EIZO®
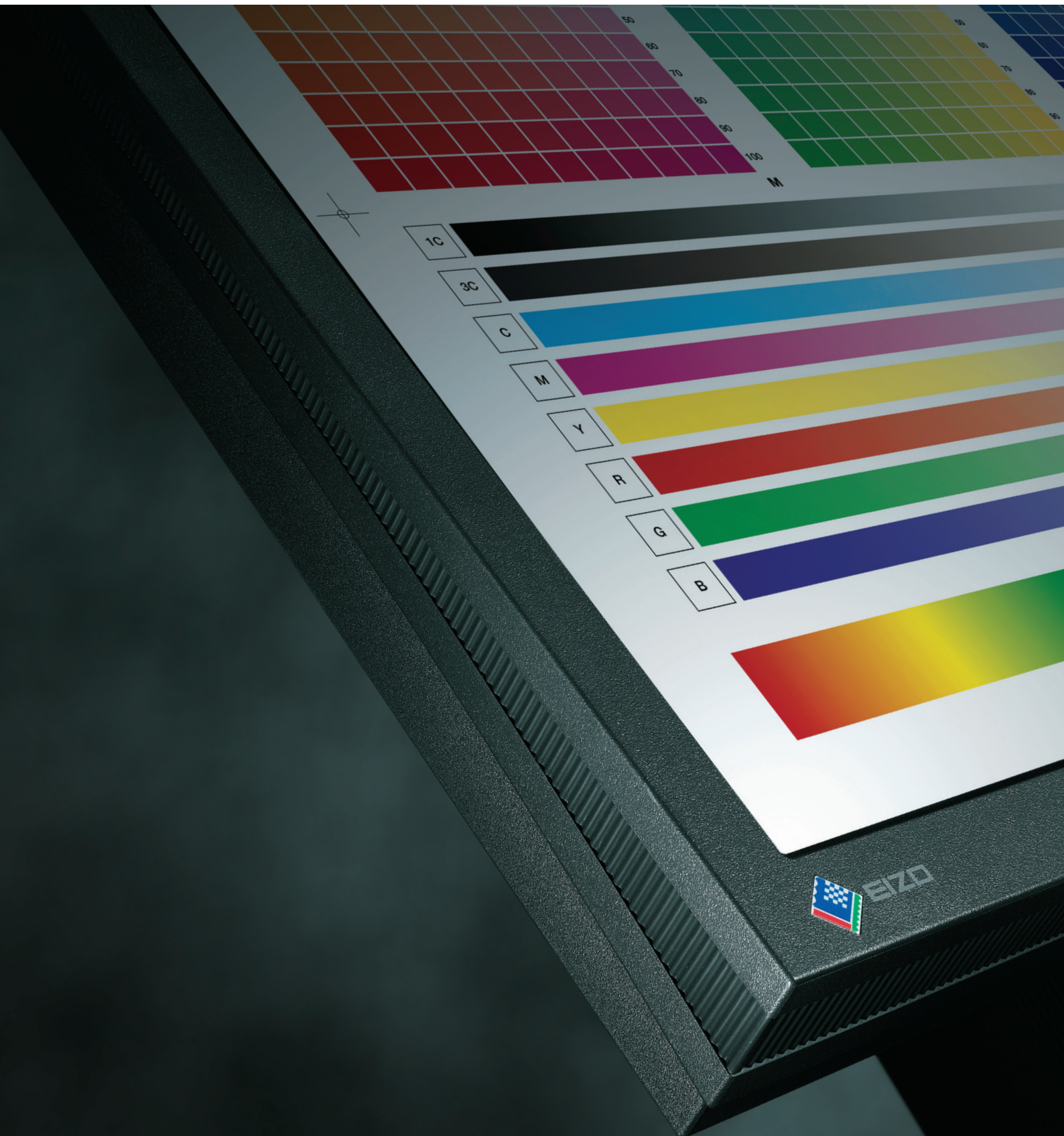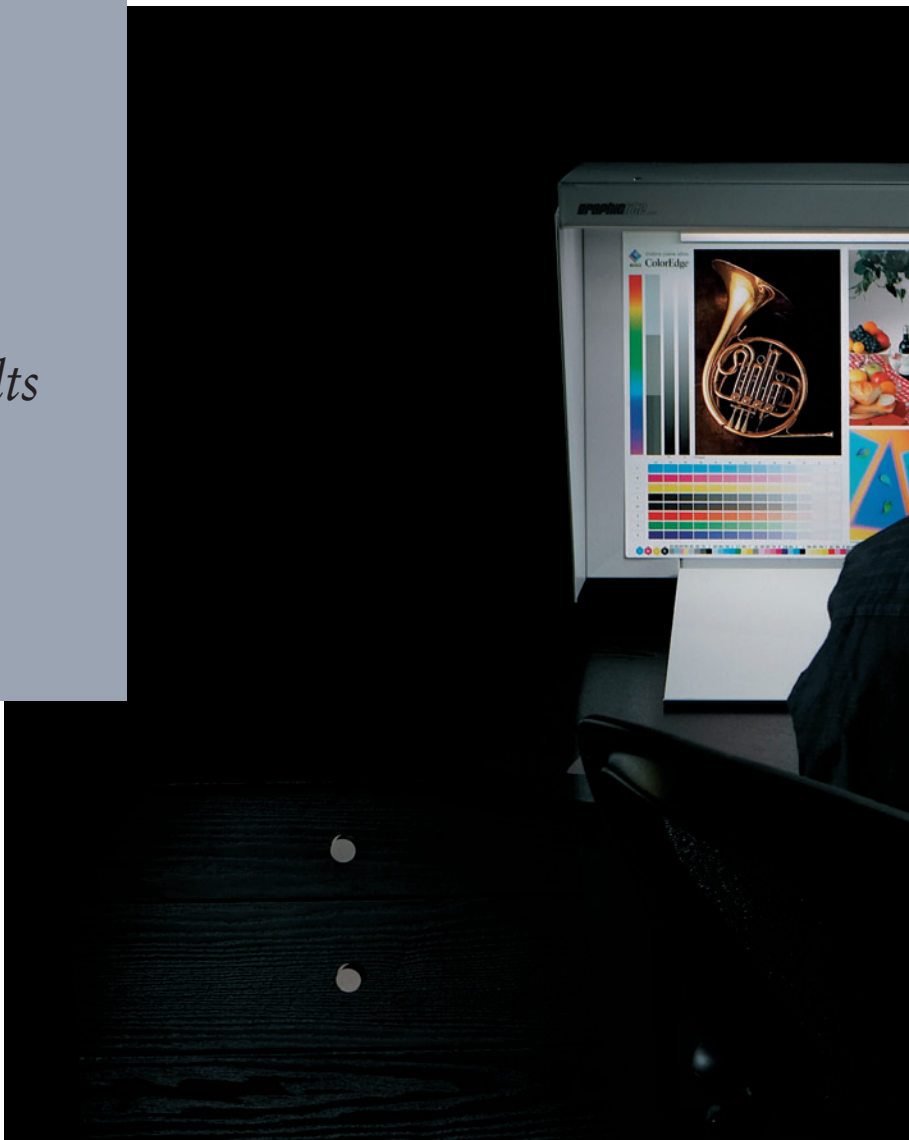
ColorEdge

Color as it's meant to be

ColorEdge — perfect color results for your digital workflow

Choosing the right monitors for a color management system

The Importance of Color Management

In today's digital production environment, there are many opportunities for discrepancies in color to arise along the path from the computer to the printer. This is because input devices (cameras, scanners, etc.), display devices (monitors) and output devices (various kinds of printers) may all be set to different color spaces. Such discrepancies can be avoided by employing a color management system that ensures every device in the production chain is set to a common color space.
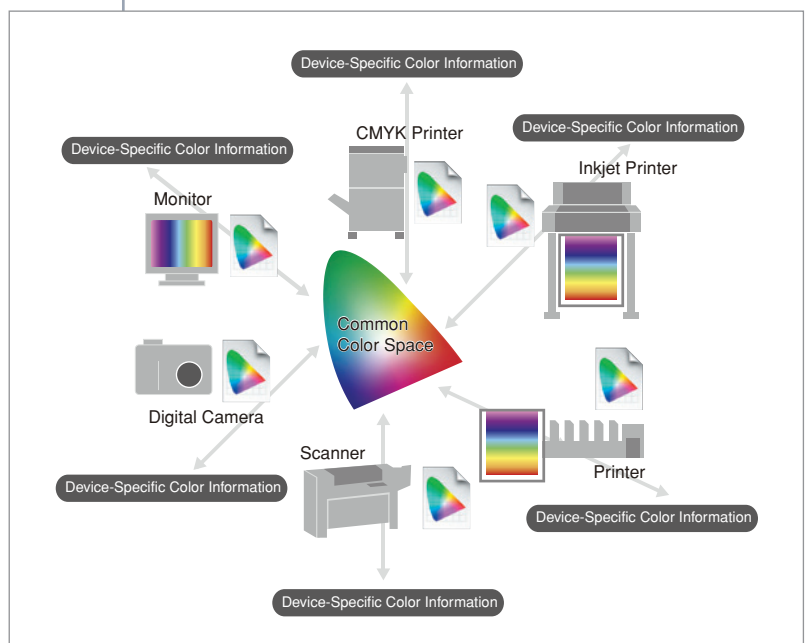
Color Management Begins with the Monitor

The monitor is the core of any professional color management system. If color is displayed accurately on the monitor, and color matching has been done with the output device, then you no longer have to make multiple proofs just to correct for color discrepancies. You can proof with confidence right from the start, while lowering costs, increasing efficiency and improving quality control.

ColorEdge – the Right Monitors for Color Management

Effective color management requires monitors with accurate color reproduction and gradation characteristics. With ColorEdge monitors you get factory-adjusted gamma, extensive hardware calibration capabilities and an exceptionally wide color gamut. Their outstanding performance and

reliability make them ideal for a wide range of professional environments where color reproduction is critical, including photography, graphics, printing and publishing.

Device-Specific Color Information

Device-Specific Color Information

CMYK Printer

Device-Specific Color Information

Inkjet Printer

Monitor

Common Color Space

Digital Camera

Scanner

Printer

Device-Specific Color Information

Device-Specific Color Information

Device-Specific Color Information

Adobe RGB color space reproduction — connecting the photographer, designer, and printer

Soft Proofing with Adobe RGB

The benefits of color management quickly become apparent once a system is put into place. When all devices share a common color space, colors match at every stage of production; knowing that color is being accurately displayed naturally improves efficiency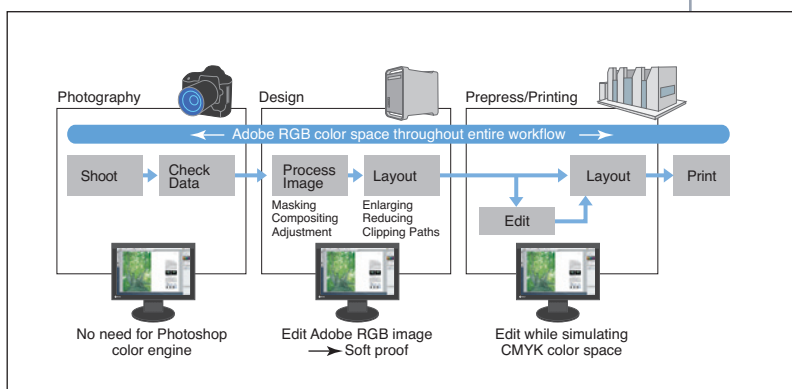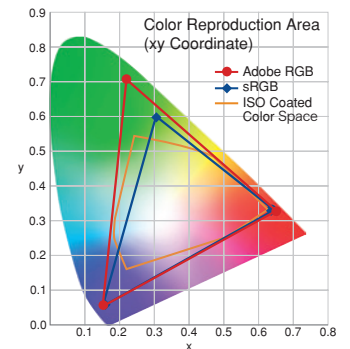. A wide-gamut ColorEdge monitor at the center of a system using Adobe RGB as the common color space is the ideal way to ensure accurate color reproduction across all digital platforms. Such a color management environment fully supports soft proofing at every step of production, from initial photography to final printing.

Wide Color Gamut Monitors
CG301W · CG243W · CG241W · CG222W · CG221

With a wide color gamut that reproduces nearly 100% of the Adobe RGB color space, these models not only cover the sRGB color space supported by many computer monitors, operating systems and digital cameras, but practically the entire ISO-coated and US web-coated CMYK color spaces used in printing as well.

Color Reproduction Area (xy Coordinate)

- Adobe RGB
- sRGB
- ISO Coated Color Space

Photography — Design — Prepress/Printing

Adobe RGB color space throughout entire workflow

Shoot → Check Data → Process Image (Masking Compositing Adjustment) → Layout (Enlarging Reducing Clipping Paths) → Edit → Layout → Print

No need for Photoshop color engine

Edit Adobe RGB image → Soft proof

Edit while simulating CMYK color space

Factory Adjustment of Gamma

The gamma level for each ColorEdge monitor is adjusted at the factory. This is accomplished by measuring the R, G, and B gamma values from 0 – 255, then using the monitor's 12-bit or 10-bit look-up table (LUT) to select the 256 most appropriate tones to achieve the desired value.

Each monitor adjusted individually at the factory. (For illustrative purposes only. Actual adjustment is performed in a darkroom.)

This is important because accurate, non-fluctuating gamma values are necessary for the proper display of color. If colors are not based on specific values and cannot be adjusted, images will be displayed differently by different monitors. ColorEdge monitors provide both precision and consistency, so graphics professionals can be sure that the final product will look exactly the way they want it to. In fact, each monitor comes with an adjustment certificate that certifies the measurement results of the gamma value.
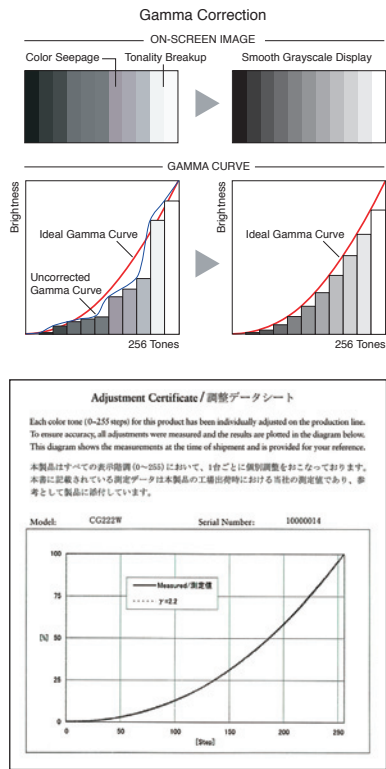

16-Bit Internal Processing
CG301W · CG243W · CG241W· CG222W · CG221 · CG211

In any color-critical work, the monitor's ability to produce black is a great differentiator. With most LCD monitors, the darkest area of the screen — or black level — is usually too bright. This leads to banding and washing out of dark grays and dark colors. With 16-bit internal processing, these models not only come very close to producing a true black, but the lowest grayscale tones can be distinguished from one another for a greater level of detail in dark areas. (The CG19 has 10-bit internal processing.)

16-bit v. 10-bit processing
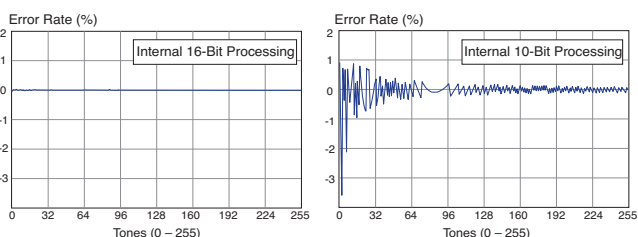
With 10-bit processing, the error rate is high in low tonal areas during calculation. With 16-bit processing, accuracy is significantly improved resulting in fewer conversion errors.

Brightness and Color Uniformity with DUE
CG301W · CG243W · CG241W · CG222W · CG221 · CG211

Fluctuations in brightness and chroma on different parts of the screen are a common trait of LCD monitors. To counteract this, EIZO incorporates a Digital Uniformity Equalizer (DUE). DUE utilizes the monitor's 12-bit look-up table (LUT) with an extensive palette of 4,081 grayscale tones for each R, G, and B, and internal calculation accuracy of 16 bits to ensure a Delta-E difference of 3 or less across the screen when the monitor leaves the factory.*


	0.0–1.5
	1.5–3.0
	3.0–4.5
	4.5–6.0
	6.0–9.0
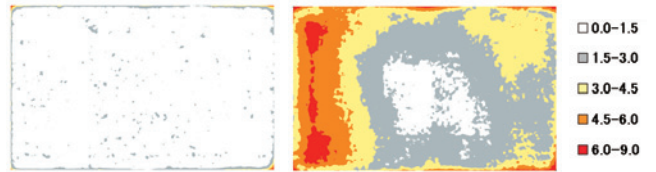
With Digital Uniformity Compensation   Without Digital Uniformity Compensation

Color-separated image with Delta-E*ab distribution across the screen of the ColorEdge CG221 (gray level 128 measured)

*Delta-E difference for the CG301W is 5 or less along the screen perimeter.

Short- and Long-Term Brightness Stabilization

Stable brightness is a key factor in achieving accurate color. However, fluctuations in backlight brightness normally occur from startup and can last for up to two hours. Furthermore, changes in ambient temperature can cause brightness levels to fluctuate, as can the inevitable deterioration of the backlight's fluorescent lamp over
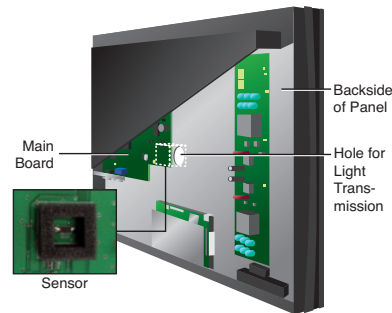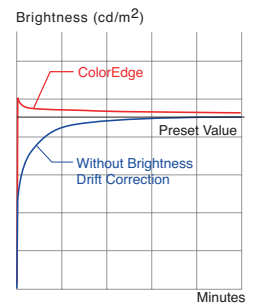

time. An EIZO patented backlight sensor incorporated in all ColorEdge monitors detects and counteracts these influences so brightness is always stable and product life is extended.

3D LUT for Better Additive Color Mixture
CG243W · CG222W

All ColorEdge models incorporate a look-up table (LUT) for accurate color and grayscale rendering, but the latest models, the ColorEdge CG243W and CG222W, utilize a new EIZO-developed 3D LUT. Whereas a typical 1D LUT adjusts color on separate tables for each red, green, and blue, a 3D LUT accomplishes this on a single, mixed-color cubic table. A 3D LUT improves the monitor's additive color mixture (combination of RGB), a key factor in its ability to display neutral gray tones.


3D LUT image
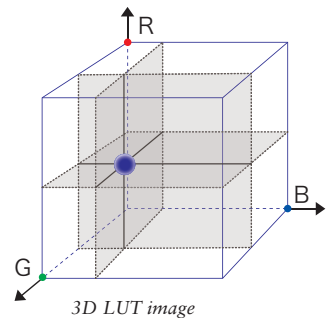
Simple and Precise Calibration

The EIZO-developed ColorNavigator software makes calibration both simple and accurate. Instead of having to judge colors and do time-consuming inputting, or having a specialist do it for you, all you need to do is input target values for brightness, white point and gamma. ColorNavigator works with a wide range of measurement devices to directly utilize the 12- or 10-bit LUT of ColorEdge monitors for accurate and reliable calibration in minutes. The latest version of ColorNavigator is always available as a free download at www.eizo.com.

Preset or User-Assigned Values

Preset Values

Printing and Photography/Graphic Design settings are available with default values. Just select either one and Color-Navigator will begin calibrating. Ideal for users with limited color management knowledge, this takes the guesswork out of assigning values.
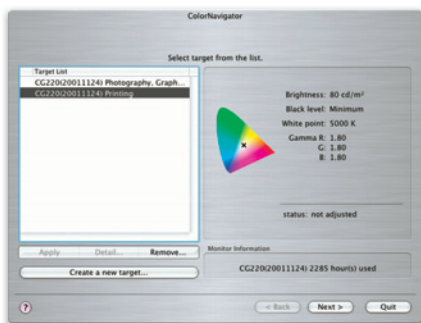
User-Assigned Values

Experienced users can assign the desired values for brightness, white point, and gamma and then calibrate.


Calibration Parameters

Brightness		30 cd/m²– 200 cd/m²† in 5 cd/m² increments. Setting to the monitor's minimum and maximum values is also possible.
	Black Level‡	0.2 cd/m² – 3.5 cd/m² (0.1 cd/m² increments) Setting to the monitor's minimum value is also possible.
White Point	Color Temperature	4,000 K – 10,000 K in 100 K increments
	Color Coordinates	x Value, y Value
Gamma		1.0 – 2.6 in 0.1 increments and L*

† With the CG222W and CG221, it may not be possible to set the brightness to the maximum value (200 cd/m²) depending on LCD panel performance.
‡With the CG19, choosing 6-Color Adjustment after calibrating will disable the black level adjustment function, and gamma will only be adjustable from 1.8 to 2.6 in increments of 0.2.

Paper White Measurement

ColorNavigator offers a paper white measurement function for color matching between the image on your monitor and the image on your printouts. By measuring the white of the paper to be used for printing, ColorNavigator will automatically set the target values for brightness and white point accordingly.
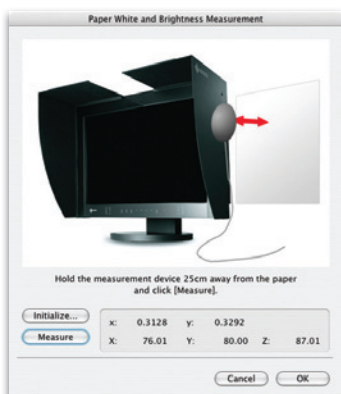

Light Box Brightness Adjustment

With ColorNavigator and a measurement device, you can set your light box's* brightness to the desired value. ColorNavigator can then take the resulting brightness level and set it as the monitor's target calibration value to ensure uniform brightness between your monitor and light box when color proofing.

*Currently supports JUST Color Communicator 1 and 2 only.

Profile Validation

This function measures the monitor's color patches to determine the difference between the Delta-E value of the monitor's profile and the actual displayed values of the monitor.
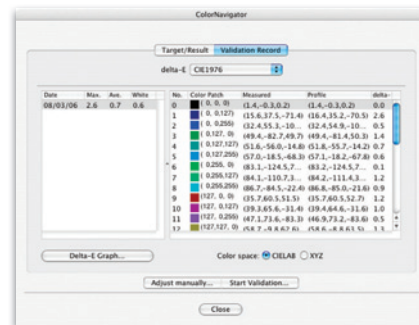
This allows for verifying the results of calibration or checking to see how much the monitor's colors have varied since it was last calibrated. ColorNavigator can also measure CMYK color patches (GRACoL 2006 Coated #1 and FOGRA39) and output them as Adobe Photoshop or Acrobat files.* The measurement results of both the monitor and profile for each color patch are indicated in either CIELAB or XYZ values, and the difference between them expressed in Delta-E. The Delta-E variation can be shown in a graph and compared with previous results. ColorNavigator even exports profile validation results as a PDF for easy distribution among work sites, printers, or clients.

*Photoshop CS/CS2/CS3/CS4 or Acrobat 7/8/9 Professional are required for Macintosh, and Photoshop CS3 or Acrobat 8/9 Professional are required for Windows.

Post-Calibration Color Adjustment

Sometimes due to variations in output from different printers or the special requirements of a project, it is necessary to fine-tune an otherwise perfectly calibrated monitor to match target colors. ColorNaviga-

tor lets you easily adjust hue and saturation for all six primary and secondary colors (RGB and CMY), as well as white balance, brightness, black level and gamma, to achieve the closest possible visual match. For confirmation of calibration results or to achieve more accurate manual adjustments, a test pattern screen with a grayscale ramp, low tones, high tones and gamma values can be displayed.

ColorNavigator Compatible Measurement Devices

X-Rite: Eye-One Series, ColorMunki, DTP94, DTP94B
DataColor: Spyder 2, Spyder 3
EIZO: EX1 (Bundled with EIZO EasyPIX color matching tool. For details please visit www.eizo.com)

ColorNavigator Compatible OSes

Compatible OSes*	Macintosh	Windows
	OS X 10.3.9 – 10.5	Vista (x64, x86) / XP (x64, x86)

* Mac OS 9.2.2, 10.2 – 10.3.8, and Windows 2000 can only be run on previous versions of this software except with the CG301W, CG243W, CG241W, and CG222W which only support the operating systems listed above.

Specifications

	ColorEdge® CG301W	ColorEdge® CG243W	ColorEdge® CG241W
Panel Size	29.8" / 76 cm (756 mm diagonal)	24.1" / 61 cm (611 mm diagonal)	24.1" / 61 cm (611 mm diagonal)
Viewing Angles (H, V)	178°, 178° (at contrast ratio of 10:1)	178°, 178° (at contrast ratio of 10:1)	178°, 178° (at contrast ratio of 10:1)
Panel Type	VA (with overdrive circuit)	IPS	VA (with overdrive circuit)
Brightness	260 cd/m² (maximum) 120 cd/m² or less (recommended[1])	270 cd/m² (maximum) 120 cd/m² or less (recommended[1])	300 cd/m² (maximum) 120 cd/m² or less (recommended[1])
Contrast	850:1	850:1	850:1
Response Time (Typical)	Gray-to-gray: 6 ms, black-white-black: 12 ms	Gray-to-gray: 5 ms, black-white-black: 13 ms	Gray-to-gray: 6 ms, black-white-black: 16 ms
Native Resolution	2560 × 1600 (16:10 aspect ratio)	1920 × 1200 (16:10 aspect ratio)	1920 × 1200 (16:10 aspect ratio)
Pixel Pitch	0.2505 × 0.2505 mm	0.270 × 0.270 mm	0.270 × 0.270 mm
Display Colors	16.77 million from a palette of 68 billion	DVI: 16.77 million from a palette of 68 billion DisplayPort: 1.07 billion from a palette of 68 billion	16.77 million from a palette of 68 billion
Wide Gamut Coverage	Adobe RGB: 98%, sRGB: 99%	Adobe RGB: 98%, sRGB: 100%	Adobe RGB: 96%, sRGB: 98%
Look-Up Table	12 bits per color	12 bits per color	12 bits per color
Internal Processing	16 bits per color	16 bits per color	16 bits per color
Screen Uniformity[2]	Center: ΔE≤3, Perimeter: ΔE≤5	Entire Screen: ΔE≤3	Entire Screen: ΔE≤3
Cabinet Colors	Black	Black	Black
Dot Clock	269 MHz	Analog: 170 MHz, Digital: 164.5 MHz	Analog: 202.5 MHz, Digital: 164.5 MHz
Analog Scanning Frequency (H, V)	–	24 – 76 kHz, 47.5 – 86 Hz	24 – 94 kHz, 47.5 – 86 Hz
Digital Scanning Frequency (H, V)	26 – 100 kHz, 29.5 – 30.5 Hz/59 – 61 Hz (VGA Text: 69 – 71 Hz)	26 – 78 kHz, 23.75 – 63 Hz (VGA Text: 69 – 71 Hz)	26 – 78 kHz, 47.5 – 63 Hz (VGA Text: 69 – 71 Hz)
Video Input Terminals	DVI-D 24 pin × 2 (dual link × 1, single link × 1 [with HDCP])	DVI-I 29 pin × 2 (with HDCP), DisplayPort (with HDCP)	DVI-I 29 pin × 2 (with HDCP)
USB Ports / Standard	1 upstream, 2 downstream / USB 2.0	1 upstream, 2 downstream / USB 2.0	1 upstream, 2 downstream / USB 2.0
Power Requirements	AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz	AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz	AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz
Power Consumption	170 W (maximum)	95 W (maximum)	110 W (maximum)
Power Save Mode	Less than 2 W	Less than 0.9 W	Less than 2 W
Height Adjustment Range	118 mm	82 mm	82 mm
Tilt / Swivel / Pivot	40° Up, 0° Down / 35° Right, 35° Left / 90°	40° Up, 0° Down / 35° Right, 35° Left / 90°	40° Up, 0° Down / 35° Right, 35° Left / 90°
Dimensions (W × H × D)	With Stand: 689 × 511.5 – 629.5 × 254.7 mm Without Stand: 689 × 450 × 90 mm	With Stand: 566 × 456 – 538 × 230 mm Without Stand: 566 × 367 × 85 mm	With Stand: 566 × 456 – 538 × 230 mm Without Stand: 566 × 367 × 85 mm
Net Weight	With Stand: 15.7 kg Without Stand: 11.2 kg	With Stand: 10.7 kg Without Stand: 7.1 kg	With Stand: 11 kg Without Stand: 7.4 kg
Preset Modes	Fine Contrast (Custom, sRGB, Calibration, Emulation)	Color Mode (Custom, sRGB, Rec709, EBU, SMPTE-C, DCI, Calibration)	Fine Contrast (Custom, sRGB, Calibration, Emulation)
Supplied Accessories	AC power cord, signal cables (DVI-D – DVI-D, DVI-D – DVI-D [dual link supported]), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator software, PDF user's manual, ICC Profile), adjustment certificate, ScreenCleaner, monitor hood, quick reference, 4 screws for mount option, warranty registration card	AC power cord, signal cables (DVI-D – DVI-D, DisplayPort – DisplayPort), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator software, PDF user's manual), adjustment certificate, ScreenCleaner, monitor hood, quick reference, 4 screws for mount option, warranty card	AC power cord, signal cables (DVI-D – DVI-D, DVI-I – D-Sub mini 15 pin), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator CE software, PDF user's manual, ICC Profile), adjustment certificate, ScreenCleaner, monitor hood, quick reference, 4 screws for mount option, warranty card
Warranty	Five Years[1]	Five Years[1]	Five Years[1]

[1] The usage time is limited to 30,000 hours and the warranty period of the LCD panel is limited to three years from the date of purchase. For the CG19, the warranty period of the backlight is limited to three years from the date of purchase, but brightness deterioration is not covered. For other monitors, the warranty period of the backlight is warranted only if they are used within the recommended brightness of up to and including 80 cd/m² for the CG222W; 100 cd/m² for the CG221 and CG211; 120 cd/m² for the CG301W, CG243W, and CG241W with the color temperature for the aforementioned models between 5,000 K – 6,500 K and limited to three years from the date of purchase subject to the usage time being less than or equal to 10,000 hours. [2] Measured at gray level 128 and color temperature of 5000 K. With current LCD technology, a panel may contain a limited number of missing or flickering pixels.

Accessories

Monitor Hoods

EIZO's monitor hoods reduce screen glare and include a sliding top cover so they can remain in place when the monitor is calibrated. Sold separately for the and CG19 and bundled with all other models.
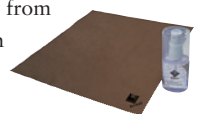
Panel Protectors
CG243W · CG241W · CG211 · CG19

These protection sheets are easy to place over the screen surface, allow a minimum of 87% light transmission, and prevent dust and scratches. (Sold separately.)
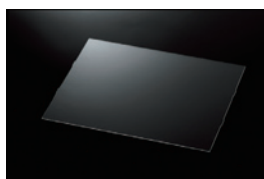
Screen Cleaner Kit

Keep your screen free from dust and fingerprints with this screen cleaner kit. Includes pump spray and cloth. Sold separately for the CG19 and bundled with all other models.

ColorEdge® CG222W	ColorEdge® CG221	ColorEdge® CG211	ColorEdge® CG19
22" / 56 cm (558 mm diagonal)	22.2" / 56.4 cm (563 mm diagonal)	21.3" / 54 cm (540 mm diagonal)	19" / 48 cm (481 mm diagonal)
178°, 178° (at contrast ratio of 10:1)	170°, 170° (at contrast ratio of 10:1)	170°, 170° (at contrast ratio of 10:1)	170°, 170° (at contrast ratio of 10:1)
VA (with overdrive circuit)	IPS	IPS	IPS
200 cd/m² (maximum) 80 cd/m² or less (recommended[1])	200 cd/m² (maximum) 100 cd/m² or less (recommended[1])	225 cd/m² (maximum) 100 cd/m² or less (recommended[1])	280 cd/m² (maximum)
800:1	400:1	500:1	450:1
Gray-to-gray: 8ms, black-white-black: 16 ms	Gray-to-gray: –, black-white-black: 30 ms	Gray-to-gray: –, black-white-black: 30 ms	Gray-to-gray: –, black-white-black: 20 ms
1680 × 1050 (16:10 aspect ratio)	1920 × 1200 (16:10 aspect ratio)	1600 × 1200 (4:3 aspect ratio)	1280 × 1024 (5:4 aspect ratio)
0.282 × 0.282 mm	0.249 × 0.249 mm	0.270 × 0.270 mm	0.294 × 0.294 mm
16.77 million from a palette of 68 billion	16.77 million from a palette of 68 billion	16.77 million from a palette of 68 billion	16.77 million from a palette of 1.06 billion
Adobe RGB: 92%, sRGB: 97%	Adobe RGB: 98%, sRGB 98%	Adobe RGB: 78%, sRGB: 99%	Adobe RGB: 75%, sRGB: 92%
12 bits per color	12 bits per color	12 bits per color	10 bits per color
16 bits per color	16 bits per color	16 bits per color	10 bits per color
Entire Screen: ΔE≤3	Entire Screen: ΔE≤3	Entire Screen: ΔE≤3	–
Black	Black	Black	Gray, Black
Analog: 202.5 MHz, Digital: 162 MHz	Analog: 202.5 MHz, Digital: 162 MHz	Analog: 202.5 MHz, Digital: 162 MHz	Analog: 135 MHz, Digital: 108 MHz
24 – 82 kHz, 47.5 – 86 Hz	31 – 94 kHz, 49 – 86 Hz	24 – 100 kHz, 49 – 86 Hz	30 – 82 kHz, 49 – 86 Hz
31 – 65 kHz, 47.5 – 61 Hz (VGA Text: 69 – 71 Hz)	31 – 76 kHz, 59 – 61 Hz (VGA Text: 69 – 71 Hz)	31 – 100 kHz, 59 – 61 Hz (VGA Text: 69 – 71 Hz)	30 – 65 kHz, 59 – 61 Hz (VGA Text: 69 – 71 Hz)
DVI-I 29 pin × 2 (with HDCP)	DVI-I 29 × 2	DVI-I 29 × 2	DVI-I 29 pin × 2
1 upstream, 2 downstream / USB 2.0	1 upstream, 2 downstream / USB 2.0	1 upstream, 2 downstream / USB 2.0	1 upstream, 2 downstream / USB 2.0
AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz	AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz	AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz	AC 100 – 120 V / 200 – 240 V, 50 / 60 Hz
75 W (maximum)	100 W (maximum)	75 W (maximum)	60 W (typical)
Less than 2 W	Less than 2 W	Less than 2 W	Less than 3 W
82 mm	100 mm	82 mm	100 mm
40° Up, 0° Down / 35° Right, 35° Left / 90°	30° Up, 3° Down / 35° Right, 35° Left / –	40° Up, 0 ° Down / 35° Right, 35° Left / 90°	40° Up, 1° Down / 35° Right, 35° Left / 90°
With Stand: 507 × 439 – 521 × 230 mm Without Stand: 507 × 333 × 74 mm	With Stand: 565 × 452.5 – 552.5 × 272 mm Without Stand: 565 × 394.5 × 101 mm	With Stand: 472 × 459 – 541 × 208.5 mm Without Stand: 472 × 373 × 69 mm	With Stand: 414 × 409.5 – 509.5 × 202.7 mm Without Stand: 414 × 340 × 64 mm
With Stand: 11.2 kg Without Stand: 7.7 kg	With Stand: 14.5 kg Without Stand: 10.4 kg	With Stand: 10.2 kg Without Stand: 7.0 kg	With Stand: 8.1 kg Without Stand: 5.8 kg
Fine Contrast (Custom, sRGB, Calibration, Emulation)	Fine Contrast (sRGB, Custom, Calibration, Emulation)	Fine Contrast (sRGB, Custom, Calibration)	Fine Contrast (sRGB, Custom, Calibration)
AC power cord, signal cables (DVI-D – DVI-D, DVI-I – D-Sub mini 15 pin), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator software, PDF user's manual, ICC Profile), adjustment certificate, ScreenCleaner, monitor hood, quick reference, 4 screws for mount option, warranty card	AC power cord, signal cables (DVI-D – DVI-D, DVI-I – D-Sub mini 15 pin), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator software, HTML user's manual, ICC Profile), adjustment certificate, ScreenCleaner, monitor hood, quick reference, warranty card	AC power cord, signal cables (DVI-D – DVI-D, DVI-I – D-Sub mini 15 pin), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator software, HTML user's manual, ICC Profile), adjustment certificate, ScreenCleaner, monitor hood, quick reference, warranty card	AC power cord, user's manual, signal cables (DVI-D – DVI-D, DVI-I – D-Sub mini 15 pin), USB cable, setup guide, EIZO LCD Utility Disk (ColorNavigator software, HTML user's manual, ICC Profile), quick reference, warranty card
Five Years[1]	Five Years[1]	Five Years[1]	Five Years[1]

Color Universal Design Feature

Color Vision Deficiency Simulation

CG301W · CG243W · CG241W · CG222W

To accommodate the more than 200 million people worldwide with a color vision deficiency, care must be taken when choosing color schemes, otherwise important details may not be discernible. These models instantly simulate how still and moving images appear to people with red-green color vision deficiency (protanopia and deuteranopia) through internal hardware conversion and EIZO proprietary software. (Compatible with Windows Vista and XP, and with Macintosh OS X 10.3.9 or later.)

Original mode

Deuteranope mode

Warranty

Brightness and Color Warranty

EIZO offers a five-year warranty for all ColorEdge monitors. For most models, the backlight is warranted for three years at a brightness of up to a specific figure and color temperature from 5,000 – 6,500 K with the usage time a maximum of 10,000 hours. (See footnote 1 on page 6 for brightness figures.)

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