DC-8

Color Doppler Ultrasound System

Datasheet

Release 1.5

mindray

healthcare within reach

1 System Overview

1.1 Application

- Abdomen
- Obstetrics
- Gynecology
- Cardiology
- Small parts
- Urology
- Vascular
- Pediatrics
- Emergency Medicine
- Anesthesia
- Others

1.2 Transducer types

- Curved array transducer
- Linear array transducer
- Phased array transducer
- 4D Volume transducer

1.3 Imaging modes

- B-Mode
- Tissue Harmonic 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
- Pulsed Wave Doppler
- Continuous Wave Doppler
- TDI
- UWN(Ultra Wideband Non-linear) Contrast Imaging
- Smart 3D (Freehand 3D)
- 4D
- Elastography
- iScape View (Panoramic Imaging)

1.4 Standard features

- B-Mode
- THI and PSH
- M-Mode
- Color Doppler Imaging
- Power Doppler Imaging and Directional PDI
- Pulsed Wave Doppler
- iBeam (Spatial Compounding Imaging)
- iClear (Speckle Suppression Imaging)
- iTouch (Auto Optimization)
- Zoom/iZoom (Full Screen Zoom)
- FCI (Frequency Compounding Imaging)
- B steer
- ExFOV
- HR Flow (High Resolution Flow)
- Raw data processing
- 4 active probe ports
- 1TB hard drive
- DVD R/W driver
- 6-USB

1.5 Optional features

- Continuous Wave Doppler
- Free Xros M
- Free Xros CM
- iScape View
- UWN Contrast Imaging
- Contrast Imaging QA(Quantitative Analysis)
- Smart 3D
- Real-time 4D
- iPage (Tomographic Ultrasound Imaging)
- SCV (Slice Contrast View)
- STIC (Spatio-Temporal Image Correlation)
- CMPR (Curved MPR)
- Color 3D
- Niche
- IMT
- Elastography
- TDI (Include TVI, TVD, TVM, TEI)
- TDI QA (TDI Quantitative Analysis)
- DICOM
- Clinical Measurement Package
- Smart OB (Auto OB measurement)

- iWorks (Auto Workflow Protocol)
- iNeedle (Needle Visualization Enhancement)
- Battery

1.6 Language support

- Software: English, Chinese, German, Spanish, French, Italian, Portuguese, Russian, Czech, Polish, Turkish, Finnish, Danish, Icelandic, Norwegian, Swedish
- Keyboard input: English, Chinese, German, Spanish, French, Italian, Portuguese, Russian, Czech, Polish Icelandic, Norwegian, Swedish, Finnish, Turkish, Danish, Hungarian
- Control panel overlay: Chinese, Italian, Portuguese, Spanish, German, Russian, French, Czech, Polish
- User manual: English, Chinese, German, Spanish, French, Italian, Portuguese, Russian, Polish, Turkish

2 Physical Specification

2.1 Dimension and weight

- Height: 1355-1780mm
- Width: 585mm
- Depth: 930mm
- Weight: approx. 111kg (no peripherals)

2.2 Monitor

- 19-inch high resolution color LCD monitor
- Resolution: 1680×1050
- Viewing angle: ≥178 degrees
- Digital on-screen display of brightness and contrast controls
- Auto-calibrate brightness after system boot-up each time
- Independent tilt of 20 degrees up, 90 degrees down and swivel of -90 to +90 degrees

2.3 Audio speakers

- Stereo audio speakers

2.4 Multi-directional articulating monitor arm for better user-friendly experience

- Rotate: ±90 degrees (from center)
- Up: 280mm
- Pull: 550mm

2.5 Wheels

- Diameter: 125mm
- Front castor (2 ea): total lock and break
- Rear castor (2 ea): right one for total lock and break; left one for swivel lock

2.6 Probe port and holder

- Probe ports: 4 active ports
- Probe holder: 5 (one for pencil probe), plus 1 dedicated endocavity probe holder

2.7 Electrical power

- Voltage: 100-127V~, or 220-240V~
- Frequency: 50/60 Hz
- Power consumption: Max. 800 VA
- Circuit breaker: 250V~, 13A

2.8 Operating Environment

- Ambient temperature: 0-40 °C
- Relative humidity: 30%-85% (no condensation)
- Atmospheric pressure: 700hPa-1060hPa

2.9 Storage & Transportation Environment

- Ambient temperature: -20-55 °C
- Relative humidity: 30%-95% (no condensation)
- Atmospheric pressure: 700hPa-1060hPa

3 User Interface

3.1 Control panel

- User-centric control panel with home-based and kidney-shaped layout favors easy access to keys
- Backlit keys ensure accurate work in the dark room

- Programmable keys available for user-defined functions
- 8-segment TGC control
- Full-sized, backlit QWERTY keyboard for text input, function keys and system programming
- Adjustable key volume and trackball speed meet different needs
- Dedicated palm rest design to help reduce user repetitive stress injury
- Independent rotation and up/down of control panel facilitates optimal positioning
  -rotate: ±90 degrees (from center)
  -down/up: 780-970mm (190 mm range)

3.2 Touch screen

- 10.4-inch high sensitivity anti-glare color touch screen
- Resolution: 1024x768
- Digital brightness and contrast adjustment through preset
- Viewing angle: ≥170 degrees
- Support either hand writing or with gloves on

3.3 System boot-up

- Boot-up from complete shut-down in less than 52 sec
- Shut-down in less than 33 sec

3.4 Comments

- 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
- User customizable

3.5 Bodymark

- More than 140 bodymarks for versatile application
- User customizable

3.6 Screen information*

- Common info:
  - Mindray logo
  - Hospital name,
  - Exam date
  - Exam time
  - Acoustic power
  - Mechanical index
  - Tissue thermal index
  - ID, Last name, First Name, Middle initial, Gender, Age
  - Probe model
  - ECG icon (when ECG connected),
  - Operator
  - TGC Curve
  - Focus position
  - Thumbnail
  - Imaging parameters
  - Help guidance
  - Dynamic Trackball indices

*Not all items are listed in this part, detail info please refer to user manual

4 Imaging Parameters

4.1 Overview

- Echo enrich technology
- Up to 10752 channels
- 12-beam forming

4.2 B-mode

- Display formats: Single(B), Dual(B+B), Quad(4B)
- iClear: Off; 7 steps
- iBeam: Off; 4 steps; max. 7 angles
- iTouch: Auto optimization
- FCI: Frequency compounded imaging
- Dual Live: side by side live display
- Image quality: Pen/Gen/Res (depend on probe)
- B steer: available on linear transducers
- ExFOV: extended FOV available on convex, linear, and volume

transducers
- Depth: 1.5-40cm , 0.5-2cm/step (all depend on transducer)
- Frame rate (max): 1333 f/s
- Acoustic output power: 3.2%-100%
- TGC: 8 pods on control panel
- LGC: 8 segments on touch screen
- Dynamic range: 30-180, 5/step
- Gain: 0-100, 1/step
- Focus number: 1-4 (depend on transducer)
- Focus position: adjustable
- FOV: continuously adjustable
- Line density: L/M/H/UH
- Persistence: 7 steps
- Horizontal Scale: on/off
- L/R flip and U/D flip: on/off
- Rotation: 0, 90, 180, 270
- TSI: general/muscle/fluid/fat
- Gray Map: 10 types
- Tint map: off; 8 types

4.3 THI and PSH
- Available on all types of transducer
- Patent PSH technology, obtains purer harmonic, better contrast resolution, higher SNR, exceptional high frequency harmonic
- iClear available
- Image quality: HPen/HGen/HRes or HPen/ HPen-Gen/HGen/HRes (depends on probe)

4.4 M-mode
- Display formats: V2:3, V3:2, V 3:1, H2:3, FULL (V: vertical, H: horizontal)
- Color M-mode available
- Acoustic output power: 3.2%-100%
- Dynamic range: 30-180, 5/step
- Gain: 0-100, 2/step
- M sweep speeds: 6 steps
- M soften: 5 steps
- Tint map: off; 8 types
- Gray Map: 10 types
- Edge enhancement: 4 steps

4.5 Free Xros M (option)
- Display formats: V2:3, V3:2, V 3:1, H2:3, FULL (V: vertical, H: horizontal)
- Color Free Xros M available
- Up to 3 lines
- Display all lines
- Sweep speeds: 6 steps
- M Tint map: off, 8 types
- Gray Map: 10 types

4.6 Free Xros CM (option)
- Only available in TDI mode
- Display formats: V2:3, V3:2, V 3:1, H2:3, (V: vertical, H: horizontal)
- Acoustic output power: 3.2%-100%
- Gain: 0-100, 1/step
- Sweep speeds: 6 steps
- Tint map: off; 8 types
- Gray Map: 10 types
- Edit, undo, delete function for curved line

4.7 Color Doppler Imaging
- Dual live
- HR Flow: High Resolution Flow provides better image quality and flow sensitivity
- Image quality: Pen/Gen/Res
- Max velocity: 239cm/s
- Steer: max. 30 degrees (linear transducer)
- Max frame rate: 593 f/s
- Acoustic output power: 3.2%-100%
- Gain: 0-100, 2/step
- ROI size/position: adjustable
- Scale: 20 steps
- Baseline: 16 steps
- Wall filter: 8 steps
- PRF: 0.1-15.5kHz
- Packet size: 4 steps
- Flow state: L/M/H
- Smooth: 7 steps
- B/C align: on/off
- Priority: 0%-100%, 10%/step
- Color map: 21 types
- Invert: on/off
- Persistence: 7 steps

- Velocity tag: on/off
- Line density: L/M/H/UH

4.8 Power Doppler Imaging

- Dual live
- HR Flow: High Resolution Flow provides better image quality and sensitivity
- Support directional power doppler
- Image quality: Pen/Gen/Res
- Acoustic output power: 3.2%-100%
- Dynamic range: 10-70, 5/step
- Gain: 0-100, 2/step
- ROI size/position: adjustable
- Steer: max. 30 degrees (linear transducers)
- Scale: 20 steps
- Wall filter: 8 steps
- PRF: 0.1-15.5kHz
- Packet size: 4 steps
- Flow state: L/M/H
- Smooth: 7 steps
- B/C align: on/off
- Priority: 0%-100%, 10%/step
- Color map: 4 types
- Directional color map: 4 types
- Persistence: 7 steps
- Line density: L/M/H/UH

4.9 PW/CW-Mode

- Display formats: V2:3, V3:2, V 3:1, H2:3, FULL, Duplex/Triplex(PW only) (V: vertical, H: horizontal)
- Image quality: Pen/Gen/Res
- PW velocity: max. 9.24m/s
- PW velocity: min. 0.05cm/s
- CW velocity: max. 38m/s
- Sample volume size: 0.5-20mm (PW only), 12 steps
- Sample gate depth: adjustable
- Scale: max. 38 m/s
- Baseline: 8 steps
- PW Steer: max. 30 degrees (linear transducer)
- Volume: 0%-100%, 2%/step
- PW PRF: 0.7-24kHz
- Gain: 0-100, 2/step
- Dynamic range: 24-72, 2/step
- Sweep speed: 6 steps
- Wall filter: 7 steps
- Invert: on/off
- Auto invert: on/off
- Angle correction: -89~89 degrees, 1/step
- Quick angle: 0, -60, 60 degrees
- Gray map: 10 types
- Tint map: Off; 8 types
- Time/frequency resolution: 5 steps
- Auto calc: on/off
- Auto calc cycle: 1, 2, 3, 4, 5
- Trace area: above, below, all

4.10 Tissue Velocity/Energy Imaging (included in TDI option)

- Available on phased array transducer
- Dual live: side by side displays B and B+TVI
- Max frame rate: 2038 f/s
- PRF: 0.4-14.8kHz
- Acoustic output power: 3.2%-100%
- Gain: 0-100, 2/step
- Dynamic range: 10-70, 5/step (TEI only)
- ROI size/position: adjustable
- Scale: max. 20 steps (TVI only)
- Baseline: 16 steps (TVI only)
- Wall filter: 8 steps
- Packet size: 4 steps
- Tissue state: L/M/H
- Smooth: 7 steps
- B/C align: on/off
- Priority: 0%-100%, 10%/step
- Color map: 10 types
- Invert: on/off (TVI only)
- Persistence: 7 steps
- Velocity tag: on/off (TVI only)
- Line density: L/M/H/UH

4.11 Tissue Velocity Doppler(included in TDI option)

- Available on phased array

transducer
- Display formats: V2:3, V3:2, V 3:1, H2:3, FULL, Duplex/Triplex (V: vertical, H: horizontal)
- Sample volume size: 0.5-20mm , 12 steps
- Sample gate depth: adjustable
- Scale: max. 3.69m/s
- Baseline: 8 steps
- Volume: 0%-100%, 2%/step
- PRF: 0.7-24kHz
- Gain: 0-100, 2/step
- Dynamic range: 24-72, 2/step
- Sweep speed: 6 steps
- Wall filter: 7 steps
- Invert: on/off
- Auto invert: on/off
- Angle correction: -89-89 degrees, 1/step
- Quick angle: 0, -60, 60 degrees
- Gray map: 10 types
- Tint map: Off; 8 types
- Time/frequency resolution: 5 steps

4.12 Tissue Velocity Motion (included in TDI option)
- Display formats: V2:3, V3:2, V 3:1, H2:3, FULL (V: vertical, H: horizontal)
- Acoustic output power: 3.2%-100%
- Dynamic range: 30-180, 5/step
- Gain: 0-100, 2/step
- M sweep speeds: 6 steps
- M soften: 5 steps
- Gray Map: 10 types
- Edge enhancement: 4 steps

4.13 Smart 3D (option)
- Smart 3D
  - Acquisition Method: Rocked, Linear
  - iClear: Off; 7 steps
  - VR: on/off, select volume rendered image
  - MPR: on/off, select A, B and C plane
  - Display formats: MPR only/asymmetric
  - VOI: on/off
  - Reset: all, orientation, reset curve
  - Active quadrant: A, B, C, VR
  - VR orientation: 0, 90, 180, 270
  - Inversion: on/off
  - Accept VOI: on/off
  - Flip: flip VR
  - Sync: synchronize VR with selected plane
  - Render modes: Surface, Min, Max, X-ray
  - View direction: down/up, left/right, front/back
  - Threshold: 0%-100%, 1%/step (only on VR)
  - Opacity: 0%-100%, 5%/step (only on VR)
  - Smooth: 21 steps
  - Brightness: 0%-100%, 2%/step
  - Contrast: 0%-100%, 2%/step
  - Tint: off; 8 types
- Auto rotation
  - Rotation control: play, single loop, loop
  - Direction: left/right, up/down
- Edit:
  - Area selection: inside polygon, outside polygon, inside contour, outside contour, inside rect, outside rect
  - Undo: undo, undo all

4.14 4D (option)
- Available on all volume transducers
- Static 3D and 4D
  - 4D frame rate: max. 33.8 vps (DE10-3E)
  - Support Color 3D
  - iClear: Off; 7 steps
  - VR: on/off, select volume rendered image
  - MPR: on/off, select A, B and C plane
  - Display formats: MPR

only/asymmetric
- VOI: on/off
- Reset: all, orientation, reset curve
- Active quadrant: A, B, C, VR
- VR orientation: 0, 90, 180, 270
- Inversion: on/off
- Accept VOI: on/off
- Flip: flip VR
- Sync: synchronize VR with selected plane
- Render modes: Surface, Min, Max, X-ray
- View direction: down/up, left/right, front/back
- Threshold: 0%-100%, 1%/step (only on VR)
- Opacity: 0%-100%, 5%/step (only on VR)
- Smooth: 21 steps
- Brightness: 0%-100%, 2%/step
- Contrast: 0%-100%, 2%/step
- Tint: off; 8 types

• STIC
- Acquiring Time: 7.5s, 10s, 12.5s, 15s, 17.5s
- Support iPage viewing
- CMPR available
- SCV available
- 3 Slice and Niche are available

• iPage
- Slice display mode: Slice only, Slice with MPR
- Slice cut direction: Horizontal and Vertical
- Slice layout: 2*2, 3*3, 4*4, 5*5
- Active quadrant: A plane, B plane, or C plane
- Reset: All, Reset Curve, Reset Ori
- Range Pos: left or right
- Spacing: 0.5-10mm, 0.1mm/step
- Slice Number: odd numbers ranging from 3 to max. 25, depends on slice layout.
- Slice Position: a unique number for current selected slice.

• SCV
- Layout: A/A, A/C
- Reset: All, Reset Curve, Reset Ori
- Thickness: 1-30mm, 1mm/step
- Rotate RL: Only available when layout A/C is selected, ranging from 0-360°, 5°/step

• CMPR
- Trace Options: Line, Trace, Spline
- Ative Quadrant: A, B, C
- Reset Curve
- Rotate RL: ranges from 0-360°, 5°/step

• 3D Layout
- 3 Slice
- Niche
- Reset: All, Reset Curve, Reset Ori
- Active Quadrant: A, B, C, 3 Slice/Niche
- Niche Views: Inner, Outer

• Auto rotation
- Rotation control: play, single loop, loop
- Direction: left/right, up/down

• Edit:
- Area selection: inside polygon, outside polygon, inside contour, outside contour, inside rect, outside rect
- Undo: undo, undo all
- Eraser: Big Eraser, Small Eraser
- Edit Depth: 0-100%, 5%/step

4.15 iScape View (option)
• Available on all transducers
• Acquisition method: B and Power
• Supports speed indicator
• Actual size: on/off
• Fit size: on/off
• Ruler: on/off
• Tint map: off; 8 types
• Rotation: 0~355 degrees, 5/step

4.16 Elastography (option)
• Available on all linear transducers

- Support strain ratio measurement
- Unique shell analysis function
- Stress compensation technology reduces deeper tissue artifacts, obtains more uniform stress throughout whole field
- Stress indicator: supports frame by frame stress indication.
- Display format: Dual live, Single E
- Elasto Map: 6 types
- Smooth: 6 steps
- Invert: on/off
- Opacity: 6 steps

4.17 UWN Contrast Imaging* (option)

- Ultra Wideband Non-linear (UWN) contrast imaging technology, which provides exceptional contrast agent detecting capability, not only extracts second harmonic, but also non-linear fundamental
- Supports Low MI contrast imaging
- Micro Flow Enhancement (MFE)
- Available on C5-2E and C7-3E
- Available on Abdomen, Renal, Gynecology, Urology exam
- Timer1: on/off
- Timer2: on/off
- Pro capture: captures prospective image less than 480s
- Retro capture: captures retrospective image less than 120s
- Dual live: side by side displays tissue image and contrast image
- MFE: on/off
- Destruct: instantly destroy contrast bubbles
- iClear: off; 7 steps
- Mix: mix contrast image with tissue image
- Mix map: 7 types, available when Mix mode is active
- Persistence: 8 steps
- MFE period: 0.1s, 0.2s, 0.4s, 0.6s, 0.8s, 1.0s, MAX
- Dynamic range: 30-180, 5/step
- Gray map: 15 types; inactive when Mix mode is in use
- Tint map: off; 10 types
- Supports U/D Flip and L/R Flip
- Rotation: 90 degrees/step
- HImgPos: transpose position of contrast and tissue image
- Line density: L/M/H/UH
- DestructAP: -6.0-0 dB
- Destruct time: 500-2000 ms

*The DC-8 is designed for compatibility with commercially available ultrasound contrast agents. Because the availability of these agents is subject to government regulation and approval, product features intended for use with these agents may not be commercially marketed nor made available before the contrast agent is cleared for use. Contrast related product features are enabled only on systems for delivery to an authorized country or region of use. Mindray medical systems makes no claims concerning the safety or effectiveness of contrast agents.

4.18 Zoom

- Zoom: Spot zoom (write zoom) up to 10x, Pan zoom (read zoom) 0.8x-10x
- iZoom: convertible 3 steps ;normal image, zoom standard area, zoom only image area

4.19 QSave

- Quick save image parameter setting after image adjustment done
- Support Save, Save as, Restore

4.20 TDI QA (option)

- Dedicated quantification tool for TDI velocity analysis
- Freehand ROI: manually deploy ROI

on the cine
- Up to 8 ROIs
- Delete all
- Delete current
- ROI tracking: reduce effect caused by myocardial movement
- Std.Height: 1.5-50 mm
- Std.Width: 1.5-50 mm
- Std.Angle: -89-90 degrees
- Export: export current data as CSV format file

4.21 Contrast Imaging QA (option)
- Support Time-Intensity Curve analysis
- Table display: display data in table
- Freehand ROI: manually deploy ROI on the cine
- Up to 8 ROIs
- Delete all
- Delete current
- Fit curve
- Raw curve
- Motion tracking: Reduce the effect of tissue movement
- Speed: 17 steps

4.22 iNeedle (option)
- Needle visualization enhancement
- Available on all linear transducers
- Needle steer: -50, -40, -30, -20, 20, 30, 40, 50 degrees

5 Cine Review and Raw Data Processing

5.1 Cine review
- Available in all modes
- Frame by frame manual cineloop review or auto playback with variable speed
- Maximum cine memory is up to 13335 frames or 145s (depends on the mode)
- Maximum 4D cine memory is around 40s
- Retrospective and prospective storage are available and length is 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

5.2 Raw data processing
- B-mode:
  iClear
  zoom
  TGC
  LGC
  gain
  dynamic range
  gray map
  tint map
  flip
  rotation
- M-mode:
  Speed
  dynamic range,
  gain,
  gray map,
  tint map,
  edge enhancement
- Color:
  gain
  invert
  smooth
  baseline
  color map
  priority
  velocity tag
- PW:
  baseline
  wall filter
  speed
  angel correction

quick angel
invert
dynamic range
gray map
tint map

6 Measurement/Analysis and Report*

6.1 Generic measurements

- 2D-mode
  - Depth
  - Distance
  - Area: Ellipse, Trace, Spline, Cross
  - Trace Length
  - Double Distance
  - Parallel
  - Volume :3-Distance, Ellipse, Ellipse + Distance)
  - Length Ratio
  - Area Ratio
  - IMT
  - B Histogram
  - B Profile
  - Volume Flow
  - Color Velocity
- M-mode
  - Distance
  - Time
  - Slope
  - Heart Rate
  - Velocity
- Doppler mode
  - D Velocity
  - Time
  - Heart Rate
  - Acceleration
  - D Trace
  - PS/ED
  - Volume Flow
- Automatic Doppler Spectrum Analysis
  - Heart cycle pre-settable (1, 2, 3, 4, 5)
  - Automatic real-time and retrospective tracing
  - User configurable display of items
  - Support PI, RI, TAMAX, TAMEAN, Volume Flow calculations
  - Appropriate factory setting according to applications

6.2 Clinical option measurement package

- Abdominal
  - Liver
  - Common Hepatic Duct
  - Portal Vein Diameter
  - Gall Bladder: Length, Height, Wall Thickness
  - Common Bile Duct
  - Pancreas: Head, Body, Tail, Duct
  - Spleen
  - Left/Right Kidney: Length, Width, Height, Volume, Cortical Thickness
  - Left/Right Adrenal Gland: Length, Width, Height
  - Abdominal Aorta Diameter
  - Abdominal Aorta Bifurcate Diameter
  - Iliac Diameter
  - Bladder: Length, Width, Height, Volume, micturition volume
  - Common Hepatic Artery
  - Hepatic Artery
  - Portal Vein, Main Portal Vein
  - Hepatic Vein, Left Hepatic Vein, Middle Hepatic Vein, Right Hepatic Vein
  - Splenic Artery
  - Splenic Vein
  - Left/Right Renal Artery, Main Renal Artery, Renal Artery Origin, Arcuate Artery, Segmental Artery, Interlobar Artery, Renal Vein
  - Abdominal Aorta
  - Celiac Axis
  - Superior Mesenteric Artery
  - Inferior Vena Cava

- Superior Mesenteric Vein

- Gynecology
  - Cervix: Length, Width, Width
  - Uterus: Length, Width, Height, Volume, Uterus body, Endometrium Thickness
  - UT-L/CX-L
  - Ovary: Length, Width, Height, Volume
  - Follicle: Length, Width, Height, Average Diameter, Volume
- Obstetrics
  - Early OB: GS, YS, CRL, BPD, FL, NT, Amniotic Fluid
  - 2nd- 3rd Trimester: BPD, HC, OFD, FL, AC, AF, NF, PL Thickness, TAD, APAD, TCD, Cisterna Magna, HW, OOD, IOD, Orbit, HUM, Ulna, RAD, Tibia, FIB, CLAV, Vertebrae, MP, Foot, Ear, APTD, TTD, FTA, THD, HrtC, TC, Umb VD, F-Kidney, Mat Kidney, Cervix L
  - Fetal Heart: LVIDd, LVIDs, LV Diam, LA Diam, RVIDd, RVIDs, RV Diam, RA Diam, IVSd, IVSs, IVS, LV Area, RV Area, RA Area, Ao Diam, MPA Diam, LVOT Diam, RVOT Diam,
  - Gestational Age
  - Fetal Growth
  - Fetal Trend Graph
  - Estimated Fetal Weight
  - Multi-gestational Calculations
  - Fetal Biophysical Profile
  - User definable OB tables
  - Z-score
- Cardiology
  - LV Function: Teichholz, Cube, Gibson, Simpson Single-plane, Simpson Bi-plane, Modified Simpson, Bullet, S-P Ellipse, B-P Ellipse
  - Auto LV: auto measurement in Simpson method
  - LV Mass: Area-Length Method, Truncated-Ellipsoid Method, Cube Method
  - Atrial Volume: LA Vol(A-L), LA Vol(Simpson), RA Vol(Simpson)
  - LVIMP
  - LV TEI, RV TEI
  - Qp/Qs
  - PISA MR, AR, TR, PR
  - MVA(VTI), AVA(VTI)
  - MV medial/lateral (TDI)
- Urology
  - Prostate: Length, Width, Height, Volume
  - PPSA, PSAD
  - Ureter Diameter
  - Bladder: Length, Width, Height, Volume, micturition volume
  - Left/Right Kidney: Length, Width, Height, Volume, Cortical Thickness
  - Left/Right Adrenal Gland: Length, Width, Height
  - Left/Right Testis: Length, Width, Height
  - Left/Right Seminal Vesicle: Length, Width, Height
- Vascular
  - Carotid: CCA, ECA, ICA, Bulb, Vert A, Subclav A
  - Upper Extremity Artery: Subclav A, Axill A, Brachial A, Radial A, Ulnar A, Innom A
  - Upper Extremity Vein: Cephalic V, Basilic V, Ulnar V, Radial V
  - Lower Extremity Artery: CFA, SFA, Pop A, TP Trunk A, Peroneal A, P.TIb A, A.Tib A, Dors. Ped A,
  - Lower Extremity Vein: C.Iliac V, Ex.Iliac V, Femoral V, Saph V, Pop V, TP Trunk V, Sural V, Soleal V, Peroneal V, P.Tib V, A.Tib V
  - TCD (Transcranial Doppler): ACA, MCA, PCA, Basilar, A Comb.A, P Comb.A, Vertebral A, Basilar A
- Small Parts:

- Thyroid: Length, Height, Width, Volume
- Isthmus Height
- Testis: Length, Height, Width
- Mass: Length, Height, Width, Nip. Distance, Skin Distance
- Superior Thyroid Artery
- Inferior Thyroid Artery

- Orthopedics
  - Hip
  - d/D

6.3 IMT

- Intima-Media Thickness measurement
- Automatic detection of IMT when ROI is set
- Support CCA, ICA, ECA, Bulb IMT
- Near wall and far wall detection
- Angle selectable

6.4 Smart OB

- Auto measurement for OB, a special tool for easy OB scan, and greatly reduce time and increase productivity
- Support BPD, HC, OFD, FL, AC
- Initiating AC should input GA first
- Measurement result can be modified by user

6.5 Report

- Specific report template to the application
- Editable value in report
- Images are selectable
- Titles are pre-settable in setup
- Export as PDF/RTF format

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

7 Exam Storage and Management

7.1 Exam storage

- 1TB hard drive. More than 800GB internal hard drive reserved for patient data storage
- Capable of storage up to approximately 113,664 single frames
- Direct digital storage of single frame and cine 2D, color and Doppler.

7.2 Exam management

- iStation workstation dedicated for patient exam management
- Patient exam query/retrieve
- Support review of current and past exam
- New exam, Active exam, Continue exam functions, End exam are available
- Support measurements and calculations on archived exam and images
- Export images as BMP/JPG/TIFF/DCM/AVI format
- Support backup/send to USB devices, DVD-RW media

7.3 iWorks (option)

- Auto workflow protocol
- Templates are user configurable
- Functions: pause, stop, replace, repeat, skip, insert single step, return and continue, steps in thumbnail, iNCert another template
- iWorks setup mode: B/Dual/B+Color/B+ PW/B+Color+PW/B+CW/B+Color+C W/ B+M
- iWorks setup annotation: support up to 2 annotations, location and font size are configurable.
- iWorks setup bodymark: select existing library, and probe indicator is pre-settable
- iWorks setup measurement: select existing measurement library
- Template import and export are available

8 Connectivity

8.1 Ethernet Network Connection
8.2 USB to serial data output (need a converter cable)
8.3 DICOM 3.0 basic (option)
-Verify (SCU, SCP)
-Print
-Store
-Storage Commitment
-Media Exchange
8.4 DICOM Worklist (option)
8.5 DICOM Query/Retrieve (option)
8.6 DICOM Modality Performed Procedure Step - MPPS (option)
8.7 DICOM OB/GYN structure report (option)
8.8 DICOM Cardiac structure report (option)
8.9 DICOM Vascular structure report (option)
8.10 DICOM Breast Report (option)

9 Transducers

9.1 Curved array

- C5-2E
  - Application: Adult Abdomen, Pediatric Abdomen, OB/GYN, Vascular, Nerve
  - Bandwidth: 2.1-5.1 MHz(-6dB); 1.5-5.6 MHz(-20dB)
  - Number of Elements: 128
  - FOV (max): 75°
  - Extended FOV: 95°
  - Convex Radius: 51mm
  - Depth: 4-40cm
  - Physical Footprint: 76.3mm× 25.6mm
  - Footprint: 64mm × 16.2mm
  - B-mode Frequencies: 1.3-3.2, 1.9-4.6, 2.3-5.7 MHz
  - Harmonic Frequencies: 4.0, 5.0, 6.0 MHz
  - Doppler Frequencies: 2.0, 2.5, 3.0 MHz
  - Biopsy Guide: available, multi angle, reusable
- C7-3E
  - Application: OB/GYN, Adult Abdomen, Pediatric Abdomen, Vascular
  - Bandwidth: 2.8-7.1 MHz(-6dB); 2.2-8.1 MHz(-20dB)
  - Number of Elements: 192
  - FOV (max): 65°
  - Extended FOV: 85°
  - Convex Radius: 51 mm
  - Depth:3-32
  - Physical Footprint: 71mm × 21.5 mm
  - Footprint: 60.5mm × 12.2 mm
  - B-mode Frequencies: 2.6-4.8, 3.6-6.4, 3.6-7.2 MHz
  - Harmonic Frequencies: 5.5, 6.0, 6.5 MHz
  - Doppler Frequencies: 3.0, 3.3, 3.6 MHz
  - Biopsy Guide: available, multi angle, reusable (not in SFDA)
- C11-3E
  - Application: Pediatric abdominal, Neonatal Head, Peripheral Vessels
  - Bandwidth: 4-10 MHz(-6db), 3-11.2 MHz(-20db)
  - Number of Elements:128
  - FOV (max): 102°
  - Extended FOV: 122°
  - Convex Radius: 15mm
  - Depth: 1.5-28cm
  - Physical Footprint: 32.8 mm × 25mm
  - Footprint: 27.4 mm × 8.4mm
  - B-mode Frequencies: 2.6-6.5, 3.2-7.9, 4.7-12.8 MHz
  - Harmonic Frequencies: 7.0, 8.0, 9.0 MHz

- Doppler Frequencies: 4.4, 5.0, 5.7 MHz
- Biopsy Guide: available, multi angle, reusable

- V11-3E
  - Application: OB/GYN, Urology
  - Bandwidth: 4-10 MHz(-6dB); 3-11.2 MHz(-20dB)
  - Number of Elements: 128
  - FOV (max): 139°
  - Extended FOV: 159°
  - Convex Radius: 11mm
  - Depth: 1.5-28cm
  - Footprint: 24mm × 9mm
  - B-mode Frequencies: 2.6-6.5, 3.2-7.9, 4.7-12.8 MHz
  - Harmonic Frequencies: 7.0, 8.0, 9.0 MHz
  - Doppler Frequencies: 4.4, 5.0, 5.7 MHz
  - Biopsy Guide: available, single angle, reusable
- V11-3BE
  - Application: OB/GYN, Urology
  - Bandwidth: 4-10 MHz(-6dB); 3-11.2 MHz(-20dB)
  - Number of Elements: 128
  - FOV (max): 139°
  - Extended FOV: 159°
  - Convex Radius: 11mm
  - Depth: 1.5-28cm
  - Footprint: 24mm × 9mm
  - B-mode Frequencies: 2.6-6.5, 3.2-7.9, 4.7-12.8 MHz
  - Harmonic Frequencies: 7.0, 8.0, 9.0 MHz
  - Doppler Frequencies: 4.4, 5.0, 5.7 MHz
  - Biopsy Guide: available, single angle, reusable
- V11-3WE
  - Application: OB/GYN, Urology
  - Bandwidth: 4-10 MHz(-6dB); 3-11.2 MHz(-20dB)
  - Number of Elements: 160
  - FOV (max): 173°
  - Extended FOV: 193°
  - Convex Radius: 11mm
  - Depth: 1.5-28cm
  - Footprint: 24mm × 9mm
  - B-mode Frequencies: 2.6-6.5, 3.2-7.9, 4.7-12.8 MHz
  - Harmonic Frequencies: 7.0, 8.0, 9.0 MHz
  - Doppler Frequencies: 4.4, 5.0, 5.7 MHz
  - Biopsy Guide: available, single angle, reusable

9.2 Volume curved array

- D6-2E
  - Application: OB/GYN, Abdomen
  - Bandwidth: 2.1-5.4 MHz(-6dB); 1.4-6.4 MHz(-20dB)
  - Number of Elements: 128
  - FOV (max): 70°(B) × 70°(sweep)
  - Extended FOV: 90°(B)
  - Convex Radius: 41mm
  - Volume Sweep Radius: 19mm
  - Depth:4-40cm
  - Footprint: 46.5 mm × 15.5 mm
  - B-mode Frequencies: 2.6-4.8, 3.6-6.4, 3.8-8.2 MHz
  - Harmonic Frequencies: 4.5, 5.5, 6.0, 6.5 MHz
  - Doppler Frequencies: 2.5, 3.0, 4.0 MHz
  - Biopsy Guide: not available
- DE10-3E
  - Application: OB/GYN, Urology
  - Bandwidth: 4.0-7.0 MHz(-6dB); 3.0-9.0 MHz(-20dB)
  - Number of Elements: 192
  - FOV (max): 150°(B) × 90°(sweep)
  - Extended FOV: 170°(B)
  - Convex Radius: 11 mm
  - Depth: 1.5-28cm
  - Physical Footprint: 24.4mm (diameter)

- B-mode Frequencies: 2.1~5.1, 3.2~7.9, 4.7~12.8 MHz
- Harmonic Frequencies: 7.0, 8.0, 9.0 MHz
- Doppler Frequencies: 4.4, 5.0, 5.7 MHz
- Biopsy Guide: not available

9.3 Linear array

- L12-3E
  - Application: Small parts, Vascular, Musculoskeletal, Nerve, Pediatrics
  - Bandwidth: 4.2-11.8 MHz(-6dB); 3-13 MHz(-20dB)
  - Number of Elements: 192
  - Field of View (max): 38mm
  - Steered Angle: +/-6°,12°(B); +/-10°, 20°, 30° (C, PW)
  - Depth:1.5-28cm
  - Physical Footprint: 45.7mm × 10.9mm
  - Footprint: 44.2mm × 8.5mm
  - B-mode Frequencies: 4.4-9.6, 5.4-11.5, 6.6-13.5 MHz
  - Harmonic Frequencies: 8.0, 9.0, 10.0 MHz
  - Doppler Frequencies: 4.4, 5.0, 5.7 MHz
  - Biopsy Guide: available, multi angle, reusable
- L14-6NE
  - Application: Small parts, Vascular, Musculoskeletal, Nerve, Pediatrics, Neonatal Head
  - Bandwidth: 5.1-12.5 MHz (-6dB); 3.5-16 MHz(-20dB)
  - Number of Elements: 192
  - Field of View (max): 38mm
  - Steered Angle: +/-6°,12°(B); +/-10°, 20°, 30° (C, PW)
  - Depth:1.5-28cm
  - Physical Footprint: 45.7mm × 10.9mm
  - Footprint: 44.2mm × 8.5mm
  - B-mode Frequencies: 5.4-11.6, 6.0-12.6, 6.6-13.5 MHz
  - Harmonic Frequencies: 8.0, 10.0, 12.0 MHz
  - Doppler Frequencies: 5.0, 5.7, 6.6 MHz
  - Biopsy Guide: available, multi angle, reusable
- L14-6WE
  - Application: Small parts, Vascular, Musculoskeletal, Nerve, Pediatrics
  - Bandwidth: 5.1-12.5 MHz (-6dB); 3.5-16 MHz (-20dB)
  - Number of Elements: 256
  - Field of View (max): 50mm
  - Steered Angle: +/-6°,12°(B); +/-10°, 20°, 30° (C, PW)
  - Depth:1.5-28cm
  - Physical Footprint: 59.1mm × 12mm
  - Footprint: 56.1mm × 10mm
  - B-mode Frequencies: 4.8-10.6, 5.4-11.6, 6.6-13.5 MHz
  - Harmonic Frequencies: 8.0, 10.0, 12.0 MHz
  - Doppler Frequencies: 5.0, 5.7, 6.6 MHz
  - Biopsy Guide: available, multi angle, reusable
- L7-3E
  - Application: Small parts, Vascular, Musculoskeletal, Nerve
  - Bandwidth: 3.0-7.0 MHz(-6dB); 3.0-8.0MHz(-20dB)
  - Number of Elements: 128
  - Field of View (max): 38mm
  - Steered Angle: +/-6°,12°(B); +/-10°, 20°, 30° (C, PW)
  - Depth:1.5-28cm
  - Physical Footprint: 45.7mm × 10.9mm
  - Footprint: 44.2mm × 8.5mm
  - B-mode Frequencies: 2.6-4.8, 3.6-6.4, 3.8-8.2 MHz
  - Harmonic Frequencies: 5.5, 6.0, 6.5

MHz
- Doppler Frequencies: 3.8, 4.4, 5.0 MHz
- Biopsy Guide: available, multi angle, reusable

9.4 Phased array
- P4-2E
  - Application: Adult cardiac, Pediatric Cardiac, TCD, Adult Abdomen
  - Bandwidth: 1.7-4.1 MHz (-6dB); 1.3-4.7 MHz(-20dB)
  - Number of Elements: 64
  - Field of View (max): 90°
  - Depth:3-32cm
  - Physical Footprint: 25.2mm × 20.6mm
  - Footprint: 23.4mm × 15.2mm
  - B-mode Frequencies: 1.3-3.2, 1.6-3.8, 2.2-5.4 MHz
  - Harmonic Frequencies: 3.4, 3.6, 3.8, 4.2 MHz
  - Doppler Frequencies: 2.0, 2.3, 2.5 MHz; TDI 3.0, 3.8MHz
  - CW Frequency: 2.0MHz
  - Biopsy Guide: available, multi angle, reusable

10 Peripheral Devices and Accessories (Option)

10.1 Black/white digital video printer
- SONY UP-D897, MITSUBISHI P93DC

10.2 Black/white analog video printer
- SONY UP-897MD, MITSUBISHI P93W-Z

10.3 Color digital printer
- SONY UP-D23MD, SONY UP-D25MD

10.4 Color analog printer
- SONY UP-20, MITSUBISHI CP910E

10.5 Graph/text printer
- HP Officejet J3600, HP Officejet6000, HP Color LaserJet CM1015 MFP, HP Deskjet1280, Epson office 85ND

10.6 Wireless printer
- HPOTOSMART PLUS e-ALL-IN-ONE B 210a

10.7 Built-in DVR
- Built-in digital video recorder, save space and is a useful tool for education and memory
- Max storage length each time: 30 min

10.8 Gel warmer
- Enables gel warming
- Easily be disassembled off system for cleaning
- Temperature: 25 °C ± 3 °C
- Light indicator for temperature protecting
- Switch: on/off
- Dimension: 77.8 mm (W) × 79 mm (D) × 151.4 mm (H)
- Weight: approx. 380g

10.9 Footswitch
- USB port: 971-SWNOM (2-pedal)
- USB port: SP-997-350 (3-pedal)
- Support User-definable functions (Freeze, Save, Print)

10.10 ECG
- 6-pin, AHA/IEC, for 3-lead wires
- ECG wave display: on/off
- Gain: 0-30, 1/step
- Sweep speed: 1-6, 1/step

10.11 PCG
- PCG wave display: on/off
- Gain: 0-30, 1/step
- Smooth: 1-4, 1/step

10.12 Barcode reader
- Laser barcode scanner
- Model: SYMBOL LS2208

10.13 Built-in Wireless adapter
- Encryption: WEP, WPA-PSK, WPA2-PSK
- Max transfer speed: 300Mbps
- Protocols: 802.11b: 11,5.5,2,1 Mbps; 802.11g: 54,48,36,24,18,12,9,6 Mbps;

802011n: up to 300Mbps

10.14 Built-in Battery

- Replaceable and rechargeable lithium battery
- Support switching to standby mode
- Full battery lasts more than 24h in standby mode
- Light indicator for standby mode
- Empty battery recharged to full in less than 8h

11 System Inputs and Outputs

11.1 Video/Audio input

- Video in: 1 port, PAL/NTSC
- S-Video in: 1 port, PAL/NTSC
- Audio in: 1 port
- Microphone: 1 port

11.2 Video/Audio output

- Video out: 2 ports, PAL/NTSC
- S-Video out: 1 port, PAL/NTSC
- HDMI: 1 Port
- VGA out: 1 port
- DVI: 1 port
- Audio out: 1 port

11.3 Physio input

- Support ECG/PCG signal
- ECG: 1 port
- PCG: 1 port

11.4 Other input/output

- USB: 6 ports
- Ethernet: 1 port
- Remote: 1 port
- RS-232 port: 1 port

12 Safety and Conformance

12.1 Quality standards

- ISO 9001
- ISO 13485

12.2 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

12.3 CE declaration

DC-8 system is fully in conformance with the Council Directive 93/42/EEC 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.

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