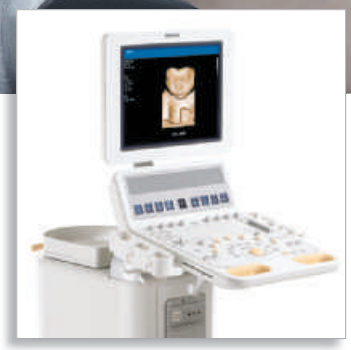

Changing your idea of clinical performance

Philips HD15 ultrasound system specifications

PHILIPS

sense and simplicity

Table of contents

1. Introduction

With its stunning images and efficiency-enhancing features, the HD15 performs unlike any other system in its class–but without the price tag to match. It packs advanced imaging technology in a small footprint, while also delivering workflow benefits that help busy facilities effectively manage their patient loads wherever first-class imaging performance is needed.

Superbly designed, versatile, and maneuverable, this system will impress those unwilling to compromise either image quality or simplicity of use.

Key Advantages

- Stunning images that spur diagnostic confidence
- Innovative patient load management support to minimize steps and speed exams and analysis
- Outstanding performance in a variety of applications and clinical settings

1.1 Applications

Abdominal
Small parts and superficial
Pediatric
Musculoskeletal
Obstetrical
Gynecological and fertility
Neonatal
Urology
Nerve
Prostate
Vascular
– Cerebrovascular
– Peripheral vascular
– Intraoperative vascular
– Transcranial Doppler
Contrast imaging
– Abdominal
– Cardiac (LVO)
Cardiac
– Adult
– Pediatric
– Transesophageal
– Stress Echo
Emergency medicine
Regional anesthesia
Critical care

1.2 Standard features

2D Imaging
Philips Color Power Angio Imaging (CPA)
M-mode
Anatomical M-mode
Pulsed Wave (PW) Doppler
Continuous Wave (CW) Doppler
Color Doppler
Tissue Harmonic Imaging (THI)
Tissue Doppler Imaging (TDI)
Trapezoidal Imaging
Freehand 3D and MPR Imaging
Cineloop review
Advanced XRES adaptive image processing
iSCAN one-touch intelligent optimization
Active native data

1.3 Optional features

Contrast Imaging
SonoCT Real-time Compound Imaging
Panoramic Imaging
DICOM networking
DICOM structured reporting
Stress echo
Automated 3D, 4D, and MPR Imaging
Fetal STIC Imaging
QLAB advanced quantification plug-ins
Philips Remote Services Network


Large flat panel LCD monitor with thumbnail displays and integrated lateral articulation
Advanced Philips imaging technologies (SonoCT, XRES, THI)
Adjustable control panel and monitor (height and swivel)
Quick keys with dynamic display of active modes
iSCAN one-touch optimization
USB port
Transducer caddy
DVD/CD-RW drive
Slim, compact frame
Electronic switching of up to four transducers
Four-way swivel wheels

2. System overview

2.1 Architecture

- All-digital broadband beamformer, built for 2D, Dual, 3D/4D, MPR and Panoramic imaging capability
  - Designed to support linear, curved, tightly curved and sector array configurations
- Next generation high speed, high resolution A/D conversion
- Philips MicroFine EX 2D focusing with Dynamic Focal Tuning
- 256 (8 bits) Gray shades in 2D, M-mode and Doppler spectral analysis
- 170 dB full time input dynamic range
- 18,432 digitally-processed channels
- 2D frame rates greater than 1060 frames per second
- Color frame rates greater than 370 frames per second
- 4D volume frame rates greater than 40 volumes per second
- Continuously variable steering in 2D, color and Doppler modes
- Built-in A/C line conditioner provides isolation from voltage fluctuation and electrical noise interference
- Internal high-capacity impeller fans with automatic speed adjustment to optimize cooling efficiency with minimal audible noise

2.2 Imaging modes

2D Imaging

- Available on all imaging transducers
- MicroFine EX 2D Focusing with Dynamic Focal Tuning
- 2D optimization control
- 8-level digital reconstructed zoom with pan (read zoom)
- Philips High Definition write zoom
- Image orientation marker
- Philips cineloop image review (up to 1,000 B/W frames)
- Persistence, adjustable in real time and cineloop review
- Selectable compression curves
- Sector size and steering control
- Selectable line density
- Up to eight transmit focal zones plus separation control
- Dual imaging (single and two buffer)
- Philips Chroma imaging with multiple color maps

Tissue Harmonic Imaging (THI)

- Available on all imaging transducers except C8-5 and L15-7io
- System processing of second harmonic frequencies (nonlinear energy) in tissue
- Pulse Inversion Harmonic mode incorporates patented pulse inversion phase cancellation technology for maximum detail resolution during harmonic imaging
- Extends high performance imaging capabilities to all patient body types
- Image display virtually free of artifacts

Expanded field of view

- Available on all imaging transducers
- Panoramic imaging
  - Extended field of view composite imaging
  - Full zoom, pan, cineloop review, and image rotation capabilities
  - Magnification of Panoramic images
- Trapezoidal imaging
  - Expands field of view on linear array transducers up to 15° on each side in vascular and general imaging applications

Philips Color Power Angio Imaging (CPA)

- Available on all imaging transducers
- Highly sensitive mode for small vessel visualization
- Fully user-configurable
- Cineloop review
- User-definable presets
- Multiple maps including directional CPA
- 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 blend levels
- TGC control
- Write priority

Doppler

- Available on all imaging transducers
- Display annotation including Doppler mode, scale (cm/sec or kHz), pulse repetition frequency, wall filter setting, gain, acoustic output status, sample volume size, normal/inverted, angle correction, grayscale curve
- Adaptive Doppler boosts weak signals to improve spectrum visibility and enhances pulsed-wave audio signals for precise flow assessment
- Intelligent Doppler imaging – automatically maintains optimal angle-to-flow to assist in delivering accurate and consistent Doppler velocity measurements (available with vascular and general imaging application packages on linear transducers only)
- Adjustable frequency/velocity display ranges
- 8-position zero baseline shift
- Normal/invert display around horizontal zero line
- Selectable sweep speeds
- Selectable grayscale curve for optimal display
- Selectable display format (1/3-2/3, 1/2-1/2, 2/3-1/3)
- Full-screen Doppler display improves diagnoses by enabling easier, more accurate caliper placement
- Doppler review for retrospective analysis of Doppler data

Color Doppler

- Available on all imaging transducers
- Adaptive color Doppler automatically optimizes color or Color Power Angio frequencies, ensuring excellent sensitivity and color penetration
- Color compare – simultaneously displays real-time Color Power Angio, color Doppler and grayscale images side-by-side
- Automatic color invert – automatically inverts color maps to maintain selected color coding when the linear steering angle passes through vertical
- Cineloop review
- Chroma 2D colorization with multiple color maps
- 256 color bins
- Continuously variable color steering
- 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 preset or is user selectable
- Velocity and variance displays
- Color/2D line density control
- Selection of color bar display units

Pulsed Wave (PW) Doppler

- Available on all transducers
- Adjustable sample volume size: .05-2.63 cm
- Duplex mode – displays tissue movement and blood flow in 2D and PW Doppler simultaneously
- Triplex mode – displays tissue movement and blood flow in 2D, color/CPA and PW Doppler simultaneously

Continuous Wave (CW) Doppler

- Available on cardiac sector transducers
- Steerable through 90°

Tissue Doppler Imaging (TDI)

- Available on all cardiac sector transducers
- Color TDI uses color to display direction and timing of myocardial function
- Pulsed wave Tissue Doppler Imaging (TDI) for velocity mapping of cardiac tissue and vessel wall motion
- Simultaneous or duplex mode of operation in conjunction with 2D, color Doppler, and color TDI

M-mode

- Available on all imaging transducers
- Selectable sweeping rates
- Time markers: 0.1 and 0.2 seconds
- Chroma colorization with multiple color maps
- M-mode review for retrospective analysis of M-mode data
- Full-screen M-mode display facilitates diagnoses by enabling easier, more accurate caliper placement
- Color M-mode integrates color Doppler and 2D information in an M-mode sweep display

Anatomical M-mode

- Available on cardiac sector transducers
- Uses 2D image as a basis for M-mode analysis at a defined line, independent of transducer orientation
- Makes it easier to keep the M-mode line perpendicular to the anatomy, even in abnormally shaped or positioned hearts
- Provides data on direction, position and timing of any single echo received from any point of the tissue for M-mode analysis in any direction, for examining cardiac chamber diameters, LV regional wall motion and location of accessory pathways
- Anatomical M-mode trace can be generated or modified post Freeze

The HD15 offers the diagnostic capabilities you need to perform difficult, in-depth echo studies with advanced quantification.

Contrast Imaging

- Power modulation imaging on the S5-2 and C5-2 transducers for cardiac and abdominal applications and the C6-3 transducer for general abdominal applications
- System optimized for detecting harmonic agent signatures
- Variable low Mechanical Index (MI) and flash modes
- Pulse Inversion Harmonic and Power Modulation
- Flash control to destroy contrast agent
- Start/Stop timer

Stress echo

- Available on cardiac sector transducers
- Fully-integrated stress echo module
- 3 fixed factory protocols
- User-defined protocols
- Stress capture in both R-R and full cycle acquire
- Stress compare with defer and select functionality
- Stop/resume a protocol with up to 4 multi cycle acquisitions
- Re-label, add or remove stages/views during a protocol
- Up to 8-stage capture-and-study protocols
- Single, quad and multi-cycle acquisition
- Gain Save
- LVO with stress
- Wall motion scoring and reporting

Freehand 3D and MPR Imaging

- Available on all imaging transducers
- Qualitative grayscale volume acquisition supported on all imaging transducers except S7-2omni
- Volume display with surface rendering (transparency, brightness, and lighting controls)
- Multiplanar view display
- Specialized algorithms and maps maximize three dimensional display
- Trim tools on both volume and multiplanar reconstructed (MPR) views
- Supported by XRES to reduce noise artifacts
- Color compare

Automated 3D, 4D and MPR Imaging

- Available on volume transducers
- Quantitative 3D volume acquisition supported on V6-2, and 3D9-3v transducers
- Ability to acquire and display up to 40 volumes per second in 4D
- Color 3D imaging
- High resolution scan and review mode
- Multiple display formats including full screen, 2-up and 4-up for rendered volume and multiplanar images include full screen, 4-up and expanded dual
- Volume display with surface rendering (transparency, brightness, and lighting controls)
- Specialized algorithms and maps maximize three dimensional display
- Individual controls for manipulating the on-screen 3D rendering and display options
- Region of Interest (ROI) trim tools on both volume and multiplanar reconstructed (MPR) views
- V6-2, and 3D9-3v transducers support XRES and SonoCT to reduce noise artifacts
- Able to perform distance, ellipse, trace, and volume measurements

Fetal STIC (Spatio-Temporal Image Correlation) Imaging

- Available on volume transducers
- Presents the heart beating in a multiplanar display, preserving spatial and temporal relationships
- Utilizes MPR views and cineloop capabilities for evaluating fetal heart anatomy
- System supports capabilities to perform the spin technique to assess pathology
- Fetal echo STIC supports image capture in gray scale only or combined with color Doppler
- Useful for easy detection of fetal heart anomalies during routine obstetrical exams

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 and Flow Opt signal processing with 4X multi-line processing and frequency compounding:
  - Improves tissue contrast resolution and textural perception
  - Sharpens lateral beam profile for finer dot size
  - Reduces speckle artifacts for increased image clarity
  - Improved exam frame rates
  - 2D Opt and Flow Opt keys with up to five settings for patient-specific optimization in 2D and color Doppler
- iSCAN one-touch Intelligent Optimization
  - In 2D one-button automatic adjustment of:
    - TGC and Receiver Gain to achieve optimal uniformity and brightness of tissues in most exams
    - Compression curve based on range of detectable tissues
  - In Doppler one-button automatic adjustment of spectral tracing to improve productivity
  - iSCAN also available in color

3.2 Control panel and user interface

- Philips common user experience provides readily accessible and logically grouped primary controls
- Easy-to-learn graphical user interface
- Quick keys with dynamic display based on system preset, mode or imaging state
- Other secondary controls accessible through on-screen menus
- Alphanumeric keyboard: QWERTY keyboard with globalization key for conversion to local language (English, French, German, Italian, and Spanish)
- User selectable keyboard input language (Roman, Simplified Chinese, Russian, and Portuguese)
- Trackball with assignable Select and Enter keys for easy system navigation
- Integrated stereo speakers
- Imaging mode keys with independent gain controls: 2D, Color Power Angio imaging, M-mode, color Doppler, Continuous Wave Doppler (CW), Pulsed Wave Doppler (PW), Tissue Doppler Imaging (TDI)
- 2D image controls: Depth, Dual Left, Dual Right, Freeze, THI, and Zoom Focus, 2D Opt
- Image enhancement controls: Dynamic Range, Focus, Gain, Persistence, Postprocessing Map, and Smooth
- Patient specific optimization keys: Flow Opt, Probe (transducer select), and THI
- Quantitative controls: Calc, Caliper, Erase, Trackball
- Doppler/Color controls: Angle, PW, Scale, Baseline, Power, Volume, Duplex, and Triplex
- Image Acquisition keys: Review, Report, Acquire, and Print 1 and Print 2 keys supporting external print/video options
- Annotation controls: Text, Body Marker, Erase, and Pointer
- Function keys: Microphone, Patient, Preset, Physio, and Setup
- Online help key
- Lateral Gain Compensation (LGC) slide pot controls
- Time Gain Compensation (TGC) slide pot controls
- Review and Report keys

3.3 Active native data

- 2D Image controls that can be changed in review include: Gain (overall gain, TGC, LGC) Dynamic Range, Gray Map, Chroma Map, Orientation (L/R, U/D), Display Zoom/Pan, XRES
- Color Image controls that can be changed in review include: Gain, Baseline, Color Map, Invert, Write Priority, Smoothing, Suppress, Variance, Directional Angio
- Physio controls that can be changed: Sweep speed, Position, Gain
- Active native data can be acquired in prospective and retrospective direction
- Active native data images are acquired at acoustic data frame rate
- Active native data in cineloop and quick review

The HD15 puts efficiency at your fingertips with primary controls organized around the trackball, tri-state lighting to quickly visualize active and available modes, and quick keys for multi-function capability.

4. Workflow

Designed for today's busy practices, the HD15 combines robust system features with practical workflow capabilities for exam and department efficiencies.

4.1 Display annotation

- On-screen display of all pertinent imaging parameters for complete documentation, including transducer type and frequency range, active clinical options and optimized presets, display depth, TGC curve, grayscale, color map, frame rate, dynamic range, compression and contrast enhancement, color gain, color image mode, and hospital and patient demographic data
- Displayed data can be turned off for generating images used in publication and presentation
- Demonstration of thumbnail images in current studies
- Sector width and steering markers
- 2D and Flow Opt settings and icons for iSCAN, XRES and SonoCT
- Real-time display of Mechanical Index (MI)
- Real-time display of Thermal Index (TIb, TIc, TIs)
- Quick text allows easy annotation at any time during an exam
- Text – places, moves, erases, modifies or appends predefined text labels, typed text and arrows
- Body markers-displays body-part icons appropriate for the active preset and indicates relative transducer position
  – Icons selectable via Quick keys
- Dual orientation marker to indicate the active buffer for two-buffer dual display
- VCR indicator allows user to know when VCR is recording
- Annotation erased with start of new study

4.2 Image presentation

- Up/down
- Left/right
- Multiple duplex image formats (1/3-2/3, 1/2-1/2, 2/3-1/3)
- Depth to 30 cm (exam and transducer specific)

4.3 Cineloop review

- Acquisition, storage in memory, and display in real-time and duplex modes of up to 1,000 frames (four minutes in Quick Review) of 2D and color images for retrospective review and image selection
- Single frames of Doppler data and M-mode images can be archived to print or electronic media
- Trackball control of frame-by-frame image selection
- Variable playback speed
- Trim capability
- Functions in 2D and Tissue Harmonic Imaging, M-mode, PW Doppler, CW Doppler, color Doppler, Color Power Angio imaging, Tissue Doppler Imaging, SonoCT, XRES and contrast imaging modes

4.4 Exam management features

Internal storage

- 250 GB hard drive space
- Direct digital storage of system configuration backup, including user defined presets and OB trending data
- Direct digital storage of single frame 2D, color and Doppler

Data export

- Ability to export AVI clips and BMP images
- Study reports available as DICOM images
- System can use JPG (Lossy) image format with user configurable compression ratio
- DICOM 3.0 print and store service class user
- Configurable print

4.5 Connectivity

- Fully-integrated interface
- USB port on control panel
- Extensive image management capability, including thumbnail image review, cineloop editing, and user-configurable patient reporting
- Study manager allows user to digitally acquire, review and edit complete patient studies
- Exam directory
- Delete and replace recalled image capability
- Multiple study archive formats (palette color, RGB, YBR)
- Multiple DICOM servers
- Multiple DICOM presets
- DICOM Structured Reporting for cardiac, and Ob/Gyn
- User may select images to print from all acquired images
- 10BaseT Ethernet output
- Site configurable IP address, port and AE title
- Performed Procedure Step (PPS)
- Modality Worklist
  – Works in conjunction with radiology/cardiology information systems
  – Automatic entry of patient demographics

5. Transducers

Offering a full complement of transducer options that extend clinical capabilities, HD15 is the one system with the performance and versatility to meet more of your needs.

5.1 Transducer selection

- Electronic switching of up to four transducers
- Dedicated (Pedoff) connector available for non-imaging CW transducer
- Multiple user-selectable transmit focal zones; up to eight focal zones on selected transducers
- Continuous dynamic receive focusing on all transducers
- Stainless steel and plastic biopsy guides available for most transducers

Curved array

C8-5 broadband curved array

- 8 to 5 MHz extended operating frequency range
- 90° field of view
- 14 mm radius of curvature
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, SonoCT, Panoramic, XRES, and Freehand 3D
- OB/Gyn, fetal echo, vascular, pediatric, and urology applications
- Biopsy kit available

C8-4v broadband curved array

- 8 to 4 MHz extended operating frequency range
- 135° field of view
- End-fire sector, 11 mm radius of curvature
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, Panoramic, SonoCT, XRES, and Freehand 3D
- Endovaginal applications
- Biopsy kit available

C6-3 broadband curved array

- 6 to 3 MHz extended operating frequency range
- 72° field of view
- 50 mm radius of curvature
- Scanplane aperture 11 mm
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, SonoCT, harmonic imaging, Panoramic, XRES, contrast, and Freehand 3D
- Abdominal, Ob/Gyn, pediatric, urology, emergency medicine, and regional anesthesia applications
- Multi-angle biopsy kit available

C5-2 broadband curved array

- 5 to 2 MHz extended operating frequency range
- 75° field of view
- 40 mm radius of curvature
- 2D, steerable pulsed Doppler, High PRF Doppler, color Doppler, Color Power Angio, SonoCT, XRES, harmonic imaging, Panoramic, contrast, and Freehand 3D
- Abdominal, Ob/Gyn, pediatric, urology, emergency medicine, and regional anesthesia applications
- Multi-angle biopsy kit available

Volume curved array

V6-2 broadband curved array

- 6 to 2 MHz extended operating frequency range
- 66° field of view
- 55 mm radius of curvature
- Steerable pulsed wave, High-PRF and color Doppler; Color Power Angio/Directional CPA, SonoCT, XRES, harmonic imaging, and STIC
- Supports high resolution 2D imaging
- Supports high resolution, quantitative, single sweep 3D volume acquisition
- Supports 4D imaging
- General purpose abdominal, obstetrical and gynecological volumetric applications
- Supports interventional applications
- Biopsy kit available

3D9-3v broadband curved array

- 9 to 3 MHz extended operating frequency range
- 130° field of view
- 11.5 mm radius of curvature
- Supports high resolution 2D imaging
- Supports high resolution, quantitative, single sweep 3D volume acquisitions (mechanical and freehand)
- Supports 4D imaging up to 22 volumes per second
- Steerable pulsed wave and color Doppler, Color Power Angio, SonoCT, XRES, and harmonic imaging
- Endovaginal applications
- Interventional applications
- Biopsy kit available

Linear array

L15-7io broadband compact linear array

- 15 to 7 MHz extended operating frequency range
- 8° of trapezoidal imaging
- 23 mm effective aperture length
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, Panoramic, XRES, and Freehand 3D
- High-resolution intraoperative vascular and cardiac, vascular, and small parts applications

L12-5 50 mm broadband linear array

- 12 to 5 MHz extended operating frequency range
- Fine pitch, 256 element, high resolution linear array
- 10° of trapezoidal imaging
- 50 mm effective aperture length
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, harmonic imaging, Panoramic, SonoCT, XRES, and Freehand 3D
- Small parts and breast, musculoskeletal, obstetrics, vascular, and pediatric applications
- Biopsy kit available

L12-3 broadband linear array

- 12 to 3 MHz extended operating frequency range
- 15° of trapezoidal imaging
- 35 mm effective aperture length
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, SonoCT, XRES, Panoramic, harmonic imaging, and Freehand 3D
- Vascular, abdominal, small parts, musculoskeletal, pediatric, emergency medicine, and regional anesthesia applications
- Biopsy kit available

L9-3 broadband linear array

- Fine pitch, 160 element, high-resolution linear array
- Harmonics capable
- 15° of trapezoid imaging
- 38 mm effective aperture length
- Steerable pulsed Doppler, color Doppler, Color Power Angio, SonoCT, XRES, Panoramic, and harmonic imaging
- Vascular applications: carotid, arterial and venous
- Biopsy kit available

Sector array

S8-3 broadband sector array

- 8 to 3 MHz extended operating frequency range
- 90° field of view
- 2D, steerable PW Doppler, CW Doppler, High PRF Doppler, color Doppler, Color Power Angio, Tissue Doppler, XRES, harmonic, contrast, imaging, and Freehand 3D
- Adult and pediatric cardiac, abdominal, obstetrics, and pediatric applications

S7-2omni broadband sector array

- Transesophageal phased array
- 7 to 2 MHz extended operating frequency range
- 180° mechanical rotation, 90° field of view
- Electrocautery suppression
- 2D, steerable PW Doppler, CW Doppler, High PRF Doppler, color Doppler, Color Power Angio,
- Tissue Doppler, XRES, and harmonic imaging, LVO
- Adult TEE applications

S5-2 broadband sector array with PureWave crystal technology

- 5 to 2 MHz extended operating frequency range
- 90° field of view
- 2D, steerable PW Doppler, CW Doppler, High PRF Doppler, color Doppler, Tissue Doppler, XRES, Freehand 3D, and harmonic imaging including LVO
- Cardiac, abdominal, TCD, and obstetrics, fetal echo, and emergency medicine applications
- Biopsy kit available

Biplane sector array

BP10-5ec broadband curved array

- 10 to 5 MHz extended operating frequency range
- Biplane intersecting sagittal and tranverse sectors, 8 mm radii of curvature, field of view: 126°
- 2D, steerable pulsed Doppler, color Doppler, Color Power Angio, SonoCT, XRES, Panoramic, harmonic imaging, and Freehand 3D
- Endorectal and endovaginal applications for urology
- Biopsy kit available

Non-imaging

D5cwc CW transducer

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

D2cwc CW transducer (Pedoff)

- Dedicated 2 MHz Pulsed Wave and Continuous Wave Doppler
- Cardiology applications

5.2 Transducer application guide

Transducers

		Curved				Volume		
								
Transducer		**C8-5**	**C8-4v**	**C6-3**	**C5-2**	**V6-2**	**3D9-3v**	**L15-7io**
Application	**Exam Type**							
Abdominal	General			●	●	●		
	Renal			●	●	●		
	Vascular			●	●			
Obstetrics	Early OB	●	●	●	●	●	●	
	General OB	●	●	●	●	●	●	
	Fetal Echo	●	●	●	●	●	●	
Gynecology	Pelvis	●	●	●	●		●	
	Fertility		●	●	●		●	
Cardiology	Pediatric							
	Adult General							
	Adult large							
Vascular	Carotid							
	Arterial	●						●
	Venous	●						
	Abdominal			●	●			
	Transcranial Doppler							
Pediatric	Abdomen	●		●	●			
	Hip							
	Pediatric Cephalic	●						
	Neonatal Cephalic	●						
Small Parts	Superficial							
	Thyroid							
	Testicle							
	Breast							
Musculoskeletal	Superficial							
	General							
Urology	Prostate							
	Bladder		●	●	●			
	Renal	●		●	●			
Intraoperative	Cardiac							●
	Vascular							●
Non-imaging	Cardiac							
	Vascular							
Emergency Medicine	FAST			●	●			
	Thoracic							
	Access							
Regional Anesthesia	Superficial							●
	Deep			●	●			

Linear			Sector			Biplane	Non-imaging	
								
L12-5 50 mm	L12-3	L9-3	S8-3	S7-2omni	S5-2	BP10-5ec	D5cwc	D2cwc
	●		●		●			
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6. Measurements and analysis

The HD15 is engineered with leading edge usability, including one-button iSCAN image optimization and Tissue Specific Imaging presets.

6.1 Measurement tools

- 2D distance
- 2D circumference/area by ellipse, continuous trace, trace by points
- 2D curved-linear distance
- M-mode distance (depth, time, slope)
- Manual Doppler distance
- Manual Doppler trace
- Automatic Doppler trace – traces frozen spectral display to calculate and display user-selected measurements in most presets
- Philips High Q Automatic Doppler Analysis
- Time/slope measurements in Doppler and M-mode
- Doppler values containing PI, RI, S/D indices
- 2D volume
- Heart rate
- Trackball-controlled electronic measurement calipers: 8 sets
- User-defined measurements and calculations
- On-the-fly measurement labels
- Fully editable results data sheet
- Integrated patient exam report
- Moveable results box can be moved to any corner of the screen
- User-defined measurements
- User-defined calculations
- User-defined fetal growth tables
- User-defined finding codes

6.2 High Q automatic Doppler analysis

- Automatic real-time and retrospective tracing of:
  - Instantaneous peak velocity (or frequency)
  - Instantaneous intensity weighted mean velocity (or frequency)
  - User configurable display of values
  - User can adjust goal posts to within a single heart cycle, allowing quantification of any portion of the cycle (e.g., systole only)
- Vascular
  - Automatic real-time display of:
    - Time-averaged mean velocity (or frequency)
    - Resistive index
    - Pulsatility index
    - Systolic/diastolic ratio and diastolic/systolic ratio
    - Acceleration/deceleration times
- Cardiology
  - Automatic real-time display of:
    - Peak velocity
    - Peak gradient
  - Display of:
    - Cardiac output
    - VTI
    - Mean velocity
    - Mean gradient

6.3 QLAB advanced quantification plug-in options

Region of Interest (ROI) quantification

- Image data content analysis
- Contrast intensity analysis
- Grayscale, Power/Angio
- Color Doppler velocity analysis
- Draw up to 10 ROIs
- Calculate Mean, Median, and Standard Deviation of intensity per frame
- Graphical display of time vs. intensity data
- Curve-fit graphical data
- Compare images and ROIs

Automated measurement of Intima Media Thickness (IMT)

- Automatic assessment of the IMT or user selected frame
- Intended for carotid and other superficial Arteries

Tissue Motion Quantification (TMQ) for cardiac applications

- Image Data content analysis
- Gain controls for overall and horizontal planes
- Semiautomatic border detection for cardiac chambers and vessel cavities
- Adaptive semiautomatic blood pool detection with waveform display of LV volume and ejection fraction
- Color Kinesis tool for displaying semiautomated boarders over time parametrically
- Transparency control to visualize echo grayscale under a semitransparent Color Kinesis image
- Color Kinesis for any frame rate
- Color Kinesis for the mitral annulus
- Manual user editable timing overrides for the onset and duration of the parametric display
- Single-plane volume measurements based on the 5/6 Area-Length method and Simpson's Biplane Method of Disks (MOD)
- Capable of adding LV volume and ejection fraction data to final patient report
- Mitral Annulus Aortic Diameter measurement

Strain Quantification (SQ)

- Tissue Doppler Imaging (TDI) velocity mode quantification
- Measures the myocardial velocity and derives the strain rate and strain along user-defined M-lines
- Capable of drawing up to 3 M-lines at a time
- Capable of subdividing each M-line into 8 subregions or according to user-defined subregion sizes
- Point of interest tool obtains values from any point on the M-mode display
- Able to present results in two display formats: virtual M-mode display and Graph display
- Capable of 3 different user-selectable options for strain trend error correction
- User selectable strain rate sample size from 0.25 to 3.0 cm
- User-definable M-line width for trans-mural sampling
- Export of all time-data series in CSV/Excel format

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

- 3D/4D viewer for Ob/Gyn and General Imaging including interventional applications
- Review 3D/4D, color 3D as well as color fetal STIC
- Multiplanar reconstruction (MPR)
  - Render control provides MPR views with 1 up, 2 up and 4 up review formats
- iSlice precision volume slicing capability
  - Displays 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)
  - Multiple image controls: Brightness, Transparency, Zoom, Rotate View
- Free rotation of any source
- Full cineloop review control
- 2D grayscale display adjustments
- Color display adjustments
  - Invert images can be viewed and manipulated on 3DQ software
- Zoom control
- Swivel review mode
- Cine/pan slice control through volume
- User-selectable image storage
  - Ability to re-save images into Review
- Quick launch to measurements allows users to perform basic 2D measurements and advanced 3D measurements
  - Auto ruler display
- Compatible with freehand and automated volumes
- Thick slice imaging
  - User-adjustable slice thickness and depth
  - Variable thick slice display adjustments with present vision settings
- Slice Plane imaging allows users to evaluate volume data
- 2D and 3D measurement tool including distance, area, angle, stacked and auto contour and ellipsoid measurements
  - Vascularization Index, Flow Index and Vascularization Flow Index results on 3D color mode data sets
- Contrast Timer marker on HD15 data sets saved with contrast timer
- 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

6.4 Clinical option analysis packages

Clinical analysis capabilities are included in Tissue Specific Imaging Clinical Options and can be configured to meet your needs.

- Comprehensive measurements, calculations and application-specific reports with imbedded images, including expanded cardiac, vascular, Ob/Gyn and general imaging capabilities for thorough exam documentation
- Cardiac analysis
  - Volume by area/length method
  - M-mode analysis
  - Peak and mean gradients
  - Pressure half time
  - Continuity equation
  - Diastolic function
  - Cardiac output
  - Qp:Qs ratio
  - Pulmonary vein analysis
  - Valvular analysis
    - Proximal Isovelocity Surface Area (PISA)
    - E/A ratio
  - Ventricle analysis
    - Ejection fraction (via Teichholz or cubed method)
  - Simpson's biplane and single plane
  - LV mass
  - IVRT
- Vascular analysis
  - Abdominal vascular
  - Cerebrovascular
  - Transcranial vasculature protocols
  - Right and left, lower and upper extremity protocols
  - Optional tools: percent diameter area reduction
  - Automated finding codes and user comments
- Ob/Gyn and fertility analysis
  - Fetal biometry
  - Biophysical profile
  - Amniotic fluid index
  - Early gestation
  - Fetal long bones
  - Fetal cranium
  - Nuchal thickness
  - Other OB measurements:
    - 2D echo
    - Fetal heart M-mode
    - Fetal Doppler
    - Echo Doppler
    - User-defined fetal growth tables
  - OB calculations and tables are user definable
  - OB trending data for up to ten studies per patient
  - Gynecology/Fertility
    - Uterus
    - Right and left ovary
    - Right and left follicles
- General imaging analysis
  - General abdominal
  - Small parts
  - Pediatric general
  - Musculoskeletal
- Limited analysis capabilities available on Regional Anesthesia and Acute Care (emergency medicine and critical care) Tissue Specific Imaging Clinical Options

The fast and robust 3D/4D capabilities on the HD15 provide visualization and analysis of volume data and is also viewable in 3D color Doppler, Invert and Color Invert modes.

7. Physical specifications

Physical dimensions

Depth	43.5 in/110 cm
Width	22.4 in/57 cm
Ground clearance	4.5 in/11.4 cm
Height (adjustable)	54.3-61 in/138-155 cm
Control panel height (adjustable)	30.6 to 37.5 in/77.7 to 95.4 cm
Wheel base	22 .4 in/57 cm
Wheels	5 in/12.7 cm diameter, 3.8 in/9.5 cm wide
Weight	220 lbs/100 kg (no peripherals)

Cart

- Designed for easy maneuverability
- Front handles for mobility
- Four-wheel swivel ability
- Two-wheel swivel lock and brake
- Lightweight aluminum frame
- Back deck provides easy access to hardcopy/documentation devices

Monitor

- 19 inch (48.3 cm) high-resolution color monitor
- Raises, lowers and rotates with control panel
- Independent tilt (+15/-10 degrees) and swivel (+/- 180 degrees)
- Integrated lateral articulation of monitor assembly

Control panel

- Control panel can be raised, lowered and rotated nearly 360°
  - Supports comfortable operation from standing and sitting positions
  - Improves accessibility of controls and reduces extended reaching
- Palm rest

Footswitch

- Three pedals
- Allows Freeze, Acquire and Enter in stress
- Includes two user-definable record functions

Physio

- One 3-lead ECG input
- One external ECG input
- Two physio input channels (1V, p-p)
- Selectable ECG triggered skipping between 1 and 20

The HD15's small, mobile design brings advanced clinical performance to the bedside.

Exam documentation

Peripherals

- The system supports up to three on-board peripheral devices (excluding report printers)
  - Video-recording peripherals, operated via system user interface - DVD recorder or super VHS VCR
  - Small format digital color printer (USB)
  - Small format digital B/W printer (USB)
- Support for various Hewlett-Packard brand color and monochrome report printers (USB, externally mounted)
- Export of measurement and analysis data to off-line reporting software packages (USB)
- System supports a range of plain paper printers

Input/output ports

- Six available ports
- USB port
- Standard USB interface for support of qualified plain paper printers
- Composite video: output to external monitor, VCR or printer
- Black and white composite video output
- External print trigger
- LAN connector – used with DICOM networking
- S-video output for VCR
- DVI-D port
  - Supports external monitors with DVI input: WSXGA with 1680 x 1050 resolution
- RS-232 port to support data transfer

Power Requirements

Power	750VA
Frequency	50 to 60 Hz
Voltage	100V to 240V AC
Power cords	Available for electrical standards worldwide

Electrical safety standards

- CSA C22 .2 No. 601.1
- IEC 60601-1
- UL 60601-1
- EN60601-1

Environmental

Temperature	
System	0-40° C at 20-80% relative humidity
VCR and printers	0-40° C at 80% relative humidity (non-condensing)
Heat dissipation	<2500 BTUs/hour (fully loaded)

Maintenance/Serviceability

- RSN connectivity with Philips service contract and standard internet connection.

Localization options

- Software: English, French, German, Italian, Japanese, Spanish, Simplified Chinese, Russian, and Portuguese
- Training and user documentation: Chinese (Simplified or Traditional), Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Norwegian, Polish, Romanian, Russian, Spanish, Swedish, Turkish, Portuguese
- Online help: English, French, German, Italian, Japanese, Spanish, Portuguese, Russian, and Simplified Chinese

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