

I-Guard® / Ambient Light Compensation

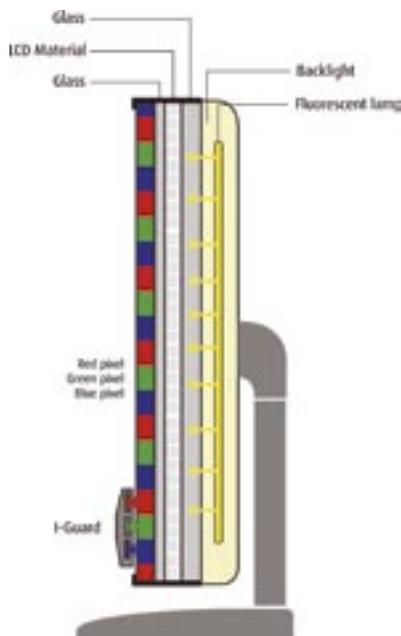
Maintaining image quality and DICOM-compliance under all lighting conditions

Radiologists expect the quality of their medical images to remain stable over time. Although the data stored in the computer archive is purely digital and therefore stable over time, the perceived image on a display workstation is not. Aging and environmental changes can affect the perceived image significantly. Therefore, displays intended for medical use should have a means to stabilize the image quality and maintain DICOM accuracy over time.

Another image stability issue is caused by the changing ambient light conditions in the reading room, which can influence the display's performance and the radiologist's ability to detect subtle information. Therefore, there should also be a way to ensure the display's DICOM-compliance even in changing ambient light conditions

I-Guard and Ambient Light Compensation (ALC)

Barco has effectively tackled the above-mentioned DICOM consistency issues with two innovative technologies that ensure worry-free DICOM compliance under all lighting conditions: its patented I-Guard technology and its Ambient Light Compensation (ALC) system.



Side view of an LCD screen with I-Guard sensor

I-Guard



As an essential component of Barco's Coronis family of diagnostic displays, I-Guard has become the industry standard technology for monitoring the image quality and DICOM-consistency of diagnostic displays.

The latest version of I-Guard has been further perfected with increased read-out speed and enhanced sensitivity down to the lowest luminance levels.

The current generation I-Guard technology brings:

- Perfect DICOM-compliance for both color and grayscale display systems
- Much faster calibration speed
- Improved low light measurement performance

In addition to its application in grayscale diagnostic display systems, the I-Guard perfectly meets the needs of color display systems.

In color displays, a transparent color filter is stacked on top of the Liquid Crystal Display (LCD). So, in order to properly calibrate the luminance output of a color display, the sensor has to look at the image the same way as the radiologist does: from the front of the screen.

Barco's I-Guard is a tiny, embedded optical precision photometer positioned at the front of the LCD screen. Contrary to backlight sensors, which are only capable of detecting what they see (the backlight), I-Guard sees what the radiologist sees: the result of the complete image formation process of the LCD, including the graphic board, the Look-Up Table, the driving electronics, the backlight and the Liquid Crystal cells. I-Guard continuously monitors the light output of the red, green and blue contributions without disturbing the actual image display. The intelligent I-Guard communicates its readings to the controlling electronics, which make corrective actions to the LCD in real-time.

In addition to its stabilizing function, I-Guard can precisely measure and calibrate any DICOM Just Noticeable Difference (JND) value as defined by DICOM Part 14 with 18-bit precision.

I-Guard requires a few square millimeters at the edge of the screen to do its job unnoticed in the background, without disturbing the radiologist's work. Whether it is overnight when the screen is not used, or during a busy day while the display is in use, I-Guard can take readings from the small test-patch displayed in the I-Guard area while a medical image is on the screen.

Combined with Barco's MediCal QAWeb softcopy QA tool, I-Guard brings fast and easy calibrations, automatic Quality Assurance testing and remote diagnoses of the display.

Reading environment	Max illuminance level (Lux)	Preset illuminance (Lux)
X-Ray Diagnostic reading room	10	5
CT/MR/NM reading Room	60	35
Staff office	180	120
Clinical viewing room	250	215
ER room	300	275
OR room	400	350
Custom	TBD (<1000 Lux)	TBD (<1000 Lux)

Typical ambient light levels in various reading environments

Ambient Light Compensation (ALC)



Changing ambient light conditions in the radiology reading room greatly influence display performance and the ability to detect subtle information. To compensate for this, Barco created the intelligent Ambient Light Compensation (ALC) system.

Barco's ALC functionality:

- Measures the ambient luminance
- Compares the measured luminance to preset thresholds that characterize your reading room, as defined in the AAPM TG18 guidelines
- Notifies the QA administrator if the ambient luminance is not within the predefined range
- Corrects the DICOM curve in the Look-Up Table in real-time in accordance to the luminance level of the reading environment (if preferred)

In combination with Barco's MediCal QAWeb, ALC provides an automatic alert functionality that warns the administrator when the level of ambient light in the reading room is too high.

Request more information

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