M8 Elite

Diagnostic Ultrasound System

Datasheet

Premium Capability

Easy Mobility

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M8 Elite Diagnostic Ultrasound System

Performance Specifications

System Overview

Applications

- Abdomen
- Cardiology
- Vascular
- Obstetrics
- Gynecology
- Small parts
- Urology
- Breast
- Pediatrics
- Nerve
- Critical Care
- Emergency Medicine

Transducer types

- Curved array
- Linear array
- Phased array
- Pencil

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
- Pulsed Wave Doppler
- Continuous Wave Doppler
- TDI
- UWN+ (Ultra-Wideband Non-linear Plus) Contrast Imaging™
- Low MI Contrast (Myocardium Contrast Imaging)
- Tissue Tracking QA
- Stress Echo
- Elastography
- iScape™ View (Panoramic Imaging)
- 3D/4D

Standard features

- B-mode
- THI and PSH™
- M-mode
- Color Doppler Imaging
- Power Doppler Imaging and Directional PDI
- Pulsed Wave Doppler
- iBeam™ (Spatial Compound Imaging)
- iClear™ (Speckle Suppression Imaging)
- iTouch™ (Auto Image Optimization)
- Echo Boost™
- Zoom/iZoom (Full Screen Zoom)
- FCI (Frequency Compound Imaging)
- B steer
- ExFOV (Extended Field of View)
- HDR Flow (High Dynamic Range Flow)
- HR Flow™ (High Resolution Flow)
- Raw data processing
- Smart Doppler (only available on PW steer and correct angle)
- iScanhelper (Anesthesia version)
- 1 active probe port
- 240GB solid hard drive
- 2-USB
- HDMI
- Internal WIFI
- UltraAssist (Off-line software)
- iStorage
- Built-in Battery
- Power adapter
- Control panel film with language

Optional features

- Continuous Wave Doppler
- Free Xros M™
- Free Xros CM™
- iScape™ View
- UWN+ Contrast Imaging™
- Low MI Contrast
- Contrast Imaging QA (Quantitative Analysis)
- IMT
- Elastography
- TDI (Include TVI, TVD, TVM, TEI)
- TDI QA (TDI Quantitative Analysis)
- TT QA (Tissue Tracking Quantitative Analysis)
- LVO (Left Ventricular Opacification)
- Stress Echo
- Smart 3D™ (Freehand 3D)
- Real-time 4D
- iPage+ (Multi-Slice Imaging)
- Smart-V ™ (Smart Volume)
- AutoEF (Automatic Ejection Fraction measurement)
- DICOM
- Clinical Measurement Package
- Smart OB™ (Auto OB measurement)
- Smart NT™ (Auto NT measurement)
- iWorks™ (Auto Workflow Protocol)
- iNeedle™ (Needle Visualization Enhancement)
- Moble Trolley: UMT-500Plus
- Audio/Video extend module: iDock51
- ECG function
- Barcode reader: DS6707-SR (2D Barcode); SYMBOL LS2208-SR (1D Barcode)
- Footswitch: 1-pedal/2-pedal/3-pedal
- External DVD R/W drive

Language support

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

Physical Specification

Dimension and weight

- Width: 390mm
- Depth: 362mm
- Height: 59mm
- Weight: approx. 5.8kg (with batteries), 5kg (no accessories or batteries)

Monitor

- 15.6-inch high resolution color LED monitor
- Resolution: 1920×1080
- Automatic brightness adjustment
- Screen Saver
- Open angle adjustable: 0°-150° (The angle between the monitor and control panel)
- View angle (right/left): 89°

Handle

Probe port

- 1 port connect to a transducer or the probe extend module
- 1 pencil probe port

Electrical power

- AC adapter Input:
- Voltage: 100-240V~Frequency: 50/60 Hz
- Power input: 2.0A max
- Battery: Lithium-Ion Battery Pack 14.8V, 5800mAh (single battery)

Operating Environment

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

Storage & Transportation Environment

- Ambient

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M8 Elite Diagnostic Ultrasound System

Performance Specifications

temperature: -20~55℃
Relative humidity: 20%-95% (no condensation)
Atmospheric pressure: 700hPa-1060hPa

Alloy Enclosure
Magnesium-alloy enclosure design

User Interface

Control panel
Power/Battery Indicator
Alphanumeric Keys
Function Keys
Ergonomic Soft Key Operation
Backlit keys, ensuring accurate work in the dark room
8-segment TGC control
Programmable keys, available for user-defined functions
Trackball, speed adjustment
Key Brightness adjustment
Integrated speakers, audio volume adjustment

System boot-up
Boot-up from complete shut-down in about 28sec
Boot-up from standby mode in about 7sec
Shut down in about 12sec

Comments
Supports text input and arrow
Adjustable text size and arrow size and direction
Supports home position
Covers various application
More than 800 comments items for versatile application
User customizable

Bodymark
More than 140 bodymarks for versatile application
User customizable

Screen information* (presettable)
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.

Imaging Parameters

Overview
Digital beamformer
Up to 82,944 channels
12-beam forming

B-mode

Display formats:	Single(B), Dual(B+B), Quad(4B)
iClear™:	Off; On, 1-7steps
iBeam™:	Off; On, 1-3steps
iTouch™:	Auto optimization (TGC, Gain)
Image quality:	Pen/Gen/Res (depend on probe)
B steer:	available on linear transducers
ExFOV:	Off; On,1-2steps (extended FOV available on convex and linear transducers)
Depth:	1.5-40cm (depend on transducer)
Frame rate (max):	1041f/s
Acoustic output power:	3.2%-100%
TGC:	8 pods on control panel
LGC:	4 segments on soft menu (4 levels of preset values)
Dynamic range:	30-200, 5/step (30-240 for C11-3s)
Gain:	0-100, 1/step
Focus number:	1-4, adjustable
Focus position:	Max. 16, adjustable
FOV (Field of View):	on/off
Line density:	L/M/H/UH
Persistence:	0-7, 8 steps
Horizontal Scale:	on/off
L/R flip:	Right/Left
U/D flip:	Up/Down
Rotation:	0°, 90°, 180°, 270°
TSI (Tissue Specific Imaging):	general/muscle/fluid/fat
Gray Map:	8 types
Tint:	on/off
Tint map:	off; 8 types
Auto Merge:	on/off

THI and PSH
Available on all types of transducer (except CW2s and CW5s)
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)

M-mode

Display formats:	V2:3, V3:2, H2:3, V3:1
Display formats:	Full (V: vertical, H: horizontal, L: left, R: right)

Color M-mode available (convex and phased probe only)

Acoustic output power:	3.2%-100%
Dynamic range:	0-180, 5/step (30-240 for C11- 3s)
Gain:	0-100, 1/step
Speed:	6 levels
M soften:	0-4, 5 steps
Tint:	on/off
Tint map:	off; 8 types
Gray Map:	8 types
Edge enhance:	0-3

Free Xros M (option)

Display formats:	V2:3, V3:2, H2:3, V3:1 (V: vertical, H: horizontal, L: left, R: right)

Color Free Xros M available
Up to 3 lines

Speed:	6 levels
Tint:	on/off
Tint map:	off; 8 types
Gray Map:	8 types

Free Xros CM (option)
Only available on TDI

Display formats:	V2:3, V3:2, H2:3, V3:1, (V: vertical, H: horizontal, L:left, R: right)
Acoustic output power:	3.2%-100%
Gain:	0-100, 1/step
Speed:	6 levels
Tint:	on/off
Tint map:	off; 8 types
Gray Map:	8 types

Color Doppler Imaging

Dual live:	on/off
HR Flow™:	High Resolution Flow provides better image quality and flow sensitivity
Image quality:	Pen/Gen/Res
Max velocity:	150 cm/s
Steer:	max. 30 degrees (linear transducer)
Max frame rate:	293 f/s
Acoustic output power:	3.2%-100%
Gain:	0-100, 2/step
ROI size/position:	adjustable
Scale:	30 levels
Wall filter:	0-7, 8 steps
PRF:	max. 15.1kHz, min. 0.1kHz
Packet size:	0-3, 4 steps
Flow state:	L/M/H, 3 steps
Smooth:	0-6, 7 steps

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M8 Elite Diagnostic Ultrasound System

Performance Specifications

B/C Align:	on/off
Priority:	0%-100%, 1%/step
Color map:	V0-V10, VV0-VV9, 21 types (Variance)
Invert:	on/off
Persistence:	0-6, 7 steps
Velocity tag:	on/off
Line density:	L/M/H/UH, 4 steps

Power Doppler Imaging

Dual live:	on/off
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:	30 steps
Wall filter:	0-7, 8 steps
PRF:	max. 15.1 kHz, min. 0.1kHz
Packet size:	0-3, 4 steps
Flow state:	L/M/H
Smooth:	0-6, 7 steps
B/C align:	on/off
Priority:	0%-100%, 1%/step
Color map:	4 types
Directional color map:	4 types
Persistence:	7 steps
Line density:	L/M/H/UH

PW/CW-Mode

Display formats:	V2:3, V3:2, H2:3, V3:1, Full (V: vertical, H: horizontal, L: Left)
iTouch™:	on/off, auto optimization (Baseline, PRF)
Image quality:	Pen, Gen, Res
PW velocity:	max. 898cm/s
CW velocity:	max. 3744cm/s
Sample volume size:	0.5-20mm (PW only), 0.5-5mm/step
Sample gate depth:	adjustable
Scale:	max. 3841cm/s
Baseline:	-4~4, 9 steps
PW Steer:	max. 30 degrees (linear transducer)
Volume:	0%-100%, 2%/step
PW PRF:	max. 24kHz, min. 0.7kHz
CW PRF:	max. 100kHz, min. 0.3kHz
Gain:	0-100, 2/step
Dynamic range:	24-72, 2/step
Sweep speed:	6 levels
Wall filter:	0-6, 7 steps
Invert:	on/off
Auto invert:	on/off
Angle:	-89°~89°, 1/step
Quick angle:	0°, -60°, 60°
Auto Correct (linear probe only, Duplex/Triplex "Off" or Display format "Full" status)	
Tint:	on/off
Tint map:	off, 8 types
HPRF:	on/off
Time/frequency resolution:	0-4, 5 steps
Auto calc:	on/off
Auto calc cycle:	1-5, 1/step
Trace area:	above, below, all
Trace Sensitive:	0-5, 6 steps
Trace Smooth:	0-4, 5 steps
Duplex/Triplex:	on/off (both supporting PW & CW duplex/triplex)

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:	1782f/s
PRF:	max. 15.4kHz, min. 0.4kHz
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. 30 steps, 5.0-150cm/s
Baseline:	-8~8, 17 steps (TVI only)
Wall filter:	0-7, 8 steps
Packet size:	0-3, 4 steps
Flow state:	L/M/H, 3 steps
Smooth:	0-6, 7 steps
B/C Align:	on/off
Priority:	0%-100%, 1%/step
Map:	10 types
Invert:	on/off (TVI only)
Persistence:	0-6, 7 steps
Line density:	L/M/H/UH, 4 steps

Tissue Velocity Doppler(included in TDI option)

Available on phased array transducer	
Display formats:	V2:3, V3:2, H2:3, V3:1, Full (V: vertical, H: horizontal, L: left, R: right)
Sample volume size:	0.5-20mm, 12 steps
Sample gate depth:	adjustable
Scale:	max. 368.75 cm/s
Baseline:	-4~4, 9 steps
Volume:	0%-100%, 2%/step
PRF:	max. 24.0kHz, min. 0.7kHz
Gain:	0-100, 2/step
Dynamic range:	24-72, 2/step
Speed:	6 levels
Wall filter:	0-6, 7 steps
Invert:	on/off
Angle correction:	-89°~89°, 1/step
Quick angle:	0°, -60°, 60°
Gray map:	10 types
Tint:	on/off
Tint map:	Off; 8 types
Time/frequency resolution:	0-4, 5 steps

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%
Gain:	0-100, 2/step
M sweep speeds:	6 steps
M soften:	5 steps
Gray Map:	8 types
Edge enhancement:	4 steps

iScape™ View (option)

Panoramic imaging	
Available on all transducers (except pencil probes)	
Acquisition method:	B mode and Power mode
Imaging length:	100cm
Tint map:	off; 8 types
Rotation:	0°~355°

Zoom

iZoom™

- Full screen zoom
- Normal image, Zoom standard area, Zoom image area, 3 steps
- Spot zoom (write zoom) 0.8-10x
- Pan zoom (read zoom) 0.8-10x

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

UWN+ Contrast Imaging™*/ Low MI Contrast (option)

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	
Supports Low MI contrast imaging	
Micro Flow Enhancement (MFE) available	
Available for C5-1s, SP5-1s (SP5-1s is only available for Low MI Contrast)	
Timer1:	on/off

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Performance Specifications

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:	8 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:	-43.4~0 dB
Destruct time:	500-2000 ms

*The M8 Elite 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.

Stress Echo(option)

Available on cardiac sector transducers

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), ASE 17 (with score 4-7)

Customized stages: up to 6 views per stage, and up to 12 stages per study

View:	standard views (PSLA, PSAX, A4C, A2C), and customized views

Image acquisition

- R-wave trigger
- Acquire mode: Manual ROI or full screen
- Ability to acquire frames or clips in B-mode, LVO Image selection
- Attach the images with view annotation label (PSLA, PSAX, A4C, A2C, and customized views)

Review

- Automatically adjust to the number of images user defined

Wall Motion Scoring

- 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

LVO (option)

Available on SP5-1s

Dedicated left ventricle contrast imaging tool

iBeam™

Spatial compound imaging

9 angles maximum

Available on all convex and linear transducers

iTouch™

Auto image optimization

B-mode:	gain, TGC
Color:	gain
Power:	gain
PW:	gain, scale, PRF, WF
Contrast imaging:	gain

Echo Boost™

Only for cardiac exams

Improve the homogeneity of cardiac images through the whole field of view

Better contrast resolution of myocardium tissue layers

Better noise control in cardiac chambers and muscles

B steer

Only for linear transducers

ExFov

Extended field of view

Available for all convex and linear transducers

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

QSave

Quick save image parameter setting after image adjustment done

Support Save, Save as, Restore

TDI QA (option)

Dedicated quantification tool for TDI velocity, strain, strain rate analysis

Ellipse ROI, Standard ROI

Up to 8 of ROI areas

Delete all

Delete current

ROI tracking:	tracking ROI along with cardiac movement
Smooth:	1-7, 1/step
X scale:	1-5, 1/step
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

TT QA(option)

Tissue tracking quantitative analysis

Mandatory ECG connection before TT QA cine acquisition

Six views for analysis:	ALAX, A4C, A2C, PSAXB, PSAXM, PSAXAP
Reload:	reload cine again for new study
Edit:	modify trace points

Start tracking

Accept & compute:	start tracking myocardium movement when user accept trace result
Display effect:	0/1; at 0, tracking in velocity vector arrow; at 1, tracking in dots
Trace method:	3 point or manual for ALAX, A4C, A2C; manual for PSAXB, PSAXM, PSAXAP
Bull's eye:	Trace result in bull's eye model
Torsion:	Torsion rate curve display
LGC:	available
Valve's open and close time index:	MVC, MVC', AVC, AVO, MVO
Data export:	export data in CSV file
Cycle:	ECG triggered cardiac cycle recognition for analysis; cycle from 1-10, 1/step
Auto play:	stop, X1/10, X1/5, X1/4, X1/3, X1/2, X1, X2, X3
Thickness:	1-30mm, 1mm/step; adjust trace thickness
Track point:	20-40, 1/step
Parameter:	Volume, Speed, Displacement, L Strain, L Strain R, T Strain, T Strain R, Area, R Strain, R Strain R, C Strain, C Strain R, Rot., Rot. R
Smooth:	0-4, 1/step

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 of ROI areas

Delete all

Delete current

Fit curve

Raw curve

Motion tracking:	Reduce the effect of tissue movement
XScale:	5 steps

Smart 3D™

Smart 3D

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Performance Specifications

- Acquisition Method: Rocked, Linear
- VR/MPR: set parameters for volume rendered image or MPR plane
- Current window: switch VR or A/B/C plane
- Display formats: Quad, Dual, Single, MPR only, A4:1
- VOI: on/off
- Reset: all, orientation, reset curve
- VR orientation: 0°, 90°, 180°, 270° for quick rotation
- Inversion: inversion, gray
- 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: 0-20, 1/ step
- Tint: off; 8 types
- Brightness: 0%-100%, 2%/step
- Contrast: 0%-100%, 2%/step

Tool: Auto rotation

- Rotation control: play, single loop, loop
- Direction: left/right, up/down
- Position: Set Start/Set end

Edit

- Eraser: Soft eraser/hard eraser, inside polygon, outside polygon, inside contour, outside contour, inside rect, outside rect, line
- Eraser Diameter: 8-60, 1/step
- Cut (area selection): inside polygon, outside polygon, inside contour, outside contour, inside rect, outside rect
- Undo: undo, undo all

4D

Available on all volume transducers

Static 3D and 4D

- iClear: Off; 7 steps
- VR/MPR: set parameters for volume rendered image or MPR plane
- Current window: switch VR or A/B/C plane
- Maximum frame rate in 4D: 31.3 vps (D7-2s)
- Display formats: Quad, Dual, Single, MPR only, A4:1
- VOI: on/off
- Reset: all, orientation, reset curve
- VR Orientation: 0°, 90°, 180°, 270° for quick rotation
- Inversion: Inversion, Gray
- 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)
- Brightness: 0%-100%, 2%/step
- Contrast: 0%-100%, 2%/step
- Tint: off; 8 types
- Smooth: 0-20, 1/ step

iPage+

- Slice cut direction: Horizontal and Vertical
- Slice layout: 1*1, 2*2, 3*3, 4*4, 5*5
- Reference plane: A plane, B plane, or C plane
- Reset Ori
- 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.

- Range position

Smart-V™ (Smart Volume)

- Auto 3D volume calculation
- Manual ROI on A, B, C plane separately
- Auto detect contour of target
- Volume result shows in result window
- Reset: all, orientation, reset curve
- Active Quadrant: A, B, C
- Support MRP measurement

iNeedle™

Needle visualization enhancement

Best angle indicator

Available on all linear transducers

Needle steer: -50, -40, -30, -20, 20, 30, 40, 50 degrees

Auto EF (option)

Adjust Frame

Layout: Dual/ Single

Diastole FR

Systole FR

Volume curve: on/off

Adjustment for the border of endocardium

Cine Review and Post Processing

Cine review

Available in all modes

Frame by frame manual cineloop review or auto playback with variable speed

Independent cine review in 2D Dual and Quad mode one by one

Maximum cine memory is up to 38597 frames or 155.6s (depend on the mode)

Retrospective storage (online setting available, 1-120s, or 1-120 cycles, pre-settable) and prospective storage (1-480s, or 1-390 cycles, pre-settable)

Maximum 4D cine memory: 7568 frames

Frame compare: compare different frames for one cine in dual format

Cine compare: compare two or more than two cines in dual or quad format

Jump to first and jump to last: one keystroke review the first or last frame

Start point and end point: selectable

Raw data processing

B-mode:

- iClear™
- Zoom
- TGC
- LGC
- HScale
- Dual live
- Auto merge
- iTouch brightness
- 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
- Angle correction
- Quick angle
- Invert
- Audio
- T/F Res
- Dynamic range
- Gray map
- Tint map

M8 Elite Diagnostic Ultrasound System

Performance Specifications

Measurement/Analysis and Report*

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

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 (Trace available)
- Fetal Heart: LVIDd, LVIDs, LV Diam, LA Diam, RVIDd, RVIDs, RV Diam, RA Diam, IVSd, IVSs, IVS, LV Area, RV Area, RA Area, AoDiam, 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
- MAPSE
- FAC, RV FAC
- 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

Report

Specific report template by application
User-defined report template
Editable value in report
Images selectable
Able to Export as PDF/RTF file

IMT

Intima-Media Thickness Measurement
Automatic detection of IMT when ROI is set
Support CCA, ICA, ECA, Bulb IMT

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Performance Specifications

Near wall and far wall detection
Angle selectable
Support IMT growth curve

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
Needs GA before start auto AC
Measurement result can be modified by user

Smart NT

NT auto measurement
Auto detection of NT inside ROI

iStorage (included in UltraAssist)

Data transfer

iReport (embedded in M8 Elite)

User-defined report template software

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

Exam Storage and Management

Exam storage

240GB hard drive. More than 188GB internal hard drive reserved for patient data storage
Capable of storage up to approximately 314907 single frames (FRM format)
Storage area
- Pre-settable: image area, standard area, full-screen
- Image area: 1000*790
- Standard area: 1200*910
- Full-screen: 1920*1080

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 and End exam are available
Support measurements and calculations on archived exam and images
Export image as BMP/JPG/TIFF/DCM/FRM format (FRM: system format)
Export cine as DCM/AVI/CIN/MP4 format (CIN: system format)
Support backup/send to USB devices, DVD-RW media

iWorks™

Auto workflow protocol
Templates are user configurable

Functions:	pause, stop, replace, repeat, skip, insert single step, return and continue, steps in thumbnail, iNSert™ another template
iWorks setup mode:	B/Dual/B+Color/B+ PW/B+Color+PW/B+CW/ B+Color+CW/ 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

Connectivity

Ethernet Network Connection

Wireless connection: Internal WIFI

DICOM 3.0

DICOM Basic
- Verify (SCU, SCP)
- Print
- Store
- Storage Commitment
- Media Exchange

DICOM Worklist
DICOM Query/Retrieve (option)
DICOM Modality Performed Procedure Step - MPPS (option)
DICOM OB/GYN structured report
DICOM Cardiac structured report (option)
DICOM Vascular structured report
DICOM Breast structured report

iStorage (included in UltraAssist)

Direct network storage tool between ultrasound system and personal computer

Probes

Curved array

C5-1s
- Application: Adult Abdomen, Gynecology, Obstetrics
- Bandwidth: 1.3-5.1 MHz (-20dB)
- Number of Elements: 128
- FOV (max): 61°
- Extended FOV: 101°
- Convex Radius: 60mm
- Physical Footprint: 76.5mm× 28mm
- Footprint: 64.9mm × 16.2mm
- B-mode Frequencies: 1.3-3.2, 1.9-4.6, 2.3-5.7 MHz
- Harmonic Frequencies: 3.5, 4.0, 5.0, 6.0 MHz
- Doppler Frequencies: 2.0, 2.5 MHz
- Biopsy Guide: NGB-022, available, multi angle, reusable

C6-2Gs
- Application: Interventional
- Bandwidth: 1.7-6 MHz (-20dB)
- Number of Elements: 128
- FOV (max): 92 °
- Extended FOV: 132°
- Convex Radius: 20 mm
- Footprint: 31.5mm×11.2mm
- B-mode Frequencies: 2.6-4.8, 3.6-6.4, 3.8-8.2MHz
- Harmonic Frequencies: 4.0, 4.5, 5.0MHz
- Doppler Frequencies: 2.5, 3.0MHz
- Biopsy Guide: NGB-024, available, multi angle, reusable

V11-3Ws
- Application: Gynecology, Obstetrics, Urology
- Bandwidth: 3-11.2 MHz (-20dB)
- Number of Elements: 160
- FOV (max): 173°
- Extended FOV: 180°
- Convex Radius: 11 mm
- Physical Footprint: 24.9mm ×21.8mm
- Footprint: 24mm×9mm
- B-mode Frequencies: 2.6-6.5, 3.2-7.9, 4.7-12.8MHz
- Harmonic Frequencies: 7.0, 8.0, 9.0MHz
- Doppler Frequencies: 4.4, 5.0MHz
- Biopsy Guide: NGB-004, available, single angle, reusable

C11-3s
- Application: Abdomen, Pediatrics, Transcranial, Vascular, Small parts, Musculoskeletal
- Bandwidth: 3-11.2MHz (-20dB)
- Number of Elements: 128
- FOV (max): 100°
- Extended FOV: 121°
- Convex Radius: 15mm
- Physical Footprint: 32.8mm×25mm
- Footprint: 27.4mm×8.4mm
- B-mode Frequencies: 2.6-6.5, 3.2-7.9, 4.7-12.8MHz
- Harmonic Frequencies: 7.0, 8.0, 9.0MHz
- Doppler Frequencies: 4.4, 5.0MHz
- Biopsy Guide: NGB-018, available, multi angle, reusable

D7-2s
- Application: Obstetrics, gynecology
- Bandwidth: 1.6-6.2 MHz (-20dB)
- Depth: 4.0-40cm
- Number of Elements: 128
- FOV (max): 71° X 70° (sweep)
- Extended FOV: 111°
- Convex Radius: 40mm
- Physical Footprint: 74mm × 49mm
- Footprint: 49mm × 14.15mm
- B-mode Frequencies: 2.6-4.8, 3.6-6.4, 3.8-8.2 MHz
- Harmonic Frequencies: 4.5, 6.0, 6.5 MHz

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M8 Elite Diagnostic Ultrasound System

Performance Specifications

- Doppler Frequencies: 2.5, 3.0, 4.0 MHz
- Biopsy Guide: None

Linear array

L10-3s
- Application: Vascular, Small Parts, Musculoskeletal, Nerve
- Bandwidth: 2.7-10.5MHz (-20dB)
- Number of Elements: 128
- Field of View (max): 34mm
- Steered Angle: ±6°/±12° (B Steer), ±10°/±20°/±30° (Color/PW Steer)
- Footprint: 9.0mm×39.0mm
- B-mode Frequencies: 3.6-8.4, 4.2-9.8, 4.8-11.0MHz
- Harmonic Frequencies: 7.0, 8.0, 9.0MHz
- Doppler Frequencies: 3.6, 4.4, 5.0MHz
- Biopsy Guide: not available

L12-4s
- Application: Small parts, Vascular, Pediatrics, Superficial, Musculoskeletal, Neurology
- Bandwidth: 3-13MHz (-20dB)
- Number of Elements: 192
- Field of View (max): 38mm
- Steered Angle: ±6°/±12°(B Steer), ±10°/±20° /±30° (Color/PW Steer)
- Physical Footprint: 45.7mm×10.9mm
- Footprint: 44.2mm×8.5mm
- B-mode Frequencies: 4.4-9.6, 5.4-11.5, 6.6-13.5MHz
- Harmonic Frequencies: 8.0, 9.0, 10.0MHz
- Doppler Frequencies: 4.4, 5.0, 5.7MHz
- Biopsy Guide: NGB-007 available, multi angle, reusable

L14-6Ns
- Application: Small parts, Vascular, Pediatrics, Superficial, Musculoskeletal, Neurology
- Bandwidth: 3.5-16 MHz (-20dB)
- Number of Elements: 192
- Field of View (max): 38mm
- Steered Angle: ±6°/±12° (B Steer), ±10°/±20° /±30° (Color/PW Steer)
- Physical Footprint: 45.7mm×10.9mm
- Footprint: 44.2mm×8.5mm
- B-mode Frequencies: 5.4-11.6, 6.0-12.6, 6.6-13.5MHz
- Harmonic Frequencies: 8.0, 10.0, 12.0MHz
- Doppler Frequencies: 5.0, 5.7, 6.6MHz
- Biopsy Guide: NGB-007, available, multi-angle, reusable

L16-4Hs
- Application: Musculoskeletal, Nerve, Vascular Surgery
- Bandwidth: 3.5-16 MHz (-20dB)
- Number of Elements: 128
- Field of View max): 25.3mm
- Footprint: 6mm×28.8mm
- B-mode Frequencies: 5.4-11.6, 6.0-12.6, 6.6-13.5MHz
- Harmonic Frequencies: 8.0, 10.0, 12.0MHz
- Doppler Frequencies: 5.0, 5.7MHz
- Biopsy Guide: not available

L14-6Ws
- Application: Breast, Small Parts, Musculoskeletal, Nerve
- Bandwidth: 3.5-16 MHz (-20dB)
- Number of Elements: 256
- Field of View (max): 50mm
- Steered Angle: ±6°/±12° (B Steer),±10°/±20° /±30° (Color/PW Steer)
- Physical Footprint: 59.1mm×12mm
- B-mode Frequencies: 4.8-10.6, 5.4-11.6, 6.6-13.5MHz
- Harmonic Frequencies: 8.0, 10.0, 12.0MHz
- Doppler Frequencies: 5.0, 5.7MHz
- Biopsy Guide: NGB-007, available, multi-angle, reusable

L20-5s
- Application: Small Parts, Musculoskeletal, Vascular, Nerve
- Bandwidth: 6-23MHz (-20dB)
- Number of Elements: 192
- Field of View (max): 28.7mm
- Steered Angle:
  - B: +/-6°, +/-12°;
  - C: +/-20°, +/-15°, +/-10°
  - PW: +/-30°, +/-20°, +/-10°
- Depth: .5-28cm
- Physical Footprint: 42.2mm × 22.1mm
- Footprint: 31.5mm × 4.5mm
- B-mode Frequencies: 6.0~12.6, 9.0~15.6, 11.5~23.0 MHz
- Harmonic Frequencies: 12.0, 14.0, 16 MHz
- Color Frequencies: 9.0, 11.0, 13.0, 13.0 MHz
- Doppler Frequencies: 9.0, 11.0, 13.0, 13.0 MHz
- Biopsy Guide: not available

Phased array

SP5-1s
- Application: Adult Cardiac, Transcranial, Adult Abdomen
- Bandwidth: 1.1-4.4MHz (-20dB)
- Number of Elements: 80
- Field of View (max): 90°
- Physical Footprint: 38.2mm×30.5mm
- Footprint: 23.4mm×15.2mm
- B-mode Frequencies: 1.0-3.5, 2.0-4.0, 2.5-5.0MHz
- Harmonic Frequencies: 3.0, 3.4, 3.8MHz
- Doppler Frequencies: 2.0, 2.3, 2.5MHz; TDI 3.0, 3.8MHz
- CW Frequency: 2MHz
- Biopsy Guide: NGB-011, available, multi angle, reusable

P10-4s
- Application: Neonatal Cardiac, Transcranial
- Bandwidth: 2.9-10.5MHz (-20dB)
- Number of Elements: 128
- Field of View (max): 90°
- Physical Footprint: 15.1mm×10.2mm
- Footprint: 15.0mm×9.1mm
- B-mode Frequencies: 3.2-6.8, 3.8-10.2, 4.6-11.4MHz
- Harmonic Frequencies: 7.5, 8.0, 9.0MHz
- Doppler Frequencies: 4.0, 5.0, 5.7MHz; TDI 5.7, 6.2MHz
- CW Frequency: 5MHz
- Biopsy Guide: not available

P7-3s
- Application: Pediatric abdomen, Pediatric cardiac, Neonatal cephalic, Neonatal abdomen, Neonatal cardiac
- Bandwidth: 2.0-8.0MHz (-20dB)
- Number of Elements: 96
- Field of View (max): 90°
- Physical Footprint: 34.0mm×24.5mm
- Footprint: 21.0mm×13.8mm

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M8 Elite Diagnostic Ultrasound System

Performance Specifications

- B-mode Frequencies: 2.3-5.4, 2.8-6.4, 3.3-7.2MHz
- Harmonic Frequencies: 6.0, 6.5, 7.0MHz
- Doppler Frequencies: 2.7, 3.3, 4.0MHz; TDI 5.0, 6.2MHz
- CW Frequency: 2.5MHz
- Biopsy Guide: not available

P7-3Ts
- Application: Transesophageal Echo
- Bandwidth: 1.9-8.2MHz (-20dB);
- Number of Elements: 64
- Field of View (max): 90°
- Physical Footprint: 14mm×12mm
- Footprint: 14mm×12mm
- B-mode Frequencies: 2.3-5.4, 2.8-6.4, 3.3-7.2MHz
- Harmonic Frequencies: 6.0, 6.5, 7.0MHz
- Doppler Frequencies: 2.7, 3.3, 4.0MHz; TDI 5.0, 6.2
- CW Frequency: 2.5MHz
- Biopsy Guide: not available

P8-3Ts
- Application: Pediatric Transesophageal Echo
- Bandwidth: 2.8-7MHz (-20dB);
- Number of Elements: 48
- Field of View (max): 90°
- Physical Footprint: 10.7mm×7.9mm
- Footprint: 10.7mm×7.9mm
- B-mode Frequencies: 2.3-5.4, 2.8-6.4, 3.3-7.2MHz
- Harmonic Frequencies: 6.0, 6.5, 7.0MHz
- Doppler Frequencies: 2.7, 3.3, 4.0MHz; TDI 5.0, 6.2
- CW Frequency: 2.5MHz
- Biopsy Guide: not available

CW probe

CW2s
- Application: Transcranial, Cardiac, Pediatrics
- Number of Elements: 2
- CW Frequency: 2.0MHz
- Biopsy Guide: not available

CW5s
- Application: Vascular
- Number of Elements: 2
- CW Frequency: 5.0MHz
- Biopsy Guide: not available

Peripheral Devices and Accessories (Option)

Probe extend module: PEM-51

One extend three probe ports

Black/white digital video printer

SONY UP-D897

MITSUBISHI P95DW-N

Color digital video printer

SONY UP-D25MD

Digital graph/text printer

HP Deskjet 1050 J410 series

HP OfficeJet7000 wide format

HP OfficeJet Pro 8100

Footswitch

USB port: 971-SWNOM (2-pedal/3-pedal)

USB port: FS-81-SP (1-pedal)

Support User-definable functions (Freeze, Save, Print)

Built-in Battery for Main Unit

Replaceable and rechargeable lithium battery

Full battery lasts more than 24h in standby mode

Empty battery recharged to full in 4h

Continuous work time: about 1.5 hour in B mode

Mobile Trolley

UMT-500Plus
- Power supply module
- External DVD R/W Storage
- Platform Height: 809-1059mm adjustable
- Built-in battery for trolley, continuous work time: about 2h in B mode

Barcode reader
- 1-D barcode reader: SYMBOL LS2208
- 2-D barcode reader: SYMBOL DS6707

System Inputs and Outputs

I/O Port

USB3.0: 2 ports

ECG: 1 port

HDMI: 1 port

Video/Audio Extend port

Video/Audio Extend module iDock51 (option)
- S-Video Output: 1 port
- VGA: 1 port
- Audio Output: 1 port

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

CE declaration

The M8 Elite system is fully in conformance with the Council Directive 93/42/EEC Concerning Medical Devices, as amended by 2007/47/EC. The number adjacent to the CE marking (0123) is the number of the EU-notified body that certified meeting the requirements of Annex II of the Directive.

NOTICE:

Not all features or specifications described in this document may be available in all probes 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.

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