



MS12 Technical Specifications

Digital Color Doppler Ultrasound System



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1 General Specifications

1.1 Applications

- Abdomen
- Cephalic
- OB/Gynecology
- Cardiology
- Peripheral vascular
- Small parts
- Musculoskeletal
- Transvaginal
- Transrectal

1.2 Available Probes

- Convex array probe
- Linear array probe
- Phased array probe

1.3 Imaging Modes

- B
- M
- Anatomical M
- ColorM
- CFM
- PDI/DPDI
- PW
- CW
- TDI
- TDI+PW
- TDI+M

1.4 Function and Configuration

- 5-band adjustable frequency in B mode (fundamental wave and harmonic wave)
- SNRT-scan
- Compound imaging
- LGC (8 bands)
- Tissue-specific index
- Image rotation
- Widescan
- HPRF
- Simultaneous mode (Triplex)
- PW auto trace
- Auto IMT
- Scr-ZoomB-modeode panoramic imaging
- Biopsy guide
- Vis-needle
- ECG

- SR Flow
- Show gallery
- M-help
- Standby mode
- Auto Pleural Line
- Auto B Line
- Lung Mode

1.5 Available Languages

- Software: English, Simplified Chinese, Spanish, Russian, French, Italian, German and Polish
- Key panel: English, Simplified Chinese, Spanish, Russian, French, Italian, German and Polish
- User manual: English, German, French, Portuguese and Spanish

2 Physical Specifications

2.1 Size and Weight

- Size: approx. 378 mm (W) × 352 mm (H) × 114 mm (D)
- Weight: approx. 6.5 kg (including battery)

2.2 Monitor

- 15.6-inch medical high-resolution monitor
- Resolution: 1920*1080
- Viewing angle: 178°(horizontal), 178°(vertical)
- Up/down angle: 0° to 45°

2.3 Control Panel

- User-oriented design
- Backlight design: panel buttons
- Multiple defined-keys
- TGC: 8 segment sliders
- Trackball sensitivity: adjustable
- Keyboard on the control panel

2.4 Speaker

Hi-Fi Speaker

2.5 Probe Port and Probe Holder

- Probe port: 2
- Probe holder: 3

2.6 Trolley

- Model: ST-200
- Width: approx. 455 mm
- Depth: approx. 610 mm

- Height: approx. 780 mm (adjusted to the lowest position)
- Lifting height: 0 - 100 mm, 3 levels
- Casters
 - ✓ Diameter: 5 inch
 - ✓ Specification: all the 4 casters can be independently locked
- Front handle: 1
- Cable hanger: 1
- Document basket: 1
- Printer compartment: 1

2.7 Electrical Specifications

- Power supply: 100 - 240V~, 1.5 - 0.75A
- Frequency: 50/60 HZ
- Power output: 180VA

2.8 Working Environment

- Temperature: 0°C to +40°C
- Relative humidity: 30% - 85% RH (no condensation)
- Atmospheric pressure: 700 hPa - 1060 hPa
- System noise: ≤ 55 dB

2.9 Storage and Transportation Environment

- Temperature: -20°C to +55°C
- Relative humidity: 20% - 90% RH (no condensation)
- Atmospheric pressure: 700 hPa - 1060 hPa

3 Annotation and Body Mark

- Annotation can be selected and input in the library
- All exam applications included
- Annotation: text annotation and arrow annotation
- Annotation can be edited and arranged
- User-defined annotation
- Text font size and arrow size: adjustable
- Body marks: ≥ 165 selectable
- Body marks are classified by specific exam types, and position is adjustable

4 Monitor Information

- Manufacturer logo
- Hospital name
- System date and time
- Probe and exam item
- MI and TIS

- Operator
- Patient ID, name and date of birth
- Tissue temperature display (specified probe)
- Depth scale and focus position
- Image parameter
- Thumbnail
- Clipboard
- Screen saver

5 Image Parameter

5.1 Description

- System boot up: approx. ≤32 s
- System shut down: approx. ≤17 s
- Grayscale: 256 levels
- Transducer element: up to 128
- Volume: 0 - 100%, 10 levels, 10% each step

5.2 B mode

- Gain: 0 - 255 adjustable
- Scan depth: ≥ 40 cm
- Compound imaging: Off, 1, 2, 3, 4 adjustable, 5 levels
- Frequency: 5 bands adjustable (fundamental wave and harmonic wave)
- Chroma: Off and 12 types selectable, 13 levels
- μScan: Off, 1, 2, 3, 4, 5, 6 levels
- Line density: Min, Low, Med, High, Max, 5 levels for high density probe; Low, Med, High, 3 levels for general probe
- Persistence: Off, Low, Med, High, Max, 5 levels
- Focus: focus position and range adjustable, 21 levels adjustable; 1 represents single focus and 2 - 21 represent focus span control.
- Dynamic range: 20 - 320
- Gray map: 1 - 16, 16 levels
- Power%: 1 - 100% adjustable, 5% each step
- TSI: adipose, muscle, fluid tissue and normal tissue, 4 levels
- TGC: 8 segment sliders
- LGC: 8 bands adjustable
- Image reverse: left/right, up/down
- Rotation, 0°, 90°, 180°, 270°, 4 levels
- Sector width: 5 levels adjustable
- B steer: 0, ±2°, ±4°, ±6°, 7 levels, linear array image steer
- Widescan: On/Off (linear and convex array probe)

- Auto optimization

5.3 M Mode

- Gain: 0 - 255 adjustable, 5 each step
- Chroma: 13 levels
- Display format: FULL, H1/1, V1/2, V1/1, V2/1
- Sweep speed: Min, Slow, Med, Fast, Max, 5 levels
- Power%: 1% - 100% (associated with B mode)
- Mode: CFM + M, TDI + M

5.4 Anatomical M-mode

- Gray map: 1 - 16, 16 levels
- Chroma: 13 types selectable
- Display 3 sample lines simultaneously
- Angle and position of sample lines adjustable

5.5 CFM Mode

- Gain: 0 - 255 adjustable, 5 each step
- Power%: 1 - 100%, 5% each step
- B reject: 0 - 255 adjustable, 17 each step, 16 levels
- Size and position of color ROI: adjustable
- Image reverse: up/down, left/ right
- Invert: On/Off
- Frequency: 3 levels adjustable
- Wall filter: Min, Low, Med, High, Max, 5 levels
- PRF: 0.5 - 10 KHz (probe dependent)
- Line density: Min, Low, Med, High selectable, 4 levels
- Color map: 6 types of color Doppler selectable
- Baseline: 9 levels
- Persistence: Off, Low, Med, High, Max selectable, 5 levels (probe dependent)
- ROI steer: 0, $\pm 8^\circ$, $\pm 12^\circ$, $\pm 16^\circ$ adjustable (linear array probe)
- Auto optimization

5.6 PDI/DPDI Mode

- Power%: 1 - 100%, 5% each step
- B reject: 0 - 255, 17 each step, 16 levels
- Persistence: Off, Low, Med, High, Max selectable, 5 levels (probe dependent)
- Color map: 1 - 7 adjustable, 7 levels
- Image reverse: up/down, left/right
- Wall filter: Min, Low, Med, High, Max, 5 levels

5.7 PW Mode

- Power%: 1 - 100%, 5% each step

- Gain: 0 - 255 adjustable, 5 each step
- Display format: FULL, H1/1, V1/2, V1/1, V2/1, 5 levels
- Simultaneous mode (Triplex)
- PW sample volume: 0.5 - 24.0 mm
- PW sample position: adjustable
- Invert: On/Off
- Quick angle correction: 0° , 60° , -60°
- Angle correction range: -88° to 88° , 2° each step
- Steer angle: 0, $\pm 8^\circ$, $\pm 12^\circ$, $\pm 16^\circ$ adjustable (linear array probe)
- Doppler auto trace: achievable in real-time mode and frozen mode
- Baseline: 9 levels selectable
- Frequency: 3 levels adjustable
- Wall filter: Min, Low, Med, High, Max, 5 levels
- PRF: 1 - 16 KHz
- HPRF
- Max. velocity range: 0 - 12.3 m/s (3P-A, PRF=16 KHz, $\theta=60^\circ$, frequency= 2.0 MHz, the lowest baseline)
- Sweep speed: Min, Slow, Med, Fast, Max, 5 levels
- Chroma: 13 types selectable

5.8 CW Mode

- Power%: 1 - 100%, 5% each step
- Gain: 0 - 255 adjustable, 5 each step
- Display format: FULL, H1/1, V1/2, V1/1, V2/1, 5 levels
- CW sample position: adjustable
- Invert: On/Off
- Angle correction range: -88° to 88° , 2° each step
- Doppler auto trace: achievable in real-time mode and frozen mode
- Baseline: 9 levels selectable
- Wall filter: Min, Low, Med, High, Max, 5 levels
- PRF: 1 - 50 KHz (3P-A probe)
- Max. velocity range: 0 - 42.7 m/s (3P-A, PRF=50 KHz, $\theta=60^\circ$, frequency=1.8 MHz, the lowest baseline)
- Sweep speed: Min, Slow, Med, Fast, Max, 5 levels
- Chroma: 13 levels

5.9 TDI Mode

- Tissue speed imaging and tissue Doppler power imaging
- Power%: 1 - 100%, 5% each step
- Frequency: 3 levels adjustable
- PRF: 0.5 - 10 KHz
- Flow reject: 0 - 255, 17 each step, 16 levels
- Line density: Low, Med, High selectable, 3 levels
- Color map: 1 - 5 for tissue speed map, 6 -10 for tissue Doppler power map, 10 levels
- Color baseline adjustment: 9 levels adjustable
- Size and position of color ROI: Adjustable
- Invert: On/Off

5.10 TDI+PW Mode

- PRF: 0.5 - 4.5 KHz
- Max velocity range: 0 - 3.2 m/s (3P-A, PRF=4.5 KHz, $\theta=60^\circ$, the lowest baseline, SVD=0.1 cm, FRQ=2.4 MHz)

5.11 TDI+M Mode

- Gain: 0 - 255 adjustable, 5 each step
- Chroma: 13 levels
- Display format: FULL, H1/1, V1/2, V1/1, V2/1, 5 levels
- Sweep speed: Slow, Med, Fast, Max, 4 levels

5.12 Panoramic Imaging

- Available probes: L741, 3C-A, C613, EC9-5, 10I2, C322, 9L-A
- B mode panoramic imaging
- Rotation: 180° to -180°
- Zoom ratio: 8.0 times
- Maximum available length: 1000 mm

5.13 Biopsy Guide

- Biopsy line angle: adjustable
- Biopsy line dot size: adjustable
- Biopsy line angle calibration
- Biopsy line offset calibration
- Biopsy line calibration parameter storage and loading default
- User-defined biopsy line angle

5.14 Vis-needle

- Available probe: L741, 10I2
- Steer angle: 20° to 50° , 10° each step, 4 levels
- Biopsy depth: adjustable

- Dual live

5.15 Widescan

- Widescan: Off, On
- Available probe: linear array probe, convex array probe

5.16 Zoom

- Zoom ratio: 0.8 - 10.0
- Scr-Zoom
- HD Zoom

5.17 M-help

- Applications: Liver, Kidney, Spleen, Biliary system, Uterine adnexa, Obstetrics, Cardiac, Artery and Vein, Thyroid, Breast and Prostate and testicle
- Available for 82 slices
- Available for probe position, slice figure and ultrasound image display
- User defined key

5.18 Preset Exam

- Preset optimal exam mode and parameter for different probes and exam types
- Preset order: adjustable
- Import or export preset
- After normal update, the preset parameters are not cleared.

6 Measurement/Analysis and Report

6.1 Measurement Settings

- BSA setting: Eastern, Western
- Cross cursor size: Large, Medium, Small
- Measure line size: Large, Medium, Small
- Distance dash line display: On, Off
- Velocity cross line display: On, Off
- Ellipse cross line display: On, Off
- Line ID display: On, Off
- Keep result window: On, Off
- Result font size: Large, Medium, Small
- Result position: Top Right, Top Left, Bottom Left, and Bottom Right adjustable in 2D or M+D mode
- Pleural line color: Blue, Yellow
- Pleural line thickness: On, Off
- Display B line Dist result: On, Off

6.2 Application-specific Measurement Package

- Obstetrics measurement package
- Small parts measurement package
- Gynecology measurement package
- Vascular measurement package
- Abdominal measurement package
- Cardiac measurement package
- Urology measurement package
- Pediatrics measurement package

6.3 Report

- Application-specific measurement report
 - ✓ Fetal growth curves
- Measurement values: editable
- Value method: single value switch achievable
- Image insertion
- Report preview
- Report logo (170 x 60 Pixel, bmp): changeable
- Report font size and color settings
- Background color settings
- Display item settings
- Export format: TXT, PDF, HTML

6.4 Auto Measurement

Auto IMT

7 Storage and Data Management

7.1 Storage

- 250G solid-state disk
- Hard disk storage: 1T (optional)
- 2D cine storage time setting:
 - ✓ Retrospective storage: 1 - 120 s
 - ✓ Prospective storage: 1 - 480 s
 - ✓ Freeze storage: 1 - 170 s

7.2 Data Management

- Image sharing service (Samba)
- Export data to USB drive or DVD
- Export format:
 - ✓ System format
 - ✓ PC format
 - ✓ Image format: BMP, JPG, TIF
 - ✓ Cine format: AVI, WMV
 - ✓ Report format: PDF, TXT, HTML
 - ✓ DICOM format
- Clipboard: thumbnail display, delete, export

- Create exam, activate exam, resume suspended exam
- Query/Retrieve service
- Review current exam and history exam
- Post-processing and post-measurement
- Backstage storage: quick switch of DICOM cine

8 Cine Review

- Cine review: frame by frame manual play and auto play with adjustable speed
- Skip from first frame to last frame
- Auto play by using trackball

9 System Input and Output

9.1 I/O Port

- USB port
 - ✓ USB 3.0: 3
- Video output port: 3
 - ✓ VIDEO OUT
 - ✓ S-VIDEO OUT
 - ✓ HDMI OUT
- AUDIO output port: 1
 - ✓ AUDIO OUT
- Foot switch input: 1
- Ethernet port: 1
- Video print port: 1
- Headphones port: 1
- MIC port: 1
- ECG port: 1
-

9.2 Network Connection

- Local network
 - ✓ Local network: Enable/Disable
 - ✓ DHCP or static IP
 - ✓ Static IP: IP, netmask and default gateway settings
 - ✓ MAC address check
- Ping IP Address
- Wireless network
 - ✓ Wireless network: Enable/Disable
 - ✓ Authentication method: WEP, WPA-PSK, WPA-EAP
 - ✓ DHCP or static IP
 - ✓ Static IP: IP, netmask and default gateway settings
 - ✓ MAC address check

10 DICOM 3.0

- DICOM storage
- DICOM structured report
 - ✓ Gynecology structured report
 - ✓ Obstetrics structured report
 - ✓ Cardiology structured report
 - ✓ Vascular structured report
- DICOM storage commitment
- DICOM Worklist
- DICOM MPPS
- DICOM print
- DICOM Q/R list

11 Probe

11.1 Convex Array Probe

- 3C-A
 - ✓ Application: Abdomen, Gynecology and Obstetrics
 - ✓ Frequency range: 1.0 - 7.0 MHz
 - ✓ Central frequency: 3.2 MHz
 - ✓ Curvature radius: 50 mm
 - ✓ Transducer element: 128
 - ✓ Acoustic lens: 60 mm × 18 mm
 - ✓ Biopsy bracket: NGB3C-A, 12°/16.5°/22.5°/33.5°, disinfectable
 - ✓ Field of view: 60°
 - ✓ Widescan: 15°
 - ✓ Depth: ≥ 40 cm
- C613
 - ✓ Application: Cardiology, Abdomen and Pediatric Cardiology
 - ✓ Frequency range: 4.0 - 13.0 MHz
 - ✓ Central frequency: 6.0 MHz
 - ✓ Curvature radius: 14 mm
 - ✓ Transducer element: 128
 - ✓ Acoustic lens: 30 mm × 10 mm
 - ✓ Biopsy bracket: NGBC613, 12°/18°/30°, disinfectable
 - ✓ Field of view: 92°
 - ✓ Widescan: 15°
 - ✓ Depth: ≥ 15 cm
- 6V1
 - ✓ Application: Gynecology
 - ✓ Frequency range: 3.0 - 15.0 MHz
 - ✓ Central frequency: 6.0 MHz
 - ✓ Curvature radius: 11 mm
 - ✓ Transducer element: 128
 - ✓ Acoustic lens: 32 mm × 10 mm
 - ✓ Biopsy bracket: NGB6V1, 3°, disinfectable
 - ✓ Field of view: 135°
 - ✓ Widescan: 15°
 - ✓ Depth: ≥ 15 cm
- EC9-5
 - ✓ Application: Prostate

- ✓ Frequency range: 3.0 - 15.0 MHz
- ✓ Central frequency: 6.0 MHz
- ✓ Curvature radius: 8 mm
- ✓ Transducer element: 128
- ✓ Acoustic lens: 27 mm × 10 mm
- ✓ Biopsy bracket: NGBEC9-5, 1.5°, disinfectable
- ✓ Field of view: 146°
- ✓ Widescan: 15°
- ✓ Depth: ≥ 15 cm

- 6CT-A

- ✓ Application: Abdomen
- ✓ Frequency range: 3.0 - 15.0 MHz
- ✓ Central frequency: 5.0 MHz
- ✓ Curvature radius: 40 mm
- ✓ Transducer element: 128
- ✓ Acoustic lens: 35 mm × 9 mm
- ✓ Field of view: 44°
- ✓ Widescan: 15°
- ✓ Depth: ≥ 20 cm

- C322

- ✓ Application: Abdomen
- ✓ Frequency range: 2.0 - 7.0 MHz
- ✓ Central frequency: 3.5 MHz
- ✓ Curvature radius: 20 mm
- ✓ Transducer element: 72
- ✓ Acoustic lens: 32 mm × 11 mm
- ✓ Field of view: 68°
- ✓ Widescan: 15°
- ✓ Depth: ≥ 30 cm

11.2 Linear Array Probe

- L741

- ✓ Application: Peripheral Vascular, Superficial and Small Parts
- ✓ Frequency range: 4.0 - 16.0 MHz
- ✓ Central frequency: 7.5 MHz
- ✓ Transducer element: 128
- ✓ Acoustic lens: 49 mm × 10 mm
- ✓ Biopsy bracket: NGBL741, 45°/55°/63°, disinfectable
- ✓ Width of view: 46 mm
- ✓ Depth: ≥ 11 cm
- ✓ B steer: 0°/±2°/±4°/±6°, 7 levels
- ✓ ROI/sample line steer: 0°/±8°/±12°/±16°
- ✓ Widescan: 10°

- 9L-A

- ✓ Application: Peripheral Vascular, Superficial and Small Parts
- ✓ Frequency range: 2.0 - 13.0 MHz
- ✓ Central frequency: 6.0 MHz
- ✓ Transducer element: 128
- ✓ Acoustic lens: 42 mm × 9 mm
- ✓ Biopsy bracket: NGB9L-A, 38°/47°/59°, disinfectable
- ✓ Width of view: 35 mm
- ✓ Depth: ≥ 11 cm
- ✓ B steer: 0°/±2°/±4°/±6°, 7 levels
- ✓ ROI/sample line steer: 0°/±8°/±12°/±16°

- ✓ Widescan: 10°
- 10I2
 - ✓ Application: Peripheral Vascular, Superficial and Small Parts
 - ✓ Frequency range: 4.0 - 16.0 MHz
 - ✓ Central frequency: 7.5 MHz
 - ✓ Transducer element: 96
 - ✓ Acoustic lens: 28 mm × 10 mm
 - ✓ Width of view: 25 mm
 - ✓ Depth: ≥ 11 cm
 - ✓ B steer: 0°/±2°/±4°/±6°, 7 levels
 - ✓ ROI/sample line steer: 0°/±8°/±12°/±16°
 - ✓ Trapezoid imaging: 10°
- 12L-B
 - ✓ Application: Peripheral Vascular, Superficial and Small Parts
 - ✓ Frequency range: 3.0 - 17.0 MHz
 - ✓ Central frequency: 8.0 MHz
 - ✓ Transducer element: 192
 - ✓ Width of view: 38 mm
 - ✓ Depth: ≥ 11 cm
 - ✓ B steer: 0°/±2°/±4°/±6°, 7 levels
 - ✓ ROI/sample line steer: 0°/±8°/±12°/±16°

11.3 Phased Array Probe

- 3P-A
 - ✓ Application: Cardiology
 - ✓ Frequency range: 1.0 - 6.0 MHz
 - ✓ Central frequency: 2.7 MHz
 - ✓ Transducer element: 64
 - ✓ Acoustic lens: 25 mm × 16 mm
 - ✓ Field of view: 90°
 - ✓ Depth: ≥ 30 cm
- 7P-B
 - ✓ Application: Pediatric Cardiology
 - ✓ Frequency range: 2.0 - 9.0 MHz
 - ✓ Central frequency: 4.5 MHz
 - ✓ Transducer element: 96
 - ✓ Acoustic lens: 21 mm × 12 mm
 - ✓ Field of view: 90°
 - ✓ Depth: ≥ 20 cm

11.4 Other Probes

- CWD2.0
 - ✓ Application: Cardiology and Vascular
 - ✓ Central frequency: 2.0 MHz
 - ✓ Transducer element: 2

12 Accessories

12.1 Printer

- Printer types
 - ✓ Color ink jet printer
 - ✓ B/W video printer
 - ✓ Color video printer
- Print type

- ✓ Video print
- ✓ USB print
- ✓ Windows print
- Add printer

12.2 Foot Switch

- 2 pedals
- USB port and round port connection
- User-defined short-cut keys

12.3 USB Bar Code Scanner

- Bar code scanning input
- Bar code scanning search

12.4 External DVD

- Export patient data to DVD
- Import patient data from DVD

12.5 Built-in Battery

- Normal battery ≥ 90 min
- Large capacity battery ≥ 180 min

13 Safety and Certification

- Comply with:
 - ✓ IEC 60601-1, Class I BF
 - ✓ IEC 60601-1-2, Group 1, Class B
 - ✓ IEC 60601-2-37

NOTE:

- The specifications of this system may change without any prior notification.
- Some products or features may not be available in some countries.
- Please contact your local Medisono sales representative for more information.