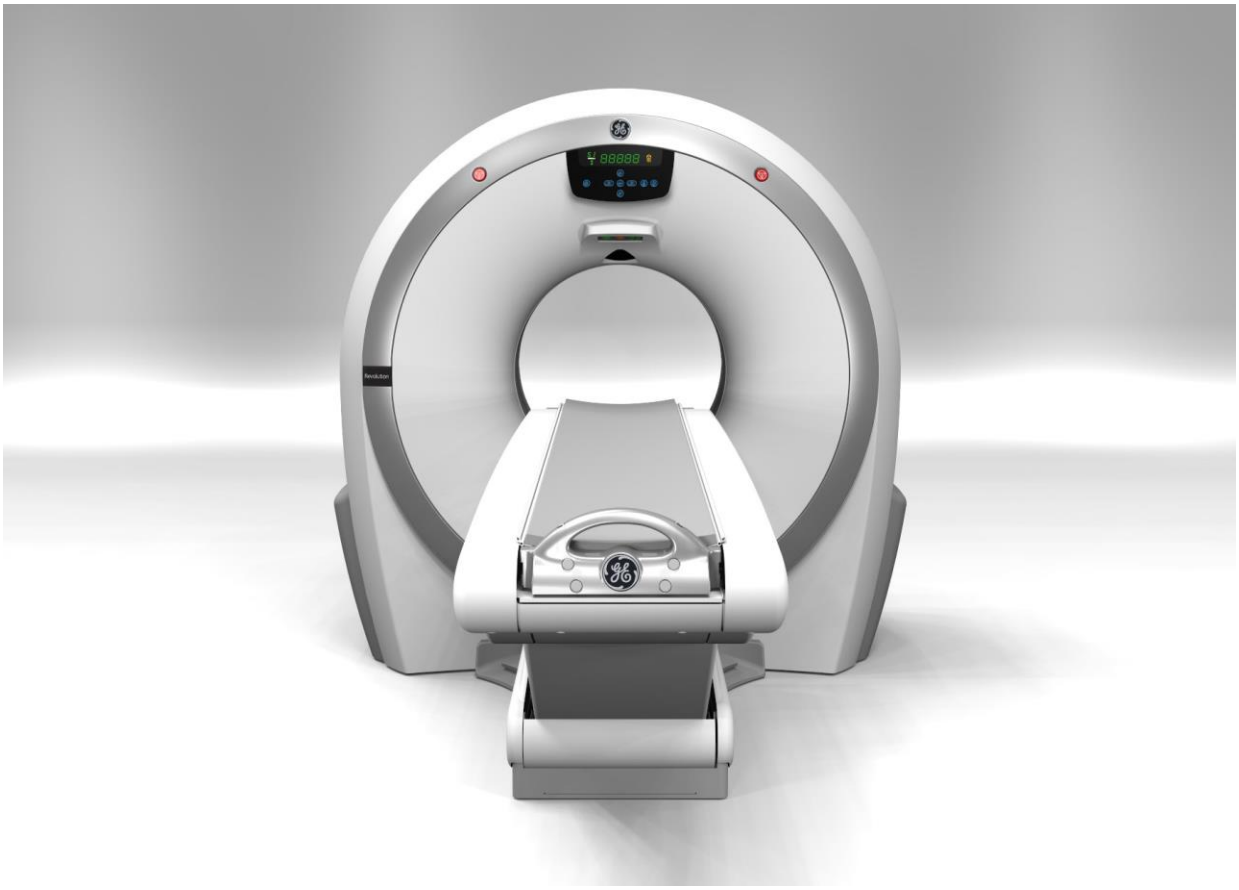
GE Healthcare

Revolution™ ACT

Product Data Sheet



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A new Revolution in affordable care

Your Aspirations. Realized.

Millions of patients around the world are still waiting to receive the standard of care they need and in an affordable way. Healthcare providers are seeking better technology to help more patients and drive better outcomes.

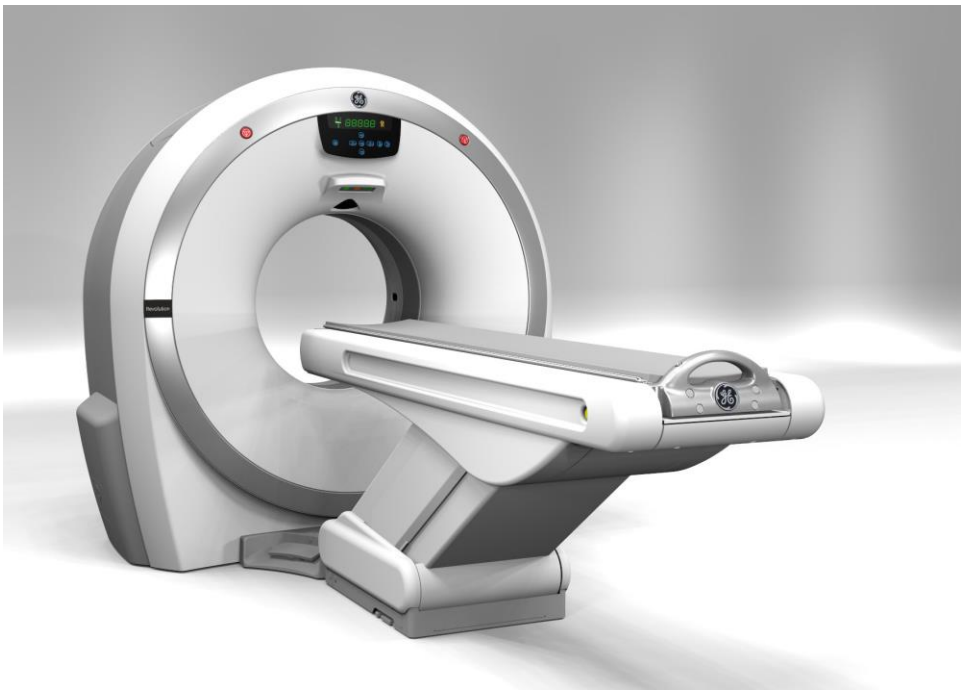
Simple and fast, CT is arguably the most valuable diagnostic imaging tool in healthcare. Yet its capacity to improve patient care is far from tapped.

All revolutions start somewhere. Our revolution began with the Revolution CT system — designed from the ground up for pioneering the future of CT. Now we introduce Revolution ACT.

Revolution ACT is designed not only as a product, but as a solution to help you provide better patient care — and provide it to more patients. It's the centerpiece of our commitment to help you achieve your CT services aims.

You'll find many of the technologies inherited from our most advanced Revolution CT system – like the new Clarity panel detector, new user interface, or Organ Dose Modulation.
Helping you feel more confident about moving to the next level, clinically and economically — that's intelligent innovation.

Revolution ACT: It's exactly what's needed to help you achieve success. And exactly what you'd expect from GE.



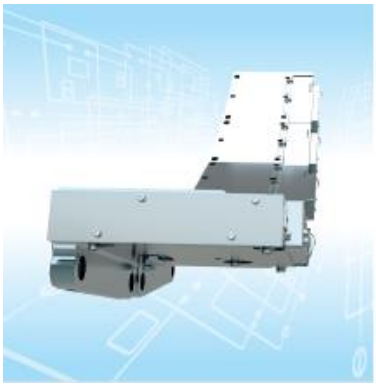
New Clarity panel detector

The new Clarity panel detector is yet another innovation in GE's long history of advancements in CT going back to 1976. To clinicians and patients, this technology is the center piece of our commitment to continuously provide higher image quality. Revolution ACT innovative detector technology is designed to provide long term protection of your investment while delivering clinical capability and economic returns today.

Clarity panel detector inherits many elements our premium Revolution CT product including the integrated detector design and data processing chipsets. The new detector design leverages the latest advancement in the semi-conductor and electronics industries making it compact, better integrated and more efficient.

Highly innovative segmented panel designs built with advanced packaging and miniaturization technology for lower power consumption and improved thermal performance. Since thermal control is localized on the integrated panel, the detector achieves better precision in performance and reduces the detector startup time.

The higher density of interconnects and modern A/D chips deliver better* signal linearity with fast response time. An integrated DAS on Detector or DoD design, the analog signal transmission length from Detector to DAS is cut to a virtual zero reducing noise by up to 20% and improving image quality*.



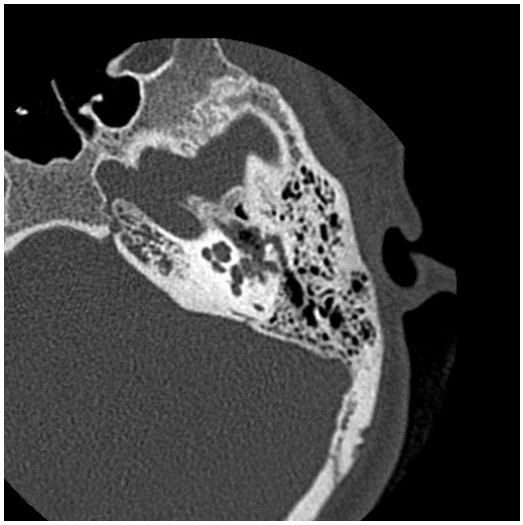
*Compared to traditional GE 16-slice CT scanners

Advanced Acquisition*

A higher sampling density provides better representation of the original signal and can potentially lead to improved image quality and fidelity. The term “conjugate samples” refers to two projection samples that are 180º apart in their respective projection angle, but at an equal distance to the iso-center. Taking both sets of projection measurements into consideration, we obtain a significantly increased sampling density and, therefore, potentially improve the overall acquisition. Using GE’s novel conjugate cone beam reconstruction algorithm, the conjugated rows of projections are considered jointly in the back projection step and delivers improved Z-axis visualization performance. Conjugate cone-beam acquisition enables 32-slice imaging on Revolution ACT.

*Option

Ultra Kernel



Adaptive Enhance Level Adjustment (AELA) can improve visual spatial resolution while maintaining pixel noise standard deviation and artifact. This kernel maybe helpful in enhancing the visualization of small anatomical structures with high contrast.

Combine with sub-millimeter slice thickness acquisition, Revolution ACT allows imaging at higher spatial resolution and greater detail of small anatomical structures.

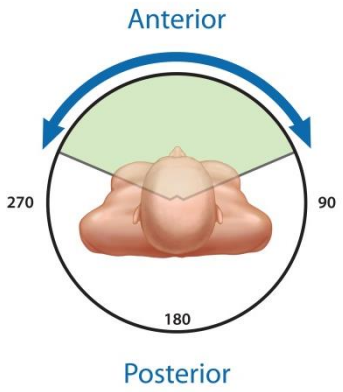
Smart Dose with ASiR™ *

Noise and artifacts stood in the way of producing high-quality CT images in low-dose exams that reduce risk to patients. Advanced image reconstruction techniques provide the breakthrough, enabling high image quality in multi-slice CT exams at significantly less dose than before. ASiR uses sophisticated statistical modeling to remove noise in images while preserving anatomical detail. This enables a same- or better-quality image to be produced with lower tube current or tube voltage, thus lower dose, for all CT applications in which it is used. ASiR is one of the key dose reduction technologies flowing down from our premium product line. ASiR is the most-used dose-lowering software in the industry. It allows healthcare providers to lower dose by up to 40% to their patients as compared to standard image reconstruction without reducing imaging quality. ASiR also improves low-contrast detectability and can have equivalent IQ to an acquisition with 1.67 times the mA.

Operators can manage longer coverage scans easier. The maximum tube power and current of ASiR allows achieving the same image quality at a lower mA with less tube heat output, which enables the tube for longer duration under helical scan. Revolution ACT performance will be equivalent to 40KW and 333mA (@120kV, 3.3MHu tube heat capacity equivalence with ASiR). This improved efficiency helps lower power consumption and operational costs to the administrators.

*Option

Smart Dose: Organ Dose Modulation (ODM)*



Organ Dose Modulation (ODM) is a scan mode that was developed to reduce dose via x-ray tube current modulation for superficial tissues such as breasts, eyes, gonads etc. ODM was developed to provide the dose reduction goal of a shield material without the negative effects it may have on imaging performance. ODM not only reduces the dose to the sensitive organ by up to 40% but also optimizes the overall dose while maintaining the noise index (NI) value selected by the user.

Smart Dose: Advanced Noise Reduction Tech. (ANRT)

ANRT Is a reconstruction technology used to reduce the noise of diagnostic images and retain detailed information of the image structure. ANRT noise-reduction technology can, while maintaining image noise level, lessen the dose of some X-ray testing, or improve image noise level and image quality. ANRT is only applicable on digital oblique images.

Smart Dose: Volumetric image Space Recon (ViSR)*

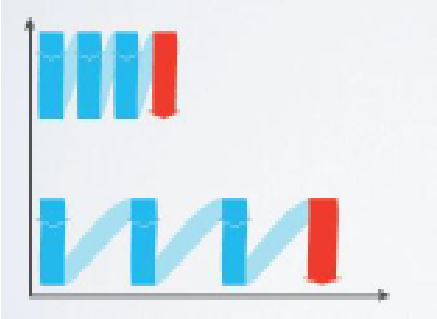
Volumetric Image Space Reconstruction (ViSR) helps reduce artifacts and noise without compromising resolution. It contains an adaptive filter that is designed in the projection space with the filter parameters dynamically adjusted to adapt to the local noise characteristics such that the amount of smoothing operation is based on the x-ray flux level at each projection channel. By selectively smoothing only the channels that contribute to the excessive noise and streaking artifacts, and by varying the degree of smoothing based on the noise level of the signal, the objectives of simultaneously reducing the streaking artifacts in the images and preserving the spatial resolution of the system are achieved. This advanced filter helps manage photon starvation resulting either from large-size patients as well as wide or dense anatomical objects such as shoulders and pelvis.

An intelligent filter that assesses homogeneity and connectedness of objects within an image is employed to achieve noise reduction. In anatomical regions such as the brain, this 3D filter reduces noise without compromising resolution, for clear visualization of brain, tumor, and pediatric cases. With ViSR the scanner delivers up to 20% image quality improvement at the same dose, or the same image quality with up to 36% dose reduction[1].

1. In clinical practice, the use of VISR may reduce CT patient dose depending on the clinical task, patient size, anatomical location and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task
2. When ASiR is installed, 3D Neuro Filter would be disabled

*Option

Smart Flow: pitch booster with IQ Enhance



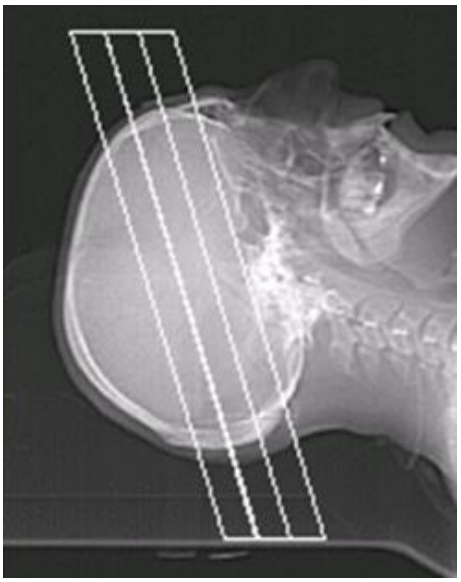
IQ Enhance is an advanced algorithm to reduce helical artifact in thin-slice helical scanning. The Revolution ACT scanner with this feature can accelerate its helical pitch up to 3.0x when acquiring the same helical artifact level compared with the same scanner with IQ Enhance disabled.

Use of IQ enhance (IQE) along with sub-second rotation speed allows faster pitch scanning covering more anatomy at similar image quality.

Smart Flow: new user interface

Smart Flow with new user interface: the workflow and user interface have been completely redesigned with continuous feedback from a cross section of technologists and radiologists to make it easy-to-learn and use. The workflow features a modern look and feel that is inspired by our Revolution CT product. Many steps of the user experience have been reworked right from patient entry, to protocol selection, to monitoring and processing the patient scan. Smart new features include a simple and advanced mode – where users can switch between the modes at the click of a button.

Smart Flow: volume helical digital tilt



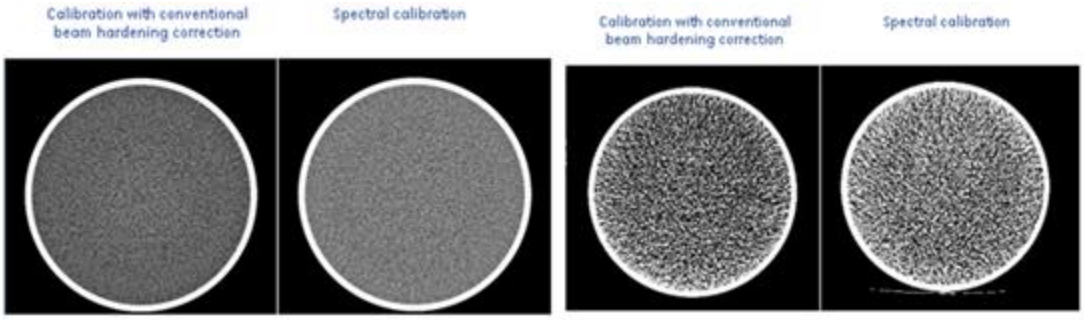
Volume helical digital tilt is an innovation in image reconstruction technology that allows clinicians to reconstruct tilted views of up to 30 degrees without the need for physically tilting the scanner. Digital tilt uses a novel resampling technology within the reconstruction pipeline to map vertical data samples to user specified tilted view angle.

Digital tilt exams are more efficient since operators can setup the entire workflow from their console without the need for multiple trips between console and gantry controller.

With a volume helical acquisition, clinicians have the additional advantage of leveraging powerful post processing and visualization tools for creating volume rendering, multiplanar reformatting (MPR), and curved MPR views as needed.

Smart Flow: spectral calibration

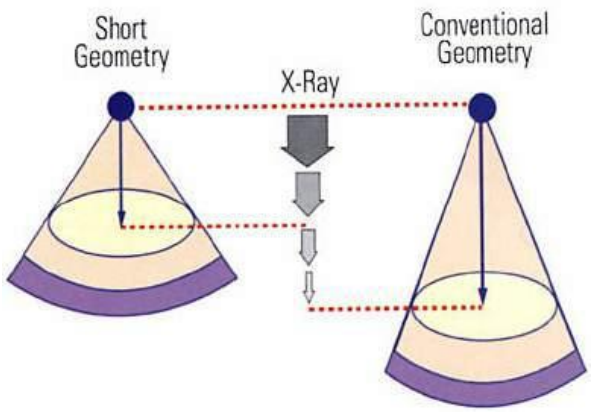
Spectral calibration calculates the beam hardening vectors based on a theoretical model of x-ray attenuation through beam-path and the data from scanning a 20 cm water phantom. Applying the result from spectral calibration in reconstruction, the uniformity of the CT numbers in image, especially the off-center image, is improved compared with the conventional beam hardening correction method.



Gantry specifications	
Aperture	65 cm
Maximum SFOV	43 cm
Focal spot to detector distance	94.9 ± 0.1 cm
Tilt	± 30 degrees (digital)
Rotation Speed	0.6*, 0.98, 1.0, 1.2, 1.5, 2.0, 3.0, 4.0 seconds
Laser Alignment	Internal & external with ± 1 mm accuracy

* Partial Scan, 0.6 second equivalent rotation speed in Segmented CINE mode.

The "short geometry design" improves geometry efficiency compared to conventional long geometry system. For example, Revolution ACT distance from focal spot to detector is 94.9 cm. The geometric efficiency of Revolution ACT is approximately 26% higher than that of a long geometry scanner. This means that the effective generator power output of Revolution ACT is equivalent to a 32 kW generator.



Tube	
Anode Heat Storage	2.0 MHU and 3.3MHU equivalent with ASiR
Anode Heat Dissipation (max)	6200W (500 kHU/min)
Focal Spot	0.8 mm (W) x 0.6 mm (L) Nominal focal spot size (IEC 60336:2005)
Tube Current (max)	200 mA and 333mA equivalent with ASiR

Power generation	
Generator	NEW Compact Generator
Maximum Power	24 kW and 40kW equivalent with ASiR
kV Modes	80 / 100 / 120 / 140
x-ray Current (max)	200 mA and 333mA equivalent with ASiR

The tube contains a well-tested, high-heat transfer technology to manage throughput. Special treatment of the inner glass envelope and a space-age coating on the graphite target improve high voltage stability for consistent techniques.

Scan Watch streamlines patient scan workflow to reduce the patient waiting time. It displays the tube usage percentage on host UI so that the operator can know the current tube usage status before setting up a new exam.

Patient table	
Vertical Scannable Range	700mm- 900mm
Maximum Horizontal Range	1520 mm
Maximum Vertical Range	441mm-900mm
Maximum Scan Range	1350 mm (with extender)
Movement Speed	0.5 mm/sec to 100 mm/sec
Loading Capacity	180 kg (400 lb)
Positioning Accuracy	0.25 mm

Convenient controls on the gantry for cradle movement and patient positioning. Optimized table dimensions designed to accommodate large variety of patients. Latch free control is provided and readily accessible on the table for emergency release. Vertical movement of the table enables optimal patient position and convenient loading and unloading.

Imaging system	
Detector	New Clarity panel detector HiLight™ scintillator with DAS on detector (DoD)
Slices per rotation	Up to 32-slice*
Slice Thickness	0.625 mm* – 10.0 mm
Reconstruction Frame Rate	Up to 22*
Maximum helical pitch	1.75:1
Scan Field of View (SFOV)	Pediatric, Adult Head, Small Body, Large Body

*Option

Integrated console computer	
CPU	Intel Xeon E5 Series CPU
Maximum Internal Memory	16GB
Disk Storage Capacity	1 TB
Display Monitor	21.5" color LCD monitor
Highest resolution	1920 x 1080
Display GPU	AMD FirePro Series Graphics Card
Reconstruction GPU	*AMD FirePro Series Graphics Card

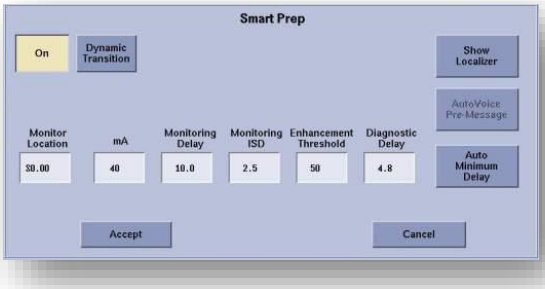
*Option

Emergency patient mode

Revolution ACT has a dedicated user interface (UI) for emergency cases to start the examination quickly. Patient name and patient ID are assigned automatically. Once a protocol is selected, scan setup interface displays.

SmartPrep

SmartPrep allows intermittent monitoring of IV contrast enhancement in an area of interest. The contrast flow is monitored by low-dose scans until the contrast enhancement reaches the preferred point and then auto trigger function will automatically initiate the scan prescription

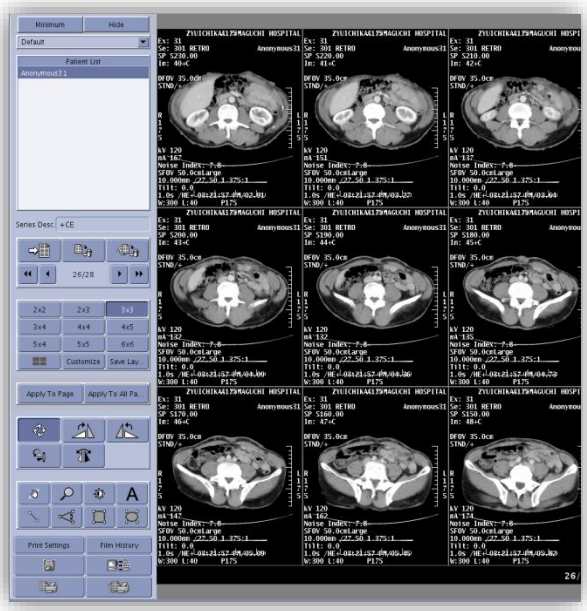


Dynamic Transition

With SmartPrep procedure, Dynamic Transition allows the scan phase to start automatically when the Hounsfield unit (HU) of the transition region-of-interest (ROI) reaches the desired enhancement threshold.

Enhanced filming workflow

The new filming tool provides you a friendly and powerful user interface. It allows you to open multiple sessions at the same time for one or more patients; you could set up multiple films in parallel.



In the enhanced filming tool, besides the fixed layout 1:1, 2:1, 4:1, 6:1, 8:1, 9:1, 12:1, 15:1, 8:1, 20:1, 24:1, 25:1, 30:1, 35:1 and 42:1, clinicians could also choose to create your own customized layout to match your specific needs. And it also allows editing of the annotations on the image.

Real-time scout

Scout image can be displayed simultaneously with the acquisition. With the real-time scout image display, you can decide to stop scout acquisition once the necessary anatomy is covered.

Connect Pro

Connect Pro assists easy retrieval of patient critical information from HIS/RIS using DICOM connection (and then sends this information to patient schedule). HIS/RIS & PACS requires ConnectPro

10 PMR

Prospective multiple reconstruction (PMR): Up to 10 sets of reconstructions can be pre-programmed as part of the scan protocol prior to acquisition. The operator can select different start/end location, slice thickness, interval, reconstruction algorithms and display fields of view for each reconstruction.

Up to 10 IPS transfer speed of images real-time during acquisition to up to 4 different destinations

AutoTransfer
AutoTransfer by series to distribute images where you need them when you need them.

User interface
The Revolution ACT operator console utilizes a computer workstation with the following user interface features:

One 21.5" wide screen LCD monitor
Wide screen display with a new user interface allows efficient control of scan workflow and imaging workflow.

Monitor provides a 1920 x 1080 high resolution, flicker-free display.

New compact scan control box design to fit efficiently on your desktop with intercom speaker, microphone and volume controls.

Three button mouse with mouse pad.

The user interface is designed using design elements from Revolution CT for a modern look and feel.

Desktop overview
The user interface utilizes the paradigm of managed work environments for a more intuitive clinical workflow.

Virtually all clinical operations are managed through two "virtual desktops" or applications managers: Exam Rx, ImageWorks. Operators can effortlessly move back and forth between these environments simply by clicking on an icon.

Exam Rx
The Exam Rx desktop environment provides the clinical tools necessary for comfortable, efficient control of patient studies.

These tools include patient scheduling and data entry, exam protocol selection, protocol viewing and editing, scan data acquisition, image reconstruction, image display and routine analysis, manual filming, AutoStore and AutoTransfer.

Patient scheduling
Patient demographics and exam protocols can be pre-programmed in advance of patient arrival by selecting Schedule Patient from the scan/recon monitor. This productivity enhancement allows entry of all or some of a patient's demographic data, as well as pre-selection of the exam protocol.

This feature is available any time a patient exam is not currently underway.

Patient data entry
Patient data can be entered as part of New Patient set-up, or can be recalled from the list of pre-scheduled patients.

Presets for referring physician, radiologist and operator can be saved on the system reducing data entry required by the user.

Trauma patient ID allows patient scans and image display/analysis without entering patient data before scanning.
Based on site preference, essential and optional patient information is easily managed at the click of a button for higher efficiency.

Exam protocol selection
One of the main contributions of the Revolution ACT scanner to department productivity is its streamlined exam set-up. Exam parameter set-up has been streamlined through the use of protocols.

Protocols can be easily selected in one of three convenient ways:

- A large, graphical Anatomical Programmer located on the New Patient screen.
- A default list of the "top 10" most commonly used protocols located near the anatomical programmer.
- A numerical entry.

Protocol view/edit
A single, full screen View/Edit table allows fast and easy examination and modification of exam parameters before scanning begins.
Exam parameters can be changed for just one scan, or for all scans in a series.

Scan data acquisition
Full-screen DynaPlan Plus illustrates scan status graphically, with real-time feedback while the exam is underway. Scans, programmed delays (prep, breathing, inter-group), and even AutoVoice announcements are clearly shown before and during scanning.

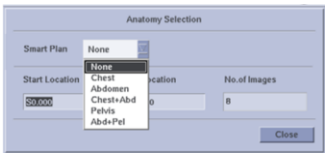
AutoVoice: 3 pre-recorded voices are available in English & other languages to automatically deliver patient breathing instructions with a programmable delay; especially useful for multiple helical scanning and SmartPrep.

Full simultaneity allows scan and recon to work concurrently with image display, processing and analysis (including computationally intensive features such as MPR, MPVR and 3D/MIP) while still running image archival, filming and networking processes.

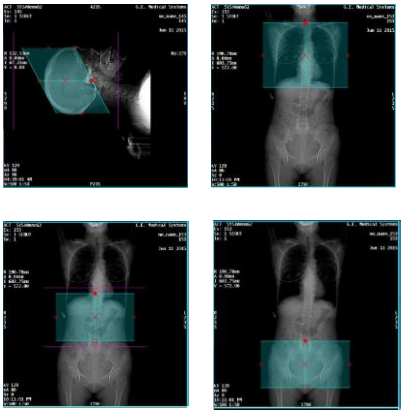
SmartPlan

SmartPlan is proposed to provide a way to assist users to set localizer more efficiently. SmartPlan provides the initial localizer based on different anatomy parts including Head, Chest, Abdomen, and Pelvis. User reviews the results and decides if the parameters need be adjusted.

SmartPlan feature could be enabled through protocol management.



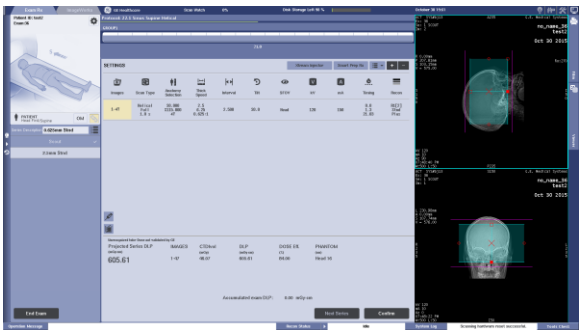
After acquiring the scout image, entering to next series (Axial/helical/cine) which SmartPlan is enabled in protocol management, SmartPlan is triggered and modifying the initial localizer for the Axial series.



Dose computation & display

Volume CTDIw (CTDIvol), DLP (dose length product), and Dose Efficiency computation and display during scan prescription provide patient dose information to the operator.

All essential dose information is now conveniently and clearly displayed in a dedicated section of the screen.



Auto image management

The Exam Rx work environment conveniently provides for selection of AutoStore (to remote, such as PACS), and AutoTransfer (across a network). Auto Transfer capability can be specified by Image, Series or Exam.

ImageWorks

ImageWorks software is designed to take advantage of the Revolution ACT CT scanner's computer and image processor. This desktop environment includes image management and networking.

Because some of the image analysis and display features of ImageWorks replicate those in Exam Rx, the next section describes only features that are incremental or significantly different.

Image access

Point and click interface along with a pictorial directory (browser) allows for easy selection by exam, series or image

Routine image display

Image display features provided within Exam Rx:
Zoom/Roam
Explicit Magnify
Flip/Rotate
ProView
Display Normal
List/Select

Ellipse ROI
Measure Distance
Grid On/Off
Cross Reference
User Annotation
Exam/Series Page
Hide Graphics
Erase
Screen Save
Gray Scale Enhancement

Routine measurements

Image measurement features provided within Exam Rx:
Box ROI
Ellipse ROI
Trace ROI
Measure Distance
Measure Angle
Grid On/Off
Hide Graphics
Erase
Screen Save
MIROI (Multiple Image ROI)
Report Pixels

Display preferences

Display settings available to tailor the overall display (settings apply to all images in all exams):
Annotation Levels
Inverse Video
Next/Prior Each View Port
Next/Prior Series Binding
Continuous Report Cursor

Image analysis

Multi-projection Volume Reconstruction (MPVR):
MIPS
Average -
Multi-planar Reformation (MPR):
Batch Reformatting.
Image Addition and Subtraction:

Image display

Magnifying Glass allows quick 2x mag window that can be moved over an image.

Cine mode provides paging in up to 4 view ports of up to 128 previously stored CT or MR images at full selected display frame rate. For more than 128 images, display frame rate may be reduced.

Cine mode also provides temporal, spatial or manual playback loops.

Image annotation

Image annotation and cursor are shadowed to permit ease in reading.

Manual image filming

On-screen filming is available for any digital camera using a 3M-952 protocol.

Images may be individually filmed manually via "drag and drop" to the on-screen Film Composer.

Print series allows the automatic printing of an entire series with one keystroke.

Page filming allows the creation of an entire film with one keystroke.

Multiple-image formatting allows filming of multiple images in a single film frame. As for that format over 30, the function does not support at the auto film format.

Film formats supported are 1:1, 2:1, 4:1, 6:1, 8:1, 9:1, 12:1, 15:1, 16:1, 20:1, 24:1 ,25:1, 30:1, 35:1, 42:1 and 35 mm slide (based on capability on imager side).

Important note: Revolution ACT comes standard with a DICOM Print interface configurable for multiple DICOM Print destinations. Connections with cameras that do not support DICOM Print may require a filming interface (purchased separately).

Image management

Images may be stored and retrieved via optical drive media using DICOM 3.0 format. This allows interchange with other imaging systems supporting DICOM 3.0 format. Not all vendors' implementation of DICOM 3.0 are identical, so please check with the manufacturer for compatibility.

Off-line retrieval of all image files. Images may be viewed as soon as they are restored from the media.

Image networking

Exams can be selected and moved between Revolution ACT and any imaging system supporting the DICOM 3.0 protocol for network send, receive and pull/query (also depends on capability on imaging system side).

Image transfer time using DICOM 3.0 protocols is approximately 0.1 second per 512 images on 100baseT network.

Network history log with sort and search capabilities for image transfer confirmation.

Industry standards

Revolution ACT complies with a wide variety of industry standards to facilitate more rapid adoption of features and performance improvements as the computing and medical imaging industry evolves.

DICOM conformance standards

DICOM 3.0 Storage Service Class
Service Class User (SCU) for image send
Service Class Provider (SCP) for image receive
DICOM 3.0 Query/Retrieve Service Class
DICOM 3.0 Storage Commitment Class Push
DICOM 3.0 Modality Worklist (including Performed Procedure Step) (through ConnectPro option)
DICOM 3.0 Print
DICOM Gray Scale Presentation state for image presentation
DICOM Structured Dose Report

HIPPA

Password protected user login and authentication
Image anatomization tool

Product network filters restricts access to scanner system by IP address, services type (IE ftp, telnet) and DICOM port number. User configurable.

Filming protocol

3M-952 Standard
Table

Slip ring technology has advanced axial scanning by enabling scans with simultaneous table movement.

Helical multi-slice prescription

Streamlined prescriptions and easy-to-use default protocols make Revolution ACT fast and efficient in patient set up.

Multi-slice acquisitions and short intergroup delays help to reduce potential misregistration between scans by increasing the number of scans possible in a patient breath hold.

Helical multi-slice modes

The complex nature of helical multi-slice scanning has been simplified by grouping all critical acquisition parameters within few basic scan modes, all optimized for image quality and speed. These clinically derived multi-slice scan modes offer a wide range of selections that carefully balance acquisition speed, image thickness, and retrospective image reconstruction flexibility.

Slices per Rotation	Up to 32-slice*
Slice thickness modes, mm	0.625*, 1.25, 2.5, 3.75, 5, 7.5, 10,
Rotation speed	0.98, 1.0, 1.2, 1.5, 2.0
Available pitch	0.625 to 1.75 with multiple options in between 0.563:1, 0.938:1. 1.375:1, 1.75:1 0.625:1, 0.875:1, 1.35:1, 1.675:1, 0.75:1, 1.5:1, 1:1*
Minimum inter-group delay, s	1.0
Minimum scan-to-scan cycle, s	1.0
Minimum pixel size, mm	0.19
DFOV selection cm	9.6 – 43
Table movement speeds, mm/s	3.75 – 35

Helical image reconstruction

Reconstruction algorithms: Soft, Standard, Detail, Bone, Bone Plus, Lung, Edge, Ultra*, and Chest.

The new Ultra kernel enhances imaging and visualization of small high contrast structures such as inner ear.

Iterative bone processing, which is always enabled for adult head scanning, reduces image artifacts in head scans stemming from x-ray beam hardening effects.

This simplified user interface guides the user in the choice of scan parameters. The user selects a pitch mode, a desired image slice thickness and table travel per rotation. The user interface also displays the resulting choice of retrospective image thicknesses available for each choice of acquisition parameters.

*Option

Axial Scanning

Axial scans

Multi-slice acquisitions and short inter-scan delays help to reduce potential misregistration between scans by increasing the number of scans possible in a patient breath hold.

Axial multi-slice prescription

Simplified scan prescriptions and easy-to-use default protocols make the Revolution ACT CT Scanner System fast and efficient in patient set-up.

Slices per rotation	Up to 32-slice*
Slice Thickness Modes, mm	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10
Rotation Speed, s	0.98, 1.0, 1.2, 1.5, 2.0, 3.0, 4.0
Minimum Interscan Delay (ISD), s	1.0
Incremental Gantry Display, mm	0.5
Minimum scan-to-scan cycle s	1.0

Axial image reconstruction:

Iterative bone processing, which is always enabled for head scanning, reduces image artifacts in head scans stemming from x-ray beam hardening effects. The operator has the option to reconstruct the original raw data set at any of the defined nominal slice thicknesses.

These reconstruction features effectively facilitate later, more detailed image analysis without additional patient scans and subsequent dose and image registration concerns.

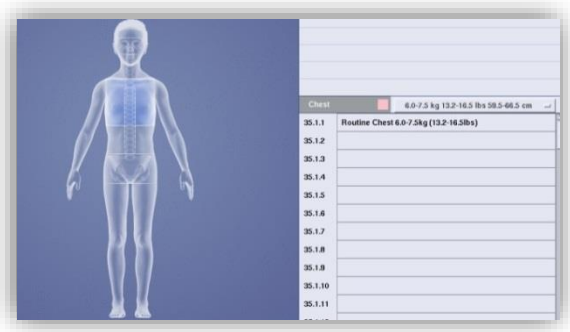
Reconstruction Algorithms:
Soft, Standard, Detail, Bone, Bone Plus, Lung, Edge, Ultra*, and Chest.

The new Ultra kernel enhances imaging and visualization of small high contrast structures such as inner ear

* Option

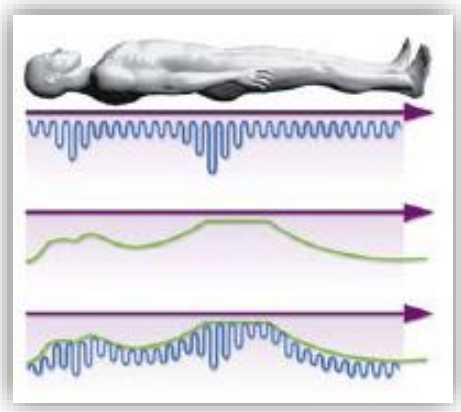
"Color Coding for Kids™" protocols

Providing pediatric scan protocols based on the Broselow-Luten™ Pediatric System, designed to facilitate pediatric emergency care and reduce medical errors.



3D dose modulation

Before the scan, clinicians can select the desired Noise/IQ: CT then tailors automatically exposure parameters, patient to patient and real-time x-y-z during each scan.



Beam tracking techniques

Beam tracking enables real-time x-ray follow-up to reach high spatial resolution with no post-patient collimation and no dose penalty.

Dose Check

Dose Check offers the guidance on dose given in clinical practice and is based on the standard XR-25-2010 published by the National Association of Electrical and Medical Imaging Equipment Manufacturers (NEMA).

Dose Check provides the following:

- Check against a Notification Value if the estimated dose for the scan is above typical dose value at your site.

- Checking against an Alert Value where the user needs specific authority to continue the scan at the current estimated dose without changing the scan parameters..

- Define Alert Values for adult and pediatric with age threshold.

- Audit logging and review.

- Protocol Change Control.

Dose computation and display

CTDIvol (CTDI volume), DLP (dose length product), and dose efficiency are computed and displayed during a scan to show patient dose information.

Dose reporting

A machine-readable DICOM-structured Dose Report is saved for each CT exam. This allows a hospital's radiation tracking system/RIS/HIS to retrieve the dose information for a given CT study.

Dose report capacity

With the help of prospective display of CTDIvol, DLP and dose efficiency, Revolution ACT helps clinicians reach ALARA dose, and keep track of it.

Volume Viewer*

Manage 3D and 2D imaging in real time using Volume Analysis. Review multiple acquisitions within the same display, associating 2D images with a variable slab-thickness capability (Average, MIP, MinIP, and Volume Rendering) according to each exam's requirements.

Volume Viewer is an innovative and powerful suite of productivity enhancers (Volume Rendering, Volume Analysis and Navigator) also includes:

Dynamic Volume Review for Fast Screening
Curved Volume of Interest
Protocol Management and Loading
Review Layout Presets
Multiple VR Objects Merge
Pseudo Surface Shading Mode
Predefined Cut Planes
VR Preset save/recall
3D Rendered Lumen View
Automatic Path Tracking
Path Bridging (in case of occlusions)
SmartCursor for Easy Navigation
Synchronized Reformatted Views
Cut visualization mode

Multi-planar reconstruction (MPR)

Reformatting with multi-planar reconstruction (MPR) lets you view datasets in the axial, sagittal, coronal, and oblique planes, to help you more confidently assess and diagnose the sinus, chest, abdomen, inter-vertebral discs, and fractures.

Multi-planar volume reconstruction (MPVR)

Helps you accurately enhance contrast and improve visualization of structures. Apply MIP (Maximum Intensity Projection) for vascular anatomy; MinIP (Minimum Intensity Projection) for airways and bronchi; or Average for head or abdominal examinations. View the selected volume from any desired plane, and combine it with variable slice thickness to clearly analyze lesions in the pancreas, renal arteries, and spine.

3D surface, 3D MIP, and 3D volume rendering

Enhance three-dimensional visualization of imaged tissue. It provides you with more information about the spatial relationships of different structures than standard 3D surface rendering, so you can interpret CT exams more confidently.

ImageWorks

ImageWorks is a desktop environment designed to take advantage of the Revolution ACT scanner's computer and image processor. Standard features include archive, network and manual film control, as well as some advanced image processing such as multi-planar reformatting (MPR), multi-projection volume rendering (MPVR), and MR image display.

The ImageWorks desktop also provides a gateway for DICOM 3.0 image transactions.

*Option

Software Clinical Applications – Advanced*

AutoBone™ Xpress
AutoBone XPress is an image analysis software package that is intended to facilitate segmentation of bony structures and calcifications for CT Angiography exams.

Advanced Vessel Analysis Xpress
AVA Xpress is intended to provide an optimized non-invasive application to analyze vascular anatomy and pathology and aid in determining treatment paths from a set of Computed Tomography (CT) Angiographic.

Navigator - Virtual Endoscopy
Allow visualization of intra-luminal structures such as airways, sinus, or vascular structures. Images can be viewed dynamically using a virtual "fly-through" mode.

Neuro DSA
Workflow allows subtraction and visualization of two image sets such as non-contrast and contrast enhanced CT.

DentaScan
DentaScan is a fast simple non-invasive software package, which provides a panoramic dental view enabling accurate measurements to be taken. DentaScan facilitates dental prosthetic implants and other dental surgical procedures by providing highly detailed information of the teeth and the surrounding bone structure.

Advantage CTC Pro3D EC
AdvantageCTC is a post-processing application. Data of the colon acquired on a CT Scanner can be processed using Colon Advantage CTC software. Patients who have suspected colonic diseases are the targeted population for this software.

CT Perfusion 4D – Multi Organ
CT Perfusion 4D – Multi-organs is an image analysis software package that allows the evaluation of dynamic CT data following an injection of a compact bolus of contrast material, and generating information regarding changes in image intensity over time.

CT Perfusion 4D – Neuro
CT Perfusion 4D – Neuro is an image analysis software package that allows the evaluation of dynamic CT data following an injection of a compact bolus of contrast material, and generating information regarding changes in image intensity

Biopsy Rx
Simplified prescription for single or multiple scans around an arbitrary table position aids biopsy studies.

*Option

Low-contrast detectability

System LCD is measured with an 8 inch (20 cm) CATPHAN phantom. The phantom is widely accepted as a standard for measuring image quality performance on multi-slice CT scanners. The statistical LCD shall meet the following minimum specifications:

5 mm @ 0.30% at 13.3 mGy
5 mm @ 0.30% at 10.0 mGy w/ 40% ASiR*
*when ASiR option is enabled

High-contrast spatial resolution

In-plane spatial resolution performance for axial, helical, and cine scans is demonstrated on a 0.05 mm tungsten wire. The system shall meet the following minimum specifications:

High resolution algorithm (Edge) – typical

	X/Y – lp/cm
50%	≥ 8.5
10%	≥ 13.0
0%	≥ 18.0

Uniformity

Homogeneity in Hounsfield unit (HU) values are measured using an 8 inch (20 cm) water phantom. The system shall meet the following minimum specifications on typical head scanning protocol:

CT number uniformity (water): ± 3 HU

CTDI

CTDI is measured using a 16 and 32 cm CTDI phantom

Helical scans are tested with 120 kV and 0.938:1 pitch using a standard reconstruction kernel and 35 cm FOV. The system CTDIvol expressed in mGy/100 mAs shall meet the following specifications (±15%):
9.44mGy (CTDIvol) for body scan

Axial scans are tested with 35 cm FOV at 120kV. The system CTDIw expressed in mGy/100 mAs shall meet the following specifications:
8.86mGy (CTDIw) for body scan

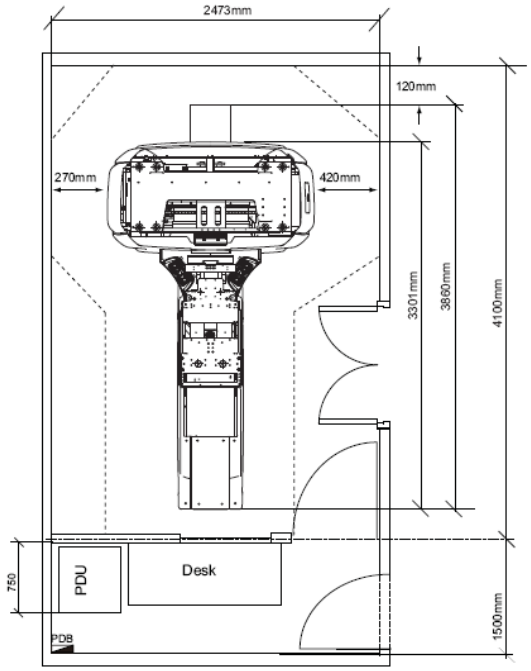
Axial head scans are tested with 25 cm FOV at 120 kV. The system CTDIw expressed in mGy/100 mAs shall meet the following specifications:
17.23mGy (CTDIw) for head scan

Just as you provide the best care possible to your patients, we're redesigned Revolution ACT with your demanding clinical needs and outstanding patient care in mind.

System Component Dimensions

Component	Size (cm)			Weight (kg)
	W	H	D	
Gantry	178.3	174.1	92.1	870
Computer console	17.8	44.8	44.5	15
Table & cradle	56.8	91.4	213.8	340
PDU	55.0	106.2	70.0	300
Total weight				1525

The minimum room size for Revolution ACT would be as shown in the below figure.



Temperature and humidity

Exam and control rooms: 64°-79°F (18°-26°C) at 30%-60% relative humidity (non-condensing).

Equipment room: If a separate equipment room is used to house the PDU, the allowable temperature range is 60°-84°F (15°-29°C) at 30%-60% relative humidity (non-condensing).

Temperature rate of change: 3°C/hour max.

Relative humidity rate of change: 5% RH/hour max.

Power requirements

The only facility input to the system is 200/220/240/380/400/420/440/460/480 V nominal, 3 phase Delta or Wye, 50/60 Hz, 40kVA service, 15 KVA average power; main disconnect to be located within 5 feet (1.5 m) of the PDU. The facility must also provide a protective disconnect device with low voltage, low energy local and multi-point remote capability, in the line feeders to the PDU.

Complete, detailed specifications of all power requirements are available upon request. For most installations, Revolution ACT does not require any power conditioning equipment to be used in conjunction with the PDU. Regulators are not recommended for use with this system. For those sites with known large power line transients, a suppresser filter for the system computer and peripherals may be useful. In general, suppresser filters are not recommended.

Cooling requirements

The cooling requirements do not include cooling for the room lighting, personnel or non-CT equipment present. Cooling requirements are listed by subsystem to allow planning for each room of the CT suite.

Cooling requirements are given for minimum, recommended and growth allowance scenarios. The minimum cooling figures assume patient throughput of 3 patients per hour and 75 scan rotations per patient.

The recommended cooling requirements assume patient throughput limited by the tube cooling algorithm.

The suite cooling can be sized for future developments by using the growth allowance figures. This cooling will accommodate more patients per hour and/or potential future system enhancements.

GE Healthcare offers you continuous care through various innovative technologies and education opportunities to ensure that your Revolution ACT meets your demanding clinical needs.

We back you with a large and experienced team of field service engineers to help increase your system uptime and access. Your organization will be assigned a primary field engineer fully acquainted with your system's service history.

Speedy remote serviceability.

Your Revolution ACT scanner comes with broadband connection capability, so GE service engineers can diagnose and fix your system remotely. Built-in self-check systems connect your CT scanner directly to our technical centers.

Remote serviceability lets your field engineer quickly assess the problem and spend minimal time on troubleshooting.

GE iLinq™ connects you directly to GE Healthcare support.

Touch a button on your console screen to quickly summon technical or applications help, saving you precious time. For urgent concerns, we connect you to an engineer in five minutes or less.

Our AppsLinq™ service provides a live clinical application support and training solution, delivered remotely—a customized, cost-efficient solution that fits imaging operators' busy schedules.

The TiP® Virtual Assist provides your staff with interactive, real-time applications training and support right on the console from a dedicated, experienced team of application specialists.

Warranty

The published Company warranty in effect on the date of shipment shall apply. The Company reserves the right to make changes.
All specifications are subject to change.

Regulatory Compliance

Laser alignment devices contained within this product are appropriately labeled according to the requirements of the Center for Devices and Radiological Health.

This product is a CE-compliant device which satisfies regulations regarding Electro-Magnetic Compatibility (EMC) and Electro-Magnetic Interference (EMI), pursuant to IEC-60601-1-2.

CE 0459

About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement and performance solutions services helps our customers to deliver better care to more people around the world at a lower cost. In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

Our "healthymagination" vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access, and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

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