 <i>Close-up Measurement</i> .....	20
3.2.2.3 <i>Tele Measurement</i> .....	23
3.2.3 <i>Measuring Light</i> .....	24
3.3 Calibration Settings For Monitors / Light .....	26
<b>4. TECHNICAL DATA.....</b>	<b>28</b>
<b>5. PRODUCT INFORMATION BASICCOLOR DISCUS .....</b>	<b>31</b>

Made To Measure

**Chapter 1**

---

**Preface**



## 1. Preface

Thank you for choosing *basICColor DISCUS*! You have decided for a lab-grade colorimeter of the highest quality. This manual will help you to understand your new instrument and utilize it to its full capacity

*basICColor DISCUS* was developed as a long-term stable reference for your production and QC needs. Extensive temperature compensation routines and the elaborate design with sealed optics and defraction filters guarantee for the best long term repeatability. Thus, variations in measurement data can be attributed to the monitor hardware unambiguously - an elementary prerequisite for an authoritative long-term QC for image editing and softproof monitors.

During production each individual instrument undergoes a lengthy QC and calibration process. Thus we make sure your *basICColor DISCUS* meets your highest demands. Calibrations Jedes Gerät durchläuft in der Produktion einen mehrwöchigen Prüf- und Kalibrierprozess. So ist sichergestellt, dass Ihr Gerät die hohen Anforderungen in Ihrer Produktion erfüllt. Für die aktuellen DTP-Monitore sind Kalibriereinstellungen vorinstalliert, weitere Einstellungen

## Chapter 2

---

# Installation and Licensing

## 2. Installation, Licensing

### 2.1. Minimum System Requirements

#### 2.1.1. Apple Computer

- Apple® with Intel® processors
- Mac OS X (10.5.8 or higher)
- minimum 512 MB available system memory (RAM)

#### 2.1.2. Windows®

- Intel® Pentium® 4 processor
- Windows® XP with SP3, Windows® Vista or Windows® 7
- minimum 512 MB available system memory (RAM)

#### 2.1.3. All Systems

- Minimum 100 MB free hard disk space
- CD-ROM drive (for installation)
- Color monitor with a minimum resolution of 1280 x 800 pixels and a color-depth of 24-bit (16,7 million colors)
- USB port 2.0 or higher  
with power supply of 4.7 V to 5.5 V DC

## **2.1.4. Skill requirements**

These instructions assume familiarity with the basic operation of the Mac OS X on Apple Macintoshes or Windows XP, Windows 7, or Windows Vista operating systems on PCs.

## **2.1.5. Driver Installation**

The required drivers will be installed with *basICColor display* software (separate license required for full operation). Therefore please install *basICColor display* before connecting the *DISCUS* with your computer the first time.

You will also find the drivers in a sub-directory „Drivers“ for manual installation.

You will have to restart your computer after installing the drivers.

## **2.2. Documentation**

This documentation describes the use of *basICColor DISCUS* on Mac OS X and Windows. Mostly the Mac OS X version will be covered here, where the screenshots come from as well.

If the usage differs in Windows, notes will describe the differences.





## 2.3. Installation

- 1.) Turn on the computer on which you wish to install and use the software.
- 2.) Insert the basICColor DVD into your drive.  
Alternatively you can download the installer from [www.basICColor.de](http://www.basICColor.de).
  - **Mac:** The basICColor DVD folder will appear on your screen. Click on this folder in order to access the basICColor *display Installer* or open the downloaded installer. We recommend to check our download area first since this ensures that you will use the latest version.
  - **Windows:** If the basICColor DVD does not appear automatically go to “My Computer” and select the DVD drive.
- 3) Begin installation by double-clicking the basICColor *display Installer*. Follow the instructions on the screen.
- 4) Once basICColor *display* has been successfully installed, you can start the software by double-clicking the program icon.

### Hint: 14-days-tryout-license

*basICColor GmbH* offers you the option to test *basICColor display* for 14days. The software is fully functional and can be used without any restrictions. You can download a 14-days-tryout-license from our *basICColor* license server (<http://license.basicolor.de>). It is locked to an individual computer.

## 2.4. Product Registration And Licensing

Licensing and unlocking basIColor *display* software is linked to an individual computer. You will receive an individual license file (.lic-file) that allows you to “unlock” and use the software on the computer on which it was installed.

The first time you start basIColor *display*, the “Licensing” window will pop up. You have the option of testing the fully functional software without any obligation for 14 days. Or you can immediately request your permanent license file if you have purchased basIColor *display*.

- a) If your computer is directly connected to the internet, simply click the “License...” button.
  
- b) If your computer is not connected directly to the internet, use a different computer to access **www.basiccolor.de** and click on “Licensing”. Follow the instructions on the screen.
  
- c) If you do not have an Internet connection at all, click on the “Fax Form...” button to open a PDF document. Fill it out and fax it to the fax number you find on the form.

If you have never registered on the basIColor web site, you will need to complete the registration information in order to open your personal basIColor account. Your registered

e-mail address and password will allow you to log on to the basICColor web site to request license files and to download basICColor *display* software updates.

Once you have logged on you still have the option of selecting either the **14-days demo** license file or the **permanent** software license file. Before making your selection please note:



On the inside of the CD-ROM box you will find the TAN-Number.

- **[TAN]** (TransActionNumber) There should be a sticker in the basICColor DVD tin box with a TAN. Alternatively you will receive a TAN from your dealer or via e-mail. Once you have entered this number in the corresponding field and submitted the online form, you will be automatically directed to the of download your individual license file. If your basICColor DVD tin box does not contain a TAN or if you don't have a DVD or don't have a TAN, then go to the <licensing without a TAN> section on the licensing web site. Your licensing request will be processed and after all technical and commercial requirements have been met, you will get access to your individual license file.
- **[Machine ID]** The number entered in this field must be the same as the number displayed in the basICColor *display* "Licensing" window since this is the number that will be used in generating your individual license file.



- **[Product]** Please select *basICColor print* from the pull-down menu if it should not be selected already. Fill out all the required information (indicated with an \*) and submit the form. You will either be linked directly to the web site where you can immediately download your individual license file, or you will receive a message indicating that your request requires further verification and that you will receive an e-mail notification when your individual license file is available.

**IMPORTANT:** Your license file will be stored in your account on [www.basICColor.de](http://www.basICColor.de). You can retrieve it from the licensing server at any time by logging in to our web-site from within the application and going to the <My Licences> section. This security method replaces the need for a hardware dongle. For site licenses you can either purchase a hardware dongle or have it locked to your *basICColor DISCUS*.



For licensing you will need a machine ID of the computer on which you intend to install the software and a TAN (TransActionNumber).

As soon as you receive your license file (*basICColor\_display.lic*) click on the button “Load License...” and install the license file to the application. Now the application is unlocked and ready to use.

Once you have received your license file (*basICColor\_display.lic*) it is valid for all software updates and reinstallation of *basICColor display* on that particular computer. If you wish



to install basICColor *display* on additional computers, you need to obtain a new individual license file for each one. Additional licenses can be purchased from your basICColor dealer or basICColor GmbH. If you purchase a new computer on which you would like to install basICColor *display* please request your replacement license file online from the basICColor license server (Licensing -> 2. Without TAN) or contact basICColor GmbH directly ([support@basicolor.de](mailto:support@basicolor.de)).

You can check the status of your license in the basICColor *print* "Help/License" window. The "License..." menu opens the "Licensing" window and shows the status of your license in the top left corner. In our example the license is permanent.

Made To Measure

## Chapter 3

---

# Controls and Measure Modes

## 3.1 Controls and Functionality

The housing of *basICColor DISCUS* is designed as a flat disc. The reason for this design is the necessity to measure ambient light as close to the paper surface as possible – with the same sensor as your display measurement. You select the modes „Calibration“, „Emissive“ and „Ambient Light“ by positioning the wheel to the positions • / •• / ••• (5a, 6a, 7a).





## Elements of the housing

- 1) Position mark for the aperture on the opposite side
- 2) 45°-lay-on surface for measuring the influence of lateral light
- 3) Thread for mounting the counter-weight (for contact measurement)
- 4) 3/8" tripod socket, with adaptor for 1/4"
- 5) Wheel: Calibration position
  - 5a: Position mark „•“ for black calibration
- 6) Wheel: Aperture for emissive measurement with thread for optional lens hood
  - 6a: Position mark „••“ for emissive measurement

The image shows the DISCUS in the position „••“.  
Thus you can see the aperture of the sensor and the thread for mounting an optional lens for tele measurement.
- 7) Wheel: Diffuser for ambient light measurement
  - 7a: Position mark „•••“ for light measurement
- 8) Wheel: Laser hole for emissive measurement („••“)
- 9) Wheel: Laser hole for light measurement („•••“)
- 10) Setting mark on wheel
- 11) Recessed grip for operating the wheel

## 3.2 Measure modes and settings

### 3.2.1 Black Calibration

For black-calibrating the instrument, please set the wheel to position 1: „•“.

The software (i.e. *basICColor display*) normally requests this when connecting the instrument. In this position the sensor is completely covered so that a dark current calibration can be performed.



## 3.2.2 Object / Monitor measurement

For „normal“ monitor measurement with *basicColor DISCUS* please set the wheel to position 2: „••“.

After the dark current calibration the software (e.g. *basicColor display*) will prompt you to do so before you calibrate or profile your monitor. In this position the sensor is uncovered. This position is suited for contact measurement (Instrument directly on the monitor surface), as well as for tele measurement (near and far/ instrument on a stand or tripod in front of the monitor/screen).



### 3.2.2.1 Contact measurement

For measuring your monitor with *DISCUS* in contact please mount the counterweight (orange puck) with the thumb screw. Adjust the tape measure to the appropriate length and position the *DISCUS* onto your monitor. The buckle allows you to quickly adjust the length of the tape measure for different monitor sizes. Just memorize the appropriate numbers in the buckle for your monitors.

The mounting of tape measure is designed so that it indicates the distance from the top edge of the monitor to the aperture of the *DISCUS*. If you want to perform periodic check measurements memorize the position of the tape measure at the top edge of the monitor. Thus you achieve a high repeatability without any additional provisions.



### 3.2.2.2 Close Distance Measurements

For close distance measurements please mount the *DISCUS* on a tripod or the *DISCUS* table stand (optional accessory). Position the instrument at a distance of approx. 25 cm) in planar alignment with the monitor. The tape measure accounts for the optical path within the *DISCUS* and thus shows the correct distance between monitor and sensor also in close distance measurements.

In this setup the lighting conditions on the monitor surface match the lighting situation of a user sitting in front of the monitor at viewing distance. Table stand and 25 cm distance also allow for the user to sit in normal working position during the measurement.

In case you want to optimize the planar alignment between Monitor and *DISCUS* you can use a hand mirror. Switch on the positioning laser on your *DISCUS*, position the mirror at the laser spot on your monitor and adjust monitor and *DISCUS* so that the reflection of the laser spot hits the laser aperture on the *DISCUS*.

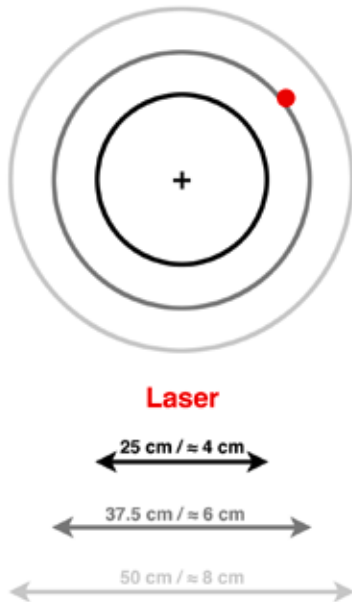
**CAUTION:**  
Never look directly into the laser beam

Although this is a low power laser and you do not need protective eye-wear, you should not look directly into the laser beam. This could result in an unpleasant irritation of the retina.



## Objective Of Close Distance Measurement

Close distance measurement evaluates the monitor in consideration of the ambient lighting conditions at your workstation. You will encounter a major difference between contact measurement and close distance measurement in the shadow details. Monitor calibration with close distance measurement yields better shadow details because the incident light on the monitor will be accounted for and will be compensated. The objective is to assess the entire workstation in step with actual practice (including monitor, ambient light and hood).



### Parallax: Measure spot / Laser spot

Since apertures for the sensor and the laser are located at a distance of each other, there is a parallax like in a photo camera. The laser is aligned in parallel with the optical axis of the sensor at a distance of ca. 3 cm. The diagram shows the position of measure spot and laser spot at 3 different measure distances.

At a distance of 25 cm the measure spot has a diameter of ca. 4 cm. Nevertheless you should use the full screen mode so that the monitor functions as a light source for the environment. Especially in small rooms with brightly colored surfaces in the vicinity the monitor as an illuminant cannot be neglected. A user's brightly colored clothing can form another strong source of interference, because the light of the monitor is being reflected.

## Prerequisites for the Use of Close Distance Measurement

Because the lighting situation is a relevant factor in close distance measurement it is necessary to keep the ambient light absolutely stable while measuring. International standards call for a dimmed standard lighting anyway, which eliminates the influence of daylight.

If required, windows need to be fitted with neutrally colored blinds.

On the other hand, profile validation with close distance measurement under different kinds of ambient light gives a good indication for judging the physical influence of the ambient light. In case of considerable fluctuations, the deviating adaptation to the ambient light adds to the measured changes on the monitor surface.

As a general rule the monitor validation will show slightly larger  $\Delta E$  values and a lower contrast with close distance measurements because the changes in ambient light add to the monitor variances. In contact measurement the influence of ambient light is completely eliminated.

Only monitors with a matte surface are suited for close distance measurements. On glossy screens the reflections distort the results whereas using a hood or shading screen would embellish the result.

### **3.2.2.3 Long Distance Measurement**

For long distance measurements (e.g. projectors or public displays) please mount the instrument on a tripod. *basiCColor DISCUS* is fitted with a 3/8" thread and an adapter to 1/4". Please also mount the optional lens for long distance measurement (available Q3 2011). This lens reduces the measure angle and allows for accurate measurements even at very long distances.

Laser and optical axis are adjusted in parallel. The parallax is approx. 3cm also when using the optional lens.



**CAUTION:**  
**Never look directly into the laser beam**

Although this is a low power laser and you do not need protective eye-wear, you should not look directly into the laser beam. This could result in an unpleasant irritation of the retina.

When measuring at a distance, please also pay attention to other persons in the same room..

### 3.2.3 Measuring Light

For light measurements with the *basICColor DISCUS* please set the wheel to position 3: „•••“.

The software (e.g. *basICColor display*) will normally prompt you accordingly after the black current calibration and before you attempt to measure. In this position the callotte is placed in front of the aperture. In your software please select the correct calibration matrix for the *basICColor DISCUS* (JUST with Diffuser).



## Measuring Light At Paper Level

For measuring the illuminance at the level of your print or proof, please put the instrument upside down in the center of your color matching table. Since the *basICColor DISCUS* has a flat, Durch das plane parallel housing, the flat callotte will receive the same amount of light at the same angle as your copy. The housing has a thickness of just over 1" which leads to a good approximation even in small light booths. Also measure the uniformity of your light booth this way.



## Influence Af Ambient Light

In an „open“ environment (e.g. at the control panel in the press-room) you would want to know about the influence of the lateral ambient light. In order to facilitate the relevant measurements the housing is fitted with two 45° bevels and the edge of the housing is rectangular to the bottom. Thus your able to measure under 5 different angles without any auxiliary means:

Paper plane / Paper plain  $\pm 45^\circ$  / Paper plain  $\pm 90^\circ$ .

In an ideal environment there will only be changes in the illuminance level, not in color.



**CAUTION:**  
Never look directly into the laser beam

Although this is a low power laser and you do not need protective eyewear, you should not look directly into the laser beam. This could result in an unpleasant irritation of the retina.

Switch the laser on only when needed.

## Measurement Perpendicular To Light Source

If you want to measure perpendicularly to your light source switch the laser on. You can now aim at the light source. The laser beam is bright enough so that it can be detected even on fluorescent lamps. For other light sources either aim at the lamp housing or use a mirror to reflect the laser beam.

## 3.2 Calibration Settings For Monitors and Light Sources

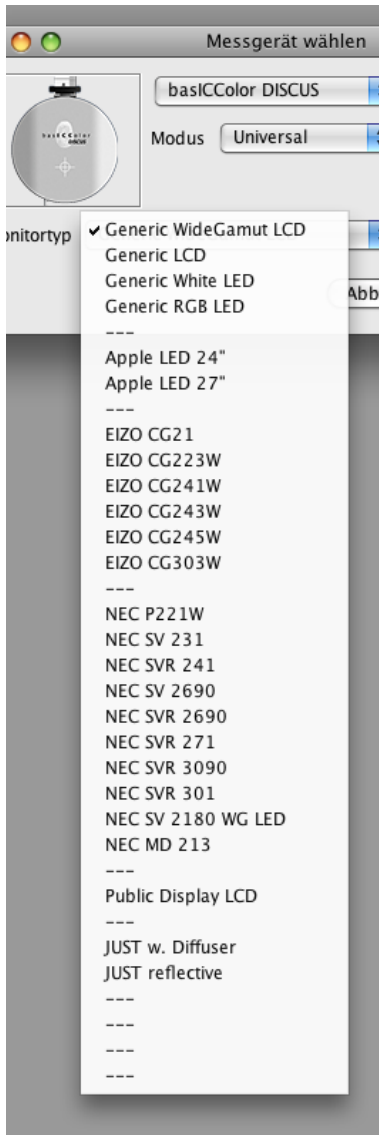
A colorimeter operates based on the same principles as the human eye. It yields XYZ measurement values and is thus called a 3-filter-instrument. The actual filters are resembling the standardized sensitivity curves of the human eye, as well as technically possible. For an exact adjustment to the properties of different monitor technologies or light sources colorimeters require additional calibration matrices.

The *basIColor DISCUS* uses a highly sensitive, thus fast Jenoptik sensor. Its thinfilm glass-filters guarantee for a long lifetime and a narrow inter-instrument agreement.

basIColor has built in a 2-tier instrument calibration:

4 base calibrations adjust the *basIColor DISCUS* to different monitor technologies (generic calibrations):

- Wide Gamut, CCFL backlight
- Standard Gamut, CCFL backlight
- Wide Gamut, white LED backlight
- Wide Gamut, RGB-LED backlight



For some prevalent monitor models and light sources (Apple, EIZO, NEC; Just Normlicht,...) the *basicColor DISCUS* holds additional precision calibrations.

Locate and select your monitor type (or the closest model) in the list of monitor calibrations when connecting your *basicColor DISCUS*. For other, unknown models please select the appropriate generic calibration (Generic WideGamut LCD, Generic LCD, Generic White LED, Generic RGB LED).

If you measure a light booth with the callotte in front of the sensor aperture, please select „Just w. Diffuser“. If you measure the light indirectly towards a neutral gray reference with the open sensor aperture, please select „Just reflective“.

basicColor will update the list of precision calibrations in future updates of *basicColor display*. The software will automatically download these calibrations to the instrument. For other monitor calibration software supporting the *basicColor DISCUS*, please refer to the software manufacturer.

basicColor GmbH also offers precision calibration for additional monitors as a service.

## Chapter 4

# Technical Specification

Measure Modes:	Contact measurement Tele-measurement (close /long distance) Light measurement (diffuse/reflective)
Optical Design:	High-sensitive colorimetric sensor w/ long term stable thinfilm glas filters complex optical path for a large Strahlengang für große measurement spot, even in contact measurement
Aperture Angle:	Sensor optics $\pm 4.5^\circ$ With optional lens $\pm 1^\circ$
Wheel:	3 positions: - Object measurement with fine thread (for ambient light hood, filters...) - integrated flat calotte for light measurement (measure angle: $\approx 180^\circ$ ) - Calibration position and protective cover for the measure and laser apertures
Contact Measurement:	Counterweight and tape measure
Tele Measurement:	3/8" tripod socket and 1/4" adapter, laser beam positioning, tape measure
Light Measurement:	3/8" tripod socket and 1/4" adapter, laser beam positioning, coplanar unibody housing for measuring of lighting at press console, light booth etc., flat calotte coplanar, only 27mm from paper surface, 2 45° positioning bevels for assessing

	lateral ambient light
Housing:	Unibody aluminum for heavy duty production environments, also works as heat sink
Measuring Range:	- Luminance: 0,05 to 2.500 cd/qm - Chromaticity: 0,05 to 2.500 cd/qm
Accuracy:	- Luminance: +/-2% 1 digit (1 ~500cd/m2) - Chromaticity: +/-0.002 (Illuminant D65) - Chromaticity: +/-0.0025 (CCT 4000-15000K) - Chromaticity: +/-0.0065 (other colors)
Calibration:	PTB traceable
Flickering:	According to VESA Standard
Interface:	USB 2.0
Power Supply:	4,7 to 5,5V DC through USB connector
Calibration Matrix:	up to 8 base calibrations up to 30 precision calibrations
Measurement Speed:	max. 10 measurements/s at low sensitivity, max. 4 measurements/s at high sensitivity
Temperature Range:	Compensation for 10°C to 50°C
Length of USB Cable:	ca. 1800 mm
Dimensions:	ø 99mm, Thickness: 27mm
Weight:	330g

## Chapter 5

---

# Product Information baslCColor DISCUS



## 5. Product Information basIColor DISCUS

Software - Copyright © 2001 - 2011 basIColor GmbH. All rights reserved.

Manual - Copyright © 2011 basIColor GmbH. All rights reserved.

This manual, as well as the software described in it, is furnished under license and may be used or copied in accordance with terms of the license. Your License Agreement with basIColor GmbH, which will be displayed and printed out during software installation, specifies the permitted and prohibited uses of the basIColor *display* software. Any unauthorized duplication or use of any basIColor *software* product, in whole or in part, is strictly forbidden. The information in this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by the *basIColor GmbH*. *basIColor GmbH* assumes no responsibility or liability for errors or inaccuracies that may appear in this document. No part of this user guide may be reproduced, transmitted, transcribed, or translated into any language without the express written permission of the *basIColor GmbH*.

basIColor® is a registered trademark of basIColor GmbH.

Apple, Macintosh, ColorSync are registered trademarks of Apple Computer, Inc. All other trademarks or registered trademarks are the property of their respective holders.

Authors: Markus Hitzler, Karl Koch  
Version 1.0, April 2011