As the incidence of breast cancer rises, regular mammograms are recommended for early detection.

It is vital in the process of early breast cancer detection to find subtle masses and calcifications. Film imaging for mammography diagnosis has long been the primary methodology.

However, to meet the demand for a higher quality of images and reduction of reading time and cost, digitizing and networking of medical images in a filmless environment is spreading rapidly.

The transition from film to filmless mammography naturally requires a monitor to display extremely precise images equal to or better than film mammography.

In the mammography field today high-performance monitors featuring high resolutions and displaying high density images contribute to the process of early breast cancer detection.

Future Focused

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8 Requirements to Select the Optimum Digital Mammography Monitor

1. **High-Resolution**
   - High resolutions are required to display the correct “information volume” of a digital mammography image.

2. **High-Definition & High-Density**
   - For the detection of mammary gland disorders which appear as “distortion,” the monitor needs this required performance in order to display the subtle structures.

3. **Multi-Grayscale**
   - For the detection of small tumors which appear as delicate “density” differences, the monitor needs the correct display of extremely subtle grayscale shadings.

4. **Brightness Uniformity**
   - For correct luminance display of delicate “density” differences, the monitor needs uniformity in brightness across the entire screen.

5. **Image Sharpness**
   - For detection of subtle masses and calcifications, the monitor needs to display the outlines of the images with a high degree of sharpness.

6. **DICOM Part 14 Compliance**
   - For unified image display between multiple monitors, the monitor’s tone characteristic is required to comply with the grayscale standard DICOM Part 14.

7. **DICOM Part 14 Calibration**
   - Since the quality characteristics gradually change over time, monitor that is calibration compliant with DICOM Part 14 is required.

8. **Simple Quality Control Procedures**
   - For the continuous quality maintenance and control, monitor enabling easy-to-follow QC procedures is required.
Digital Mammography Monitors RadiForce Mammo-Series

It is vital in the process of early breast cancer detection that monitors display accurate and consistent quality images. EIZO provides optimum diagnosis confidence with distinctive versions of the RadiForce 10 megapixel and 5 megapixel monitors for digital mammography imaging.

Common Features

High-Definition Images

- Information volume of a digital mammography image should exceed 5 million pixels. When a lower resolution monitor displays this “information volume,” the monitor stretches the information forcing the mosaic to appear as shadings. With a 2048 x 2048 resolution or 5.24 million pixels, the stretching effect is minimized and the mosaic becomes suitable for rendering subtle masses and calcifications, within the mammography image.

DICOM Part 14 Factory Adjustment

To ensure the most accurate and consistent shadings possible, EIZO carefully measures and sets every grayscale tone on the production line to produce a monitor compliant with DICOM Part 14.

10-Bit Simultaneous Gray Scale Display

10-bit (1,024 tone) simultaneous grayscale display extends grayscale fidelity to the boundaries of human visual perception abilities and helps radiologists discern the finest nuances within an image. A 10-bit graphics board and 10-bit viewer software needed for 10-bit display.

Brightness Uniformity

The Digital Uniformity Equalizer (DUE) function provides optimum backlight luminance uniformity which is considered difficult to attain due to the characteristics of LCD monitors.

Quick Brightness Stabilization for Instant Viewing

At startup or upon wakeup, the EIZO patented drift correction function quickly stabilizes the brightness to the monitor’s recommended brightness level. In addition, a sensor measures the backlight brightness and compensates for brightness fluctuations caused by the ambient temperature and the passage of time.

High Quality Assurance

- Long Service Life with the High Brightness
  When used at the recommended brightness for calibration of 500 cd/m², the monitor offers a long usage time guarantee of 40,000 hours. This contributes to a reduction in long-term asset management and maintenance costs.

- Brightness Stability Within Usage Time Guaranteed
  EIZO’s confidence in its product quality extends to brightness stability which is also covered during the usage time specified in the warranty.

- Customer Assurance with Medical Standards
  Meets the strictest medical, safety and EMC emissions standards.

- ISO 13485 Certification
  Acquiring ISO 13485 certification demonstrates EIZO’s ability to consistently meet customer requirements for our products and services.

Ergonomic Features

- Mode Selection for Optimum Viewing
  Selectable with the front panel buttons, the CAL Switch function allows for various imaging modes of different modalities such as digital mammography, ultrasound, and MRI images. Furthermore, with ScreenManager Pro for Medical installed, auto mode settings can be made with the Auto CAL Switch function.

- Quick Brightness Stabilization for Instant Viewing
  The Digital Uniformity Equalizer (DUE) function provides optimum backlight luminance uniformity which is considered difficult to attain due to the characteristics of LCD monitors.

- Environmental Awareness

Manufacturing Environmentally Friendly Products

Based on our awareness that our products have an impact on the environment and our pledge to consider respect for the environment as an integral part of product quality, we have continued to lead the industry in our efforts to reduce the environmental impact of our products. In product development, we rigorously work to ensure that our products comply with domestic and international legal requirements and environmental standards of third-party organizations.

Harmonizing with Environment and Society

We are conscious of the importance of environmental preservation as a common issue for all humankind and pledge to do our utmost to protect the environment in all aspects of our corporate operations. We obtained ISO 14001 certification, and all our employees are committed to the effective use of natural resources and energy, and also to reducing CO₂ emissions which are believed to cause global warming.

The consistent color point and bezel-less configuration of a single monitor serve to reduce eye fatigue for the radiologist while lowering the administrative and QA costs for the operator. With the unobstructed viewing space, applications can offer greater hanging protocol flexibility for richer comparisons between past and present images.

**Finest Details with Mono-Pixel Design**

Thanks to its unique Mono-Pixel design and a pixel pitch size of just 0.158 mm, the RadiForce GX1030 offers exceptionally high brightness levels and a wide aperture ratio to bring out the finest details with a smooth, clear representation.

**Bezel-Less Configuration for Enhanced Operability**

The consistent color point and bezel-less configuration of a single monitor serve to reduce eye fatigue for the radiologist while lowering the administrative and QA costs for the operator. With the unobstructed viewing space, applications can offer greater hanging protocol flexibility for richer comparisons between past and present images.

**Two Monitors in One**

With its 10 megapixel widescreen, the RadiForce GX1030 is an optimal replacement for traditional dual head 5 megapixel display installations. With the unobstructed viewing space, applications can offer greater hanging protocol flexibility for richer comparisons between past and present images.

**76 cm (30”) Monochrome LCD Monitor**

With its widescreen format, the RadiForce GX1030 is an optimal replacement for traditional dual head 5 megapixel display installations. With the unobstructed viewing space, applications can offer greater hanging protocol flexibility for richer comparisons between past and present images.

**Integrated Front Sensor for Ease of Mind**

The Integrated Front Sensor provides independent verification measurement of the brightness and grayscale tone at the front surface of panel. Located underneath the display bezel, the front sensor does not interfere with the viewing area and is protected from inadvertent damage or removal.

**Internal Test Pattern Generator for Expanded Image Quality**

The internal Test Pattern generator can be used to visually inspect image quality without attaching external hardware or installing QC software on the mammography workstation. This can be useful during the initial installation or on systems that prohibit users from installing software packages.
EIZO offers the same color and grayscale for two monitors bundled as a pair in one box.

15MSp viewer software needed for 15MSp display.

Sub-Pixel Drive (SPD) function is capable of displaying 2048 x 7680 super high resolution by controlling each sub-pixel separately. With a 15 mega sub-pixels (MSP), sufficient information volume of the original medical image will be displayed, making the monitor suitable for rendering the outline of a detailed digital mammography image more sharply.

With an anti-reflective coating panel used in a dark environment, there is no diffused reflection by the waffled surface, and the outline of the image is displayed more clearly. Therefore, subtle images such as calcification and masses will be displayed more sharply. Available with either an anti-reflective coating panel or anti-glare panel meet the needs of different reading environments.

Easy Calibration with Integrated Front Sensor
An Integrated Front Sensor housed within the front bezel performs calibration compliant to DICOM Part 14. The sensor does not interfere with the viewing area and is protected from inadvertent damage or removal.

Anti-Reflective Coating Panel
With an anti-reflective coating panel used in a dark environment, there is no diffused reflection by the waffled surface, and the outline of the image is displayed more clearly. Therefore, subtle images such as calcification and masses will be displayed more sharply. Available with either an anti-reflective coating panel or anti-glare panel meet the needs of different reading environments.

Backlight Saver
With ScreenManager Pro for Medical utility software installed, the Backlight Saver function turns off/on the monitor’s backlight in conjunction with the screen saver or the viewer application. This function helps to reduce power consumption when the monitor is used for a prolonged period of time.

Presence Sensor for Power Savings
The presence sensor feature unites convenience with savings by ensuring that the monitor conserves power when it is not in use. The presence sensor prompts the monitor to switch to power save mode when it detects the user is away from the monitor, and then resume normal operation when the user returns.

The capability of rendering 15 mega sub-pixels makes the RadiForce GX530 ideal for displaying digital mammography images. With high-end features like the Integrated Front Sensor for self-calibration and the integrated presence sensor for energy savings, the GX530 offers tomorrow’s technology today.
**Specifications**

**Quality Control of Digital Mammography Monitor**

**Monitor Quality Control Tool**

EIZO’s easy-to-use RadiCS quality control software and UX1 sensor (sold separately) enables precise calibration conforming to DICOM Part 14 and enables quality control complying with ACR Practice Guide and other QC standard for digital mammography monitors. GX530 will be supported in the version to be released in summer 2011 and GX530 in version 3.6.1.

**Centralized Management of All Monitors**

RadiNET Pro (sold separately) enables centralized management of calibration tasks, history data of multiple RadiCS clients via a network, and remote QC functions. GX530 will be supported in the version to be released in summer 2011 and GX530 in version 3.6.1.

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### Graphics Boards

<table>
<thead>
<tr>
<th>Graphics Board</th>
<th>XGA Pro</th>
<th>MID-V500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus Interface</td>
<td>CLS (PCI)</td>
<td>CLS (PCI)</td>
</tr>
<tr>
<td>Chassis</td>
<td>CompactPCI</td>
<td>CompactPCI</td>
</tr>
<tr>
<td>Output Terminal</td>
<td>12.5” (25.4 cm)</td>
<td>12.5” (25.4 cm)</td>
</tr>
<tr>
<td>Frame Rate</td>
<td>50 Hz</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>110 W</td>
<td>110 W</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>243.5 x 479.1 x 50.8 mm</td>
<td>243.5 x 479.1 x 50.8 mm</td>
</tr>
</tbody>
</table>

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### Monitor Cleaning Kit

- **ScreenCleaner**
  - Keep your screen free from dust and fingerprints with this screen cleaner kit. Includes pump spray and cloth. Compatible with GX530 only.

### Accessories

- **Dual Height Adjustable Stand**
- **Panel Protector**
  - Protect against scratches and dust with high light transmission panel. Compatible with GX530 only.

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### Model Variations

- **GX1030/CL**
  - Clear Base
- **GX1030/CL-BL**
  - Black Base
- **GX530/CL**
  - Clear Base
- **GX530/CL-BL**
  - Black Base
- **GX530/CLAR**
  - Clear Base with AR Coating (sold separately)

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### RadiWorkstation

**ESX-1054**

- **Ultra-High-Resolution**
  - Panoramic view width of approximately 360°
- **High-Bright**
  - Brightness of 1,200 cd/m²
- **Color Accuracy**
  - Wide color gamut of approximately 1,000,000:1

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### Output Terminal

- **DVI-I x 1, DisplayPort x 2**
- **2 GB**
- **74 W**
- **228.6 x 111.1 mm**

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### Power Requirements

- **Ac 100 - 120 V, 200 - 240 V: 50 / 60 Hz**
  - **140 W**
  - Less than 2 W

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### Input Terminals

- **DVI-D x 1, DisplayPort x 1**
- **120 W**
- **Less than 2.5 W**

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### Monitor Specifications

- **Panel Type**
  - TFT Monochrome LCD Panel (IPS)
- **Panel Size**
  - 76 cm / 30” (763 mm diagonal)
- **Display Size (H x V)**
  - 645.1 x 403.2 mm
- **Native Resolution**
  - 4096 x 2560
- **Viewing Angles (H, V)**
  - 170°, 170°
- **Brightness (Typical)**
  - 1,200 cd/m²
- **Contrast Ratio (Typical)**
  - 1200:1
- **Response Time (Typical)**
  - 12 ms (V, H)
- **Synchronizing Frequency (H, V)**
  - 31 - 135 kHz, 24 - 61 Hz
- **Dot Clock**
  - 265 MHz
- **Input Terminals**
  - DVI-I x 1 (dedicated 5MP connections for each side)
- **Frame Buffer Memory**
  - 384 MB
- **Graphics Boards**
  - PCI-Express x16
- **Bus Interface**
  - Standard Windows 7 / Vista / XP
- **Power Consumption**
  - 140 W
- **Net Weight (With Stand / Without Stand)**
  - 15.3 kg / 11.8 kg

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### CE Marking

- **CE (Medical Device Directive), EN60601-1, UL60601-1, CSA C22.2 No. 601-1, IEC 60601-1**
- **US FDA 510(k) for Mammography and General Radiography pending, RoHS, CCC, GOST-R**

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### Dimensions (Unit: mm)

- **GX1030**
  - 424 x 340 x 104 mm
  - 9.4 kg
- **GX530**
  - 496 x 315.5 x 90 mm
  - 9.7 kg

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### Technical Support

- **Please contact the EIZO subsidiary or distributor in your country for the latest information.**

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### Quality Control Standards of Digital Mammography Monitor

As with the use of film mammography, image quality testing of the monitor at installation and regularly during use should be carried out. This ensures that the monitor maintains a consistent display of quality digital mammography.

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### ACR “Practice Guideline for Determinants of Image Quality in Digital Mammography”

This guideline was formulated collaboratively by specialists in mammography and medical physicists who represent the American College of Radiology (ACR), the American Association of Physicists in Medicine (AAPM), and the Society for Imaging Informatics in Medicine (SIIM).

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### EUREF “European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis Fourth Edition”

This guideline was issued by the European Commission in cooperation with EUREF (European Reference Organisation for Quality Assured Breast Screening and Diagnostic Services), EBCN (European Breast Cancer Network), and EFSOMA (European Society of Mammology).

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### PAS 1054

“Requirements and Testing of Digital Mammographic X-ray Equipment” formulated by the German Institute for Standardization (DIN) in cooperation with the German Radiology Society (DRG) and others. This standard defines the details of the quality assurance obliged by the X-ray Ordinance as well as the QS-BL for general X-ray systems and DIN V 6868-57 for image display devices.
Eizo Nanao Corporation supports pink ribbon campaign for early detection of breast cancer.