

GE Healthcare

Vivid i



Product Description

The Vivid *i* is a high-performance, battery-operated, ultra-portable diagnostic Ultrasound systems providing exceptional image quality. The Vivid *i* is designed for cardiovascular imaging, abdominal, small-parts, perioperative monitoring and 2D ICE imaging.

System Architecture

The Vivid *i* is based on GE's TruScan Architecture, which is common to all GE Ultrasound systems, EchoPAC PC Workstation, software and network solutions. It features a software-driven PC-based platform, raw data storage with advanced post-processing capabilities, seamless DICOM standard connectivity and compatibility with the GE family of Cardiovascular Ultrasound Systems. Innovative tools offer advanced connectivity, remote monitoring and consultation for improved productivity and quality of care.

Advanced, energy-efficient power management designed for cool operation provides scanning with rechargeable battery power for more than one hour. Standby mode with battery allows fast boot-up anywhere.

Coded Harmonics – Produces excellent quality images from even difficult-to-image patients

Data Acquisition

- Programmable system architecture
- Application-Specific Channel Architecture: the Vivid *i* employs a flexible digital beam-former architecture capable of using up to 1024 channels depending on specific application requirements
- Application-specific digital beam forming algorithm for each mode
- Supports Phased Array, Linear and Curved Array, TEE, 2D-ICE and non-imaging Pencil transducers
- Receive focusing, aperture, apodization and frequency response are all continuously variable as a function of depth
- Wide aperture mode in convex and linear array probes

Data Processing

- Echo data processing of phase, amplitude and frequency
- Easily upgradeable
- Digital raw data replay allows for image post processing and un-compromised offline measurement and analysis

Display Screen

- High-resolution, flat 15-inch TFT LCD screen
- Display size: 1600 x 1200 pixels with 260,000 simultaneous colors available
- Scanner software supports display resolution of 800 x 600 pixel
- Screen can be closed or tilted at angles ranging between 0-180°
- Wide-angle visibility
- Digital brightness, contrast and blue-tint adjustment for optimal viewing in different ambient light conditions
- Closing down the screen will automatically place system into standby mode allowing fast boot-up upon screen opening

Display Formats

- Instant-review screen displays 12 simultaneous loops/images for a quick study review
- Scanplane position indicator and probe temperature are displayed with all multi-plane TEE probes
- Image orientation marker
- Selectable display configuration of duplex and triplex modes: side-by-side or top-bottom, during live, digital replay and clipboard image recall
- Single, dual and quad-screen view
- Split screen view

Display Annotations

- Mechanical Index (MI)
- Thermal index: application dependent
- Patient name/ID and additional patient information
- Hospital name
- Time/date
- Trackball-driven annotation arrows
- Scanning parameters
- Application
- Probe name
- Stress protocol parameters
- Active mode display
- Parameter annotation follow ASE standard
- Multi-language support for user interface, reports and help manual

Tissue Imaging

General

- Variable transmit frequencies for resolution/ penetration optimization
- High Resolution (HR)-zoom or display-zoom with zoom area control
- Variable contour filtering for edge enhancement
- Variable dynamic range and transmit power settings
- Depth range up to 30 cm – probe specific
- Selectable grayscale parameters: gain, reject, gray-maps, DDP and compress – can be adjusted in live, digital replay and image clipboard recall
- Automatically calculated TGC curves require less operator interaction
- Continuous Tissue Optimization (CTO) of the 2D-mode image to optimize the uniformity and brightness of the tissue continuously in real-time
- Selectable Automatic Tissue Optimization (ATO) of the 2D-mode image in digital replay or image clipboard recall. ATO may be combined with CTO – user selectable
- Clear Vessel (patent pending): aims to reduce reverberations and clutter noise while scanning the carotid
- "Smart Depth" for 2D (option) – automatically optimizing transmit pattern parameters according to scan-depth setting

2D-mode

- Sector tilt and width control
 - Coded Octave Imaging: second-generation harmonic tissue imaging providing improved spatial and contrast resolution over conventional imaging;* features reduced noise and improved wall definition; COI gives improved axial resolution without sacrificing frame rate, making it the tissue well-suited for all patient groups
- * Comparative claims made throughout this document are comparing Vivid i imaging to conventional imaging techniques.*
- Confocal imaging: allows for multiple transmit focal zones over range of view and a high-vector density – probes dependent and user adjustable
 - Expanded cardiology performance on the 3S-RS probe, including six levels of harmonics and ultra-high frame rates
 - Harmonic tissue imaging on all linear and convex probes
 - Adaptive reject for improved cardiac IQ

- UD Clarity and UD Speckle reduce imaging – an advanced image processing technique to remove speckle in real time examining the relative difference between neighboring pixel values and determining whether the grayscale variations have a sharp difference, follow a trend, or are random in nature
- Coded Phase Inversion (CPI) for improved contrast resolution
- Variable image width: a reduction either increases frame rate or increases the number of focal zones while maintaining the frame rate – application dependent, on linear/convex array probes
- Multiple-angle compound imaging, multiple co-planar images from different angles combined into a single image in real-time improving border definition, contrast resolution and reducing angular dependence of border or edge (on 4C-RS and on linear probes)
- Virtual convex: provides a larger field-of-view in the far field on linear probes (option)
- Virtual apex: provides a wider field-of-view with phased array probes, effective with certain applications
- Dual focus: offers additional focal zone for added spatial and contrast resolution from heart base up to apical areas (cardiology application only)
- Left/right and up/down invert in live, digital replay or image clipboard recall
- Digital replay for retrospective review or automatic looping of images allowing for adjustment of parameters such as gain, compression, reject, anatomical M-mode, persistence and replay speed
- Data Dependent Processing (DDP) performs temporal processing, which reduces random noise but leaves motion of significant tissue structures largely unaffected, can be adjusted even in digital replay
- Different gray-maps and colorized 2D-mode user selectable in real-time or in digital replay or image clipboard recall

M-mode

- Trackball-steerable M-mode line available with all imaging probes – max steering angle is probe dependent
- Simultaneous real-time 2D- and M-mode
- M-mode PRF 1 kHz: all image data acquired are combined to give high-quality recording regardless of display scroll speed
- Digital replay for retrospective review of spectral data
- Several top-bottom formats, side-by-side format and time-motion only format – can be adjusted in live, digital replay or image clipboard recall

- Selectable horizontal scroll speed: 1, 2, 3, 4, 6, 8, 12, 16 seconds across display
- Horizontal scroll can be adjusted in live, digital replay or image clipboard recall

Anatomical M-mode

- Vingmed-patented, any plane M-mode display derived from 2D cine loop
- M-mode cursor can be adjusted at any plane
- Can be activated from real-time scan, digital replay or image clipboard recall
- Anatomical color M-mode available in real-time scan, digital replay or image clipboard recall
- Measurement and analysis capability
- Anatomical tissue velocity M-mode (option)

Color Doppler

General

- Steerable color Doppler available with all imaging probes – max steering angle is probe dependent
- Trackball-controlled Region of Interest (ROI) position/size
- Removal of color map from the tissue during digital replay or image clipboard recall
- Digital replay for retrospective review of color or color M-mode data allowing for adjustment of parameters, such as color/tissue priority and color gain, even on stored data
- PRF settings: user selectable
- Advanced regression wall filter gives efficient suppression of wall clutter
- For each encoding principle, multiple-color maps can be selected including variance maps, in live digital replay or image clipboard recall
- More than 65,000 simultaneous colors processed providing smooth display, 2D color maps containing a multitude of color hues
- Simultaneous display of grayscale 2D and 2D with color flow in live, digital replay or image clipboard recall
- Color invert: user selectable in live, digital replay or image clipboard recall
- Variable color baseline: user selectable in live, digital replay or image clipboard recall
- Multivariate color priority function gives reliable delineation of disturbed flows even across bright areas of the 2D-mode image

- Color Doppler frequency can be changed independently from 2D for optimal flow

Color Doppler Imaging

- Digital signal processing power maintains high frame rates with large ROIs even for very low PRF settings
- Variable Region of Interest (ROI) size in width and depth
- User-selectable radial and lateral averaging to help reduce of statistical uncertainty in the color velocity and variance estimates
- Data Dependent Processing (DDP) performs temporal processing and display smoothing to reduce the possibility for loss of transient events of hemodynamic significance
- Digital replay for retrospective review or automatic looping of color images allowing for adjustment of parameters such as DDP, baseline shift, color maps, color/tissue priority and color gain even on frozen/recalled data
- Application-dependent multivariate motion discriminator reduces flash artifacts
- "Smart depth" for color (**option**) – automatically adjusts transmit pattern parameters according to depth of color ROI
- Multiple-angle compound imaging in 2D mode is maintained while in Color Doppler mode

Color Angio (Color Intensity Imaging)

- Angle-independent mode for visualization of small vessels with increased sensitivity compared to standard color flow

Color M-mode

- Variable ROI length and position – user selectable
- User-selectable radial averaging to reduce the statistical uncertainty in the color velocity and variance estimates
- Selectable horizontal scroll speed: 1, 2, 3, 4, 6, 8, 12, 16 seconds across display – can be adjusted during live, digital replay or image clipboard recall
- Real-time 2D image while in color M-mode
- Same controls and functions available as in standard 2D color Doppler

Anatomical Color M-mode

- Vingmed-patented, any plane color M-mode display derived from color Doppler cine loop
- Available in real-time scan, digital replay or image clipboard recall
- Also applicable to Tissue Velocity Imaging (**option**)
- Measurement and analysis capability

B-Flow (option)

- B-Flow is a digital imaging technique that provides real-time visualization of vascular hemodynamics by directly visualizing blood reflectors and presenting this information in a grayscale display
- Use of GE-patented techniques to boost blood echoes, and to preferentially suppress non-moving tissue signals
- B-Flow is available for most vascular and shared service applications

Blood Flow Imaging (BFI) (option)

- Combines color Doppler with grayscale speckle imaging
- Allows better delineation of blood flow without bleeding into tissue or vessel wall

Spectral Doppler

General

- Operates in PW, HPRF and CW modes
- Trackball-steerable Doppler available with all imaging probes – max steering angle is probe dependent
- Selectable Doppler optimization
- Real-time duplex or triplex operation in PW Doppler mode for all velocity settings
- Frame rate control for optimized use of acquisition power between spectrum, 2D and color Doppler modes in duplex or triplex modes
- Spectral analysis with an equivalent DFT rate of 0.2 ms
- Automatic Spectrum Optimization (ASO) provides a single press, automatic, real-time optimization of PW or CW spectrum scale and baseline display
- Dynamic gain compensation for display of flows with varying signal strengths over the cardiac cycle
- Dynamic reject gives consistent suppression of background – user selectable in real-time, digital replay or image clipboard recall
- Digital replay for retrospective review of spectral Doppler data
- Several top-bottom formats, side-by-side format and time-motion only format – can be adjusted in live, digital replay or image clipboard recall
- Selectable horizontal scroll speed: 1, 2, 3, 4, 6, 8, 12, 16 seconds across display – can be adjusted in live, digital replay or image clipboard recall
- Adjustable spectral Doppler display parameters: gain, reject, compress, color maps – can be adjusted in live, digital replay or image clipboard recall
- Adjustable baseline and velocity scale

- Wall filters with a range of 10-3000 Hz (velocity scale dependent)
- Angle correction with automatic adjustment of velocity scale in live, digital replay and image clipboard recall
- Stereo speakers mounted in the front panel
- Display annotations of frequency, mode, scales, Nyquist limit, wall filter setting, angle correction and acoustic power indices

PW/HPRF Doppler

- Automatic HPRF Doppler maintains its sensitivity even for shallow depths and with the highest PRFs
- Digital velocity tracking Doppler employs processing in range and time for high-quality spectral displays
- User-adjustable baseline shift in PW live, digital replay and image clipboard recall
- Adjustable sample volume size of 1-15 mm (probe dependent)
- Maximum sample volume depth 30 cm

Tissue Doppler Imaging

- Myocardial PW Doppler provides real-time Doppler spectral information for specified myocardial motion allowing for instantaneous tissue velocity measurement

CW Doppler

- Highly sensitive steerable CW available with all phased array and pencil probes

Tissue Velocity Imaging and Tissue Tracking (option)

Tissue Velocity Imaging (option)

- Myocardial Doppler imaging with color overlay on tissue image
- Tissue Doppler data can be acquired in background during regular 2D imaging
- Segmental wall motion analysis can be obtained with use of anatomical M-mode from digital replay or image clipboard recall
- Tissue color overlay can be removed to show just the 2D image, still retaining the tissue velocity information
- Quantitative profiles (Q-Analysis) can be derived on data transferred to EPPC workstation

Tissue Tracking (option)

- Real-time display of the time integral of TVI for quantitative display of myocardial systolic displacement
- Myocardial displacement is calculated and displayed as a color-coded overlay on the grayscale and M-mode image – different colors represent different displacement ranges

Tissue Synchronization Imaging – TSI (option)

- Parametric imaging which gives information about synchronicity of myocardial motion
- Delayed myocardial segments produce red overlay – whereas segments moving in normal rhythm are green
- Waveform trace available to obtain quantitative time to peak measurement from TSI Image
- Available in live scanning as well as an offline calculation derived from TVI data including velocity trace visualization

Automated Ejection-Fraction Calc (option)

- Automated EF measurement tool based on 2D-speckle tracking algorithm
- Integrated into M&A package with worksheet summary

Cine Memory

- High-fidelity loops and images may be reviewed by scrolling or by running cine loops
- TruScan architecture offers broad post-processing capabilities of recalled images and loops allowing manipulation of parameters such as gain, baseline, color maps, sweep speeds, audio gain and cine speed
- Cine memory contains up to 180,000 frames (with default image settings: 2,500 to 5,600 frames)
- “Image Clipboard” for thumbnail storage and review of saved images and loops
- Trackball-controlled cine review

Fast Power-Up

- Standby mode to support fast boot-up
- Battery power backup allows continuous scanning during power interruptions

Physiological Traces

- Integrated ECG or external ECG lead input
- Internally generated respiratory trace using ECG leads (option)
- External respirator interface (option)
- High-resolution display of the ECG and respiratory trace
- User-adjustable trace gain/position and trace-invert
- User pre-settable trace gain/position
- Automatic QRS complex detection

User Interface

Operator Keyboard

- Easy-to-learn user interface with intelligent keyboard

- Keyboard with application-specific push buttons for primary controls
- Interactive back-lighting of application-specific push buttons
- Full-size, alphanumeric keyboard with adjustable backlighting
- Application-specific secondary controls available through slide bars operated by a four-way rocker
- Slide pot TGC curve with six pots
- Overall gain for 2D mode and active mode on same rotary
- Digital harvesting of images and loops into image clipboard
- Patient browser screen for registration of demographic data and quick review of image clipboard contents
- Fully programmable user presets for probe/application default settings
- User-programmable FLEX key for easy access to an often-used function in global and on application level
- Support for 12 international (European) keyboard character sets (ISO 8859)
- Integrated speakers
- Adjustable carrying handle on the rear of the system

Analysis Program

- Personalized measurement protocols allow individual set and order of measurement and analysis items
- Measurements can be labeled seamlessly by using protocols or post assignments
- Bodymark icons for location and position of probe
- Cardiac calculation package including extensive measurements and display of multiple repeated measurements
- Vascular measurements package
- Measurements assignable to protocol capability
- Parameter annotation follow ASE standard
- Measurements assignable to report generator
- Doppler auto trace function with automatic calculations in live, digital replay or image clipboard recall
- Seamless data storage and report creation
- Measurements are summarized in worksheets – individual results can be edited or deleted
- User-assignable parameters
- Report templates can be customized on board

- ASE-based default text modules (English) – user customizable
- Image view during reporting
- Ability to export report in PDF or CHM format
- Generate report templates by the Report Designer or import from EchoPAC PC

Smart Stress Echo (option)

- Stress package with memory buffer offers pharmaceutical, exercise and bicycle stress exam protocols with user-configurable templates and shuffle mode
- “Smart Stress” function with the ability to save over 17 imaging parameters from each imaging plane – these imaging parameters are recalled at each stress level, thereby requiring no system adjustments
- Reference loop display during acquisition for comparing resting images or previous-level images to each stress level (dual screen)
- Advanced and flexible stress-echo examination capabilities
- Image acquisition, review, wall-segment scoring and reporting
- Treadmill Stress-exercise with more than 120 seconds of raw data continuous capture
- Possibility of extensive post-processing of images under review
- Wall motion scoring (bull’s-eye and segmental)
- Template Editor to customize the number of stress levels, number of views, number of heart cycles and systolic or full-cycle capture

OB/GYN Application Module (option)

- OB package for fetal growth analysis containing more than 100 biometry tables
- Dedicated OB/GYN reports
- Fetal graphical growth charts
- Growth percentiles
- Multi-gestational calculations (up to four)
- Programmable OB tables
- Expanded worksheets
- User-selectable fetal growth parameters based on European, American or Asian methods charts
- GYN package for ovary and uterus measurements and reporting

Quantitative Analysis (Q Analysis) (option)

- Q analysis software package, designed for analysis of TVI related (Tissue Tracking, Strain, Strain rate, TSI) raw data
- Quantitative profiles for TVI, tissue tracking, strain and strain rate can be derived. Up to eight traces can be generated from selected points in the myocardium
- Sample-area points may be dynamically anchored to move with the tissue when running the cine loop
- Arbitrary Curved anatomical M-Mode
- Cine compound displays cine loops generated from a temporal averaging of multiple consecutive heart cycles
- Quantitative profiles (Q-Analysis) can be derived on data transferred to EPPC workstation

IMT Measurement Program (option)

- Automatic measurements (patent pending) of carotid artery Intima-Media Thickness (IMT) on any acquired frame
- On-board IMT package provides non-interrupted workflow – fully integrated with M&A, worksheet, archiving and reporting functions
- Robust algorithm provides quick, reliable measurements, which can be stored to the on-board archive for review and reporting
- IMT measurement can be made from frozen images or images retrieved from archive
- IMT package supports measurements of different regions of the intima in the carotid vessel (e.g., Lt./Rt./CCA/ICA etc.)
- Frame for IMT measurement can be selected in relation to the ECG waveform
- IMT protocol allows to pre-define the size and location of the IMT ROI relative to some vertical marker (bulb), to support consistent results

Advanced Options

Contrast Imaging*

All use of contrast agents should be used as described on the label by the contrast agent manufacturers.

LVO Contrast (option)*

LV Contrast (available on probes: 3S-RS, 5S-RS, 6T-RS and 6Tc-RS) enhances delineation of the LV border in combination with ultrasound contrast agents. The new implementation of GE’s Coded Phase Inversion (CPI) provides high-resolution detection of contrast in the LV cavity and excellent suppression of myocardial tissue signals.

* *Harmonic imaging for supporting contrast agent imaging was developed by Schering.*

LOGIQView (option)

- LOGIQView: provides the ability to construct and view a static 2D image with wider field-of-view of a linear array transducer – this allows viewing and measurements of anatomy that is larger than what would fit in a single image

Wideband Probes

- Electronic selection between one solid-state connector and one stand-alone Doppler connector

PROBE	FREQUENCY RANGE	CATALOG #
Phased Array Sector Probes		
3S-RS	1.5 – 3.6 MHz	H4000PD
5S-RS	2.0 – 5.0 MHz	H4000PC
6S-RS	2.7 – 8.0 MHz	H45021RP
7S-RS	3.5 – 8.0 MHz	H4000PE
10S-RS	4.5–11.5 MHz	H4000PF
Linear Array Probes		
8L-RS	4.0 –13.0 MHz	H40402LT
9L-RS	3.5 –10.0 MHz	H40442LL
12L-RS	6.0 –13.0 MHz	H40402LY
Convex Array (Curved) Probes		
4C-RS	1.8 – 6.0 MHz	H4000SR
8C-RS	4.7 –11.0 MHz	H40402LS
Convex Array Transvaginal Probe		
e8C-RS	4.0 –11.0 MHz	H40402LN
Intra-operative Probes		
i12L-RS	5.0 – 13.0 MHz	H40402LW
Doppler Pencil Probes		
2D(P2D)-RS	2.0 MHz	H45021C
6D(P6D)-RS	6.0 MHz	H45021CA
Multiphase Transesophageal Phased Array Probes		
6Tc-RS	2.9 – 8.0 MHz	H45551ZE
9T-RS	4.0 – 10.0 MHz	H45531YM
Intra-Cardiac Echo (ICE) Catheters		
ACUSON AcuNav™10F	4.5 – 11.5 MHz	Distributed by Biosense Webster Inc.
ACUSON AcuNav™8F	4.5 – 11.5 MHz	Distributed by Biosense Webster Inc.
SoundStar™ 3D Ultrasound Catheter* based on AcuNav 10F	4.5 – 11.5 MHz	Distributed by Biosense Webster Inc.

PROBE	FREQUENCY RANGE	CATALOG #
ICE Probe Connector		
SwiftLink™ ICE probe connector, allows use of the of the different ICE catheters on Vivid i		H45021YE
TEE Probe Adaptor		
Allow to use multi-plane TEE RS probe on other Vivid systems		H45021KP

* Pending CE mark.

Supported Applications (probe dependent)

- Adults Cardiac
- Pediatrics Cardiac
- Vascular
- Pediatric General
- Neonatal Cephalic
- Transcranial (adult cephalic)
- Fetal heart
- Abdomen
- Gynecological
- Obstetrical
- Musculoskeletal including Superficial
- Small Parts
- Breast
- Nerve Imaging
- Coronary
- Intraoperative
- Intracardiac and Intraluminal Echocardiography (ICE)

Biopsy Bracket Support (option)

- On-screen biopsy Guide-Line, guide-Zone and depth measure for “Civco” multi-angle biopsy bracket, supporting probe models
 - 3S-RS
 - 4C-RS
 - 8L-RS
 - e8C-RS
 - 9L-RS
 - 12L-RS

Image Management and Archiving

- Built-in patient archive with images/loops, patient information, examination information and texts, measurements and report
- Raw data workflow: ultimate workflow with instant access data management

- Data are either stored internally or to a Remote Archive (EchoPAC or ImageVault server)
- Raw data allows changes to gain, baseline, color maps, sweep speeds, etc. for recalled images and loops
- DICOM 3.0 Image Format: DICOM incorporates raw image data information with all its data management flexibility into the image communication standard DICOM
- Images can be directly stored or exported in DICOM format to a DICOM server (PACS) (Option, see DICOM Network Connectivity)
- Image clipboard for stamp-sized preview images to allow recalling images or loops of choice directly
- 2D, CFM and TVI data at maximum frame rate may be reviewed by scrolling or by running cine loops
- Configurable HTML-based report function
- Report template designer package
- Internal archive data can be exported to removable image storage through DVD/CD-RW, USB flash card (option), External Hard-disk (option) Magnet-Optical Disk (option) and DICOM Media (option)
- Internal hard disk: for storing programs, application defaults, ultrasound images and patient archive
- Over 120 Gbyte disk space for exam archive storage
- Raw-Data, DICOM, AVI, MPEG and JPEG export
- DVD writer (supports CD-R and DVD-R)

Self-contained DICOM Viewer

- Exams can be exported to CD/DVD or USB media with an integrated "EZ DICOM CD viewer™"
- Self-contained "EZ DICOM CD viewer™" allows review of exams from media on a standard PC

Excel Export

- Allows export of all archived measurement and textual patient information in standard Microsoft Excel files

DICOM Network Connectivity (option)

Provides communication to a DICOM server and DICOM printer. Includes:

- Ethernet network connection
- Verification AE
- Image Export AE (Network storage)
- Modality Worklist AE
- Storage to DICOM server

- DICOM structured report SCU for cardiac and vascular
- Storage commitment
- Performed procedure step
- Verify: provides verification of an active connection between the scanner and another DICOM device
- Support of two patient ID fields in DICOM

Modality Worklist (option)

- Modality worklist: gives access to a list of patients from a worklist server (usually HIS)

DICOM Print (option)

- Allows printing images via a DICOM Printer

DICOM Media Support

- DICOM media: read/write images on DICOM format

EchoPAC Connectivity

- Connectivity and image analysis capability of Vivid *i* from EchoPAC PC
- EchoPAC PC allows instant access to ultrasound raw data provided by the system
- Comprehensive review, analysis and post-processing capabilities on EchoPAC PC
- Advanced quantitative analysis and post-processing capabilities
- Q-Analysis on raw data from Vivid *i* on EchoPAC PC
- Three user levels help organizing data security requirements

Virtual Printer (option)

- Provides the ability to send "Print" commands to any of two printers even when not connected to a printer – upon re-connection of printer, the system automatically produces hard copies from print images saved in chronological succession on disk

MPEGvue (option)

- Using MPEGvue, exams may be stored onto removable media or on remote networked system together with integrated MPEGvue player for viewing on standard PC
- Smart email feature allows transparent transmission of images via email using resident Outlook email client
- Patient management utility on standard PC provides ability to organize the exams on different sub-directories on the user's hard disk

eVue (option)

- Allows interactive viewing of images, loops or full exams from remote location on any PC, using LAN or wireless LAN

CardioLab™/Mac-Lab™/ComboLab™ Interface (option)

- The Vivid *i* system can be interfaced to the CardioLab™ – an Electrophysiology Monitoring System, to the Mac-Lab™ – a Hemodynamic Monitoring System and to the ComboLab™, a combination of CardioLab™ and Mac-Lab™
- This interface will allow the Vivid *i* system to send Images to the CardioLab/Mac-Lab/ComboLab system over a VGA video cable
- Images and loops from the Vivid *i* system can be sent to the CardioLab/Mac-Lab/ComboLab over a LAN network cable
- Some functions on the Vivid *i* system can be operated via a remote control keyboard located in a different room
- Vivid *i* system mounted to the patient bedside, allowing the user to swivel and store the ultrasound system below the bedside

Carto™ XP/Carto™ 3 EP Interface (option)

- The system can interface with the Carto™ XP/Carto™ 3 EP navigation system and the SoundStar™ 3D ultrasound Catheter,* manufactured by Biosense Webster®
** Pending CE mark.*
- The interface will allow the Vivid *i* system to send images to the Carto™ XP/Carto™ 3 EP system over a VGA video cable
- The Vivid *i* is able to send ultrasound scaling parameters to the Carto™ XP/Carto™ 3 EP system via a peer-to-peer LAN connection

Multiple Interfacing with Carto™ XP/Carto™ 3 and CardioLab™/ComboLab™

- The Vivid *i* can be interfaced in parallel to the Carto™ XP or Carto™ 3 and to the CardioLab™ or ComboLab™, allowing the operator to use both systems during the same patient's examination

Insite™ Express Connection (ExC) enables Remote Service and Training**

- Easy, Flexible and Secure connectivity configuration
- The "Contact GE" on-screen button directly generates a real-time service request to the GE online engineering or application specialist. It takes a snapshot of the system at the time of the service request to enable analysis of problem before customer contact.

- Virtual Console Observation (VCO) enables the customer to allow desktop screens to be viewed and controlled remotely over the encrypted tunnel to enable real-time training, device configuration and clinical application support
- File Transfer enables the customer (Biomed or Clinician) to directly transfer system information (e.g. system logs, images, parametric data) to GE product engineering teams
- Software reload provides remote application reconstruction and recovery capabilities in the event of system corruption

*** Operation of Insite™ Express Connection is dependent on the infrastructure being available. Check with your local GE service representative.*

Peripherals (options)

- USB black and white video printer with control from system panel
- USB color video printer with control from system panel
- USB inkjet printer, supporting ink-saving mode
- MO 5.25" drive
- Secondary DVD/CD-RW
- USB flash memory drive for exam export
- Wireless network interface
- External USB Hard Disk USB2.0 RAID 1 mirrors the contents of one hard disk onto another – effective size: 1TB (SafeLock cart-mounted option)

Accessories (options)

- Interface cable for External ECG
- Splash-proof protective keyboard cover
- Replacement battery
- External battery charger
- Safety lock
- Video scan converter
- RollPac carrying case on wheels
- ECG adapter for DIN-type pediatrics electrode leads
- Three-pedal foot switch with programmable functionality

SafeLock Cart (option)

- Probe and gel holder
- Hand rest and handles
- Anti-theft locking device
- Four swivel wheels – front wheel breaks
- Two peripheral shelves
- Three AC outputs
- Four USB ports

Inputs and Outputs

- SVGA video out
- Connectors:
 - USB-2 (to support CD-RW, video printers, MOD, USB flash-cards, etc.)
 - LAN Ethernet
 - USB wireless LAN device
 - DC power input

Dimensions and Weight

- Depth: 313 mm (12.4 in) (excluding handle)
- Width: 358 mm (14.2 in)
- Height: 59 mm (2.3 in)
- Weight: approximately 5 kg (11 lb) without battery

Electrical Power

- Battery or mains-line operation
- Input rating (AC Adapter): 100-240 V AC/130 VA
- Frequency: 50/60 Hz

Safety Conformance

Built to meet the requirements of:

- EN/IEC/UL 60601-1 /CSA 22.1 601-1, Class I, Type B with BF or CF Applied Parts
- EN/IEC60601-1-1
- EN/IEC 60601-1-2, Class A
- EN/IEC 60601-2-37
- NEMA UD-2, UD-3
- The European Medical Devices Directive (MDD) 93/42/EEC (CE Mark)

Virus Protection

To minimize virus vulnerability, Vivid *i* is configured with a minimal set of open ports and with all network services, not actively used by the system, closed down.

This significantly reduces the risk of a virus attack on Vivid *i*. GE is continuously judging the need for additional actions to reduce vulnerability of equipment. This includes vulnerability scanning of our products and evaluation of new security patches for the third-party technology used. Microsoft and other security patches that address serious issues with Vivid *i* will be made available to customers after GE verification of those patches.

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