

Recho R9 Series

Cardiovascular Ultrasound Diagnostic System

Datasheet



1 System Overview

Powered by the most revolutionary ZONE Sonography® Technology, Recho's new eZST+ platform breaks through the technical barriers of real-time 3D imaging of the heart. It significantly improves the image frame rate, and compatible with low/high velocity flow information, providing accurate solutions for treatment of diseases.

It is applicable for the following applications: Abdomen, Obstetrics, Gynecology, Cardiology, Small parts, Urology, Vascular, Pediatrics, Nerve, Emergency & Critical and Others

1.1 Imaging Modes

- B-Mode
- THI and PSH™ (Phase Shift Harmonic Imaging)
- M-Mode/Color M-mode
- Free Xros M™ (Anatomical M-mode)
- Free Xros CM™ (Curved Anatomical M-mode)
- Color Doppler Imaging
- Power Doppler Imaging/Directional PDI
- PW (Pulsed Wave) Doppler
- CW (Continuous Wave) Doppler
- TDI (Tissue Doppler Imaging)
- UWN+ (Ultra Wideband Non-linear Plus) Contrast Imaging™
- HiFR CEUS (High Frame Rate CEUS)
- LVO (Left Ventricular Opacification)
- VLMI Contrast
- Smart 3D™ (Freehand 3D)
- Real-time 4D and Matrix 4D Imaging
- iScape™ View (Panoramic Imaging)
- STE Imaging (Sound Touch Elastography)
- STQ Imaging (Sound Touch Quantification)
- Natural Touch Elastography Imaging

1.2 Features

- B-Mode
- THI and PSH™ (Phase Shift Harmonic Imaging)
- M-Mode/Color M-mode
- Color Doppler Imaging
- Power Doppler Imaging and Directional PDI
- PW (Pulsed Wave) Doppler

- CW (Continuous Wave) Doppler
- Free Xros M™
- Free Xros CM™
- iScape™ View
- Glazing Flow
- iBeam™ (Spatial prfnd Imaging)
- iClear+
- iTouch™ (Auto Image Optimization)
- AutoTouch
- Zoom/iZoom (Full Screen Zoom)
- FCI (Frequency Compound Imaging)
- B steer
- ExFOV (Extended Field of View)
- HD Scope
- SSC (Sound Speed Compensation)
- Smart 3D™
- Color 3D
- Real-time 4D and Matrix 4D Imaging
- Quick View
- 3D Ref
- X-Vue
- STIC (Spatial-Temporal Image Correlation)
- iPage+ (Multi-Slice Imaging)
- SCV+ (Slice Contrast View)
- iLive Echo
- 3D-Print Format
- Clinical Measurement Package
- Smart Fetal HR (Fetal Heart Rate)
- Smart HRI
- Smart Hip
- Smart Trace
- CPP (Color Pixel Percentage)
- Smart Track
- HR Flow™ (High Resolution Flow)
- IMT
- RIMT (RF-Data based IMT)
- R-VQS (RF-Data based Quantitative Analysis on Vessel Stiffness)
- iNeedle™ (Needle Visualization Enhancement)
- V Flow
- UWN+ Contrast Imaging™
- HiFR CEUS (High Frame Rate CEUS)
- LVO ((Left Ventricular Opacification)
- VLMI Contrast
- Echo Contrast Imaging QA (Quantitative Analysis)

- STE Imaging (Sound Touch Elastography)
- STQ Imaging (Sound Touch Quantification)
- Natural Touch Elastography Imaging
- Endocavity STE
- ECG function
- Auto EF
- TDI (Include TVI, TVD, TVM, TEI)
- TDI QA (TDI Quantitative Analysis)
- FH Tissue Tracking QA
- Stress Echo
- Auto Strain LV
- Auto Strain RV
- Auto VQ LA
- Auto DFR
- Smart VTI
- Smart IVC
- Smart Echovue
- Smart B-line
- iWorks™ (Auto Workflow Protocol)
- DICOM
- MedSight
- UltraAssist (Off-line software)
- Q-Path
- iStorage
- Touch gestures

2 Physical Specification

2.1 Dimension and Weight

- Dimensions (in folded status):
The control panel and the monitor are in the lowest position, and the monitor is placed horizontally:
 - Depth: 990±20 mm
 - Width: 540±20 mm (main unit)/525±20 mm (control panel)
 - Height: 1080±20 mm
- Dimensions (in unfolded status):
The control panel and the monitor are in the highest position, and the monitor is placed vertically
 - Depth: 900±20 mm
 - Width: 540±20 mm (main unit)/525±20 mm (control panel)
 - Height: 1685±20 mm
- Weight (net weight, standard configured but not including probes): 110kg±10kg.

2.2 Electrical power

- Voltage: 100-240V-
- Frequency: 50/60 Hz
- Power consumption (input): 1000 VA/500W
- Power consumption (auxiliary output): 300 VA

2.3 Operating Environment

- Ambient temperature: 0-40°C
- Relative humidity: 20%-85% (no condensation)
- Atmospheric pressure: 700hPa-1060hPa

2.4 Storage & Transportation Environment

- Ambient temperature: -20-55 °C
- Relative humidity: 20%-95% (no condensation)
- Atmospheric pressure: 700hPa-1060hPa

3 User Interface

3.1 Monitor

- 23.8-inch high resolution color LED monitor
- Resolution: 1920x1080
- Viewing angle (up/down/left/right): 170 degrees
- Digital on screen display of brightness and contrast controls
- Automatic LED brightness
- Tilt/Rotate independent adjustment
- Tilt angle range: 20±5° degrees (backward), 85±5° degrees (forward)
- Rotate angle range: 90±5° degrees (to left), 150±5° degrees (to right)

3.2 Multi-directional articulating monitor arm

- Rotate angle: 90±5 degrees (to left); 150±5 degrees (to right)
- From front to back: arm: 300±20mm
- From bottom to top: 150±20mm

3.3 Touch screen

- 15.6-inch high sensitivity anti-glare color touch screen
- Resolution: 1920*1080
- Digital brightness and contrast adjustment through preset
- Viewing angle (up/down/left/right): 178 degrees

- Angle adjustable range: 30 degrees
- Support touch screen gestures
- Support either hand writing or with gloves on
- Editable touch-screen buttons: long press to add, delete or move the buttons.
- Short-cut switch of latest used transducer & exams

3.4 Touch gestures

- Swipe horizontally to turn pages
- Image parameter adjustment.
- 8 user defined gestures using two fingers for more functions, such as freeze, save, print, activate specific imaging modes, measurements, and some other special functions.

3.5 Floating control panel

- Brightness adjustable for the backlight of the whole control panel
- Full-sized, backlit QWERTY keyboard
- 8 programmable keys
- 8-segment TGC control
- Independent rotation and up/down, front/back adjustment
 - Left/right rotate angle range: 180 degrees
 - Down/up with electric lifting arm range: 200±10 mm

3.6 Transducer port and holder

- Transducer ports with dust prevention: 4 active ports, 1 parking port, and 1 pencil transducer port
- Support active transducer with indicator on
- Transducer holder: 5, plus 1 dedicated endocavity transducer holder
- Support transducer holder arbitrary sliding and swap

3.7 Wheels

- Diameter: 125mm

3.8 Central brake

- Left brake for total lock
- Right brake for swivel lock

3.9 System boot-up

- Boot-up from shut-down:

- McAfee not configured: ≤ 65 sec
- McAfee configured: ≤ 85 sec
- Boot-up from stand-by: < 20 sec
- Shut-down: < 30 sec

3.10 Language support

- Support multi-language user interface, keyboard input, and user manuals.
- User interface: English, Chinese, German, Spanish, French, Italian, Portuguese, Russian, Czech, Polish, Turkish, Finnish, Danish, Icelandic, Norwegian, Swedish, Hungarian, Serbian, Dutch, Lithuanian, Greek, Thai
- Keyboard input: English, Chinese, German, Spanish, French, Italian, Portuguese, Russian, Czech, Polish, Icelandic, Norwegian, Swedish, Finnish, Turkish, Danish, Hungarian, Serbian
- User manual: English, Chinese, Turkish

* Not all items are listed in this part; For more detailed information, please refer to User Manual

3.11 Other Features

- DVD R/W driver
- Anti-virus software
 - McAfee
 - Windows Defender
- Audio speakers: Stereo audio speakers
- Storage tray kit
 - Storage tray of the control panel base
 - Storage tray of the main unit top cover
 - Intra-cavity probe holder adapter
- Ultrasound gel warmer holder assembly
- Built-in Battery
 - Replaceable and rechargeable lithium battery.
 - Full battery lasts for no less than 24H in standby mode
 - Light indicator for battery in standby status
 - Empty battery recharged to full in less than 8H
- Built-in DVR
 - Built-in digital video recorder.

- Screen display and voice information are recorded and stored in the built-in hard disk
- Save space and is a useful tool for education and memory
- Max storage length each time: 60 min
- Probe Adapter PCM-SU01
S-connector probes can be connected to the ultrasound system with U-socket through the probe adapter.
- The ultrasound system can be disinfected.

4 Technical Specifications

4.1 Innovative eZST⁺ platform

- Premium and innovative ultrasound platform, evolving with powerful processing architecture and enhanced channel data processing based on ZONE Sonography®
- Windows Operating System
- Powerful Processing Architecture
- Advanced Acoustic Acquisition
- Total Recall Imaging (TRI)
- Enhanced Channel Data Processing
- Dynamic Pixel Focusing (DPF), digital variable aperture and dynamic apodization, A/D \geq 14 bit
- Up to 12,582,912 channels
- System Frequency Range: 1 - 30 MHz
- Parallel processing of multiple signals
- Gray Scale: 256
- Line density per frame \geq 512 ultrasound lines
- Sound Speed Compensation (SSC)
- ZONE Sonography® Technology

4.2 Transducer specification

- Single crystal and compound crystal etc.
- Supported transducer type
 - Curved array
 - Linear array
 - Phased array
 - Endocavity
 - Matrix array
 - 4D Volume
 - Transesophageal
 - pencil transducer

5 Imaging Parameters

5.1 Advanced imaging technologies

- iBeam™
Spatial Compound Imaging, permits use of multi-angle scanning to form a single image, so as to improve image contrast and resolution. Supports Spatial Compound Imaging with 3-level adjustment and up to 9-beam steer
- iClear⁺
Speckle Suppression Imaging, Available in 2D, Contrast, and 3D/4D mode. 7-level adjustment.
- iTouch™ (Auto Image Optimization)
Automatic image parameters optimization of B, Color, PW, Contrast modes, to improve the adjustment efficiency. Adjustable.
 - B: Gain, TGC
 - Color: Gain
 - Power: Gain
 - PW: Gain, Scale, PRF, Wall Filter
 - Contrast: Gain
- AutoTouch
 - Supporting Phased array probe.
 - In cardiac exam mode, this function optimizes the image parameters in real time, improves the display of tissue structures such as myocardium, reduces intracardiac noise, and displays the optimized image in real time.
 - Optimized parameters: Gain, internal TGC and internal LGC.
- TSI
Multiple imaging conditions are available according to different tissue characteristics (general/muscle/fluid/fat)
- Smart Track
 - Available on linear transducers
 - Enable the function under Color/Power mode. The angle and position of the ROI are automatically adjusted in real time, so as to save time from manual adjustment and improve the scanning efficiency.
- HD scope

By processing channel data multiply and retrospectively, HD Scope can improve the detail information and image contrast on specific area maximally.

- iNeedle
 - It is used in needle-guided biopsy, which dynamically enhance the needle display in ultrasound image. Support dual-screen display of images before and after enhancement in real-time, and adaptive angle correction.
 - Available on SC6-1U and all linear transducers
 - Needle direction: left, right
 - B/iNeedle: on/off
- Zoom: Image magnification, supports spot zoom (write zoom) and pan zoom (read zoom). Magnification $\geq 10x$
- iZoom: Full-screen magnification by one click in real time, supports ≥ 2 magnification modes.
- Glazing Flow
 - An advanced image processing technology to demonstrate the 2D blood flow with 4D visualization for easy definition and clarity.
 - Available in Color/Power mode.
 - To stereoscopically display the blood flow.
- QSave
 - Quick save image parameter settings after image adjustment done
 - Support Save, Save as, Restore
- Auto Merge
 - Dual B image merge for linear array transducer
- Adjustable Acoustic output power
 - Display TIB, TIC, TIS in real time.
 - Can be adjusted in B, Color/Power, M, PW, CW, TDI modes etc.

5.2 B-mode

- Image quality
 - Supports fundamental frequency conversion ≥ 3 segments (depends on transducers)
 - Supports THI (Tissue Harmonic Imaging) and PSH (Phase Shift Harmonic Imaging), harmonic

frequency conversion ≥ 5 segments (depends on transducers)

- ExFOV
 - Available on all transducers (except for XP8-2TU)
 - For liner transducer: after ExFOV is enabled, the image is displayed as a trapezoid. The maximum steer angle is 12°
 - For convex transducer: after ExFOV is enabled, the scanning angle will be extended.
- Maximum display Depth: $\geq 40cm$
- Maximum detection Depth of the convex transducer: $\geq 30cm$
- SSI Sound Speed Indicator
- Supports FCI (Frequency Compound Imaging)
- TGC: 8 pods on control panel
- LGC: 8 segments on touch screen
- Dynamic range (visible and adjustable): 30-350 (dependent on transducer)
- The Gain of B/M/D mode is visible and independently adjustable, $\geq 100dB$, 1dB/step
- FOV Size: continuously adjustable
- FOV Position: continuously adjustable
- Line density: adjustable

5.3 M-mode

- Supports B/M mode dual display and M mode full screen display
- Color M-mode available

5.4 Color Doppler Imaging

- Display mode: B/C, B/C/M, B/C/PW
- Dual live
- Image quality: supports Color frequency conversion ≥ 3 segments (depends on transducers)
- HR FlowTM: High Resolution Flow provides better image quality and flow sensitivity
- Steered angle $\geq \pm 30$ degrees, available on linear transducers, and the ROI can automatically be adjusted according to the flow direction of the probe
- Baseline: adjustable
- The velocity (V) and velocity variance (VV) can be displayed

- You can add tags to mark different velocity boundaries, to observe flow distribution and velocity gradient
- Glazing flow: Use the illumination model to render the 2D blood flow data to create a stereoscopic effect and enhance the mobility of the dynamic 2D blood flow.

5.5 Power Doppler Imaging

- Display mode: B/Power
- Dual live
- HR Flow™: High Resolution Flow provides better image quality and sensitivity
- Steered angle $\geq \pm 30$ degrees, available on linear transducers, and the ROI can automatically be adjusted according to the flow direction of the probe
- Supports Power and directional Power Doppler
- Glazing flow: Use the illumination model to render the 2D blood flow data to create a stereoscopic effect and enhance the mobility of the dynamic 2D blood flow.

Note: Other parameters are the same as those of the Color/Power modes

5.6 PW/CW Mode

- Includes PW (Pulsed Wave Doppler) mode or CW (Continuous Wave Doppler) mode
- Image quality: supports spectral frequency conversion ≥ 3 segments (depends on transducers)
- Automatic Spectrum Measurement
- Display formats: V2:3, V3:2, V3:1, H2:3, FULL, Duplex/Triplex (PW only) (V: vertical, H: horizontal)
- Display mode: B, PW, B/PW, B/C/PW, B/CW etc.
- Sample volume size: 0.5-30mm (continuously adjustable)
- HPRF: on/off
- Baseline: 9 steps
- PW steered angle $\geq \pm 30$ degrees, available on linear transducers
- Sweep speed: 6 steps
- Wall filter: 0 - 9
- Invert: on/off

- Quick angle: 0, -60, 60 degrees

5.7 Free Xros M™

- Three sampling lines, can be rotated by 360 degrees to acquire Free Xros M images on real-time and frozen 2D images.

5.8 Free Xros CM™

- TDI based Free Xros CM function, synchronous display of myocardial tissue segmental motion synchronism and motion phase contrast

5.9 TDI Imaging

- Imaging modes: TVI, TEI, TVD, TVM
- Spectral Doppler frequency: ≥ 5 (depends on transducers)

5.10 3D/4D

- Supports Freehand 3D (linear, convex, phased transducers)
- Supports matrix 4D imaging (Matrix 4D transducers)
- Supports real-time 4D and Color 3D (abdominal volume and endocavity volume transducers)
- Rendering modes: Surface, Min, Max, X-ray

5.11 X-View

- It is used to respectively display the scanning plane and anatomical plane on the left and right sides of the same screen in real time without changing the probe position, to acquire ultrasound images of any anatomical plane that interacts with the scanning plane. The angle of the anatomical plane can be adjusted.
- Support tilt mode: lateral, and elevation
- Support B and Color mode
- Tilt $\pm 30^\circ$, elevate $\pm 30^\circ$, and rotate 360 degrees

5.12 Quick View

- Automatically detect cardiac volume data
- Quickly acquire multiple commonly-used planes
- Including A4C, A2C, MV, TV, AV, etc.

5.13 3D Ref

- Support changing 3 different shapes
- Adjustable size of reference points
- Support selecting 6 different colors

5.14 3D-Print Format

It is used to export 3D-print format file.
e.g. STL, OBJ

5.15 Color 3D

Provides more stereoscopic blood flow signals. It is mainly used in blood perfusion tissues in some complex space to make blood flow observation visually. 3D imaging in color and power modes is supported.

5.16 STIC

Spatio-Temporal Imaging Correlation, based on the movements of the fetus, rebuilt and show the anatomical structure within a physical movement by using the interconnection between the time and the space, for better diagnosis in 3D/4D function.

5.17 iPage⁺

- Multiple tomographic parallel slices imaging, to display volume image with slices, for better display the spatial relationship of tissue and lesion.
- Displays ≥ 25 images in different planes on the screen at the same time, and the slice spacing is adjustable (0.5 mm-10 mm).

5.18 SCV⁺

Slice Contrast View Plus, includes SCV imaging and CMPR functions. SCV imaging can reduce speckle noise and improve contrast resolution as well as enhance signal-noise ratio, which helps in discovering diffuse pathology in organs. CMPR is to obtain a curved sectional image by dissecting the 4D image, so as to observe the curved tissue structure. In clinical application, it is often used to observe the curved anatomy in stretching such as fetal spine.

5.19 iLive Echo

- An advanced rendering mode for realistic volume imaging display
- Brings a better imaging experience by adding lighting rendering effect to the

traditional way, allowing human tissue texture to be revealed more clearly.

- Supports Hyaline function.

5.20 iScaleTM View

- Provide larger diagnostic field of view than traditional imaging techniques.
- Support linear probes
- Support reviewing images during acquisition
- The splicing length of iScale is not less than 260 cm
- Acquisition method: B and Power
- Supports speed indicator
- Rotation: 0-355 degrees, 5/step

5.21 UWN+ Contrast Imaging^{TM*}

- UWN+ (Ultra Wideband Non-linear Plus) contrast imaging technology, which provides exceptional contrast agent detecting capability, not only extracts second harmonic, but also non-linear fundamental signals
- Available on convex, linear, and intracavity probes.
- Micro Flow Enhancement (MFE) available

5.22 HiFR CEUS

Empowered by eZST⁺ technology, it enables a higher CEUS frame rate for better visualization of contrast agent perfusion

5.23 LVO

- Only available for the SPM6-1U probe in cardiac exam mode
- To improve the image quality of left ventricular structure display by contrast medium for better assessment of myocardial and left ventricular function.

5.24 VLMI Contrast

- Only available for the SPM6-1U probe in cardiac exam mode
- Enhances echo reflection by using contrast agent to perform myocardial analysis based on echocardiography technique

5.25 Echo Contrast Imaging QA

- Automatically Identify ED/ES/ERF timing
- Support cardiac chamber reference

- Contour thickness can be adjusted and adapted to cardiac segment contour continuous tracking
- Quantitative analysis of 7 myocardial segments
- Myocardial perfusion analysis curves are supported, and 8 curves can be displayed at the same time
- Visualized bull eye map
- Parameters such as perfusion strength and reperfusion rate are calculated automatically.
- Table display: display data in table

5.26 STE Imaging (Sound Touch Elastography Imaging)/STQ Imaging (Sound Touch Quantification Imaging)

- Available on convex, linear, intracavity probes.
- Endocavity STE
 - 2D real-time STE of the endocavity transducer. Mainly used for urology and gynecology examinations.
- Display Format: V1:1, H1:1, FULL
- HQ Elasto: on/off
- Elas.Metric: E, Cs, G

5.27 Natural Touch Elastography

- Available on linear and intracavity probes.
- Support strain, strain ratio and strain histogram measurement
- Unique shell analysis function
- Stress compensation technology reduces deeper tissue artifacts, obtain more uniform stress throughout whole field
- Stress indicator: supports frame by frame stress indication.
- Map: 6 types

5.28 AutoEF

- Automatic Ejection Fraction Measurement, it provides an efficient way to detect the left ventricle and calculate the EF.
- Output EDV/ESV/EF/SV/CO by Simpson method
- Activated with or without ECG
- Adjustment for the border of endocardium by single point or multi points

5.29 TDI QA

- Dedicated quantification tool for TDI velocity, strain, strain rate analysis
- Ellipse ROI, Standard ROI
- Up to 8 of ROI
- ROI tracking: tracking ROI along with cardiac movement

5.30 Fetal Heart TT QA (FH Tissue Tracking QA)

- Fetal Heart Tissue Tracking with Quantitative Analysis, Real-time track the continuous motion of fetal myocardium, display the mechanical changes of each segment in the longitudinal and transverse directions, offering accurate and effective evaluation of myocardial movement of fetal heart
- Available under fetal echo exam modes

5.31 Stress Echo

- Available on phased probes in cardiac mode.
- 14 factory protocols
- User-defined protocols
- ECG triggered acquisition, display, selection, comparison, evaluation and archiving of multiple cardiac loops during various stages of a stress echo examination
- ASE 16 (with score 4-7), or ASE 17(with score 4-7)
- Graphical display of scoring (Normal, Hyperkinetic, Severely Hyperkinetic, Akinetic, Dyskinetic)
- LV volume measurement
- Measurement of LV Volume in all phases of cardiac cycle
- Report
- Reporting for both Wall Motion Scoring and LV volume measurement

5.32 Auto Strain LV

Auto Strain LV (Automatic Strain of Left Ventricular) is used to quantitatively analyze the adult LV. Based on the speckle tracking technique, the system automatically tracks the motion of the LV wall in the cardiac cine and calculates parameters that reflect LV systolic function, such as LV strain value and EF (Ejection Fraction) value.

5.33 Auto Strain RV

Auto Strain RV (Automatic Strain of Right Ventricular) is used to quantitatively analyze the adult RV. Based on the speckle tracking technique, the system automatically tracks the motion of the RV wall in the RV-focus A4C (apical four chamber) cine and calculates parameters that reflect RV systolic function, such as long-axis strain and strain rate.

5.34 Auto VQ LA

Auto VQ LA (Automatic Volume Quantitative of Left Atrial) is used to quantitatively analyze the adult LV (left ventricular). It is used to automatically track the left ventricular contour in cardiac cine and calculate the LA Minor, LA Major, and ESV parameters at the end of systole.

5.35 Auto DFR

Auto DFR (Automatic Diastolic Function Ratio) is used to evaluate the diastole function of left ventricular.

5.36 Smart Echovue

This function is used to recognize the standard view type, as well as detect and display the feature structure of the standard view for the cardiac ultrasound image.

5.37 V Flow (Vector Flow)

- A novel approach for vascular hemodynamic analysis, using color coded vector arrows to display flow velocity magnitude and direction,

5.38 RIMT (RF-Data based IMT)

- Available in single/dual B carotid exam mode
- Side: left/right
- Calculation of 6 RIMT values, RIMT average value, SD and ROI W
- Report operation:
- Data deleting
- RIMT trend graphic viewing
- Preview

5.39 R-VQS

- RF-data Based Quantitative Analysis on Vessel Stiffness
- Track movements of the upper and lower vessel walls automatically

- Displacement and Vessel diameter display in the result window.
- Motion curve of vessel walls display under the image in real time.

5.40 Smart Fetal HR (Fetal Heart Rate)

Measure the fetal heart rate automatically on B/M mode

5.41 Smart VTI

Automatic Velocity Time Integral measurement, automatically trace the PW spectrum of LVOT, and obtain VTI, SV, CO and SVV, for rapid assessment of volume responsiveness. Cardiac package should be configured at the same time

5.42 Smart IVC

Automatic Inferior Vena Cava trace and calculation, automatically trace the IVC diameter change, and calculate the CI, DI and IVC Variation, helping for volume status assessment and guide the fluid therapy. Cardiac package should be configured

5.43 Smart B-line

Automatic B-line recognition and analysis, automatically count the number, distance and percentage of B-Lines, guiding the fluid infusion and preventing pulmonary edema.

5.44 iCompare

Allow to compare real-time ultrasound imaging to images from iStation; Helpful to easily evaluate and follow up the progression of disease, treatment effect monitoring

5.45 V-Mapping

- Manually edit the vascular body mark.
- Manually edit the body mark through the touch screen to Intuitively display the lesion position.

6 Cine Review and Raw Data Processing

6.1 Cine review

- Available in 2B, Color, Contrast, 4D modes.
- Supports editing during cine review. Frame by frame manual cine loop review or auto playback with variable speed

- Cine swing play: play the cine from back to front when the last frame is played.
- Save and edit the edited cine images for many times
- Supports direct storage of single-frame image and cine file in freezing status, and has independent saving key
- Maximum cine memory up to 65601 frames (B storage server) or 129.3s (M storage server) (depends on the mode)
- Maximum 4D cine memory: 20716 volumes (XP8-2TU)
- Retrospective storage (1-120s, pre-settable) and prospective storage (1-480s, pre-settable)
- Frame compare: displays one cine in dual format and allows frame by frame compare side by side
- Cine compare: compare cines which are saved in same imaging mode
- Jump to first and jump to last: one keystroke go to first or last frame in the cine

6.2 Raw data processing

- B-mode:
 - TGC
 - Gain
 - Dynamic range
 - Gray map
 - Tint map
 - iClear⁺
 - L/R Flip
 - U/D Flip
 - Rotation
 - iTouch
 - LGC
 - Dual live
 - Auto Merge
 - H Scale
 - B/iNeedle
 - Smooth
 - Zoom
 - Ref Lines
 - Dehaze
 - V1:1
 - XL View
 - Edge Enhance
 - AutoTouch

- M-mode:
 - Gain
 - Speed
 - Dynamic Range
 - Gray Map
 - Tint Map
 - Display format
- Color:
 - Gain
 - Baseline
 - Smooth
 - Color map
 - Priority
 - Dual Live
 - Invert
 - Velocity tag
 - Glazing flow
 - Flash Control
 - Smooth Style
 - Artifact Control
 - Hide Color
- PW:
 - Gain
 - Baseline
 - Volume
 - Angle
 - Speed
 - Dynamic range
 - Gray map
 - Tint Map
 - Display format
 - Invert
 - WF
 - Quick Angle
 - T/F Res

7 Measurement/Analysis and Report*

NOTICE: Support manual, semi-automat, automat, real-time on Freeze, Saved and CINE clip measurements.

7.1 Generic measurements

- Summarized items:
 - B-Mode: Distance, Angle, Circumference, Area, Volume, etc.
 - M-Mode: Slope, Heart Rate, Distance, Time, Velocity etc.
 - D-Mode: PS/ED, Velocity, Heart Rate, Time, Acceleration, Velocity Ratio etc.

7.2 Clinical option measurement package

- Abdomen
Summarized items:
Provide measurements of abdominal artery, abdominal vein, hepatic vein, liver, gallbladder, pancreas, appendix, pylorus, kidney, ureter, bladder, spleen, inferior vena cava, etc.
- Cardiology
Summarized items:
 - Left ventricular function measurement:
 - Left ventricular function measurement method: Simpson, Mod.Simpson, S-P Ellipse, B-P Ellipse, Bullet, Teichholz, Cube, Gibson
 - LV Mass (Cube-2D), (A-L), (T-E)
 - LA Vol (Simp), (A-L)
 - MVA VTI, AVA (VTI)
 - Cardiac output: LVOT, RVOT, MV, TV
 - Quantitative Analysis of PISA MR, PISA AR, PISA TR, and PISA PR
 - Qp/Qs
 - LV TEI Index
 - RV TEI Index
 - Z score (3 years and younger)
 - Z score (Under 18)
- Emergency
Summarized items: Provides application measurement related to emergency
- Gynecology
Summarized items:
Provides measurements of uterus, cervix, ovary, follicle, urethra, rectum, levator ani muscle and sphincter.
- Obstetric
Summarized items:
 - Multiple fetuses, maximum number of fetuses: 4
- Fetal physiology score
- Z score
- Fetal GA
- Fetal growth curve
- EFW%
- Pediatrics
Summarized items: provides application measurement related to pediatrics
- SmallPart
Summarized items:
Provides measurements of thyroid, parotid gland, lymph nodes, testis, epididymis, thyroid nodules, breast, etc.
- Urology
Summarized items:
Provides measurement of kidney, kidney cortex, adrenal gland, prostate gland, seminal vesicle, bladder, testis, epididymis, scrotal wall, and urine output.
- Vascular
Summarized items:
Provides measurement of carotid artery, jugular vein, upper limb artery, lower limb artery, upper limb vein and lower limb vein.

7.3 Automatic Measurement and Analysis

- IMT (Intima-Media Thickness Measurement)
Automatic detection, measurement and analysis of IMT when ROI is set
- Smart HIP
Automatic hip measurements and Graf classification of neonatal and pediatric hip for easy screening of DDH (Developmental Dysplasia of the Hip).
- Smart HRI
Hepato-Renal Index, which is provided automated liver steatosis assessment by

automatically calculating brightness scale ratio between the liver with renal cortex in B mode.

- Smart Trace
A smart tool for easy and precise boundary trace
Automatically identify and trace lesions, as well as measure the length, area and circumference of the long axis and short axis within the defined ROI.
- CPP
Measure the blood flow signal distribution in the defined ROI under the Color/Power mode, and calculate the color pixel percentage within the defined ROI.

7.4 User-defined Measurement

Supports user-defined measurement calculations and studies

7.5 Auto Report

- Specific report template by application
- Editable value in report table
- Images selectable
- Able to Export as PDF file

7.6 Comments/Bodymark

- Supports text input and arrow
- Voice annotation: record voice as annotation for images and cine
- Support freehand marking on touch screen
- Adjustable text size and arrow size
- Supports home position
- Covers various application
- More than 250 bodymarks for versatile application
- User customizable Comments/Bodymark

7.7 iWorks™

- Auto workflow protocol, can be combined with a standardized exam protocol to facilitate a more efficient and standard ultrasound exam in the clinic with guidance.
- Automatically add comments, body marks and switch the image mode according to the protocol.
- Templates are user configurable

- Template import and export are available

* Not all measurements are listed in this part; For more detailed information, please refer to User Manual

8 Exam Storage and Management

8.1 Exam Management

- iStation™ workstation dedicated for patient information management
- Workstation dedicated for image management
- Workstation dedicated for report and report template management
- Workstation dedicated for exam management
 - Patient exam query/retrieve
 - Support review of current and past exam
 - New exam, Activate exam, Continue exam functions, End exam are available
 - Support measurements and calculations on archived exam and images

8.2 Exam Storage

- Supports local hard disk storage: 1TB HDD (Hard Disk Drive) and 128G SSD (Solid State Drive)
- Direct digital storage of single frame and cine files.
- Export images in BMP/JPG/TIFF/DCM/AVI/MP4/WMV format
- Supports back-end storage, export and backup of image data, real-time exam, without affecting exam operation.
- Supports backup/send to USB devices
- Supports backup/send to DVD-RW media
- Supports DICOM 3.0
- Supports network storage (iStorage). Based on the TCP/IP protocol, the ultrasound image and report can be directly transmitted to the PC device.
- Supports print service.

9 Connectivity

9.1 Ethernet Network Connection

- Cable connection
- Wireless connection

9.2 USB to serial data output (need a converter cable)

9.3 DICOM 3.0

- DICOM Basic
 - Verify (SCU, SCP)
 - Print
 - Store
 - Storage Commitment
 - Media Exchange
- DICOM Worklist
- DICOM Query/Retrieve
- DICOM Modality Performed Procedure Step - MPPS
- DICOM OB/GYN structure report
- DICOM Cardiac structure report
- DICOM Vascular structure report
- DICOM Breast structure report
- DICOM Abdomen structure report
- DICOM Small Parts structure report
- DICOM Pediatric structure report

9.4 UltraAssist

Direct network storage tool between ultrasound system and personal computer

- The ultrasound system supports sending reports or patient information to the PC via iStorage.
- The PC supports import custom report templates and test items to the ultrasound system via iReport and iMeasurement.

9.5 MedSight

- An interactive App that lets you transfer clinical images straight from Mindray Ultrasound system to a smart device, such as mobile phone or tablet PC
- Transfer images or clips from system to mobile terminal through Wi-Fi
- Support both iOS and Android system

9.6 u-Link

- Real-time image acquisition technology. The ultrasound machine can send high

definition images to the terminal device (mobile phone/computer/tablet) quickly by one-click through private transmission protocol. It can be used in consultation, quality control, case discussion, etc.

- It is used to connect the software that supports u-Link protocol.
- One-click transmission of static and dynamic images to UltraSync

10 Transducers

10.1 Curved Array

- SC6-1U (Single Crystal)
 - Single crystal transducer
 - Application: Obstetrics, Gynecology, Abdominal, Small Organ, Musculoskeletal, Vascular, Urology, Nerve, Thoracic/Pleural
 - Bandwidth: 1.0-6.0MHz
 - FOV (max): 60°
 - Extended FOV: 72°
 - Depth: 4-40cm
 - Number of Elements:192
 - Convex Radius: 60mm
 - Biopsy Guide: NGB-022, multi angle, reusable
- C11-3U
 - Application: Abdominal, Vascular, Cardiac, Small Organ, Pediatric
 - Bandwidth: 2.6-12.8MHz
 - FOV (max): 101°
 - Extended FOV: 113°
 - Depth: 1.5-35cm
 - Number of Elements:128
 - Convex Radius: 15mm
 - Biopsy Guide: NGB-018, multi angle, reusable
- V11-3HU
 - Application: Obstetrics, Gynecology, Urology
 - Bandwidth: 3.0-11.0MHz
 - FOV (max): 170°
 - Extended FOV: 210°
 - Depth: 1.5-28cm
 - Number of Elements:192
 - Convex Radius: 11mm

- Biopsy Guide: NGB-025, single angle, reusable

10.2 Volume

- SD8-1U (Single Crystal)
 - Application: Obstetrics, Gynecology, Abdomen
 - Bandwidth: 1.8-8.2MHz
 - FOV (max): 66°
 - Extended FOV: 90°
 - Volume Sweep Angle (max): 90°
 - Depth: 4-40cm
 - Number of Elements: 192
 - Convex Radius: 45mm
 - Biopsy Guide: NGB-039, multi angle, reusable
- DE10-3WU
 - Application: Obstetrics, Gynecology, Urology
 - Bandwidth: 2.0-9.0 MHz
 - FOV (max): 153°
 - Extended FOV: 193°
 - Volume Sweep Angle (max): 120°
 - Depth: 4-40cm
 - Number of Elements: 192
 - Convex Radius: 10mm
 - Biopsy Guide: NGB-021, single angle, reusable

10.3 Linear Array

- SL10-3U (Single Crystal)
 - Application: Abdominal, Pediatric, Small Organ, Musculoskeletal, Vascular, Nerve, Obstetrics
 - Bandwidth: 2.5-13.0MHz
 - Number of Elements: 192
 - Field of View (max): 43.9mm
 - Extended FOV: 40°
 - Depth: 1.5-35cm
 - Biopsy Guide: NGB-059, multi angle, reusable
- L20-5U
 - Application: Abdominal, Small Organ, Musculoskeletal, Vascular, Nerve
 - Bandwidth: 6-23MHz
 - Number of Elements: 192
 - Field of View (max): 28.7mm
 - Extended FOV: 20°

- Depth: 1.5-35cm
- Biopsy Guide: not available

• L16-4HU

- Application: Musculo-skeletal, Nerve, Small Organ, Vascular, Pediatric, Intra-operative
- Bandwidth: 3.5-16.0MHz
- Number of Elements: 128
- Field of View (max): 25.4 mm
- Extended FOV: 20°
- Depth: 1.5-35.0cm
- Biopsy Guide: not available

• L15-3WU

- Application: Small Organ, Musculo-skeletal, Vascular, Abdominal, Pediatric
- Bandwidth: 3.8-15.4MHz
- Number of Elements: 256
- Field of View (max): 50.8mm
- Extended FOV: 20°
- Depth: 1.5-35cm
- Biopsy Guide: NGB-054, multi angle/ depth, reusable

• L30-8U

- Application: Small Organ, Musculo-skeletal, Vascular, Pediatric, Cephalic, Nerve
- Bandwidth: 8.3-30.0MHz
- Number of Elements: 192
- Field of View (max): 19.0mm
- Extended FOV: 20°
- Depth: 0.5-34cm
- Biopsy Guide: not available

10.4 Phased Array

- SPM6-1U (Single Crystal& Matrix)
 - Single crystal transducer
 - Application: Cardiac, Cephalic, Abdominal, Obstetrics, Thoracic/ Pleural
 - Bandwidth: 1.0 - 5.0MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2-38cm
 - Number of Elements: 288
 - Biopsy Guide: NGB-056 multi angle, reusable
- P10-4U

- Application: Abdominal, Cardiac, Pediatric, Nerve, Cephalic
- Bandwidth: 3.0-11.4MHz
- Field of View (max): 90°
- Extended FOV: 90°
- Depth: 2.0-16.5cm
- Number of Elements: 128
- Biopsy Guide: not available
- P8-2U
 - Application: Abdominal, Cardiac, Nerve, Pediatric, Cephalic
 - Bandwidth: 2.3-8.0MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2.0-38.0cm
 - Number of Elements: 96
 - Biopsy Guide: not available
- P8-2TU
 - Application: Cardiac
 - Bandwidth: 2.3-7.2 MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2.0-38.0cm
 - Number of Elements: 64
 - Biopsy Guide: not available
- P8-2Ts
 - Application: Cardiac
 - Bandwidth: 2.3-7.2 MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2.0-38.0cm
 - Number of Elements: 64
 - Biopsy Guide: not available
- P8-3Ts
 - Application: Cardiac
 - Bandwidth: 2.3-7.2 MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2.0-38cm
 - Number of Elements: 48
 - Biopsy Guide: not available
- XP8-2TU (Matrix 4D)
 - Application: Cardiac
 - Bandwidth: 2.0-7.4MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2.0-38.0cm
 - Number of Elements: 2048
- Biopsy Guide: not available
- XP5-1U (Matrix 4D)
 - Application: Obstetrics, Cardiac, Pediatric, Abdominal
 - Bandwidth: 1.5-4.5MHz
 - Field of View (max): 90°
 - Extended FOV: 90°
 - Depth: 2.0-38.0cm
 - Number of Elements: 2304
 - Biopsy Guide: not available

10.5 Pencil transducer

- CW5s
 - Application: Vascular
 - Number of Elements: 2
 - Biopsy Guide: not available
- CW2s
 - Application: Cardiac
 - Number of Elements: 2
 - Biopsy Guide: not available

11 Peripheral Devices and Accessories

- Black/White Video Printer
- Color Digital Printer
- Graph/Text Printer
- Gel Warmer
- Footswitch
- ECG
- PCG (not for sale in EU countries)
- Barcode Reader
- Built-in Wireless Adapter

12 System Inputs and Outputs

- Video/Audio Input
 - Microphone: 1 port
- Video/Audio Output
 - S-Video out: 1 port
 - HDMI: 1 Port
 - VGA out: 1 port
 - Audio out: 2 ports
- Physio Input
 - Support ECG/PCG signal
 - ECG: 1 port
 - PCG: 1 port
- Other Input/Output
 - USB: 4 ports
 - Type C: 1 port

- Ethernet: 1 port

13 Safety and Conformance

- Quality Standards
 - ISO 9001
 - ISO 13485
- Design Standards
 - CSA C22.2 No. 601-1
 - EN 60601-1 and IEC 60601-1
 - EN 60601-1-2 and IEC 60601-1-2
 - EN 60601-1-6 and IEC 60601-1-6
 - EN 60601-2-37 and IEC60601-2-37
 - EN 62304 and IEC 62304
 - EN 62366 and IEC 62366
 - EN ISO 17664 and ISO 17664

14 CE Declaration

The ultrasound system is fully in conformance with the Regulation (EU) 2017/745 Concerning Medical Devices. The number adjacent to the CE marking (0123) is the code of the EU-notified body that certified meeting the requirements of Annex II excluding (4), of the Directive.

15 NOTICE

Not all features or specifications described in this document may be available in all transducers and/or modes.

Mindray reserves the right to make changes in specifications and features shown herein, or discontinue the product at any time without notice or obligation. Contact Mindray Representative for the most current information.