It understands your everyday

Philips Affiniti 70 ultrasound system specifications

This material not intended for distribution in the U.S.

PHILIPS

Contents

1. Introduction

You always go above and beyond to provide the best care to your patients. But you are expected to do so with less time, fewer resources, and higher patient volume. The care you want to provide deserves tools that can set you ahead and help you stay ahead.

We designed Philips Affiniti 70 to give you the confident results you need, in the time you have. Engineered for efficiency and reliability and powered by Philips superb performance, it gets you diagnostic images you need, quickly – even on the most technically difficult patients. Its intuitive design and walk-up usability help you provide elegant, efficient care – every day.

1.1 Applications

Abdominal
Obstetrical
Fetal echo
Cerebrovascular
Vascular (peripheral, cerebrovascular, temporal TCD, and abdominal)
Abdominal vascular
Gynecological and fertility
Small parts and superficial
Musculoskeletal
Pediatric general imaging
Prostate
Echocardiography (adult, pediatric, fetal)
Stress echocardiography
Transesophageal echocardiography (adult and pediatric)
Surgical imaging
Interventional imaging
Contrast imaging
Bowel imaging
Strain elastography, shear wave elastography (ElastPQ)
Perioperative
Epicardial echocardiography

2. System overview

2.1 System architecture

- Supports both strain and shear wave elastography (Elast PQ)
- Offers up to 4,718,592 total digital channels
  - Next-generation ultra-low noise, wide dynamic range, 280 dB, digital broadband acoustic beamforming with proprietary architecture
  - Powerful distributed multi-core processing architecture capable of achieving 225 x 109 40-bit Multiply-Accumulates/second. Includes 512 GB hard drive support for transducer frequencies up to 20 MHz
  - Optimized for high definition 54.6 cm (21.5 in) LCD display
  - Designed to support virtually any array configuration: sector, linear, curved, tightly curved, and TEE
  - Contrast imaging uses both Pulse Inversion and power modulation technologies
  - Supports depths from skin line (using zoom function) to 30 cm
- High precision beam-steered image compounding that acquires more tissue information and reduces angle-generated artifacts
- Up to nine lines of sight, obtained by steering the ultrasound beam, available on linear, curved and tightly curved arrays, and mechanical volume arrays
- WideSCAN capability to expand field of view during SonoCT imaging
- SonoCT capability available during contrast imaging modes
  - Philips next-generation XRES adaptive image processing for noise and artifact reduction that enhances tissue and border definition
- Performs 350 million calculations per frame of image data over 1400 frames per second
- Provides XRES capability when in contrast imaging modes
- Operates in 2D and 2D/CFI/Doppler/TDI mixed modes over 1400 frames per second
- Offers XRES capability in contrast imaging modes
  - Philips adaptive broadband flow imaging
- Doppler bandwidth that automatically adjusts for optimal flow sensitivity and resolution
- Advanced dynamic motion suppression algorithms that reduce flash artifacts
  - Fully independent triplex multiple mode operation for extraordinary ease of use during Doppler procedures
  - Auto Doppler flow optimization for carotid/arterial applications using linear array transducers
- Automatically adjusts color box position and angle
- Automatically adjusts PW sample volume placement and angle

- Includes Auto Flow Tracking for automatic angle correction with sample volume movements
  - Advanced stress echo applications
- Stress protocols with up to ten stages
- Forty views per stage by five modes
  - Multi-application SmartExam workflow protocols
- Stress echo, echo, abdominal, small parts, Ob/Gyn, and vascular applications
- Step-by-step on-screen guidance during exam
- Full user customization
- Record function for creation of custom protocols
- Automatic mode switching including 3D
  - Fast system boot up: from off, approximately 110 seconds
  - Transport mode: from sleep mode to on, approximately 20 seconds
- Transport mode lasts 40 minutes before recharge is needed

2.2 Imaging formats

- 2D linear: WideSCAN with SonoCT
- 2D curved: WideSCAN with SonoCT
- 2D sector
- 2D virtual apex sector imaging with wide field of view
- 2D trapezoid
- Dual 2D
- Panoramic

2.3 Imaging modes

- 2D grayscale imaging with advanced pulse coding, pulse shaping, and frequency compounding technologies
- M-mode
- M-mode color Doppler
- M-mode tissue Doppler
- Anatomical M-mode
- TDI M-Mode
- 3D imaging
- 3D imaging with Color Doppler/CPA/DCPA
- 4D imaging
- Tissue Harmonic Imaging (THI) with pulse inversion technology
- Coded beamforming
- Multivariate Tissue Harmonic Imaging including pulse inversion technology and coded harmonics
- Left ventricular opacification (LVO) with pulse inversion and power modulation technologies
- SonoCT beam-steered real-time compound imaging
- Harmonic SonoCT imaging
- Up to five levels of XRES adaptive image processing technology
  - Variable settings available to the user
- iSCAN intelligent scanning for one-button TGC and gain optimization (i.e., adaptive gain compensation – AGC)
- AutoSCAN with adaptive gain compensation (AGC) for real-time frame-by-frame TGC optimization
- Simultaneous 2D M-mode
- Color Doppler
- Color Power Angio imaging (CPA) and directional CPA
  - High resolution option available in relevant clinical applications
- Strain-based elastography
- Shear wave elastography point quantification imaging (ElastPQ)
- High-PRF pulsed wave (PW) Doppler
- Duplex and simultaneous 2D/PW Doppler
- Duplex continuous wave (CW) Doppler
- Duplex, color flow, CW Doppler
- Duplex 2D, color flow, PW Doppler
- Duplex 2D, CPA, PW Doppler
- Auto Doppler optimization: Auto PW Doppler, color Doppler, flow optimization for one-button angle correction and steering
- Tissue Doppler Imaging (TDI)
- Adaptive Doppler
- Adaptive Broadband Color Flow
- Color compare mode
- Independent triplex mode for simultaneous 2D, color flow, PW Doppler
- Independent triplex mode for simultaneous 2D, CPA, PW Doppler
- Dual imaging with:
  - Two work flow choices; single buffer or dual buffer
  - Mixed mode display with one image live while other is frozen, for example, 2D/2D, 2D/color, color/color, color/CPA
- High definition zoom (write zoom)
- Reconstructed zoom with pan (read zoom)
- Panoramic imaging
- SonoCT panoramic imaging with XRES and harmonic modes
- Chroma imaging in 2D, 3D, QLAB MPR and iSlice, Panoramic, M-mode and Doppler modes
- Dynamic colorization in freehand 3D on C9-4v, C10-3v and 3D/4D on V6-2, 3D9-3v, VL13-5
- Live MVI
- Spatio-Temporal Image Correlation (STIC)

M-mode

- Available on all imaging transducers
- Anatomic M-mode available on all imaging transducers
- TDI M-mode available in cardiac applications
- Selectable sweeping rates
- Time markers: 0.1 and 0.2 seconds
- Acquisition zoom capability
- Selectable display format prospective or retrospective (1/3-2/3, 1/2-1/2, 2/3-1/3, side-by-side, full screen)
- Chroma colorization with multiple color maps
- Cineloop review for retrospective analysis of M-mode data 256 (8 bits) discrete gray levels

Spectral Doppler

- Display annotations including Doppler mode, scale (cm/sec) Nyquist limit, wall filter setting, gain, acoustic output status, sample volume size, normal/inverted, angle correction, grayscale curve
- Ultra-high resolution millisecond spectral FFT rate
- Angle correction with automatic velocity scale adjustment
- Adjustable velocity display ranges
- Nine position shifts (including 0)
- Normal/invert display around horizontal zero line
- Five selectable sweep speeds: Min, Slow, Medium, Fast, and Max
- Selectable low-frequency signal filtering with adjustable wall filter settings
- Selectable grayscale curve for optimal display
- Selectable Chroma colorization maps
- Selectable display format prospective or retrospective – 1/3-2/3, 1/2-1/2, 2/3-1/3, side-by-side, full screen
- Steering available to up to 90° (+/- 45°), dependent on transducer and clinical application
- Doppler review for retrospective analysis of Doppler data
- 256 (8 bits) discrete gray levels
- Post-processing in PW frozen mode includes map, baseline, invert, and Chroma
- Available on all imaging transducers
- Adjustable sample volume size: 1.0-20 mm (transducer-dependent)
- Simultaneous or duplex mode of operation
- Simultaneous 2D, color Doppler, pulsed Doppler
- High-PRF capability in all modes including duplex, simultaneous duplex, and triplex
- PRF range between 200 Hz-34 KHz, depending on transducer and clinical application
- 50 dB or more gain available to the user, depending on clinical application
- iSCAN optimization that automatically adjusts scale and baseline

Auto color and auto Doppler

- In live imaging provides the following capabilities:
  - Automatically adjusts color box position and angle
  - Automatically adjusts PW sample volume placement and angle
  - Includes Auto Flow Tracking for automatic angle correction with sample volume movements
  - Automatically adjusts PW scale and baseline
- When image is frozen and Doppler is active, automatically adjusts PW scale and baseline
- Auto color and Auto Doppler is available on the linear transducers L12-3, L12-4, L12-5 50, VL13-5, L18-5, and L15-7io in carotid/arterial vascular applications
- Auto Doppler is available on the curvilinear transducers C5-1, C6-2, C8-5, C9-2, C9-4v, C10-3v, C10-4ec, BP10-5ec, V6-2

Steerable continuous wave (CW) Doppler

- Available on all cardiac applications using sector transducers
- Steerable through 90° sector
- Maximum velocity range: 19 m/sec (transducer-dependent)
- iSCAN optimization that automatically adjusts scale and baseline

Tissue Doppler Imaging (TDI/TDI PW)

- Available on all cardiac imaging transducers (except S7-3t)
- Frame rate control: high frame rate acquisition of tissue motion (up to 240 fps)
- TDI gain, TGC and LGC compatible
- TDI Opt: optimized transmit and receive frequencies
- Eight maps
- TDI M-mode and TDI-PW available, dependent on transducer and clinical application

3D/4D and MPR imaging (hybrid transducers)

- Volume display with surface rendering (transparency, brightness, and lighting controls)
- Multiplanar reconstruction (MPR) view display
- Specialized algorithms and maps maximize three-dimensional display
- Cropping tools on both volume and multiplanar reconstruction (MPR) views
- Slice control on MPR and volume displays
- Supported by SonoCT and XRES modes to reduce noise artifacts

Freehand 3D volume and MPR imaging

- Qualitative grayscale volume acquisition supported on all imaging transducers
- Volume display with surface rendering (transparency, brightness, and lighting controls)
- Multiplanar view display
- Specialized algorithms and maps increase 3D display
- Trim tools on both volume and multiplanar reconstructed (MPR) views
- Supported by SonoCT and XRES modes to help reduce noise artifacts
- Resize control that adjusts for different sweep speeds
- On-screen orientation markers

Spatio-Temporal Image Correlation (STIC) imaging

- Available on V6-2 transducer
- Automated volume acquisition of fetal cardiac cycle allowed
- Grayscale and 3D Color
- CPA and Directional CPA (DCPA)
- Default 25° elevation angle
- User-configurable acquisition time
- Ability to stop acquisition and return to standby
- Ability to accept or reject detected heart rate
- Compatible with QLAB quantification software

Panoramic imaging

- Real-time extended field-of-view composite imaging, acquired in fundamental or SonoCT mode
- Ability to acquire composite image in XRES mode
- Ability to back up and realign the image during acquisition
- Full zoom, pan, cineloop review, and image rotation capabilities
- Auto fit of composite image
- Distance, curved-linear distance and area in review mode can be measured with distance marker displayed via skin-line ruler
- Ability to display or remove skin-line ruler
- Cineloop review that allows measurement on individual frames
- Scaling information included for connectivity prints allowing for measurements on a workstation
- Available on linear and curved array transducers (not available on endovaginal transducers)

Contrast imaging – cardiovascular

- System optimized for left ventricular opacification
- One-touch solution (one-button access in Adult Echo preset) with settings for bolus and infusion
- S5-1 broad bandwidth pulse inversion and power modulation technologies for high sensitivity
- LVO on and off, and contrast optimization choices and transmit power settings that can be saved with Gain Save feature for stress echo studies, eliminating setup time for image acquisition at peak stress
- Supported on the S4-2 and S5-1

Contrast imaging – general imaging

- System optimized for detecting contrast agent signatures as they are approved for use
- Contrast modes available on C5-1, C6-2, C9-2, C9-4v, C10-4ec,C10-3v, L12-3, L12-4, and L12-5 transducers
- Live MicroVascular Imaging (MVI)
- Power modulation contrast imaging available with XRES technologies
- Power modulation (PM) and flash contrast imaging modes
- Touch screen display timer
- Advanced non-linear pulsing schemes with XRES for increased contrast sensitivity
- High frequency contrast capability
- Flash imaging
- Dual imaging mode for simultaneous fundamental and contrast displays
- ECG/timed triggering
- Long loop capture mode during contrast procedures (3-10 minutes)
- QLAB ROI and MVI display

Interventional imaging

- TSP available on selected transducers for excellent performance during interventional and biopsy procedures
- Enhanced needle visualization displays
- Biopsy guide selection menus
- Contrast and interventional modes
- Support of multiple biopsy angles on S5-1, C5-1, C6-2, C9-2, V6-2, and L12-3

2D imaging

- Available with all imaging transducers
- Adjustable sector width and position during live imaging
- Ability to invert image left and right, top and bottom
- Receive gain
- LGC (lateral gain compensation) on cardiac sector transducers
- Selection between one and eight focal zones
- Dynamic range or echo compression, transducer and Tissue Specific Presets (TSP)-dependent
- Gray map
- Chroma imaging providing colorized luminance maps
- Acquisition zoom (HD zoom): ability to position the zoom ROI anywhere within the image, and change the height and width of the zoom ROI
- Display zoom and magnify on live or frozen images up to 16 times
- Three levels of frame rate
- Support of frame rates of over 1400 frames per second
- Tissue optimization
- Contrast resolution enhancement
- Tissue Harmonic Imaging
- SonoCT imaging
- Live Compare imaging; side-by-side comparison of 2D images where the current live image is compared to a stored image from the same study or retrieved multimodality image
- WideSCAN imaging
- Next-generation XRES technology
- Persistence (frame averaging)
- Grayscale standard display
- AutoSCAN with adaptive gain compensation (AGC) for real-time line-by-line TGC optimization

Tissue Harmonic Imaging (THI)

- Provides second harmonic processing to reduce artifacts and provides high quality images
- Multivariate pulsing including patented pulse inversion phase cancellation technology for increased detail resolution during harmonic imaging
- Available in all clinical applications
- Extends high performance imaging capabilities to all patient body types
- Support of SonoCT (Harmonic SonoCT) and XRES modes

Color Doppler

- Available on all imaging transducers
- Color gain
- Region of Interest (ROI)
- Freq Opt: fixed transmit/receive frequencies including adaptive flow
- Seventeen selectable baseline positions for CV, nine selectable baseline positions for GI, WHC
- Baseline invert
- B/W suppress
- Color blending
- Color compare dual display (B/W on left, color on right)
- Color map
- Color persistence
- Flow optimization: GI, WHC
- Output power
- Magnify (range from 0.8X to 8X)
- Scale sector width and position on curved and phased array transducers
- Simultaneous mode during PW mode
- Smoothing
- Ability to steer between ±3° steer angle on linear array transducers
- Variance
- Wall filter
- Write priority
- Zoom
- Cineloop review with full playback control
- Advanced motion suppression with intelligent algorithms; adapts to various application types to selectively reduce color motion artifacts
- 256 color bins
- Parallelogram steering on linear array transducers; three angles on L12-5 50 and L18-5, thirty-one angles on L12-3, L12-4, and L15-7io
- Trackball-controlled color Region of Interest: size and position
- Maps, filters, color sensitivity, line density, smoothing, echo write priority, color persistence, gain, and baseline optimized automatically by exam type or is user-selectable
- Velocity and variance displays
- Color invert in live and frozen imaging
- Frequency optimization control for spatial resolution and penetration optimization
- Color and 2D line density control
- Automatically adapts transmit and receive bandwidth processing based on the color box position, providing exceptional sensitivity and color resolution
- Color Doppler PRF maximum 34 KHz, dependent on transducer and clinical application

Color Power Angio imaging (CPA)

- Automatically adapts transmit and receive bandwidth processing based on the color box position providing optimal sensitivity and color resolution
- Highly sensitive mode for small vessel visualization
- Available on all imaging transducers for general imaging and women's healthcare
- Cineloop review
- Multiple color maps
- Individual controls for gain, filters, sensitivity, echo write priority, and color invert
- Adjustable CPA Region of Interest: size and position
- User-selectable persistence
- User-selectable blending on/off
- Cineloop review with full playback control
- Advanced motion suppression with intelligent algorithms; adapts to various application types to selectively eliminate virtually all color motion artifact
- 256 color bins
- Parallelogram steering (three angles) on linear array transducers; three angles on L12-5 50 and L18-5, thirty-one angles on L12-3, L12-4, and L15-7io
- Trackball-controlled color Region of Interest: size and position
- Maps, filters, color sensitivity, line density, smoothing, echo write priority, color persistence, gain, and baseline optimized automatically by exam type or is user-selectable
- Velocity and variance displays
- Color invert in live and frozen imaging
- Frequency optimization control for spatial resolution and penetration optimization
- Color and 2D line density control
- Automatically adapts transmit and receive bandwidth processing based on the color box position, providing optimal sensitivity and color resolution
- CPA PRF maximum 34 KHz, dependent on transducer and clinical application

Strain-based elastography

- Strain-based elastography for breast and gynecological imaging
- Available for breast imaging on the L12-5 50 transducer, and on the C10-3v for gynecological and pelvic imaging
- One-touch entry into elastography mode
- Elastogram applied as a Region of Interest box with user control of size and location through entire field of view
- Indicator for compression level
- Display options
- Single-screen 2D with elastogram
- Side-by-side display of 2D image and 2D with elastogram
- Shadow duplication (size compare) and measurement capability in side-by-side display
- Distance and area tools
- Duplication from either side of the display
- Eight selectable elastogram display maps
- Ability to hide or show the elastogram display
- Blend capability to increase 2D visibility through elastogram display
- Four smoothing selections
- Five persistence selections
- Two dynamic resolution system (DRS) selections to alternate between elastogram resolution and penetration
- Four dynamic range selections for elastogram display
- Two elastogram optimization settings for different tissue compositions
- AI – anechoic imaging for enhancing areas without ultrasound signals such as cystic and complex cystic structures
- Stiffness measurement available

Shear wave elastography

- Tissue deformation from special ultrasound push pulses
- Detection pulses used to calculate shear wave velocity
- Available on C5-1 for liver imaging

Transducers with compact connectors

Ergonomic designs with lightweight super-flexible cables

Designed for women's healthcare applications.

Specifically for cardiovascular applications.

Full range for general imaging applications.

3. System controls

Philips common user experience provides readily accessible and logically grouped primary controls along with an easy-to-learn graphical user interface.

3.1 Optimization controls

2D grayscale imaging

- Smart TGC: pre-defined TGC curves optimized for consistently excellent imaging with minimal TGC adjustment
- Lateral gain compensation (LGC) and Smart LGC for cardiac sector transducers
- Adjustable temporal resolution and spatial resolution with DRS control
- Depth: adjustment from 2.0 to 30 cm depending on transducer and exam
- Selection between one and eight transmit focal zones
- 16-level digital reconstructed zoom with pan capability
- High definition zoom that concentrates all image processing power into a user-defined area of interest; possible to combine high definition zoom with pan zoom
- Cineloop image review
- Selectable 2D compression settings
- Tissue aberration correction
- Sector size and steering control for sector and curved array image formats
- Selectable 2D line density with DRS control
- Dual imaging with either independent cineloop buffers or split screen imaging
- Dual imaging with color compare
- Dual imaging with fundamental and contrast optimization
- Chroma imaging with multiple color maps
- 256 (8 bits) discrete gray levels
- 2D acquisition frame rate over 1400 frames/sec (dependent on field of view, depth and angle)
- Live MVI

Next-generation SonoCT real-time compound imaging

- Available on all transducers except sector
- Reduced clutter and artifacts
- Automatic selection of the number of steering angles based on the user-selected resolution/frame rate (Res/Speed) condition
- Up to nine lines of sight automatically adjusted via DRS control
- Operates in conjunction with Tissue Harmonic Imaging, volume modes, panoramic imaging, and duplex Doppler
- Operates in conjunction with XRES
- Available in contrast modes
- Available with WideSCAN format during 2D imaging for extended field-of-view operation

XRES adaptive image processing

- Available on all imaging transducers
- Reduces speckle noise and enhances border definition
- Available in all imaging modes including color flow and Doppler
- Available in contrast modes
- Operates in conjunction with SonoCT imaging
- Provides high resolution algorithms for advanced speckle noise reduction, refined tissue pattern displays, and fine border definition
- Provides high speed processing that allows over 1400 frames-per-second displays
- Five different levels available, dependent on transducer and clinical application

Live volume imaging (GI/WHC)

- Single sweep 3D, 4D, STIC
- 3D preview ROI size and position
- 3D preview ROI curve adjust
- Sector width
- Angle
- Res/speed control
- Grayscale imaging controls
- 2D optimization settings
- 2D color optimization settings
- 2D power optimization settings
- Tissue Harmonic Imaging
- Rotate X, Y, Z
- Slice
- ROI size and position
- ROI curve adjust
- Pointer trim adjust
- Pointer xHair move
- Pointer cine
- Edit/accept
- Hide volume
- Up/down invert
- QuickFlip
- 3D rotate: 0°, 180°, 90°, 270°
- 3D view control: up, down, left, right, front, back
- Reset orientation
- Magnify
- 3D vision control
- Dynamic volume colorization
- Chroma colorization
- Layout
- Reference
- XRES technology
- Zoom
- Show/hide echo or color
- Reset controls
- Pan
- Sculpt
- Threshold
- Brightness
- Smoothing
- Lighting
- Transparency
- xHair display
- Save volume in native or native loop
- Acquisition sweep save
- MPR sweep save
- Generic distance and area measurements available on rendered volumes
- Distance and area measurements on MPRs
- QLAB plugins, including GI 3DQ and FHN

Tissue aberration correction (TAC)

- Automatically enabled when ABD maximum penetration TSP is selected on C5-1 transducer
  - Corrects for speed of sound disturbances due to excessive adipose layer on obese patients
- User selections with the L12-5 50, L18-5 for breast and MSK TSPs
  - Corrects for speed of sound disturbances in fatty tissue

iSCAN intelligent optimization

- One-touch image optimization
  - In 2D mode, one-button automatic adjustment of system gain and TGC to achieve balanced brightness of tissues
- Available in contrast imaging for selected transducers/applications
  - Independent settings based upon whether the contrast timer is active
- In Doppler mode, one-button automatic adjustment of:
  - Doppler PRF based on detected velocity
  - Doppler baseline based on detected flow direction
- Available on all imaging transducers
- Operates in conjunction with SonoCT and XRES imaging
- AutoSCAN continuous automatic optimization
- Adaptive gain compensation (AGC) dynamically adjusts (every pixel on every scan line) low level 2D echoes to reduce gain artifacts (shadows/through transmission) and enhance image uniformity with 2D and 3D imaging

AutoSCAN intelligent optimization

- Continuous, real-time adjustment of system gain and TGC to achieve balanced brightness of tissues
  - When activated, applies gain balancing to all grayscale image data including 2D, 3D, and M-mode grayscale data
  - Every image frame has individually adjusted image brightness
  - Available from 2D touch screen controls

iOPTIMIZE intelligent optimization

Multiple technologies for one-button approach to automatically and immediately adjust system performance for different patient sizes, flow states, and clinical requirements.

- **Tissue Specific Presets** – adjusts over 7,500 parameters during transducer/application selection
- **Patient optimization** – adjusts 2D performance to immediately adapt to different patient sizes
- **Flow optimization** – adjusts broadband flow performance to immediately adapt to different flow states
- **Dynamic resolution system (DRS)** – one control adjusts nearly 40 parameters simultaneously for user preference of spatial resolution or temporal resolution during clinical procedures
- One control optimizes functions such as:
  - Line density
  - Persistence
  - Pulse inversion harmonics
  - Synthetic aperture
  - Number of lines of sight (SonoCT)
  - RF interpolation
  - Parallel beamforming

3.2 Control panel

- Easy-to-learn graphical user interface with reduced number of hard controls
- Primary controls concentrated in cluster around trackball
- Tri-state control panel lighting (active, available, and unavailable)
- Ambient lighting control for optimal image viewing in both light and dark environments
- Full-color 12-inch capacitive touch screen, complete with swipe technology, enables easy navigation of controls and system interaction
- Dual function mode switch and independent gain controls for 2D, CPA, M-mode, Color, PW, CW Doppler, TDI, and 3D
- Eight-slide pot control adjustment of TGC curve
- iSCAN control for 2D/Doppler automatic optimization
- High definition/pan zoom control
- Dual mode control
- Freeze control
- Three programmable acquire controls

3.3 Touch screen

- Widescreen touch screen for dynamic presentation of controls
- Workflow-related controls (Patient, Review, Report, End Exam, Help) always present on touch screen
- Direct selection of any attached transducer
- Automatic or manual selection of Tissue Specific Presets parameters
- Tabbed layout and swipe capability for quick access to hidden controls
- Touch screen control adjustment of LGC and TGC curve with simultaneous display of image on touch screen to enhance ergonomics and reduce user steps
- Touch screen alphanumeric keyboard for text entry

4. Workflow

The Affiniti 70 ultrasound system features innovative Philips technologies that combine for outstanding performance and efficient workflow.

4.1 Ergonomics

- Advanced control panel design with fewer, clustered controls and easily accessed mode keys to reduce reach
- Tri-state lighting that provides immediate feedback of active, available, and unavailable controls
- Widescreen touch screen allows more controls to be available at a time
- Touch screen controls are grouped for quick recognition
- Many touch screen controls can also be accessed from the main display, allowing user to maintain consistent visual focus
- Independent adjustment of height, rotation, and lateral movement of monitor and control panel allowing enhanced user posture, increasing comfort during exams (meets industry standards recommendation for the prevention of WRMSD)
- Highly mobile cart that facilitates portable exams and positioning in confined space environments

4.2 Display annotation

- On-screen annotation of all pertinent imaging parameters for complete documentation, including transducer type and frequency, active clinical options and optimized presets, display depth, TGC curve, grayscale, color map, frame rate, compression map value, color gain, color image mode, hospital name, and patient demographic data
- User-selectable display of patient birth date, patient gender, institution name, system name, and user
- Fixed position title area for consistent annotation
- Patient name, ID, birth date, gender, and system date that can be turned off (hidden) for generating still images for publication
- Additional patient information can be displayed on demand
- Sector steering icon for endocavitary transducers
- Scan plane orientation marker
- User-selectable depth scale display
- Real-time display of mechanical index (MI)
- Real-time display of thermal index (TIb, TIc, TIs)
- Multiple trackball-driven annotation arrows
- Pre-defined annotations and body markers (application-specific and user-selectable), with two body markers supported in dual imaging format
- Doppler baseline invert in live and frozen imaging
- Compression changes available live or scrolling loop
- TGC curve (On/Auto/Off display)
- TGC values (On/Off display)
- Tool Tips provides a brief description of the abbreviated on-screen image parameters
- Trackball icon displaying functions assigned to trackball buttons
- Informative trackball arbitration prompts
- Thumbnail display of images printed/stored
- On-screen selection and display of calculations
- On-screen selection and editing of protocols
- Calculations results and analysis labels
- Graphical tabs that allow navigation to other analysis features
- Network and connectivity icons to allow immediate feedback about network and printer conditions
- Icons to display status of and/or allow access to the following functions: Print Job status, media read/write status, battery level, wireless connectivity, remote service, microphone, HIPAA status, iSCAN status, acquisition status, physio status
- Cineloop frame number display
- Cineloop bar with trim markers
- Prompt region for display of informational text and icons
- Trackball icon displaying functions assigned to trackball buttons
- Contrast specification
- Protocol procedure list with status

4.3 SmartExam protocols

- On-screen selection and editing of protocols
- Exam guide with on-screen display
- Required views based on exam type
- SmartExam customization
  - Creates a protocol as the user performs an exam
  - Saves all annotation, body markers, and labeled measurements defined in each view
  - Records modes used to capture each view
  - Captures the acquisition method (print, capture, 3D data set) in each individual view
  - Provides user ability to pause and resume recording process if needed
  - Allows user to edit views before finalizing the new protocol
- Fully customizable protocol capability for any clinical application supported on the system with flexibility to conduct the examination protocol in any sequence
- Preset protocols including but not limited to abdominal, vascular, cardiac, and Ob/Gyn exams based on industry and accreditation guidelines

- Automatic launching of annotation and body marker icon on required views
- Ability to automatically launch modes (2D, 3D, color modes, Doppler, dual, color compare) defined in a SmartExam
- Ability to pause and resume SmartExam function at any time
- System analysis capabilities supported in all defined protocols

4.4 Stress echo

- Acquisition of echocardiography single frame or loops of the left ventricle in any imaging mode including 2D, color, and spectral Doppler
- Gain Save that adjusts automatically to different views and automatically saves your preferred control settings, such as gain, depth, ROI, position, and many other parameters:
  - For each view while acquiring resting images
  - At immediate post-exercise, automatic retrieval of saved settings for each view
  - Different gain profiles for parasternal LAX and SAX views, AP4 and AP2 views allowed
- Length of acquired images that is user-adjustable between 1 and 180 seconds
- Ability to acquire routine cardiac images in timed and R-R interval clip (varies with selected compression ratio and available system memory)
- For timed acquisition, the ability to start acquisition on the R-wave if the ECG is active and an R-wave is present
- Your preferred control settings automatically saved – such as MI (mechanical index), gain and depth for each view while acquiring resting images
- Live Compare
- Ability to defer selection by stage
- Default stress protocols
  - Factory-provided non-editable default protocols include:
    - Two-stage exercise stress
    - Four-stage pharmacological stress
    - Three-stage exercise stress (bicycle)
    - Four-stage quantitative: wall motion and contrast
- Default protocols that may be used as the basis for user-defined versions
  - Support between 1 and 10 stages
  - Support user-defined stage names
  - Support between 1 and 40 views per stage
  - Support user-defined view names
  - Prompt for a particular stage and view
  - Assign stage and view names
  - Set clip length for each image or group of images
  - Set the number of cycles/beats for each image
  - Define prospective, retrospective, or multi-cycle/full disclosure acquisition
  - Define the capture format of each image or group of images
  - Define the default replay mode for each protocol
  - Set mode acquisition for each view
  - Support for up to five modes
  - Save user-defined protocols within a preset
  - Save user-defined protocols to removable media for import onto separate systems at the same software level
  - Modify protocols during use
  - Add stages at any point after the current stage
  - Pre and post data curves
  - Pre and post bull's-eye maps
  - Pre and post strain comparisons

4.5 Volume imaging solutions for connected radiology departments

- Customizable to your workflow
- Fast, one-button press volume acquisition and on-cart review
- Advanced volume and MPR visualization with QLAB GI 3DQ
  - iSlice and thick slice on cart
- Capability to export freehand, electronic, and hybrid acquired 3D grayscale data for visualization on most PACS in a stacked "fly-through" manner (like CT/MR)
- Off-cart evaluation of volume data on a multimodality clinical workstation
- Powerful 3D manipulation tools including volume rendering, MPR, MIP, slab viewing (thick slice), 3D orientation graphics
- Advanced 3D visualization with QLAB GI 3DQ including ability to handle 3D color flow
- Orientation labels feature for spatial orientation of 3D data sets
  - Adult orientation labels for non-fetal applications
  - Fetal orientation labels for fetal applications
- MPR export capability
  - Ability to export A, B, and C planes as a multiframe loop for review on a DICOM device
  - Available on all transducers, but not supported for any STIC files

4.6 QuickSAVE feature

- The system provides the ability to quickly save preferred system settings as individual exam types
- Over 40 QuickSAVE exams can be created per transducer
- Saved parameters include virtually all imaging parameters as well as color box size
- QuickSAVE exams can be copied to USB/DVD and transferred to other systems of like configuration

4.7 Image presentation

- Up/down
- Left/right
- Multiple duplex image formats (1/3-2/3, 1/2-1/2, 2/3-1/3, 50/50 and full screen)
- Depth from 1 cm to 30 cm (transducer-dependent)

4.8 Cineloop review

- Acquisition, storage in local memory, and display in real-time and duplex modes of up to 2,200 frames of 2D and color images, up to 64 seconds of Doppler data and M-mode for retrospective review and image selection, or up to 48 seconds CW for retrospective review and image selection
- Prospective or retrospective loop acquire "accept" prior to store or clip store
- Trackball control of image selection
- Variable playback speed
- Trim capability of 2D data
- Available in all imaging modes plus:
  - Panoramic imaging
  - 3D imaging
  - Independent control of 2D image or spectral data in duplex mode
  - Simultaneous control of 2D and spectral data in simultaneous mode
- On-screen display of current 2D frame number
- Many controls available in cineloop review for post-processing such as 2D gain, dynamic range/compress, XRES, magnify zoom

4.9 Exam management features

- Internal storage
- Data export
- Temporary ID feature
  - One-click start of exam from patient data entry screen with system-provided information
  - Storage of images that were created without a patient name with a temporary identification
  - Patient identification via bar code reader

Rapid Procedure Setup

- With a single selection, choose transducer, preset, study type, study description, and optionally gender
- Procedure definitions are built-in for built-in study types
- Additional procedure definitions may be added by the user
- Procedure may be automatically selected based on modality Worklist scheduled procedure information

4.10 Connectivity

Standard connectivity features

- Digital image acquisition and on-board patient exam storage
  - Direct digital storage of B/W and color loops to internal hard disk drives
  - Combined 512 GB storage capacity
  - Storage capacity of approximately 350 patient exams (assuming 40 images, 6 seconds of clips and reports per exam)
  - Fully integrated user interface
  - User-configurable "auto delete" capability
  - On-screen recall, measurement, and text editing
  - Exam directory
  - Append exam
  - To existing study
  - To new study using existing patient information
- Data types
  - 2D, M-mode, Doppler spectral frame acquisition
  - 2D clip acquisition up to 2,200 frames per clip
  - Scrolling M-mode, Doppler acquisition
  - Cartisian volume acquisition: 3D, 4D, STIC
  - MPR views
  - Q-Apps frames and clips
- Printing
  - Local print to on-board or off-board video printers
  - Printing of images in configurable N-up format to local plain paper printers
  - Page report print
  - DICOM grayscale or color print
- Media storage and retrieval
  - Export DICOM Image and structured report export to removable media
  - Export PC format image export to removable media
  - Export PDF report to removable media

– Supported media
  - Read and write (single session) to CD (CD+R)
  - DVD read-only (DVD+R)
  - DVD read + write (single session) (DVD+RW)
  - USB storage (flash memory or hard drives)
  - Export PC format images and loops to network share
  - Export PDF report to network share
– DICOM image import
  - Ultrasound images
  - Multimodality images (CT/MRI/X-Ray/Mammography/PET)
– OB trending data
  - Export OB trending information via USB storage device
  - Import OB trending information via USB storage device
  - Export and import of trending data is compatible with iU22

• RS-232 serial storage
  – Export of report data to off-line analysis computer programs
• Basic networking connectivity
  – Wired gigabit Ethernet
  – Wireless networking 802.11n
    - WPA2 Personal security
    - WPA2 Enterprise security
  – Network addressing
    - IPV4 addressing: static or DHCP for system address, static or hostnames (DNS lookup) for server addresses
    - IPV6 addressing: link local, router discovery, or DHCP for system address, hostnames for server addresses

NetLink connectivity option

• Supported DICOM services
  – Image storage
  – Structured Report (SR) storage includes OB/GYN, vascular, adult echo, pediatric echo, fetal echo, and congenital cardiology
  – Modality Worklist with automatic patient demographic entry
  – Modality Performed Procedure Step (MPPS)
  – Storage commitment push model
  – Query/retrieve of ultrasound images (study-root)
• Image and structured report export to network storage servers
  – Send images after each Print/Acquire
  – Send images at End of Exam (batch send)
  – Send images and report on-demand during exam
  – Send images or exams manually
  – Send to up to 5 storage SCP's concurrently (at End Exam or after each Print/Acquire)
  – Independently configurable destinations for each acquisition control (e.g., Acquire1, Acquire2, Save 3D, etc.)
• DICOM compression options
  – Uncompressed (Explicit VR Little Endian, Implicit VR Little Endian)
  – JPEG lossy compression (loops) with configurable quality factor 60-100
  – RLE lossless compression
  – JPEG lossless compression (frames)
• Other DICOM export options
  – Monochrome or true color
  – Configurable image size/loop export 640 x 480 or 800 x 600 or 1,024 x 768
  – Grayscale mapping choices
    - DICOM Grayscale Standard Display Function (GSDF)
    - 25 additional grayscale curves, user-selectable
  – Export optimization tool to aid user in evaluating PACS display monitor calibration and in selecting which grayscale curve to use for exported images
  – Native data attached to DICOM ultrasound images (lossless compressed)
    - 2D native data types: tissue, flow, tissue Doppler, spectral Doppler, M-mode, and elastography
    - 3D volume data including crop, resize, gain, compression, colorize, color suppress, B/W suppress, XRES and 3D quantification
  – Ultrasound region calibration (standard for ultrasound images)
  – Pixel spacing attribute for measurement calibration (optional)
  – DICOM query/retrieve of other modality images (CT/MRI/X-ray/mammography/PET)
  – De-identification feature
  – Send images to PACS and media without identifying information burned in to the image
  – Images exported to media may optionally have patient information removed from DICOM attributes or PC format names
  – All pages sent to DICOM printer have patient identification overlay – not configurable
• All pages sent to local printers are configurable to include or exclude patient identification overlay

5. Transducers

5.1 Transducer selection

- Electronic switching of transducers using four universal connectors
- Dedicated (Pedoff) continuous wave Doppler connector is available
- Automatic parameter optimization of each transducer for exam type through Tissue Specific Presets (TSP) software
- If two transducers are connected that both support the same TSP, the system supports instantaneous switching between transducers while maintaining current depth parameter if possible
- User-customizable imaging presets for each transducer
- Automatic dynamic receive focal optimization
- Transmission of focal characteristics automatically controlled through TSP, focal control, and DRS functions

Compact transducers

- Ergonomic designs with lightweight super-flexible cables
- Virtually pinless micro connectors
- Advanced low-loss lens technology for penetration with less artifacts
- Breakthrough broadband frequency response
- Support for very high frequencies up to 20 MHz and depths from skin line (with zoom function) to 30 cm
- Advanced micro-electronics in linear, curved, tightly curved, sector, and hybrid volume array configurations
- High-precision automated volume transducers

PureWave crystal technology

- Available on the X7-2t, S5-1, C5-1, C9-2, and C10-3v transducers
- Breakthrough crystal technology that allows greater acoustic efficiency and bandwidth

The only system in its class with PureWave imaging across all major clinical segments.

Curved array

C10-3v broadband curved array with PureWave crystal technology

- 10 to 3 MHz extended operating frequency range
- End-fire sector, 11.5 mm radius of curvature, 163° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, XRES, and harmonic imaging
- Endocavitary applications, including urology
- Elastography – strain-based
- Contrast mode
- Supports biopsy guide capabilities

C9-4v broadband curved array

- 9 to 4 MHz extended operating frequency range
- End-fire sector, 10 mm radius of curvature, 181° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, XRES, and harmonic imaging
- Endocavitary applications, including urology
- Contrast mode
- Supports biopsy guide capabilities

C10-4ec broadband curved array

- 10 to 4 MHz extended operating frequency range
- End-fire sector, 8 mm radius of curvature, 147° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, XRES, and harmonic imaging
- Endocavitary applications, including vaginal and rectal
- Contrast mode
- Supports biopsy guide capabilities

BP10-5ec broadband curved array

- 10 to 5 MHz extended operating frequency range
- End-fire bi-plane sector, 8.8 mm radius of curvature, 150° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, XRES, and harmonic imaging
- Rectal urology applications
- Supports biopsy guide capabilities

C9-2 broadband curved array with PureWave crystal technology

- 9 to 2 MHz extended operating frequency range
- End-fire sector, 45 mm radius of curvature, 102° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, XRES, and harmonic imaging
- General purpose obstetrical and gynecological, small adult, and pediatric abdominal applications
- Contrast mode
- Supports biopsy guide capabilities (4 angle)

C8-5 broadband curved array

- 8 to 5 MHz extended operating frequency range
- End-fire sector, 14 mm radius of curvature, 122° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, and XRES imaging
- Vascular, pediatric abdominal, and neonatal cephalic imaging
- Supports biopsy guide capabilities

C5-1 broadband curved array with PureWave crystal technology

- 5 to 1 MHz extended operating frequency range
- End-fire sector, 45 mm radius of curvature, 111° field of view (wide scan enabled)
- High density curved array with 160 elements
- Steerable pulsed, High-PRF, and color Doppler; and Color Power Angio (CPA), directional CPA, SonoCT, and mulitvariate harmonic imaging
- General purpose abdominal (adult and pediatric, including vascular), bowel, obstetrical, gynecological, prostate and interventional applications
- Intervention application
- Elastography – shear wave
- Contrast mode
- Supports biopsy guide capabilities

C6-2 broadband curved array

- 6 to 2 MHz extended operating frequency range
- End-fire sector, 10 mm radius of curvature, 163° field of view (wide scan enabled)
- High density curved array with 128 elements
- Steerable pulsed, High-PRF, and color Doppler; and Color Power Angio (CPA), directional CPA, SonoCT, and mulitvariate harmonic imaging
- General purpose abdominal (adult and pediatric, including vascular), bowel, obstetrical, gynecological, prostate, and interventional applications
- Intervention application
- Contrast mode
- Supports biopsy guide capabilities

Volume array

V6-2 broadband curved array

- 6 to 2 MHz extended operating frequency range
- Steerable pulsed wave, High-PRF, and color Doppler; Color Power Angio (CPA), Directional CPA, SonoCT, XRES, harmonic imaging, and STIC
- End-fire sector, 55 mm radius of curvature, 89° field of view (wide scan enabled)
- Support of high resolution 2D imaging
- Support of high resolution, quantitative, single sweep 3D volume acquisition
- Support of 4D imaging up to 25 volumes per second
- Comprehensive obstetrical volume applications
- Supports biopsy guide capabilities

3D9-3v broadband curved array

- 9 to 3 MHz extended operating frequency range
- 164° field of view (wide scan enabled)
- Support of high resolution 2D imaging
- Support of high resolution, quantitative, single sweep 3D volume acquisitions (hybrid and freehand)
- Support of 4D imaging up to 11 volumes per second
- Steerable pulsed wave and color Doppler, Color Power Angio, Directional CPA, SonoCT, XRES, and harmonic imaging
- Endovaginal obstetrical and GYN applications
- Supports biopsy guide capabilities

VL13-5 broadband linear array

- 13 to 5 MHz extended operating frequency range
- Fine pitch, 192 element, high resolution linear array
- Support of high resolution 2D imaging
- Support of high resolution, quantitative, single sweep 3D volume acquisition
- Support of 4D imaging
- Steerable pulsed wave and color Doppler, Color Power Angio, SonoCT, XRES, and harmonic imaging
- High resolution superficial applications including small parts, breast, and vascular imaging
- Tissue aberration correction selection for advanced breast imaging TSP
- Supports biopsy guide capabilities

Linear array

L18-5 broadband linear array

- 18 to 5 MHz extended operating frequency range
- Ultra-fine pitch, 288 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, XRES, and harmonic imaging
- High resolution superficial applications including small parts, breast, vascular, and musculoskeletal imaging
- Tissue aberration correction selection for MSK and breast imaging TSP
- Auto Doppler flow optimization
- Supports biopsy guide capabilities

L15-7io broadband compact linear array

- 15 to 7 MHz extended operating frequency range
- Unique lens design allowing high resolution imaging at transducer surface
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, and XRES imaging
- High resolution intraoperative vascular, epiaortic, and superficial (MSK and small parts) applications
- Auto Doppler flow optimization
- Fine angle steering of color and pulsed wave Doppler

L12-5 50 broadband linear array

- 12 to 5 MHz extended operating frequency range
- Fine pitch, 256 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, XRES, and harmonic imaging
- High resolution superficial applications including small parts, breast, vascular, musculoskeletal, and bowel imaging
- Tissue aberration correction selection for advanced MSK and breast imaging TSP
- Auto Doppler flow optimization
- Elastography – strain-based
- Contrast mode
- Panoramic imaging
- Pediatric application
- High frame rates available
- Supports biopsy guide capabilities

L12-3 broadband linear array

- 12 to 3 MHz extended operating frequency range
- Fine angle steering of color and pulsed wave Doppler
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, XRES, and harmonic imaging
- Vascular (carotid, arterial, and venous), intervention, bowel, MSK and small parts, and superficial imaging applications
- Cerebrovascular (carotids, vertebrals), peripheral vascular (venous, arterial), internal mammary vessels, and musculoskeletal imaging
- Surgical application
- Auto Doppler flow optimization
- Supports biopsy guide capabilities
- Contrast mode

L12-4 broadband linear array

- 12 to 4 MHz extended operating frequency range
- Fine angle steering of color and pulsed wave Doppler
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, XRES, and harmonic imaging
- Vascular (carotid, arterial, and venous), intervention, bowel, MSK and small parts, and superficial imaging applications
- Cerebrovascular (carotids, vertebrals), peripheral vascular (venous, arterial), internal mammary vessels, and musculoskeletal imaging
- Surgical application
- Auto Doppler flow optimization
- Supports biopsy guide capabilities
- Contrast mode

Sector array

S4-2 broadband sector array

- 4 to 2 MHz extended operating frequency range
- Phased array, 80 elements
- 2D; CW, steerable pulsed wave, High-PRF and color Doppler; tissue Doppler, XRES, AutoSCAN/iSCAN, and harmonic imaging
- Adult echo, abdominal, pediatric echo, and TCD applications
- Contrast mode

S5-1 broadband sector array with PureWave crystal technology

- 5 to 1 MHz extended operating frequency range
- Phased array, 80 elements
- 2D; CW, steerable pulsed wave, High-PRF and color Doppler; tissue Doppler, XRES, AutoSCAN/iSCAN, and harmonic imaging
- Adult echo, abdominal, pediatric echo, and TCD applications
- Contrast mode

S8-3 sector array

- 8 to 3 MHz extended operating frequency range
- Phased array, 96 elements
- 2D, steerable PW Doppler, CW Doppler, High-PRF Doppler, color Doppler, tissue Doppler, advanced XRES, and harmonic imaging
- Adult, fetal, and pediatric echo cardiac applications; pediatric abdomen; neonatal head application

S12-4 sector array

- 12-4 MHz extended operating frequency range
- Phased array, 96 elements
- 2D, steerable PW Doppler, CW Doppler, High-PRF Doppler, color Doppler, tissue Doppler, advanced XRES, and harmonic imaging
- Pediatric cardiac applications, neonatal head application

S7-3t sector array TEE

- 7 to 3 MHz extended operating frequency range
- Transesophageal sector array with 48 elements
- Physical dimensions:
  - Tip: 10.7 x 8 x 27 mm (0.42 x 0.31 x 1.1 in)
  - Shaft: 7.4 mm (0.29 in) diameter, 70 cm (27.6 in) L
- Manually rotatable array from 0° to 180°
- 2D, steerable PW Doppler, CW Doppler, color Doppler, XRES, and harmonic imaging
- Pediatric and adult TEE applications: patients >3.5 kg (7.7 lb)

X7-2t xMATRIX array TEE with PureWave technology

- 7 to 2 MHz extended operating frequency range
- Transesophageal xMATRIX array transducer with 2,500 elements
- Physical dimensions:
  - Tip: 1.7 x 3.8 cm (0.7 x 1.5 in) WxL
  - Shaft: 1 cm (0.4 in) diameter, 1 m (39.4 in) L
- Electronically rotatable array from 0° to 180°
- Electrocautery suppression
- 2D, advanced XRES, harmonic imaging, M-mode, color M-mode, color flow, PW Doppler, CW Doppler
- Adult TEE applications: patients >30 kg (66 lb)

Non-imaging

D5cwc CW transducer (Pedoff)

- Dedicated 5 MHz continuous wave Doppler
- Deep venous and arterial applications

D2cwc CW transducer (Pedoff)

- Dedicated 2 MHz continuous wave Doppler
- Adult cardiology applications

D2tcd PW transducer (Pedoff)

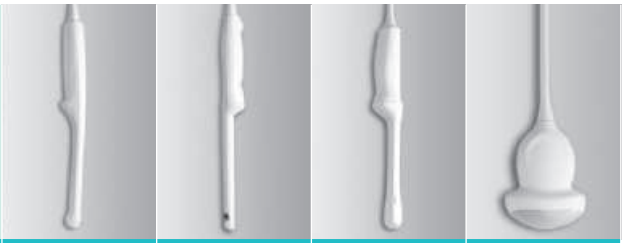
- Dedicated 2 MHz pulsed wave Doppler
- Transcranial Doppler applications

5.2 Transducer application guide

Transducer – Sector		S5-1	S4-2	S7-3t	S8-3	S12-4	X7-2t
Type of array		Sector	Sector	Sector	Sector	Sector	xMATRIX
Number of elements		80	80	48	96	96	2500
Scanplane aperture		20.3 mm	20.3 mm	5 mm	15.4 mm	9.78 mm	Proprietary
Field of view		90˚	90˚	90˚	90˚	90˚	90˚
Volume field of view							
Broadband frequency range		5-1 MHz	4-2 MHz	7-3 MHz	8-3 MHz	12-4 MHz	7-2 MHz
PureWave technology		●					●
Application	**Exam type**						
Abdominal	General						
	Renal						
	Bowel						
	Vascular	●	●				
	Penetration						
	Resolution						
	Intervention						
Obstetrics	Early						
	General						
	NT						
	Penetration						
Fetal echo	Early fetal heart						
	Fetal heart				●		
Gynecology	Pelvis						
	Fertility						
	Penetration						
Adult cardiology	Adult	●	●	●	●		●
	Epicardial						
	Epiaortic						
Pediatric cardiology	Pediatric	●	●	●	●	●	
Vascular	Carotid						
	Arterial						
	Venous						
	TCD	●	●				
	Intraoperative						
	Intervention						
	Superficial						
Pediatric general imaging	Abdomen				●	●	
	Hip						
	Neonatal head				●	●	
Small parts	Superficial						
	General						
	Thyroid						
	Testicle						
	Breast						
Musculoskeletal	Superficial						
	General						
Urology	Prostate						
	Bladder						
	Renal						
Biopsy guide		●	●				

Transducer – Curved		C5-1	C6-2	C8-5	C9-2	C10-3v	C10-4ec
Type of array		Curved	Curved	Tightly curved	Curved	Tightly curved	Tightly curved
Number of elements		160	128	128	192	128	128
Scanplane aperture		55.5 mm	63.7 mm	22.4 mm	53.76 mm	26.1 mm	24.3 mm
Field of view		111°	95°	122°	102°	163°	147°
Volume field of view							
Broadband frequency range		5-1 MHz	6-2 MHz	8-5 MHz	9-2 MHz	10-3 MHz	10-4 MHz
PureWave technology		●			●	●	
Application	**Exam type**						
Abdominal	General	●	●		●		
	Renal	●	●		●		
	Bowel	●	●		●		
	Vascular	●	●		●		
	Penetration	●	●		●		
	Resolution	●			●		
	Intervention	●	●				
Obstetrics	Early	●	●		●	●	●
	General	●	●		●	●	
	NT	●	●		●		
	Penetration	●	●				
Fetal echo	Early fetal heart				●		
	Fetal heart	●	●		●	●	●
Gynecology	Pelvis	●	●		●	●	
	Fertility	●	●		●	●	
	Penetration					●	
Adult cardiology	Adult						
	Epicardial						
	Epiaortic						
Pediatric cardiology	Pediatric						
Vascular	Carotid			●			
	Arterial			●			
	Venous			●			
	TCD						
	Intraoperative						
	Intervention						
	Superficial						
Pediatric general imaging	Abdomen	●	●	●	●		
	Hip						
	Neonatal head			●			
Small parts	Superficial						
	General						
	Thyroid						
	Testicle						
	Breast						
Musculoskeletal	Superficial						
	General						
Urology	Prostate	●	●				●
	Bladder					●	
	Renal						
Biopsy guide		●	●	●	●	●	●

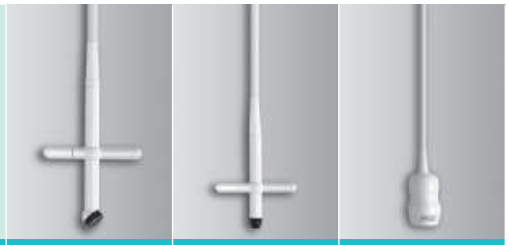
5.2 Transducer application guide (continued)



Transducer – Curved		C9-4v	BP10-5ec	3D9-3v	V6-2
Type of array		Tightly curved	Tightly curved	Tightly curved	Curved
Number of elements		128	96	128	192
Scanplane aperture		26.2 mm	19.6 mm	26.1 mm	63.4 mm
Field of view		181°	150°	130°	
Volume field of view			127° on each biplane array	156° x 85°	100° x 85°
Broadband frequency range		9-4 MHz	10-5 MHz	9-3 MHz	6-2 MHz
PureWave technology					
Application	**Exam type**				
Abdominal	General				
	Renal				
	Bowel				
	Vascular				
	Penetration				
	Resolution				
	Intervention				
Obstetrics	Early	●		●	●
	General	●			●
	NT				●
	Penetration				
Fetal echo	Early fetal heart				
	Fetal heart	●		●	●
Gynecology	Pelvis	●		●	
	Fertility	●			
	Penetration	●		●	
Adult cardiology	Adult				
	Epicardial				
	Epiaortic				
Pediatric cardiology	Pediatric				
Vascular	Carotid				
	Arterial				
	Venous				
	TCD				
	Intraoperative				
	Intervention				
	Superficial				
Pediatric general imaging	Abdomen				
	Hip				
	Neonatal head				
Small parts	Superficial				
	General				
	Thyroid				
	Testicle				
	Breast				
Musculoskeletal	Superficial				
	General				
Urology	Prostate		●		
	Bladder	●	●	●	
	Renal				
Biopsy guide		●	●	●	●

Transducer – Linear		L12-3	L12-4	L12-5	L15-7io	L18-5	VL13-5
Type of array		Linear	Linear	Linear	Linear	Linear	Linear
Number of elements		160	128	256	128	288	192
Scanplane aperture		38 mm	34 mm	50 mm	23 mm	38.9 mm	38.4 mm
Field of view							38.4 mm (non-wide scan)
Volume field of view							38 mm x 30°
Broadband frequency range		12-3 MHz	12-4 MHz	12-5 MHz	15-7 MHz	18-5 MHz	13-5 MHz
PureWave technology							
Application	**Exam type**						
Abdominal	General						
	Renal						
	Bowel	●	●	●			
	Vascular						
	Penetration						
	Resolution						
	Intervention						
Obstetrics	Early						
	General	●	●	●			
	NT						
	Penetration						
Fetal echo	Early fetal heart						
	Fetal heart						
Gynecology	Pelvis						
	Fertility						
	Penetration						
Adult cardiology	Adult						
	Epicardial				●		
	Epiaortic				●		
Pediatric cardiology	Pediatric						
Vascular	Carotid	●	●	●	●	●	●
	Arterial	●	●	●	●	●	
	Venous	●	●	●	●	●	
	TCD						
	Intraoperative				●		
	Intervention	●	●				
	Superficial	●	●	●	●		
Pediatric general imaging	Abdomen	●	●	●	●	●	
	Hip	●	●	●		●	
	Neonatal head	●	●				
Small parts	Superficial	●	●	●	●	●	
	General	●	●				●
	Thyroid			●		●	●
	Testicle			●		●	
	Breast	●	●	●		●	●
Musculoskeletal	Superficial			●	●	●	
	General	●	●	●		●	
Urology	Prostate						
	Bladder						
	Renal						
Biopsy guide		●	●	●		●	●

5.2 Transducer application guide (continued)



Transducer – Non-imaging		D2cwc	D5cwc	D2TCD
Type of array				
Number of elements				
Scanplane aperture				
Field of view				
Volume field of view				
Broadband frequency range				
PureWave technology				
Application	**Exam type**			
Abdominal	General			
	Renal			
	Bowel			
	Vascular			
	Penetration			
	Resolution			
	Intervention			
Obstetrics	Early			
	General			
	NT			
	Penetration			
Fetal echo	Early fetal heart			
	Fetal heart			
Gynecology	Pelvis			
	Fertility			
	Penetration			
Adult cardiology	Adult	●		
	Epicardial			
	Epiaortic			
Pediatric cardiology	Pediatric			
Vascular	Carotid		●	
	Arterial		●	
	Venous		●	
	TCD			●
	Intraoperative			
	Intervention			
	Superficial			
Pediatric general imaging	Abdomen			
	Hip			
	Neonatal head			
Small parts	Superficial			
	General			
	Thyroid			
	Testicle			
	Breast			
Musculoskeletal	Superficial			
	General			
Urology	Prostate			
	Bladder			
	Renal			
Biopsy guide				

6. Measurements and analysis

6.1 Measurement tools and general description

- 2D distance
- 2D circumference/area by ellipse, continuous trace, trace by points
- Auto conversion of distance to ellipse
- 2D curved-linear distance
- 2D angle: intersection of two lines
- In 2D, three distance or distance and ellipse tools to calculate volume
- In 2D, hip angle tool and d,D ratio tool
- In 2D, percent area reduction and percent diameter reduction tools
- In 2D, Simpson tool calculate LV (left ventricle) area and volume
- In 2D, area-length tool used to calculate LA (left atrium) area and volume
- In 2D, biplane volume calculation
- In 2D, comparison tool available in contrast and elastography applications
- PISA calculation available in cardiac applications
- 3D: ellipse and distance on 2 MPR views
- 3D: stacked contours on one MPR
- M-mode distance (depth, time, slope)
- M-mode heart rate calculation
- Manual Doppler distance
- Manual Doppler trace
  - Cardiac trace tool generates Vmean, Vmax, MeanPG, MaxPG, VTI
  - General imaging trace tool generates PSV (peak systolic velocity), EDV (end diastolic velocity), MDV (minimum diastolic velocity), TAPV (time averaged peak velocity), TAMV (time averaged mean velocity), RI (resistive index), PI (pulsatility index), S/D (systole/diastole) ratio, and heart rate
- Time/slope measurements in Doppler and M-mode
- High Q automatic Doppler analysis (general imaging only)
  - Automatically calculates PSV, EDV, MDV, TAPV, TAMV, RI, PI, S/D ratio, and heart rate
  - Functions in live or frozen imaging
- RA (right atrium systolic) Pressure tool
- Stiffness measurement available in elastography applications

6.2 Measurement tools and quantification

QLAB quantification software

- On-cart and off-cart access
- Customize capabilities via optional plug-ins

General Imaging 3D Quantification (GI 3DQ) plug-in

- 3D/4D viewer for Ob/Gyn and general imaging including interventional applications
- Review of 3D/4D, color 3D, and STIC files
- Multiplanar reconstruction (MPR)
- iSlice and curved iSlice precision volume slicing capability
  - Display of 2D/color slices from static or live volume
  - User-selectable slice display: 4, 9, 16 or 25
  - User-selectable interval spacing
  - User-selectable slicing depth
  - User-selectable slicing source (x, y or z)
- Free rotation of any source
- Full cineloop review control
- 2D grayscale display adjustments
- Color display adjustments
- Zoom control
- Cine/pan slice control through volume
- User-selectable image storage
- Quick launch to measurements
  - Auto ruler display
- Compatible with freehand and automated volumes
- 2D and 3D measurement tool including distance, area, angle, auto volume, stacked and auto contour, and ellipsoid measurements
  - Invert mode
  - Vascularization index, flow index and vascularization flow index results on 3D color mode data sets
  - Pixel intensity index
- Contrast timer marker on Affiniti 70 data sets saved with contrast timer
- Orientation labels display on Affiniti 70 data sets saved with orientation label marker
- XRES speckle noise reduction of MPR and volume displays
- Assisted auto-trace volume measurement tools for stacked contours and ellipse methods
- Edge detection selection for hypoechoic or high contrast targets
- Auto volume tool

Intima Media Thickness (IMT) Quantification plug-in

- Automated assessment of the IMT on user-selected frames
- For carotid and other superficial arteries

MicroVascular Imaging (MVI) plug-in

- Integration and processing of images in contrast specific imaging mode providing detection and display of very low velocity flows of very low signal amplitude
- Motion compensation for multiframe objects

Region of Interest (ROI) Quantification plug-in

- Pixel intensity index – pixel intensity analysis, data types: echo, velocity
- Pixel intensity analysis, data types: echo, velocity (color) or power (angio)
- Up to 10 user-defined regions
- Thumbnail display of frames for easy trimming
- TDI velocity timing measurement
- Log/linear data display selection
- Smoothed data display option with various curve fitting techniques
- Vascularization index, flow index, and vascularization flow index results on color mode files
- Motion compensation for multiframe objects

Vascular Plaque Quantification (VPQ) plug-in

- 3D technology to visualize and quantify vascular plaque
- Streamlined workflow through protocol-based task guidance
  - Protocol can be turned off and on dependent upon user experience
- Automatically calculates and displays vessel and plaque boundaries for each frame
  - Outer Wall and Inner Wall ROIs automatically generated for all frames between begin and end frames
  - Plaque boundary automatically generated
  - Boundaries can be adjusted manually by user
- Analysis data presented on image
  - Total plaque volume calculated (mm^3)
  - Maximum percent area reduction calculated per-frame values: plaque/lumen/wall areas, and plaque echo intensity
- Tool tips for analysis data explanation
- Analysis data shown on the graph
  - Lumen area
  - Plaque area
  - Percent reduction over vessel length
- Data exported in Excel or DICOM SR formats
- Supports monochrome, single-volume 3D volumes acquired with the VL13-5 transducer
- Measurement data exported in Excel or DICOM SR formats

Strain Quantification (SQ) plug-in

- Tissue Doppler Imaging (TDI) velocity quantification
  - Used in the evaluation of regional myocardial function
- Measures the myocardial velocity from color TDI data set and derives the displacement, strain, and strain rate along user-defined M-lines
- Cardiac phases display (overlay of AVO, AVC, MVO, and MVC mechanical events auto-imported from ultrasound cart analysis via DICOM SR or manual entry) on SQ curves for left ventricle mechanical events
- User-selectable waveform display that makes SQ curves easy to read
  - User-defined M-line motion to follow the myocardial motion
- Point of Interest (POI) tool that obtains values from any point on the M-mode display
- M-mode (hide or display) control
- User-defined and automatic (using speckle tracking algorithms) M-line motion compensation to follow myocardial motion
- Able to present TDI results in two display formats
  - Anatomical M-mode display
  - Graph display
- User-selectable waveforms for optimal sub-region visualization
- Curve processing modes
- TDI velocity, displacement, strain, and strain rate timing measurements with dedicated time calipers and labels
  - Automatic subdivision of M-line into a customizable number of sub-regions
  - Averages up to 20 cardiac beat cycles in both M-mode and graph displays

Automated Cardiac 2DQ Quantification[A.I.] (a2DQ[A.I.]) plug-in

- Available two workflows with dedicated preferences settings
  - aEF/FAC workflow
  - aTMAD workflow (Automated Tissue Motion Annular Displacement)
- Automated Region of Interest for selected anatomical views
- Tracking can be initiated from any frame and beat to beat
- Intuitive step-by-step user interface
- Multiple cardiac view/images capable
- Color Kinesis (CK) overlay for color-coded visualization and overlay transparency control
- Manual user-editable timing overrides for the onset and duration of the CK parametric display
- Simplified workflow with SmartExam
- Cardiac phases display (overlay of AVO, AVC, MVO, and MVC mechanical events auto-imported from ultrasound cart analysis or manual entry)
- Measurement data export
- Available for live image
- Timing calipers for event measurement
- Flexible UI show-and-hide
- aEF/FAC workflow
  - Latest generation of 2D speckle tracking technology
  - Left ventricle global volume and area analysis from 2D single images
  - Computation of area, LV volumes, and advanced parameters for LV systolic and diastolic function including fractional area change (FAC), ejection fraction (EF), peak ejection rate (PER), peak rapid filling rate (PRFR), and atrial filling fraction (AFF)
  - Volume measurements based on Simpson's Single Plane Method of Disks (MOD)
- aTMAD workflow
  - Mitral valve and other valve annular motion tracking over time
  - Computation of valve annular displacement curves over time

Automated Cardiac Motion 2D Quantification[A.I.] (aCMQ[A.I.]) plug-in

- Available three workflows with dedicated preferences settings
  - Global workflow
  - User-defined workflow
  - aTMAD workflow (Automated Tissue Motion Annular Displacement)
- Automated Region of Interest for selected anatomical views
- Tracking can be initiated from any frame and beat to beat
- Intuitive step-by-step user interface
- Multiple cardiac view/images capable
- Color Kinesis (CK) overlay for color-coded visualization and overlay transparency control
- Manual user-editable timing overrides for the onset and duration of the CK parametric display
- Simplified workflow with SmartExam
- Measurement data export
- Cardiac phases display (overlay of AVO, AVC, MVO, and MVC mechanical events auto-imported from ultrasound cart analysis or manual entry)
- Timing calipers for event measurement
- Flexible UI show-and-hide
  - Global workflow
  - Latest generation of 2D speckle tracking technology for 2D single plane image
  - Objective assessment of left ventricle global function and regional wall motion, deformation, and timing
  - Left ventricle global volume analysis from 2D single plane images
  - Volume measurements based on Simpson's Single Plane Method of Disks (MOD)
  - Automatic aortic valve closure time detection on AP3
  - Smooth color transited or solid color bull's-eye presentation
  - AHA/ASE 17 left ventricle segmentation templates (three apical views and three short-axis view templates
  - Easy-to-edit template position and shape
  - Tracking quality tool – editable threshold helps to display various quality tracking
  - User-editable post LV segments display – consistent display with corresponding waveform and reported values beat-to-beat selection
  - Automatic or manual peak systolic time/value measurement for longitudinal/circumferential strain
  - Simplified global result displaying bi-plane volume/EF, strain for each view, global strain, and AHA/ASE 17 LV segment bull's-eye plot
  - 2D speckle parameters
    - Volume/EF and area/FAC
    - Longitudinal strain and strain rate
    - Circumferential strain and strain rate
    - Radial and transversal displacement
    - Radial fractional shortening
    - Radial velocity
    - Speed (absolute angle independent velocity)
    - Regional rotation and rotation velocity
    - Global rotation (SAX)
- User-defined workflow for specific local strain analysis
  - Up to 17 dedicated colors to help differentiate each cord and corresponding waveform
  - Up to three waveform auto peak detections to report time to peak and peak values
- aTMAD workflow (refer to a2DQ[A.I.])
  - Mitral valve and other valve annular motion tracking over time
  - Computation of valve annular displacement curves over time

Elastography Quantification (EQ)

- Available in both single screen and side-by-side display modes
- Ability to generate up to 10 user-defined regions of interest (ROIs)
- Thumbnail display of frames
- Measurement results
- Strain rate
- Total strain
- Size comparison between two ROIs
- Strain ratio
- Calculation of maximum strain ratio
- Calculation of average strain ratio
- Calculation of ratio between two user-defined ROIs
- Graphical display
- Strain ratio parametric image
- Color-coded display of strain ratios with parametric imaging

Fetal Heart Navigator

- Protocol-driven workflow
  - Automates the initial ductal arch view
  - Guides user in obtaining view recommended in ISUOG Fetal Cardiac Screening Guidelines
  - Obtains the fetal heart views: 4-chamber, LVOT, and RVOT
- Supports V6-2 STIC data sets containing eight or more frames
- Presets supported:
  - OB difficult, OB early, OB fetal echo, OB fetal echo CV, OB general, OB max pen
- Visualization controls allow users to change display settings at any stage in the protocol
  - Chroma Map
  - Gray Map
  - Slice thickness
  - Brightness

6.3 High Q automatic Doppler analysis

- Automatic real-time and retrospective tracing of:
  - Immediate peak velocity
  - Immediate intensity-weighted mean velocity
- Automatic real-time display of (user-selectable up to six):
  - Volume flow
  - Time-averaged peak velocity
  - Time-averaged mean velocity
  - Resistive index
  - Pulsatility index
  - Systolic/diastolic ratio
  - Acceleration/deceleration times
  - Illustrated High Q

6.4 Clinical option analysis packages

- Cardiac analysis
  - Volume by area/length method
  - M-mode ejection fraction (via Teichholz or cubed method)
  - Novel 3-point adjustable Simpson's template
  - Simpson's biplane and single plane volume and ejection fraction
  - Area, length, volume, and ejection fraction
  - LV mass
  - 2D all points
  - M-mode all points
  - Peak velocity
  - Maximum and mean pressure gradients
  - Pressure half time
  - E/A ratio
  - D/E slope
  - Continuity equation
  - Diastolic function
  - Cardiac output
  - Acceleration time
  - Heart rate
- Vascular analysis
  - Right and left carotid artery protocols
  - ICA/CCA ratio
  - Bilateral lower extremity arterial and venous labels
  - Bilateral upper extremity arterial and venous labels
  - Percent diameter and area reduction
  - Vascular graft measurement package
  - User comments
  - High Q automatic Doppler analysis
- OB analysis
  - Fetal echo application
  - Fetal biometry (up to quintuplets)
  - Biophysical profile
  - Amniotic fluid index
  - Early gestation
  - Fetal long bones
  - Fetal cranium
  - Other OB measurements
    - 2D echo
    - Fetal heart M-mode
    - Fetal Doppler
    - Fetal echo
- Gynecology/fertility
  - Uterine volume
  - Right and left ovary volumes
  - Right and left follicles (10)
  - Endometrial thickness
  - Cervical length
- Abdominal vascular
  - Labels for all major abdominal arteries and veins
  - Left and right segmentation for kidneys
- General imaging
  - General
  - User-defined labels
- Prostate
  - Prostate gland
- Pediatric
  - General
  - d:D radio
- Small parts
  - General
  - Breast with right and left protocols for up to five lesions per breast

7. Physical specifications

Physical dimensions

Width	57.2 cm (22.5 in)
Height	142.2 cm–162.6 cm (56–64 in)
Depth	98.3 cm (38.7 in)
Weight	83.6 kg (184.4 lb) without peripheral devices

System cart

- State-of-the-art ergonomic design for comfort and convenience
- Easy maneuverability and mobility
  - Wheel-lock and monitor adjustments that facilitate bedside exams
- Independent height adjustment of control panel and display monitor
- Easily accessed transducer connector ports, USB, and DVD media drive
- Transducer and gel bottle holders
- Unique easy-clip cable management solution that keeps cables tangle- and damage-free while decreasing cable strain for improved comfort while scanning
- Mobility through high quality, shock-absorbing casters with foot pedal controls for:
  - 4-wheel swivel
  - 2-wheel swivel lock
  - 2-wheel brakes
- Integrated footrests
- Digitally enhanced two-speaker high fidelity stereo output with rear-mounted subwoofer
- On-board storage tray behind control panel touch screen and in rear bay storage drawer
- On-board printer bay that provides easy and ergonomic access to your printing device
- Universal peripheral bay that provides easy access for on-board hardcopy or documentation devices
- Built-in A/C line conditioner that provides isolation from voltage fluctuations and electrical noise interference
- Two high-capacity fans with decreased audible noise

Monitor

- Flat panel LCD display monitor
  - 54.6 cm (21.5 in) wide format high definition flat panel TFT/IPS display
  - High contrast ratio >1000:1
  - Extended viewing angle >178° (horizontal and vertical)
  - Response time: <14 ms
  - Virtually flicker-free technology
  - Mounted on fully articulating extension arm
  - Four-way articulation with 87.6 cm/34.5 in lateral and 17.8 cm/7 in vertical adjustment range
    - Nearly infinite positioning adjustments: height, swivel, and tilt

Control panel

- Articulation facilitates nearly infinite positioning adjustments for optimum scanning ergonomics: height, swivel, and tilt
  - Up and down 20.3 cm/8 in
  - Rotates 180° from center
  - Palm rest

Physio

- One 3-lead ECG input
  - Gain, sweep rate, and display position controls
  - Automatic heart rate calculation and display
  - Fault condition display
  - Cineloop locator displayed on one ECG input from an ECG source like stress ECG or ECG monitor

Peripherals

- The system supports up to two on-board peripheral devices (excluding report printers)
  - Video-recording peripherals, operated via system user interface
  - DVD recorder (cart-dependent)
  - Small format digital B/W printer (USB)
- Support for large format external B/W or color printer
- Support for various Hewlett-Packard, Epson, and Xerox brand color and monochrome report printers (USB, externally mounted)

Input/output ports

- Export of measurement and analysis data to off-line reporting software packages (USB) and RS-232
- Display port video export available for either full screen resolution of 1920x1080 (1080p), display area 1024x768 VGA, or S-Video in NTSC or PAL format

Power requirements and video parameters

- 100V-240 V, 50 Hz/60 Hz – PAL/NTSC
- Integrated A/C line conditioning and battery back-up system
- Power consumption: <289 VA depending on system configuration

Electrical safety standards

- Electromechanical Safety Standards met
  - CAN/CSA 22.2 No. 60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
  - IEC 60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
  - IEC 60601-1-2, Collateral Standard, Electromagnetic compatibility – requirements and tests
  - IEC 60601-2-37, Particular Requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
  - ANSI/AAMI ES60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
- Electromechanical Safety Standards met (EU Only)
  - EN60601-2-37, Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
- Agency approvals
  - Canadian Standards Association (CSA)
  - CE Mark in accordance with the European Medical Device Directive issued by British Standards Institute (BSI)

8. Maintenance and services

Maintenance

- Flexible Service Agreements to meet varied customer needs and budgets
- Centralized technical and clinical support
- On-site support
- Modular design for rapid repairs
- Easy customer access to trackball and air filter for cleaning
- Remote log file transfer
- On-cart software maintenance tools
  - Optimization
  - Maintenance
  - Repair
  - Configuration management
- Comprehensive diagnostics
  - Hardware
  - Software
  - Network
  - On-cart electronic transducer testing
- First responder access to diagnostics and utilities
- Spare parts availability for 10 years from end of production

Services

Clinical education*

- Webinars
- Symposiums
- On-site
- Class room
- Remote

Philips Remote Connectivity*

- iSSL and encryption
- Patient de-identify
- Security
- Remote Desktop
  - – Remote technical support
  - – Remote clinical support
  - – Remote clinical education
- On-cart remote support request
- Proactive monitoring with alerting capability
  - – Monitors key system parameters
    - Voltage
    - Temp
    - Fan speeds
    - Error conditions
    - Local alert handling and response

Warranty

- Philips standard product warranty

*Service agreement required for access to Philips Remote Services. Access to the Internet required. Not all remote features available in all countries; contact your Philips representative for details.

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How to reach us
www.philips.com/healthcare
healthcare@philips.com

Asia
+49 7031 463 2254

Europe, Middle East, Africa
+49 7031 463 2254

Latin America
+55 11 2125 0744

North America
+1 425 487 7000
800 285 5585 (toll free, US only)

Please visit www.philips.com/Affiniti

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