PHILIPS

Healthcare

CX50

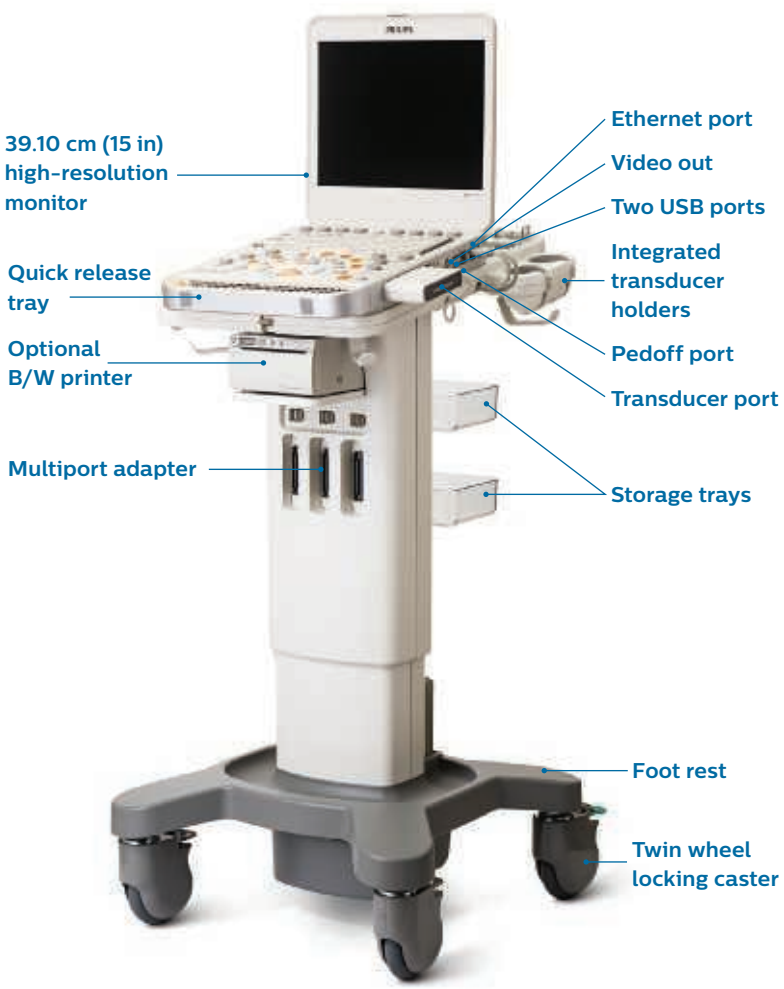
A new class of **compact** ultrasound

Philips CX50 CompactXtreme ultrasound system specifications

Contents

1. Introduction

The CX50 system is built on a platform and architecture in a small, compact design that is ideal for taking premium performance anywhere you need it. PureWave, a clinically proven imaging technology previously available only on Philips premium cart systems, captures a broad band of tissue information for exceptional quality and information. AutoSCAN optimization and Tissue Specific Imaging presets offer a new level of exam automation – transducers are optimized by exam type, providing excellent images with minimal adjustment. Highly configurable portability enables you to study the most difficult-to-image patients across a variety of clinical needs.



1.1 Applications

- Adult cardiac
- Adult transesophageal
- Stress echo
- Abdominal
- Pediatric
- Vascular – carotid, arterial, venous, abdominal, vascular access, intervention
- Transcranial Doppler
- Fetal echo
- Obstetrical
- Gynecological and fertility
- Small parts
- Breast
- Musculoskeletal
- Emergency medicine
- Regional anesthesia
- Intervention
- Laparoscopic
- Surgery
- Intraoperative – vascular, epicardial
- Intracardiac echo
- Contrast

Optional portability

- Specially designed cart
- Wheeled travel case
- Additional AC adapter

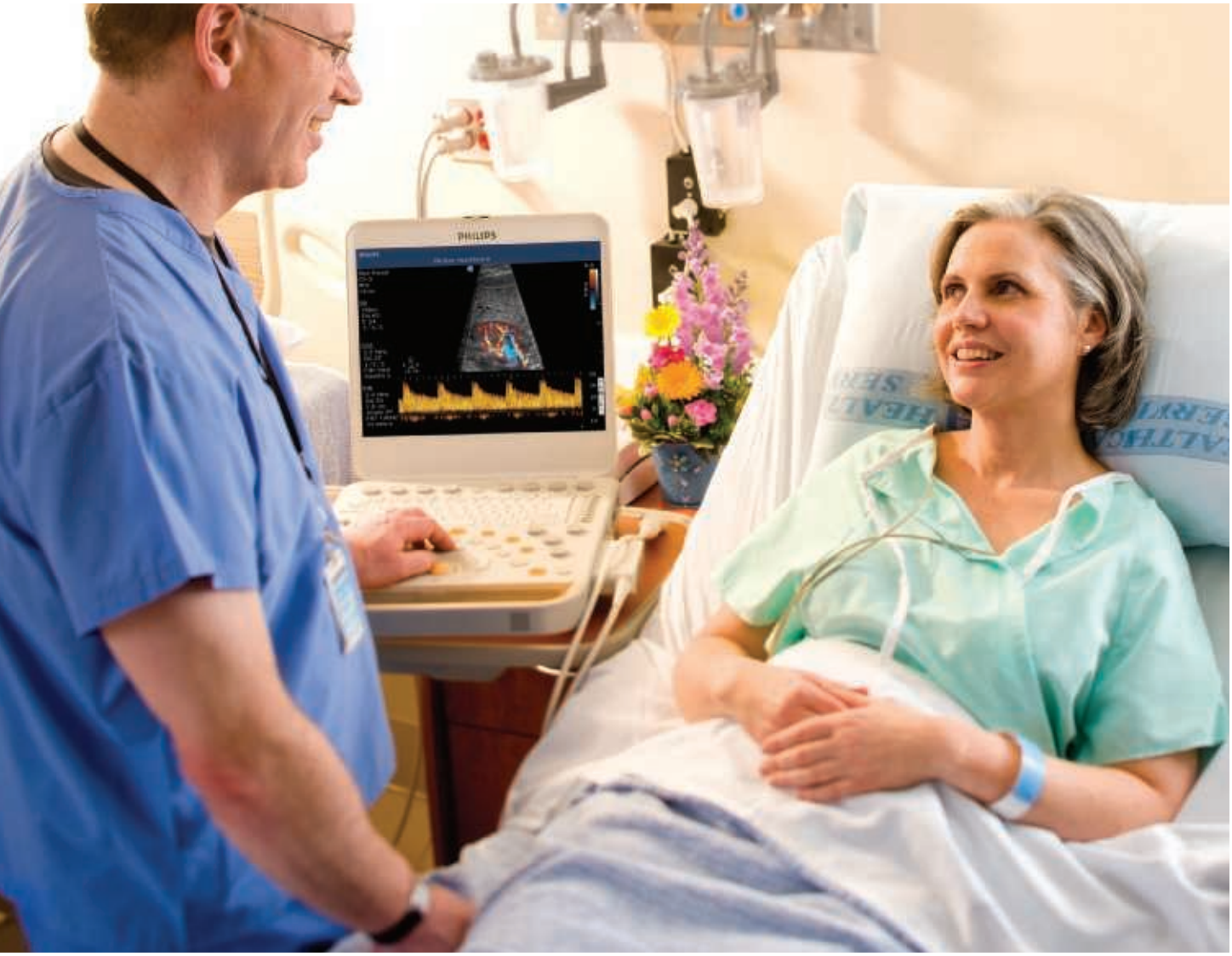
The CX50 is fully configurable, allowing you to select imaging capabilities, transducers, and clinical analysis to support your exam needs. Add supported capabilities at any time, as well as upgrades when they become available.

Key advantages

- Premium performance anywhere you need it
- Exceptional results on technically difficult patients
- Support for cardiology, general imaging, vascular, pediatrics, surgery, laparoscopic, intraoperative, and Ob/Gyn exams

2. System overview

Philips proprietary technologies are an integral part of the CompactXtreme platform, and provide the basis for its extensive range of imaging capabilities.



The CX50 system combines premium imaging technologies and advanced optimization for exceptional image quality.

2.1 System architecture

- Next-generation all-digital compact broadband beamformer with pulse-shaping capability
- High-resolution A/D conversion with 170 dB full-time system dynamic range
- xMATRIX imaging with PureWave xMATRIX Live 3D TEE imaging
- Up to 504,576 digitally processed channels
- Supports PureWave technology and high-density array configurations
- Multivariate harmonic imaging including pulse inversion processing
- One-touch 2D optimization with broadband frequency compounding
- SonoCT real-time beam-steered compound imaging
- Advanced XRES adaptive image processing
- Continuously variable steering in 2D, color Doppler, and Doppler modes
- AutoSCAN and AutoSCAN gain yield automatic optimization of images
- iSCAN one-touch intelligent optimization for 2D and Doppler
- Long loop capture for pediatric and contrast imaging up to 420 seconds
- Active native data manipulation
- Tissue-specific imaging presets
- Gray shades: 256 levels (8 bit) in 2D, M-mode, and Doppler

2.2 Imaging modes

- 2D
- Live 3D TEE and Live 3D TEE color flow
- M-mode
- Anatomical M-mode
- Live xPlane imaging for 2D and color flow
- Color M-mode
- Color Power Angio (CPA) imaging
- Directional CPA
- Pulsed wave (PW) Doppler
- HPRF PW Doppler
- Continuous wave (CW) Doppler
- Freehand 3D imaging
- Needle visualization
- QLAB advanced quantification software
- Invert and color invert
- Color compare mode
- Dual mode
  - 2D
  - Tissue Doppler imaging
  - Color
  - Color Tissue Doppler imaging
  - Color Power Angio (CPA) imaging
- Duplex for simultaneous 2D and Doppler
- Triplex for simultaneous 2D, Doppler, and color or Color Power Angio
- 2D and flow optimization signal processing
- Intelligent Doppler – automatically maintains pre-selected 0/60° flow angle
- Live compare
- Tissue Harmonic Imaging (THI)
- Zoom imaging – live or in review
- Reconstructed zoom with pan (read zoom)
- HD Zoom – real-time HD zoom increases processing capabilities depending upon 2D zoom size
- HD zoom with adjustable box size and position
- High-definition write zoom
- Trapezoidal imaging
- Pulse inversion harmonic imaging
- Contrast imaging
  - Cardiac left ventricular opacification (LVO)
  - General
  - Superficial
- Adaptive Doppler
- Adaptive color Doppler
- Color tissue Doppler imaging
- Pulsed wave tissue Doppler imaging
- Active native data (allows manipulation of raw image data)
- SmartExam system-guided protocol capability

2D grayscale

- Smart TGC: pre-defined TGC curves optimized for consistently excellent imaging with minimal TGC adjustment
- User adjustable LGC control
- AutoSCAN automatically and continuously optimizes the brightness of the image at the default gain and TGC settings for the best image display
  - Turn on and off
  - AutoSCAN gain quick key and AutoSCAN ICON display
- High-definition zoom 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
- Sector size and steering control for sector and curved array image formats
- Dual imaging with either independent cineloop buffers or split-screen imaging
- Live compare
- Chroma imaging with multiple maps
- 256 (8 bits) discrete gray levels
- 2D acquisition frame rate up to 755 frames/sec (dependent on field-of-view, depth, and angle)

The easy portability of the CX50 allows premium imaging capabilities at any location, including screening venues.

Live xPlane imaging
- Live xPlane imaging
- Live xPlane Color Flow imaging
- Live xPlane with Rotate and Tilt with on-screen directional ICON

Live 3D TEE
- Available on X7-2t transducer
- Live full-volume imaging
- Target Volume rate imaging for increasing 3D frame rate
- Long live volume loop acquire
- Beat-by-beat retrospective 3D loop selection
- Live 3D color flow imaging
- Live 3D zoom and Live 3D zoom preview
- Full volume imaging with autocrop
- 3D front, back, up, down, left, right, and 3D automatic view control
- Crop adjust with cropping
- Dynamic face cropping of Live 3D and Live 3D color imaging
- 3D Markers
- 3D Marker depth control
- 3D Dynamic Anatomic ICON – tracks direction of the 3D image view and correlates to the human icon for a mid-esophageal view
- Basic measurements on 3D image (point to point, area, circumference)
- Basic measurements on Live xPlane
- Live 3D Swivel and Swivel acquire
- iSCAN for Live 3D
- ECG display
- Enhanced Live 3D dynamic colorization for enhanced 3D effect
- Save 3D view and Restore 3D view (remembers cropping)
- Seek angle (multiplane) is available during Live 3D imaging
- Live 3D contrast for LVO with harmonics
- Maximum 90° by 90° Live 3D TEE volume imaging (mode-dependent)

M-mode
- Available on cardiac imaging transducers
- Selectable sweeping rates
- Time markers: 0.2 and 1.0 seconds
- Acquisition zoom capability
- Selectable display format prospective or retrospective (1/3-2/3, 2/3-1/3, side-by-side, full-screen)
- Chroma colorization with multiple color maps
- Cineloop review for retrospective analysis

Anatomical M-mode
- Available for cardiac imaging 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

Tissue Doppler imaging
- Available on S5-1, S8-3, and S12-5 transducers
- Allows high frame rate acquisition of tissue motion
- Color gain, TGC, and LGC
- 8 color maps
- Velocity (cm/s)

Pulsed wave Doppler
- Available on all imaging transducers
- Adjustable sample volume size: 0.8-24.6 mm (transducer-dependent)
- Simultaneous or duplex mode of operation
- Simultaneous 2D, color Doppler or CPA, pulsed Doppler
- iSCAN optimization automatically adjusts scale, baseline, and Doppler gain

Continuous wave Doppler

- Available on cardiac sector array transducers and non-imaging transducers
- Steerable through 90° sector
- Maximum velocity range: 20 m/sec (transducer-dependent)

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
- Angle correction with automatic velocity scale adjustment
- Adjustable velocity display ranges
- Normal/invert display around horizontal zero line
- Selectable sweep speeds
- 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, 2/3-1/3, side-by-side, full-screen)
- Doppler review for retrospective analysis of Doppler data
- 256 (8 bits) discrete gray levels
- Post-processing in PW frozen mode includes map, baseline

Color Doppler

- Adaptive mode adjusts Doppler frequency and sensitivity based on color ROI placement within image
- Available on all imaging transducers
- Cineloop review with full playback control
- Advanced motion suppression with intelligent algorithms; adapts to various application types to selectively eliminate virtually all color motion artifacts
- 256 color bins
- Trackball-controlled color ROI: 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
- User-selectable smoothing control
- User-selectable persistence control
- Color/2D line density control

Contrast imaging

- System optimized for detecting contrast agent signatures
- Contrast modes available on the S5-1, C5-1 and L12-3 transducers
  - Long loop captures: up to 420 seconds
- Pulse inversion contrast imaging available with XRES technology
- Power modulation (PM), pulse inversion (PI), coded harmonic, and flash contrast imaging modes
- Low MI mode
- Display timer
- Low MI color flow contrast
- Contrast flash mode
- Contrast flash power mode
- S5-1 left ventricular opacification (LVO) for adult cardiology applications
- ECG/timed triggering
- QLAB ROI display

Contrast side-by-side imaging

- Simultaneous 2D contrast and tissue images displayed side-by-side
- Image controls, such as depth, focus, left/right sector width, and top/bottom, affect both the contrast image and the tissue image
- Controls can be set independently for the contrast image and the tissue image:
  - Gain
  - 2D opt
  - Res/Spd
  - Gray Map
  - Compress
  - Chroma
  - Persistence
  - 2D PRF
  - Output power
  - XRES
  - Smoothing

Tissue Harmonic Imaging

- Second harmonic processing to reduce artifacts and improve image quality
- Multivariate pulsing including patented pulse inversion phase cancellation technology for maximum detail resolution during harmonic imaging
- Available on most imaging transducers
- Extends high performance imaging capabilities to all patient body types
- Supports SonoCT (harmonic SonoCT) and XRES mode

Intelligent Doppler imaging

- Automates critical adjustments in color/PW duplex modes
- Automatically determines the 60° angle once the sample volume is placed and maintains that 60° angle as the sample volume is moved along the color flow image as it calculates
- Available during shallow vascular imaging with high-frequency linear transducers (L12-3, L12-5 50 mm and L15-7io) using presets
- Optimization of fine angle steering automatically to 60° steering when possible

Color Power Angio imaging

- Highly sensitive mode for small vessel visualization
- Available on all imaging transducers
- Cineloop review
- Multiple color maps
- Individual controls for gain, PRF, baseline, filters, sensitivity, echo write priority, and color invert
- Dynamic motion differentiation
- Adjustable CPA ROI: size and position
- User-selectable persistence
- User-selectable blending
- Directional Color Power Angio (DCPA) mode

Freehand 3D

- Qualitative grayscale volume acquisition supported on all imaging transducers
- Volume display with surface rendering (transparency, threshold, smoothing, brightness, and opacity controls)
- Multiplanar view display
- Specialized algorithms and maps maximize 3D display
- Trim tools on both volume and multiplanar reconstructed (MPR) views
- Supported by SonoCT and XRES optimization to reduce noise artifacts
- Resize control adjusts for different sweep speeds
- Sculpt/erase control of volume
- Advanced QLAB volume analysis tools:
  - 3DQ Advanced : MPR, thick slice, and advanced volume rendering capabilities
  - iSlice precision tomographic volume imaging capability

Biopsy display

- Biopsy display guideline provides a guideline to help see the biopsy needle path
- Scan plane orientation marker
- Biopsy quick key, biopsy needle length

Needle visualization

- Available on the L12-3 and L12-5 transducers
- Provides enhanced visualization of the needle position during biopsy procedures when using standard biopsy needles
- Needle visualization displays a dashed line
- Needle path quick key for left, right approach
- Needle path for shallow, medium, and steep approaches

One-button controls are logically placed on the CX50 control panel for easy optimization during every exam.

3. System controls

The CX50 has sophisticated system controls to help you acquire the best possible data on your patients, including many one-button optimization controls that adjust thousands of system parameters.

3.1 Advanced imaging controls

AutoSCAN image optimization
- Continuously optimizes the image depending upon the brightness and TGC controls
- Toggle on or off

iSCAN image optimization
- One-touch image optimization
- In 2D mode, one-button automatic adjustment of:
  - TGC and receiver gain to achieve exceptional uniformity and brightness of tissues
- In Doppler mode, on- button automatic adjustment of:
  - Doppler PRF based on detected velocity
  - Doppler baseline based on detected flow direction
  - Gain to achieve superb brightness of spectral waveform
- Available on all imaging transducers
- Operates in conjunction with SonoCT and XRES imaging

SonoCT real-time compound imaging
- Available on all curved and linear array transducers
- Eliminates virtually all clutter and artifact
- Automatic selection of the number of steering angles (up to 9) based on the user-selected resolution/frame rate (Res/Speed) condition
- Operates in conjunction with Tissue Harmonic Imaging, volume modes, and duplex Doppler
- Operates in conjunction with XRES imaging
- Available in contrast modes

Advanced XRES adaptive image processing
- Available on all imaging transducers
- Eliminates virtually all speckle noise and enhances border definition
- Available in contrast modes

Expanded field of view
- Trapezoidal imaging
  - Expands field of view on linear array transducers up to 15° on each side in vascular and general imaging applications

Active native data
- **2D image controls that can be changed in review:** gain (overall gain, TGC, LGC), compress, gray map, Chroma map, orientation (L/R, U/D), display zoom/pan, XRES
- **PW Doppler and CW Doppler controls that can be changed:** gain, baseline, invert, angle correct, angle 60/0/60, sweep speed, grayscale and Chroma maps, compress and reject, PW trace (High Q controls), display format
- **Color image controls that can be changed in review:** gain, baseline, color map, invert, write priority, smoothing, suppress, variance, directional Color Power Angio
- **Physio controls that can be changed:** sweep speed, position, and gain
- Can be acquired in prospective and retrospective timing sequences
- Images are acquired at acoustic data frame rate
- Available in cineloop and quick review modes

Live compare
- Allows recall of current or previous exam image data for direct side-by-side comparison with current image data

3.2 Control panel and user interface

- Easy-to-learn graphical user interface
- Ergo-centric design of primary controls, readily accessible and logically grouped
- Tri-state control panel lighting (active, available, and unavailable)
- Automatic ambient lighting sensing for exceptional image viewing in both light and dark environments
- Dual function mode switch and independent gain controls for 2D, CPA, M-mode and color, PW Doppler, CW Doppler
- Eight slide-pot control adjustment of TGC curve
- Two slide-pot control adjustment of LGC curve
- iSCAN control for 2D/Doppler/color Doppler automatic optimization
- High-definition/pan zoom control
- Freeze control
- Programmable print control
- Transducer selection and tissue specific imaging control
- Report and review controls
- Protocol selection control

4. Workflow

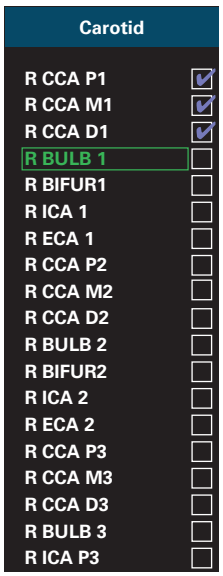
The CX50 system adapts to your workflow, whether you're in a critical care unit, at the bedside, in the emergency department, OR arena, or at a remote location. With easy-to-use tools designed for your needs, you're ready to scan, wherever your patients are located.

4.1 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 or user ID, institution name, and performed by
- Annotation data and patient name can be turned off (hidden) for generating images used in publication and presentation
- Annotations added via keyboard, quick lists or menus
  - Up to five separate lists with 26 annotations per list available
  - Users may add to the lists or move labels in list
  - Users select annotations from the list
  - Default lists provided by presets
  - Home keys for the list
  - Replace words
- Scan plane orientation marker
  - Ability to erase the last word
- 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 body markers, supported in single and dual imaging formats
- Doppler baseline invert in live and frozen imaging
- TGC curve (user-selectable On/Off display)
- TGC values (On/Off display)
- Tool tips provides a brief description of the abbreviated on-screen image parameters
- Informative trackball arbitration prompts
- Thumbnail display of images printed/stored
- Calculations results and analysis labels
- User-friendly menus that allow navigation to other analysis features
- Network and connectivity icons to allow instant feedback about network and printer conditions
- Cineloop frame number display
- Cineloop bar with trim markers
- Prompt region for informational message display
- Protocol procedure list with status

SmartExam protocols

- Exam guide with on-screen display
- Required views based on exam type
- Fully customizable protocol capability for clinical applications supported on the system with flexibility to conduct the examination protocol in any sequence
- Preset protocols for abdominal, vascular, and gynecological exams based on industry and accreditation guidelines
- Automatic launching of annotation and body marker icon on required views
- Automatic launching of calculations
- Ability to pause and resume SmartExam function at any time
- System analysis capabilities supported in all defined protocols
- Custom protocol transfer between CX50 systems



SmartExam's on-screen display provides immediate visibility of exam status.

4.2 Image presentation

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

4.3 Cineloop review

- Acquisition, storage, and display in real time and duplex modes of up to three minutes in quick review of 2D and color images
- Dual imaging (single and dual buffer)

4.4 Connectivity

- Two USB ports on control panel
- DHCP networking configurable
- 500 GB hard drive space
- Internal slot-load CD/DVD RW drive
- DICOM print, store, and storage commitment
- DICOM structured reporting for
  - Abdominal
  - Cardiac
  - Obstetrics
  - Vascular
  - Pediatric echo
  - GYN structured report
- Performed procedure step (PPS)
- Modality worklist
- DICOM reader saved onto media
- Export data as PC-compatible or DICOM files
- Ethernet at 100 Mb/second
- Wireless "B and G" networking
- TCP/IP properties are stored with the DICOM preset
  - When user changes DICOM presets, the TCP/IP properties are changed to allow the system to be moved between networks
  - DICOM presets can be saved to removable media
- USB-to-serial converter adapter

Video output

- DVI-I output of digital video to monitors or projectors
- Brightness control of video output

DICOM Capture

- Format types include:
  - Uncompressed Implicit VR Little Endian (ILE)
  - Uncompressed Explicit VR Little Endian (ELE)
  - RLE lossless compression
  - JPEG lossy compression
- Color formats: RGB, Palette, YBR Full
- Export of Live 3D image in DICOM private tag for review on QLAB or other compatible 3D viewers
- DICOM 3D clips and DICOM QLAB clips for simple review on DICOM PACS of 3D stills and loops
- Support for optional small B/W and color printers
- DICOM test patterns
- Network packet capture
- DICOM verify of connectivity
- Network diagnostics
- 2D and 3D TEE Digital Network Link for future Live review on Philips 3D cath lab software (EchoNavigator)
- Takes the Live 3D image with minimal latency via a gigabit network

4.5 Ergonomics

- Philips common user-experience control panel with central trackball and easy-access mode keys
- Tri-state lighting allows immediate feedback of active and available controls in all modes
- High-resolution LCD display with wide viewing angle and automatic ambient light compensation
- Quick keys and active mode
- System-guided exam protocol capability

4.6 Stress echo protocols

- Acquisition of single-frame or full-motion digital clips in any mode (including 2D, color Doppler, color TDI); type of image to be acquired may be changed on the fly by the operator as needed through pause protocol feature
- Gain Save adjusts automatically to different views
- Automatically saves your preferred control settings – such as MI (Mechanical Index), gain and depth – for each view while acquiring resting images
- At immediate post-exercise, system automatically retrieves saved settings for each view
- Allows different gain profiles for parasternal LAX and SAX views, AP4 and AP2 views
- Systole or full heart cycle acquisition
- Default stress protocols
  - May not be edited but may be used as the basis of a user-defined protocol
  - Factory-provided protocols include:
    - Two-stage exercise stress
    - Four-stage pharmacological stress
    - Three-stage exercise stress

- User-defined stress protocols
  - Utility for creation of user-defined protocols and editing of existing protocols for acquisition of stress and routine images, allows protocols to be defined to do any or all of the following:
    - Support between 1 and 8 stages
    - Support user-defined stage names
    - Support between 1 and 8 views per stage
    - Support user-defined view names
    - Prompt for a particular stage and view
    - Assign stage and view names
    - Set the number of cycles/beats for each view
    - Define prospective or multi-cycle/full disclosure acquisition
    - Save user-defined protocols within a preset
    - Save user-defined protocols to removable media for import onto other CX50 systems at the same software level
    - Modify protocols during use
    - Add stages at any point after the current stage
    - Change the name of a stage at any point up to acquisition of the first image of the stage
    - Save the modified protocol (it will not be automatically saved)

4.7 Integrated intervention

- Integration capability with Philips Allura X-ray systems for controls and display
- Support for radiology, vascular, and cardiology interventional procedures

4.8 Security

Security-related features
- Firewall policy blocks all unnecessary ports

OS hardening
- OS settings utilizing the DISA STIGS
- Disable unnecessary services
- Disable auto-run for removable media

Media export security
- Provides the ability to disable export of patient data to removable media

Access level
- No restrictions – users may perform exams and access all previously completed exams or MWL data
- Only patient data is locked – users may perform exams without requiring a login, but must successfully log in prior to accessing previously completed exams or MWL data
- Complete system is lockable – users and administrators must successfully log in prior to any system access

User management policy

User management local
- Local user management
- Support for multiple unique user accounts
- Support for multiple unique administrator accounts

User management remote
- Supports active directory authentication utilizing LDAP (system may not be joined to the domain)
- Support for individual accounts or AD groups for users and administrators
- May utilize LDAP or secure LDAP
- Customer may configure the system to perform authenticated binding

Password policies
- Provides the ability to specify password policies for local accounts
- Password history (1-8)
- Minimum password length (6-14 characters)
- Maximum password length (6-63 characters)
- Minimum password age (0-998 days)
- Maximum password age (1-999 days)
- Password complexity

Account lockout policies
- Lockout threshold (1-999 minutes)
- Lockout duration (1-999 minutes)
- Lockout counter reset (minutes)

Auto logoff
- Automatically logs off a user after the specified period of inactivity
- Disabled: 5, 10, 20, 30, or 60 minutes

Hard drive encryption
- 128 bit
- 128 bit with diffuser
- 256 bit
- 256 bit with diffuser

Login/legal banner
- Configurable login/legal banner
- Configurable login/legal banner title

Audit log export
- Audit logs may be exported utilizing syslog
- Available protocols are UDP or TLS

Safeguard
- Optional malware protection utilizing the McAfee Application Controls whitelisting solution

Government security
- Configurable option to provide up-to-date security features while fully hardening the system for patient data protection; option also fully removes the capability for creating or configuring any VPN functionality

5. Transducers

The CX50 ultrasound system offers a full complement of transducer options that extend capabilities to meet a wide range of imaging needs.

5.1 Transducer selection

- Automatic parameter optimization of each transducer for exam type through tissue specific presets software
- User-customizable imaging presets for each transducer
- Dedicated connector for continuous wave Doppler (Pedoff) transducers
- Continuous dynamic receive focusing on all imaging transducers

5.2 PureWave transducer technology

- Proprietary combination of PureWave crystal, impedance matching layers, backing materials, micro-electronics, and cable design
- Achieves breakthrough acoustic broadband response and twice the efficiency of conventional technology for superb image quality and Doppler performance
- Designed for multivariate harmonic imaging capabilities including pulse inversion and coded pulse sequencing
- Supports highly sensitive contrast enhanced ultrasound capabilities
- Available in sector, curved, and xMATRIX array configurations up to 10 MHz in frequency

5.3 IntraCardiac Echocardiography (ICE) imaging

- CX50 imaging of 2D, Color, PW Doppler, CW Doppler, harmonic imaging, TDI, M-mode, and Color M-mode
- Bedside, portable, simplified, cleanable user interface for integration with Philips cath labs
- Allows for operation of Philips 2D ICE solution
- Excellent suppression of interference artifacts common in interventional rooms
- Structural Heart Disease and EP presets
- 3 MHz to 10 MHz operating frequency
- 64-element phased-array imaging
- Operates with St. Jude Medical Systems patient interface module and Viewflex Xtra 9 French, four-way steering ICE catheter which has easy handle control and maintains image format during ICE procedure (see St. Jude Medical for details and sales information)

CX50 supports a broad range of exam requirements with sector, curved, and linear array transducers.

The L15-7io transducer is designed for comfort and easy access for high frequency imaging applications.

Curved array

C5-1 curved array with PureWave technology

- 5 to 1 MHz extended operating frequency range
- High-density curved array, 160 elements
- 2D, steerable PW Doppler, high PRF and color Doppler; and Color Power Angio, SonoCT, advanced XRES, and multivariate harmonic imaging
- General purpose abdominal, obstetrical, gynecological, interventional, acute care, and regional anesthesia applications
- Contrast application
- Supports reusable, four-angle, plastic biopsy guide (14-23 gauge)

C8-5 broadband curved array

- 8 to 5 MHz extended operating frequency range
- High-density curved array, 128 elements
- Field of view: 90°
- Steerable pulsed Doppler, color Doppler, Color Power Angio, SonoCT, and advanced XRES imaging
- General purpose pediatric and vascular imaging
- Supports reusable, single-angle, plastic biopsy guide (8.5FR and 14-23 gauge needles, 19 gauge not available)

C10-3v curved array with PureWave technology

- 10 to 3 MHz extended operating frequency range
- High-density curved array, 128 elements
- End-fire sector, 11.5 mm radius of curvature, 130° field-of-view
- Steerable pulsed wave, high PRF, and color Doppler, Color Power Angio, SonoCT, advanced XRES, and multivariate harmonic imaging
- Endovaginal applications
- Supports disposable plastic biopsy guide (18 gauge) and stainless steel biopsy guide (16-18 gauge)

C9-3io curved array

- 9 to 3 MHz extended operating frequency range
- Biopsy guide with three angles and on-screen graphic display
- 2D, contrast-enhanced, color, PW Doppler
- Length of transducer, cable and connector: 3.2 m/10.5 ft
- Length handle to tip: 4.66 cm/1.83 in
- Radius of curvature: 2.5 cm/0.984 in
- General abdominal surgery, general contrast, and abdominal intervention applications

Linear array

L12-3 broadband linear array

- 12 to 3 MHz extended operating frequency range
- Fine pitch, high-resolution linear array, 160 elements
- 2D, steerable PW, high PRF, and color Doppler, Color Power Angio, SonoCT, advanced XRES, and multivariate harmonic imaging
- Vascular, small parts, musculoskeletal, regional anesthesia, and acute care applications
- Contrast application
- Supports reusable, three-angle biopsy guide (14-23 gauge)

L12-5 50 mm linear array

- Fine pitch, 256 element, high-resolution linear array
- 12 to 5 MHz extended operating frequency range
- 10° of trapezoidal imaging
- Steerable pulsed wave, color Doppler, and Color Power Angio, SonoCT, XRES, and harmonic imaging
- Intelligent Doppler flow optimization
- AutoSCAN imaging
- Cable length: 198 cm/78 in
- Breast, thyroid and superficial small parts; musculoskeletal tendon, abdomen bowel, and vascular applications
- Biopsy guide available

L15-7io compact linear array

- 15 to 7 MHz extended operating frequency range
- 8° of trapezoidal imaging
- Steerable PW Doppler, color Doppler and Color Power Angio imaging, and XRES processing
- Tissue aberration correction selection for MSK and small parts
- Intelligent Doppler flow optimization
- Scanplane aperture: 23 mm linear plus 8° trapezoidal
- Trapezoidal imaging mode
- Unique lens footprint design allowing high resolution imaging at transducer surface
- Transducer length: 89 mm/3.5 in
- Cable length: 243.84 cm/96 in
- Vascular surgical, cardiac epicardial, superficial vascular, musculoskeletal, and small parts applications

L10-4lap linear array

- 10 to 4 MHz extended operating frequency range
- 2D, color, PW Doppler
- Length of transducer, cable and connector: 360.7 cm/11.83 ft
- Length of handle to tip: 51.1 cm/12.5 in
- Radius of curvature: 15.57 mm/0.613 in
- Laparoscopic applications for general abdominal and abdominal interventional procedures
- Contrast applications

Sector array

S5-1 sector array with PureWave technology

- 5 to 1 MHz extended operating frequency range
- Sector array, 80 elements
- 2D, steerable PW Doppler, CW Doppler, high PRF Doppler, color Doppler, tissue Doppler, advanced XRES and multivariate harmonic imaging including contrast LVO
- Adult cardiac, general purpose abdominal, transcranial Doppler (TCD), acute care, and adult LVO applications
- Supports reusable three-angle, plastic biopsy guide (14-23 gauge) and three-angle stainless steel biopsy guide (14-23 gauge)

S8-3 broadband sector array

- 8 to 3 MHz extended operating frequency range
- Phased array, 96 elements
- Steerable PW Doppler, CW Doppler, high PRF Doppler, color Doppler, tissue Doppler, harmonic imaging, and XRES imaging
- Pediatric and small adult cardiology and pediatric abdominal applications

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)

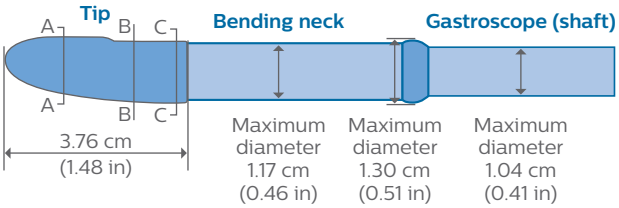
S12-4 broadband sector array

- 12 to 4 MHz extended operating frequency range
- Phased sector array, 96 elements
- Steerable PW Doppler, CW Doppler, high PRF Doppler, color Doppler, Color Power Angio, XRES, and Tissue Doppler Imaging
- Pediatric and neonatal cardiology, pediatric abdominal, neonatal head applications

X7-2t xMATRIX array TEE with PureWave xMATRIX technology

- Live 3D Echo transesophageal xMATRIX array transducer with 2,500 elements
- 7 to 2 MHz extended operating frequency range
- Physical dimensions:
  - Bi-directional curve on pill-shaped tip for easy intubation
  - Slightly elevated imaging lens for easy contact with the esophagus
  - Tip: See specification diagram adjacent
  - Shaft: 1 cm (0.4 in) diameter, 1 m (39.40 in) L
- Thin flexible cable to the connector
- Mechanically rotatable array from 0 to 180°
- Electrocautery suppression
- 2D, advanced XRES, harmonic imaging, M-mode, color M-mode, color flow, PW Doppler, CW Doppler, Live xPlane imaging, Live Color xPlane imaging, Live 3D Echo, Live 3D zoom, Live 3D color, Live 3D volume, volume rate control imaging, 3D Swivel
- High frame rate 3D imaging via target volume rate control
- Compact connector
- Connects to iE33 via an adapter
- Adult TEE applications: patients >66 lb (30 kg)

X7-2t Live 3D TEE specifications



Surface length = minimum trace length around the cross section at A, B, C of the tip.

Surface length at A = 4.83 cm (1.90 in) | Surface length at B = 4.52 cm (1.80 in) | Surface length at A = 4.52 cm (1.80 in)

Non-imaging

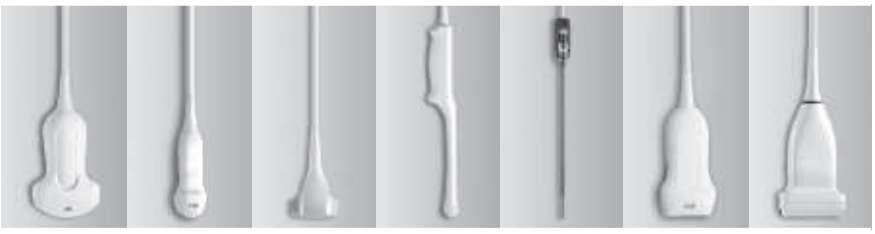
D2cwc CW transducer (Pedoff)

- Dedicated 2 MHz CW Doppler
- Adult cardiac applications

D5cwc CW transducer (Pedoff)

- Dedicated 5 MHz CW Doppler
- Deep venous and arterial applications

5.2 Transducer application guide



Transducer		C5-1	C8-5	C9-3io	C10-3v	L10-4lap	L12-3	L12-5 50
Type of array		Curved	Curved	Curved	Curved	Linear	Linear	Linear
Number of elements		160	128	128	128	128	160	256
Scanplane aperture			22.4 mm				38 mm	
Field of view		70°	90°		130°			50 mm
Broadband frequency range		5-1 MHz	8-5 MHz	9-3 MHz	10-3 MHz	10-4 MHz	12-3 MHz	12-5 MHz
PureWave crystal technology		•			•			
Application	**Exam type**							
Abdominal	General	•		•		•		
	Renal	•						
	Vascular	•						
	Difficult	•						
	Interventional			•		•		
Cardiac	Adult transthoracic							
	Adult TEE							
	Pediatric TEE							
	Congenital							
	Pediatric							
	Perioperative							
	Intraoperative							
Vascular	Carotid		•				•	•
	Arterial		•				•	
	Venous		•				•	
	Abdominal	•						
	TCD							
	Intervention						•	
	Vascular access						•	
Obstetrics	Early OB	•						
	General OB	•			•			
	Fetal echo	•						
Gynecology	Pelvis	•			•			
	Fertility	•			•			
Small parts	Superficial						•	•
	Thyroid						•	•
	Testicle						•	
	Breast						•	•
Musculoskeletal	Superficial						•	•
	Deep						•	
Acute	FAST	•						
	Lung	•					•	
	Vascular access						•	
Nerve	Superficial						•	
	Deep	•					•	
Pediatric	Head		•					
	Abdomen		•					
	Renal		•					

Transducer		L15-7io	S5-1	S8-3	S7-3t	X7-2t	S12-4
Type of array		Linear	Sector	Sector	Sector	Sector	Sector
Number of elements		128	80	96	48	2500	96
Scanplane aperture		23 mm	20.3 mm	15.4 mm	7.25 mm	Proprietary	9.8 mm
Field of view		22 mm		90°	90°		90°
Broadband frequency range		15-7 MHz	5-1 MHz	8-3 MHz	7-3 MHz	7-2 MHz	12-4 MHz
PureWave crystal technology			•			•	
Application	Exam type						
Abdominal	General		•				
	Renal		•				
	Vascular		•				
	Difficult						
	Interventional						
Cardiac	Adult transthoracic		•				
	Adult TEE				•	•	
	Pediatric TEE				•		
	Congenital		•				
	Pediatric			•			•
	Perioperative					•	
	Intraoperative	•	•			•	
Vascular	Carotid						
	Arterial	•					
	Venous						
	Abdominal		•				
	TCD		•				
	Intervention						
	Vascular access						
Obstetrics	Early OB						
	General OB						
	Fetal echo						
Gynecology	Pelvis						
	Fertility						
Small parts	Superficial	•					
	Thyroid						
	Testicle						
	Breast						
Musculoskeletal	Superficial	•					
	Deep						
Acute	FAST		•				
	Lung						
	Vascular access						
Nerve	Superficial						
	Deep						
Pediatric	Head						•
	Abdomen			•			•
	Renal						

6. Measurements and analysis

6.1 Comprehensive measurement tools

- Adult echo cardiac analysis
- Dedicated pediatric and adult congenital cardiac analysis
- Simpson's 3-Point Measurement
- Abdominal analysis
- Fetal Echo analysis
- Gyn for studies of the breast, pelvis, ovaries, and uterus
- OB primarily geared toward first, second, and third trimester neonatal growth
- Small parts analysis
- Vascular analysis that includes carotid, arterial, venous
- Transcranial Doppler analysis
- High Q automatic Doppler analysis
- QLAB quantification

6.2 QLAB advanced quantification

Region of Interest Quantification (ROI)

- Vascular, general radiology, and cardiac images
- Trending capability (available only on stand-alone PC)
- Up to ten user-defined regions
- Thumbnail display of frames for easy trimming
- Pixel intensity index (PII) and echo histogram display, supported data types: echo, velocity, or power (angio)
- Custom tools to auto trim relative to ECG trigger on cardiac and other triggered files for quantification of specific parts of cardiac cycle
- Region shaping tools
  - Polygon
  - Free-form polygon
  - Spline
  - Free-form spline
  - Rectangle
  - Square 5 mm
- Single frame tools
  - Angle
  - Annotation
  - Curved distance
  - Distance
  - Ellipse
  - Live xPlane ROI combination
- Auto area for semi-automated quantification of hypoechoic structures
- Adjustable ROI dynamic tool
- Motion compensation algorithm selectable in Preferences menu
- Data display selection
  - Log
  - Linear
- Data display smoothing option
- Mean, median, and standard deviation calculation
- Time-intensity curves
- Curve fitting tools
  - Gamma-variate (wash-in and wash-out)
  - One minus exponential
  - Linear
  - Log normal WI
  - Log normal WIWO
  - LDRW WIWO
- Graphic results with dB, intensity or velocity/frequency, time to peak, "A" value, area under curve, and peak intensity (when a gamma variate curve has been applied) for each frame
- Calculation of the following color indices using the 2D measurement tools
  - Vascularization index (VI)
  - Flow index (FI)
  - Vascularization flow index (VFI)

Cardiac 3D Quantification Advanced (3DQ Advanced)

- Left ventricle global and regional volume and timing analyses with no geometric assumption
- Comprehensive report page with AHA/ASE 17-segment bull's-eye plots and numeric values
- Image quality index using dedicated color scale for 3D volume quality control
- Display and manipulation of dynamic 3D rendering and left ventricular (LV) true volumes of Live 3D data sets
- Displays of 3D or dynamic 3D renderings in grayscale, single colorization, or dynamic colorization
- Multiplanar reconstruction (MPR) views
- Option to flip LV apical two-chamber display and corresponding SALI sequence
- iSlice display-compatible
- Measurements of LV endocardial true 3D volumes, LV ejection fraction, and stroke volume using semi-automated 3D border detection
- Computation of regional volumes based on AHA/ASE 17-segment LV model
- Edit mode that adds flexibility for optimal 3D border tracking in four dimensions
- Display of global LV volume waveforms, all 17 regional volume waveforms, or a subset of user-selected regional volume waveforms
- Displays of dyskinetic segments and corresponding volume waveforms in specific color and format
- Display of regional end-diastolic normalized regional volume waveforms
- User-selectable waveforms: single, by wall, by level (ring) modes

- A bull's-eye visualization of all 17 regional segments or the user-defined and user-selected regional segments
- Global and regional reports that provide 3D LV global values and regional timing indices from all or a subset of 17 regional segments and bull's-eye-based parametric imaging display
  - 3D true volume-based EDV, ESV, stroke volume, and EF
  - Standard deviation and maximal difference of time to minimum systolic volume (Tmsv) based on all or a subset of 17 regional segments
  - Tmsv values displayed in time (msec) or normalized to the R-R interval (%)
  - Bull's-eye showing the user-selected segments for Tmsv calculation
  - LV timing and radial excursion parametric images in bull's-eye format using effective color-coded scales
  - Parametric imaging supporting AHA/ASE 17-segment overlay on the bull's-eye for direct and rapid visualization
  - Parametric imaging that provides a radial excursion threshold slider for selective visualization of LV segments in the timing parametric display
  - Measurement data exported in Excel or DICOM SR formats

Cardiac 3D Quantification (3DQ)

- Capable of performing 2D measurements from 3D volume and 3D color volume multiplanar reconstruction (MPR) views
- Review and quantification of Live 3D, 3D zoom, 3D full volume, and color full volume files from the X7-2t x MATRIX transducer
- 3D image controls: 3D vision map, 3D single or dynamic colorization, 3D color render, 3D color suppress control
- Multiplanar reconstruction (MPR) views
  - 3D slice plane
  - Parallel plane
  - Unlimited MPR manipulation
  - Plane rotation, tilt, movement controls to reduce left ventricle foreshortening
- 3D annotation
- 3D spatial reference icon
- Cardiac 3D measurements, 3D quantification from MPR views includes the following measurements
  - Distance
  - Area
  - Biplane LV volume (Simpson's)
  - Biplane LV ejection fraction
  - Biplane LV mass

Automated Cardiac Motion Quantification[A.I.] (aCMQ[A.I.])

- Available in three workflows with dedicated preferences settings
  - Global workflow
  - User-defined workflow
  - TMAD workflow (Tissue Motion Annular Displacement)
- Automated ROI 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
- Quantification and display of 2D native ultrasound DICOM images
- 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 exported in Excel or DICOM SR formats
- Cardiac phases display (overlay of AVO, AVC, MVO, and MVC mechanical events auto-imported from ultrasound cart analysis via DICOM SR 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
  - User can accept and export results, or reject them and restart quantification
  - 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 help 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
  - 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
- TMAD workflow
  - Mitral valve and other valve annular motion tracking over time
  - Computation of valve annular displacement curves over time

Mitral Valve Navigator[A.I.] (MVN[A.I.])

- 3D assessment of mitral valve anatomy and associated structures
- Review and quantification of Live 3D and full volume data sets from X7-2t xMATRIX transducer (Live 3D TEE)
- Task-driven workflow provides user direction and guidance illustrations
- Automated ES selection
- Automated 3D annulus segmentation and leaflet surface
- Associated 2D, 3D, and projected measurements and calculations sorted by group
  - Annulus
  - Leaflet
  - Aortic-Mitral
  - Coaptation
  - Papillary
- 3D image controls
  - 3D vision map
  - 3D single or dynamic colorization
  - Auto-view
  - Absolute and relative rotation
  - Three 3D render modes: volume, slices, model
- Multiplanar reconstruction (MPR) views
  - 3D slice plane
  - Unlimited MPR manipulation
  - Slice thickness
  - MPR smooth
- 3D mitral labels
- 3D mitral model
  - Model displays: tenting surface, leaflet surface, minimum surface
  - Enhanced coaptation line tracing
  - Leaflet discontinuity traces
  - Leaflet segmentation
  - Up to 53 measurements overlay
  - Exposed and coapted leaflet length and surfaces

- Continuous display during loop playback
- Mitral valve 3D measurements and 2D/3D quantification from model view include the following measurements
  - Distances
  - Curve distances
  - Areas
  - Projected areas
  - Volumes
  - Angles
  - Ratio
- Measurement and calculation definition and overlay on 3D model
- Comprehensive reporting
- Data exported in Excel or DICOM SR formats
- Measurement data exported in Excel or DICOM SR formats

Strain Quantification (SQ)

- 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 easier to read
- User-defined M-line motion to follow 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

Intima Media Thickness (IMT) measurements

- Automated measurements of IMT in carotids and other superficial vessels
- Automated measurement technique on user-selected frames
- Selector chart to record location and side of vessel from where IMT is measured
- Report of the IMT values in mean millimeters and standard deviation
- Quick optimization for thin or thick intima media complexes
- User-adjustable ROI
- User-defined measurement capability
- Persistent storage of up to ten measurements with image files for future reference
- Measurement data exported in Excel or DICOM SR formats

MicroVascular Imaging (MVI)

- Review loops from Philips CX50 systems
- Motion compensation algorithm selectable in Preferences menu

General Imaging 3D Quantification (GI 3DQ)

- Access to 3D viewing controls
- Simple annotation
- Linear distance measurements
  - Polygon, free-form polygon, spline, free-form spline, rectangle measurements
- Curved distance measurements
- Ellipse measurements
- Area measurements
- Auto area measurements – semi-automated tool to simplify measurement of hypoechoic structures
- Angle measurements
- 3D measurement tools
  - Stacked contour measurements
  - Auto-stacked contour measurements – semi-automated tool to simplify volume measurements of hypoechoic structures
  - Auto-volume tool
  - 3D distance/curved iSlice
  - Stacked ellipsoid measurements
  - Ellipsoidal measurements
- Calculation of the following color indices using the 2D and/or 3D measurement tools
  - Vascularization index (VI)
  - Flow index (FI)
  - Vascularization flow index (VFI)
  - Pixel intensity index (PII) and echo histogram display
- Support of the display of 3D orientation labels (when enabled)
  - Trending capability (available only on stand-alone PC)

7. Physical specifications

The CX50 is a laptop-sized ultrasound system you can hand-carry or use on a specially designed cart.

System dimensions

Length	35.6 cm/14 in
Width	41.3 cm/16.25 in
Height	8.6 cm/3.4 in
Weight	7.3 kg/16.2 lb
Display	39.1 cm/15.4 in high-resolution display with wide viewing angle

Physical features

- High-resolution display with wide viewing angle
- Laptop style alphanumeric QWERTY keyboard
- Ergonomic, integrated carrying handle
- USB footswitch
- Multiple transducer module option multiport adapter connects up to three transducers

Mobility cart

- Weight: 47.4 kg/104.3 lb
- Width at base: 57.4 cm/22.6 in
- Depth including handle: 63.5 cm/25.0 in
- Height: adjustable from 90 cm/35.4 in to 108 cm/42.5 in
- Rear-mounted handle
- Casters: 5″ casters provide total locking (directional and rotational) engaged by the foot pedals
- Quick-release tray
  - Simple latch system to secure CX50 system in place
  - System's integrated handle accessible from front for secure maneuverability
- Storage
  - Two clear plastic storage trays 24 cm x 16 cm x 6 cm with maximum weight of 2 kg
  - One USB peripheral tray 24 cm x 16 cm x 2.5 cm with straps to secure devices less than 2 kg
  - One handle-mounted clear plastic storage tray
  - Transducer holders accommodate four transducers
  - Multiple transducer, ECG, and power cord cable hooks conveniently positioned to facilitate cable management
  - Rear-mounted USB and Ethernet port panel
  - Optional multiport adapter allows simultaneous connection up to three transducers
  - Optional integrated B/W printer
  - Input power to integrated B/W printer
- Input power to B/W printer and color printer
- USB hub with cables to:
  - B/W printer
  - Color printer
  - CX50 USB

Travel case

- Dimensions: 57 cm/22.5 in x 42 cm/6.5 in x 32 cm/12.5 in (H x W x D)
- Weight: 7 kg/15.4 lb/ when empty
- Features:
  - Accommodates CX50 system and AC adapter
  - Removable transducer bag stores three transducers and one gel bottle
  - Wheels and retractable handle allow easy transport

Power requirements

System/AC adapter	100-240V, 50/60 Hz, 2.65A MAX
Optional cart	100-240V, 50/60 Hz, 10-5 A

Power management

- Internal lithium-ion polymer battery
- Fully charged new battery yields approximate 45-minute battery life under continuous use without AC; actual time varies with age and condition of battery
- Quick-charge battery technology
- Advanced battery/AC monitoring circuitry includes on-screen graphics and low battery warning
- Suspend mode for instantaneous boot-up between exams

Environmental

Heat dissipation	700-1100 BTUs/hour (fully loaded)
Operation range	10˚C–40˚C operating in 15–80% relative humidity

ECG and physio

- One three-lead ECG input
- One external ECG input
- Two physio input channels (1V, p-p)
- Selectable ECG triggered skipping between 1 and 20
- Respiration
- ECG inputs
  - Low-level ECG input
  - Analog output
  - Pulse/Phono/Aux 2 input
  - External ECG/Aux 1 input

Electrical safety standards

- CAN/CSA-C22.2 NO. 60601-1
- ANSI/AAMI 60601-1
- JIS T 0601-1, Japan
- EN 60601-1, European Norm, Safety of Medical Electrical Equipment
- EN 60601-1-2, European Norm, Collateral Standard: Electromagnetic compatibility
- EN 60601-2-37, European Norm, Particular requirements for the safety 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)
- Japanese Ministry of Health, Labor and Welfare

8. Maintenance and services

Maintenance

- Easy customer access to air filter for cleaning
- System designed for easy replacement of key components by your facility's biomedical engineers
- Flexible RightFit service agreements to:
  - Maximize uptime
  - Access Philips award-winning service organization
  - Minimize risk

Services*

- Clinical applications support available
- On-cart transducer test provides confidence in your transducer quality
- Philips Remote Services connectivity allows for many advanced service features, including:
  - Virtual on-site visits for both clinical and technical support, providing fast resolution to issues and questions
  - Remote clinical education
  - Remote log file transfer decreases downtime by allowing rapid diagnosis of problems by Call Center personnel
  - Online Support Request
    - Simplifies support engagement
    - Provides fast response to clinical questions and technical issues
    - User can enter request directly on ultrasound system
  - Proactive monitoring
    - Helps prevent unscheduled downtime
    - Monitors key system parameters.
    - Sends an alert to Philips Call Center so action can be taken before system operation is affected
- Optional Utilization Report provides data to help manage ultrasound assets
  - Track system and transducer usage
  - Summarize data about exam types and duration
  - Provide data to help with credentialing and privileging
  - Identify referrals by exam type

* Optional. Not all services available in all geographies; contact your Philips representative for more information. May require service contract.

www.philips.com/CX50

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