EIZO®

Future Focused

Managing the quality of monitors used every day leads to the improvement of the quality of medical care itself.

Detecting changes in a monitor's display quality

and making the proper adjustments.

Efficiently managing the huge quantity of monitors throughout the hospital.

With filmless imaging spreading in the medical world,

there is a growing interest in maintaining the quality

of monitors displaying medical images.

With the know-how and experience as a specialist in monitor manufacturing,

we offer state-of-the-art solutions for the quality control of monitors

which will lead to the improvement of the quality of medical care itself.

Optimum Image, Same Image.

Controlling the Quality of Monitors

**Q1 Do all monitors have same quality ?
Does quality remain unchanged over time ?**

A1 Monitor quality is determined by brightness, grayscale and brightness uniformity characteristics which vary by monitor. Moreover, they change slowly over time.

Q2 What happens if the monitor quality differs or changes ?

A2 In a hospital where the images are displayed on different monitors for diagnosis or for past and present image comparison, differences or changes in monitor quality may lead to deterioration in the quality of medical care itself.

Q3 What can be done to maintain monitor quality ?

A3 Monitor quality control (QC) is required to detect the characteristic difference or the gradual changes and to take suitable steps for maintenance.

Q4 What's required to start utilizing monitor QC ?

A4 Software that can detect changes in monitor characteristics and perform the appropriate calibration when necessary.

Q5 Are there any standards for monitor QC ?

A5 Monitor QC assessment and judgment criteria have been standardized and put forward by organizations worldwide such as AAPM, DIN, JIRA, and IEC.

QC Standards

■ **AAPM On-line Report No.03** "Assessment of Display Performance for Medical Imaging Systems" formulated by Task Group (TG) 18 of American Association of Physicists in Medicine.

■ **ACR "Practice Guideline for Determinants of Image Quality in Digital Mammography"** This guideline was formulated collaboratively by specialists in mammography and medical physics 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).

■ **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 EUSOMA (European Society of Mastology).

■ **IEC 61223-2-5** "Evaluation and routine testing in medical imaging departments - Part 2-5 : Constancy tests - Image display devices" formulated by the International Electrotechnical Commission.

■ **IPEM Report 91** "Recommended Standards for the Routine Performance Testing of Diagnostic X-ray Imaging Systems" formulated by the Institute of Physics and Engineering in Medicine in the UK.

■ **DIN V 6868-57** "Image Quality Assurance in X-ray Diagnosis - Part 57 : Acceptance testing for image display devices" formulated by the German Institute for Standardization (Deutsches Institut für Normung e.V).

■ **QS-RL "Qualitätssicherungs-Richtlinie"** "Guideline for implementing quality assurance of the X-ray systems for diagnostic and medical treatment purposes according to chapters+C21 16 and 17 of the X-ray Ordinance". This defines the details of the quality assurance of general X-ray systems obliged by the X-ray Ordinance.

■ **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-RL for general X-ray systems and DIN V 6868-57 for image display devices.

■ **JESRA X-0093** "Quality Assurance (QA) Guideline for Medical Imaging Display Systems" formulated by Japan Industries Association of Radiological Systems (JIRA).

■ **Quality Control Manual for Digital Mammography** Quality control manual for digital mammography system written by NPO Central Committee for Quality Control of Mammography Screening. This NPO studies and manages quality control of mammography.
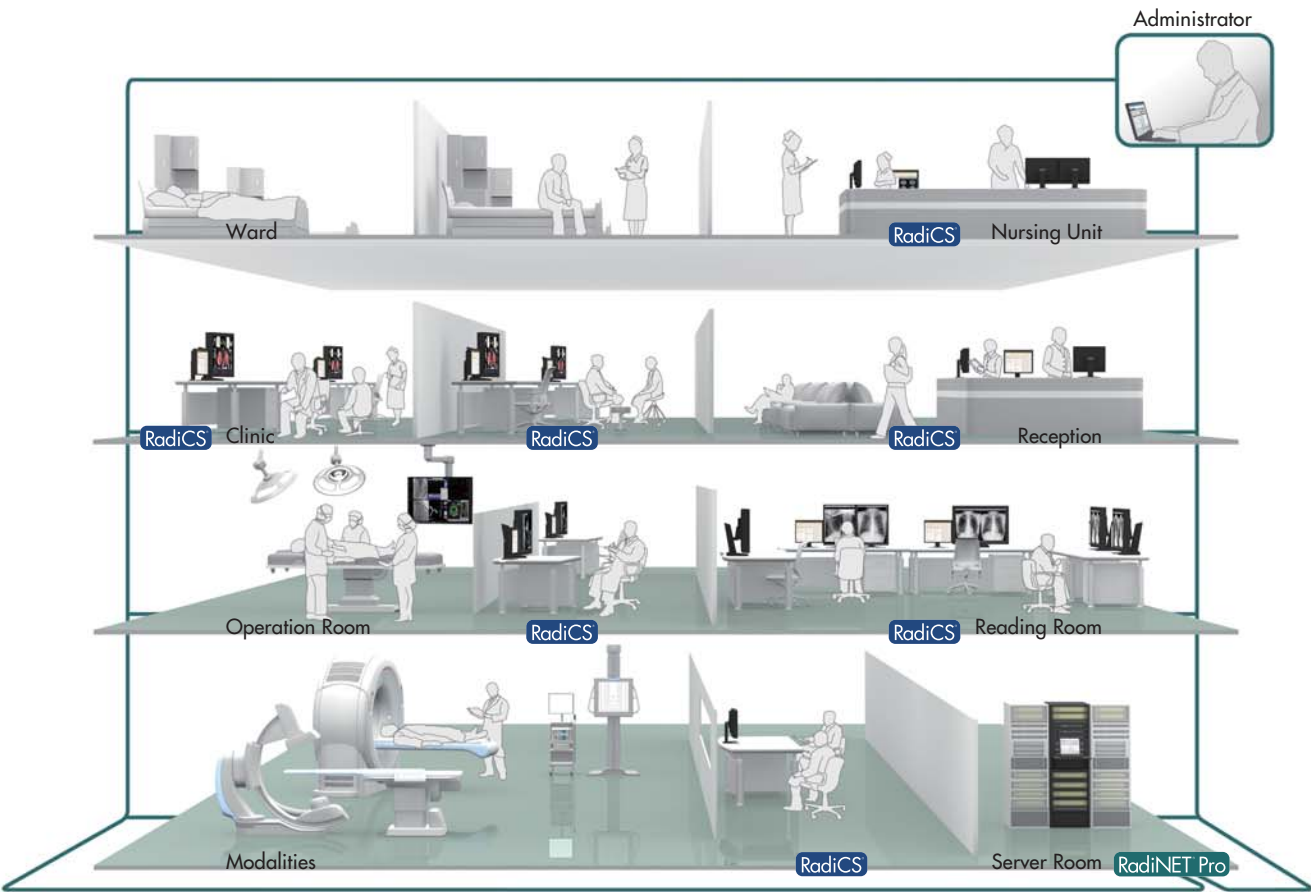
Optimum Quality Control (QC) for Hospitals

QC for Individual Monitors:

Knowledge and experience is necessary to quality control each monitor, from checking to calibration, according to established guidelines. EIZO can offer you solutions to perform high-end quality control with user-friendly software and sensors.

Client

Monitor Quality Control Software

RadiCS® + UX1 Sensor

Administrator

Ward

RadiCS Nursing Unit

RadiCS Clinic RadiCS RadiCS Reception

Operation Room RadiCS RadiCS Reading Room

Modalities RadiCS Server Room RadiNET Pro

QC Management for Large Amounts of Monitors:

Cost and labor is necessary to QC manage the large quantity of monitors throughout the hospital. EIZO can offer you solutions to perform efficient QC management using your intra-hospital network.

Administrator

Network QC Management Software

RadiNET® Pro + Server

Client

Useful Sensors:

Choice of sensors to lighten the workload of quality control management.

Built-In

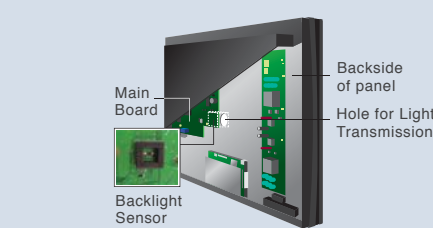**Smart 1 & 2** Integrated Front Sensor

Integrated Front Sensor (IFS) housed within the front bezel does not interfere with the screen even during its use.

Smart 5
Ambient Light Sensor

Smart 3 & 4
Presence Sensor

Backlight Sensor

Backside of panel

Main Board

Hole for Light Transmission

Backlight Sensor

Built-in backlight sensor inspects monitor quality by measuring the backlight brightness directly.

External

UX1 Sensor   **Clip-On Swing Sensor G2**

External sensor assures high-precision calibration.

Clip-on sensor attachable to the monitor bezel and appears on the display only during QC tasks.


Smart QC Solutions

Smart 1 Integrated Front Sensor for Easy QC Tasks

Without having to connect and disconnect, an IFS performs QC tasks such as testing and calibration and does not interfere with the screen.

Smart 2 Integrated Front Sensor for Intelligent QC

An IFS and RadiCS SelfQC function allows QC tasks to be performed by the monitor itself even when the connected workstation is switched off. This dramatically cuts monitor quality control workload and maintenance costs.
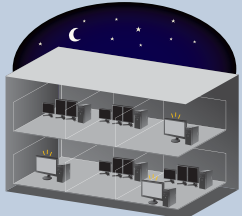
Smart 3 Presence Sensor for Smart QC Tasks

The presence sensor of the monitor or Clip-On Swing Sensor determines whether to start QC tasks automatically at scheduled times set by RadiCS. If the user is working, the QC task stays in stand-by mode, and when the user is away from the monitor the task is performed.

Smart 4 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.
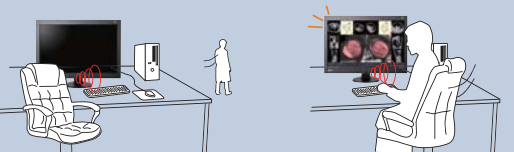
Smart 5 Ambient Light Sensor for Ideal Work Environment

Using the luminance detecting function, the ambient light sensor of the monitor or Clip-On Swing Sensor measures the illuminance in front of the monitor periodically. It will warn the user when the illuminance exceeds the preset illuminance level to maintain an ideal work environment.
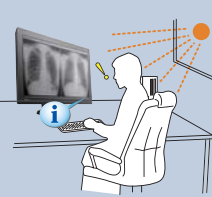
Quality Control Software

RadiCS®

RadiCS provides total support for the quality maintenance and control of client monitors, covering everything from calibration to acceptance and constancy tests, calibration asset, and historical management. Complying with AAPM, DIN, IEC and other standards, RadiCS enables precise QC with easy-to-follow procedures.

Improved User-Interface and Enhanced Operability

Graphical design and icons are arranged next to the text making it easy to comprehend the functions visually and intuitively. A compendium list also enables users to check the condition of monitors instantaneously. Furthermore, RadiCS simplifies operability such as gaining access to necessary information with just one click of a mouse.
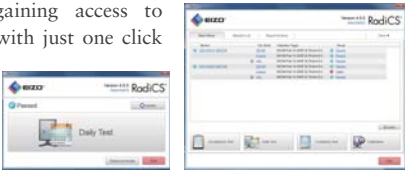
Acceptance and Constancy Testing in Easy Steps

RadiCS enables you to perform brightness, grayscale and uniformity checks that comply with AAPM TG18, DIN V 6868-57, and other QC standards.

Flexible Schedule Setting

The timing of when to perform QC tasks such as daily tests or constancy tests can be set according to the needs of your institute. For example, when turning the PC on or off, or just after a specific application is opened.

Warning Icon for Swift QC

A warning icon appears on the desktop taskbar when the monitor fails a QC check such as a constancy test. This enables prompt detection and correction of the monitor quality.
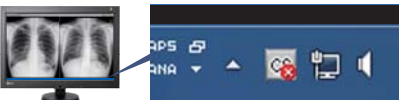
DICOM Part 14 Calibration

The built-in backlight sensor enables simplified calibration compliant with the DICOM Part 14 standard to correct the grayscale tones and brightness of the monitor. Furthermore, the use of an Integrated Front Sensor or bundled UX1 Sensor enables higher calibration performance.

Integrated Front Sensor
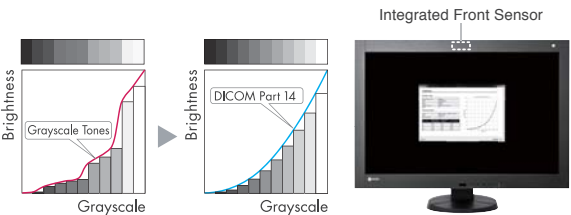
Historical Management and Report Generator

Calibration, acceptance and constancy test results are stored as history. Using this history data, you can easily create reports compliant with QC guidelines.
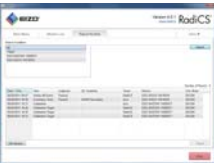
Continuous Asset Management

Asset management numbers for monitors, PCs, and graphics boards as well as installation location and medical institution names can be registered along with the monitor usage time. This supports continuous management of the IT properties within the facility.

Intelligent Hands-Off Check

Using a built-in backlight sensor, the hands-off check function determines whether the brightness of the monitor is within the appropriate range. This automatic brightness change detection reassures the continuous use of the monitor.

Backside of panel

Main Board

Backlight Sensor

Hole for Light Transmission
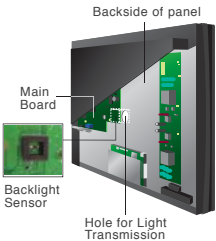
### Backlight Meter for Remaining Time Estimate

The backlight meter function detects the condition of the monitor backlight and estimates the remaining time that the monitor can maintain the factory-set brightness. This helps in planning when the monitor should be replaced.
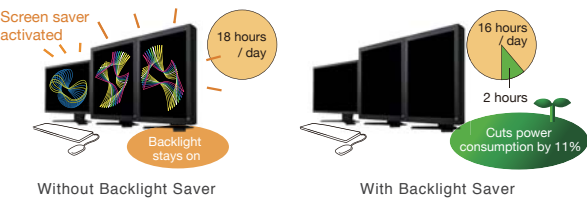
Distinct QC for All Modes

RadiForce monitors with a CAL Switch function have display modes for different types of images such as CR and endoscopy. RadiCS enables you to perform testing and calibration of each display mode.

[RX430 Usage Example]

RX430

| CR Mode | ES Mode | MRI Mode |
| RX430 ❶ | RX430 ❷ | RX430 ❷ |
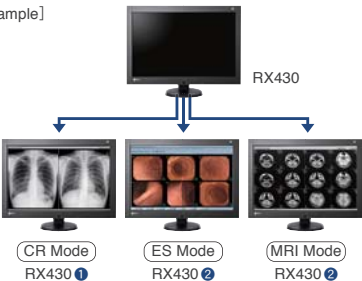
### Low-Power-Consumption with Backlight Saver

The Backlight Saver function turns off and on the monitor's backlight in accordance with the activation of screen saver/desktop, or with the starting /closing of an application such as a DICOM viewer. This function helps to reduce power consumption and promotes the reliable and stable use of the monitor.

Screen saver activated

18 hours / day

Backlight stays on

16 hours / day

2 hours

Cuts power consumption by 11%

Without Backlight Saver   With Backlight Saver

Compatible with Non-RadiForce Monitors

RadiCS enables you to perform acceptance and constancy test and calibration on non-RadiForce monitors such as EIZO FlexScan LCD monitors.

RadiCS Client License must be purchased when using RadiCS with other commercially available monitors.
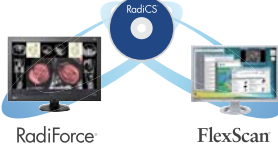
RadiForce   FlexScan

Network QC Management Software

[For Small & Medium Sized Hospitals]

RadiNET® Pro Starter Edition

[For Large Sized Hospitals]

RadiNET® Pro

[Network QC Management Server Providing]

RadiNET® Pro Web Hosting

RadiNET Pro enables unified QC management of multiple monitors used in Picture, Archive and Communications Systems (PACS), Hospital Information Systems (HIS) and Radiology Information Management Systems (RIS) in a hospital. As well as reducing the workload of monitor administrators and maintenance service managers, this dramatically cuts monitor quality support and maintenance costs.

Centralized Management of up to 8,000 Monitors

RadiNET Pro enables centralized management of all the client PC monitors with RadiCS software installed via an intra-hospital network. Up to 8,000 monochrome or color monitors connected to 1,000 client PCs covering everything from QC history reference to setting changes.

RadiNET Pro Starter Edition can manage up to 20 monitors. 10 Monitor Access License must be purchased for every 10 additional monitors.

Worry-Free Web Hosting

Instead of installing and setting up your own network QC management server in your hospital, EIZO will host the server for you. RadiNET Pro Web Hosting will free you from concern for initial investment and running cost. EIZO provides expert maintenance services for server operation which will give you reassurance you need for monitor QC.
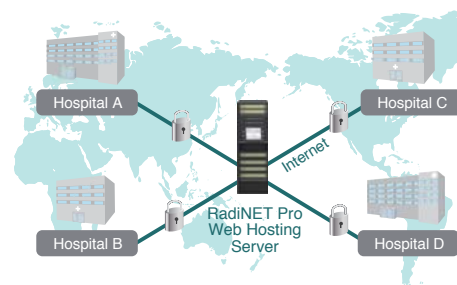
Easy-to-Use Web-Based Application

This simple web-based application offers easy access to desired information. The administrator may conduct monitor QC operations from anywhere in the hospital smoothly and promptly. The user interface incorporates a tree view which makes it easy to visually capture the structure of all controlling monitors. It also supports various resolutions which increase the flexibility of the layout.
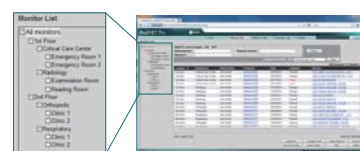
To-Do List and Alert Mail for Immediate Maintenance

The monitor will be added to the administrators to-do list when there is a change in the monitor's quality condition. An alert message can also be sent automatically to the administrator's specified mail address to enable immediate maintenance.
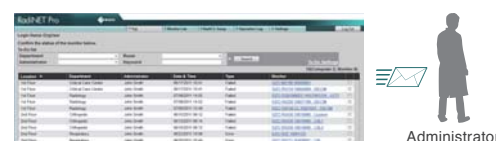
Save Time with Remote Calibration

QC tasks such as testing and calibration using the Integrated Front Sensor or swing sensor can be performed remotely. This dramatically reduces the time and effort of the users and administrators required for calibration of the monitors.
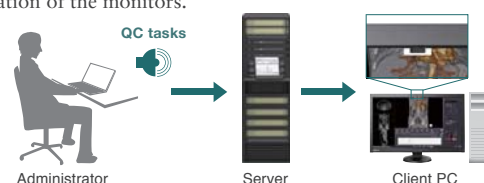
One Time Remote Setting

Settings for monitor calibration, acceptance and constancy testing, scheduling and asset management can be performed remotely. Furthermore, setting for one monitor can also be transmitted to other monitors by remote control (identical models only).
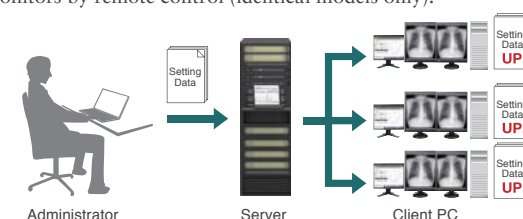
Collective Report Generator

Results of acceptance and constancy tests and calibration history, along with all the monitor data can be created in reports or printouts. For extra convenience, collective reports of multiple monitors can also be generated as one report and printed out.

Remaining Time List for Forecast Reference

Remaining time of the monitor estimated by the RadiCS's backlight meter function can be collected and listed in "Monitor List" window. Predicting the time of monitor replacement is helpful for the administrator to plan for capital investments.
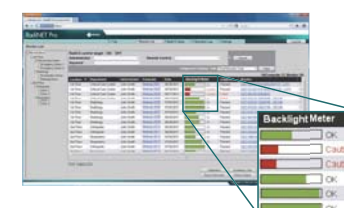
Remote Upgrade of RadiCS Software

The bundled RadiCS Network Upgrade Software enables hospital-wide upgrading of all client PC RadiCS versions remotely and efficiently.
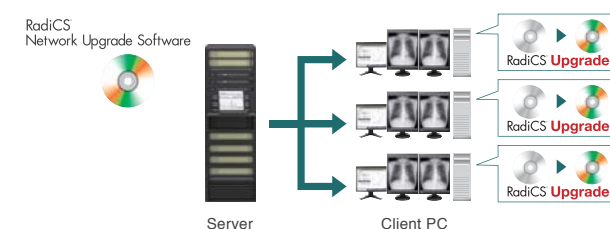
CSV File Output

You can output the monitor information and QC history data as Comma Separated Values (CSV) file format. This enables you to modify the data into various applications which can be used for administration surveys or reports.

Security Assurance

All the RadiNET Pro access information and client monitor setting history will be listed on a log window. This allows for the monitoring of non-authorized users as a security measure.

Compatible with Non-RadiForce Monitors

Unified management of non-RadiForce monitors such as EIZO FlexScan LCD monitors offers comprehensive QC management throughout the hospital.
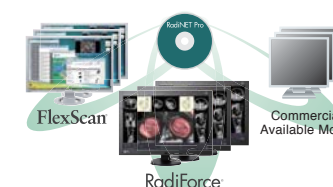
For Small & Medium Sized Hospitals

| 20 monitors maximum |

Client

Quality Control Software & Sensor

RadiCS + UX1 Sensor

Client

Optional Sensor

Clip-On Swing Sensor G2

Administrator

Network QC Management Software

RadiNET Pro Starter Edition

Administrator

Optional License

10 Monitor Access License

Needs to be purchased
for every 10 additional monitors.

For Large Sized Hospitals

| 8,000 monitors maximum |

Client

Quality Control Software & Sensor

RadiCS + UX1 Sensor

Client

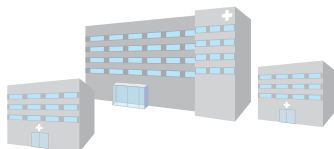**Optional Sensor**

Clip-On Swing Sensor G2

Administrator

Network QC Management Software

RadiNET Pro

Worry-Free Web Hosting

Client

Quality Control Software & Sensor

RadiCS + UX1 Sensor

Client

Optional Sensor

Clip-On Swing Sensor G2

Administrator

Network QC Management Server Providing

RadiNET Pro Web Hosting

RadiCS UX1
Monitor Quality Control Tool

Compatible Monitors	RadiForce Monitors ※
Compatible Operating Systems	Windows 7 / SP1 Windows Vista SP2 Windows XP Professional x64 Edition SP2 Windows XP Professional SP2 / SP3 CentOS 5.3
Display Functions	DICOM Part 14 GSDF, CIE, Exponential (gamma value), Log Linear, Linear, User definition
Interface	USB, RS232C, DDC
Languages	English, German, Japanese
Package Contents	RadiCS CD-ROM (RadiCS, User's Manual), UX1 Sensor

RadiNET Pro Starter Edition
Network QC Management Software
[For Small & Medium Sized Hospitals]

RadiNET Pro
Network QC Management Software
[For Large Sized Hospitals]

Manageable Number of PCs / Monitors	RadiNET Pro Starter Edition: 20 Monitors Maximum RadiNET Pro: 1,000 PCs / 8,000 Monitors Maximum
Administrator PC Browser	Microsoft Windows Internet Explorer 9.0, 8.0, Mozilla Firefox 5.0
Administrator PC Resolution	1280 x 1024 Minimum
Server PC Operating Systems	Windows Server 2008 R2 Standard Edition SP1 Windows Server 2008 Standard Edition SP2 Windows Server 2003 R2 Standard Edition SP2 Windows Server 2003 Standard Edition SP2
Server PC Database	SQL Server 2008 R2 Workgroup Edition SQL Server 2008 R2 Standard Edition SQL Server 2008 R2 Express Edition SQL Server 2008 Workgroup Edition SP2 SQL Server 2008 Standard Edition SP2 SQL Server 2008 Express Edition SP2 SQL Server 2005 Workgroup Edition SP3 / SP4 SQL Server 2005 Standard Edition SP3 / SP4 SQL Server 2005 Express Edition SP3 / SP4
Server PC Hard Disk Drive	100 GB Minimum
Server PC Memory	2 GB Minimum
Languages	English, German, Japanese

UX1 Sensor

Compatible Monitors	RadiForce Monitor ※
Interface	USB
Dimensions (ø x H)	Ø 68.58 x 40.64 mm
Weight	140 g

Clip-On Swing Sensor G2

Compatible Monitors	RadiForce Monitor (Built-In Swing Sensor models not included) ※
Compatible Software	RadiCS version 3.4.0 or later
Dimensions (W x H x D)	117 x 28.5 x 96 mm
Weight	160 g

RadiCS Version UP KIT

A software for major version up of RadiCS.

RadiCS Client License

A license to use RadiCS with other commercially available monitors.

10 Monitor Access License
for RadiNET Pro Starter Edition

Monitor Access License must be purchased for every 10 additional monitors when using RadiNET Pro Starter Edition.

Please check radiforce.com website for compatibility.