System Description

The M7/M7T is an ergonomically designed portable and ease-of-use machine for multi-specialty use like adults, pregnant women, pediatric patients and neonates. It is intended for use in abdominal, gynecology, obstetrics, peripheral vascular, small parts, urological, cardiac, anesthesia, emergency, ICU/CCU, pediatrics and neonates, transcranial (neonatal cephalic), first aid, interventional, MSK, athletic medical treatment and intraoperative exams.

Dimensions and Weight

- Width: 361mm (14.21 inch)

- Depth: 357mm (14.06 inch)

- Height: 75mm (2.95 inch)

- Weight: approx. 6.5kg (including batteries and 4D board, without power adapter)

Electrical Power

- **AC adapter input**

  - Voltage
    100-240V~ (AC adapter)
    220-240V～, 50/60Hz (Configured with UMT-300 Mobile Trolley)
  - Frequency: 50/60Hz
  - Input power
    1.5- 0.6A (AC adapter)
    600 VA (configured with UMT-300 Mobile Trolley)

- **AC adapter output:**
  - Voltage: 12V ⎓
  - Output current: 10A

- **Battery**
  - Lithium-Ion Battery Pack: 11.1V ⎓ , 4500mAh

Operating Environment

- Ambient temperature: 0°C ~ 40°C

- Relative humidity: 30% ~ 85% (no condensation)

- Atmospheric pressure: 700 hPa ~ 1060 hPa

Storage & Transportation Environment

- Ambient temperature: -20°C ~ 55°C

- Relative humidity: 30% ~ 95% (no condensation)

- Atmospheric pressure: 700 hPa ~ 1060 hPa

Transducer Type and Scanning Methods

- **Transducer Types**

  - Linear Array transducer
  - Phased Array Transducer
  - Convex Array Transducer
  - 4D Volume Transducer

- **Scanning Methods**

  - Electronic convex
  - Electronic linear
  - Electronic sector

System Introduction

M7 is with the total quality Magnesium alloy shell. It can provide maximum shock protection for system.

- **System Boot**

  - System Boot Time: 50s (Depend on the Configuration)
  - System Boot Time(From Standby mode):12s (Depend on the Configuration)

- **Monitor**

  - 15 inch LCD, High-Resolution Monitor. Max Resolution:1024 X 768
  - Brightness adjustment
  - Screen Saver
  - Open Angle adjustable: 150° (The angle between the monitor and control panel)

- **Control Panel**

  - Power/Battery Indicator
  - Alphanumeric Keys
  - Function Keys
  - Knobs
  - Ergonomic Soft Key Operation
  - Backlight Keys
  - 8 Segment TGC
  - Blank Keys for User-Defined Functions
  - Trackball: color and Sensitivity Adjustment
  - Brightness adjustment
  - Integrated Speakers, Audio Volume Adjustment

- Handle

- Transducer port

  1 port connects to a transducer or the probe extend module.

- Transducer locking lever

- Power input port

  1 port connect to the power adapter

- I/O(Input/Output) Extend Port

  1 port connect to the I/O Extend Module

- Probe Extend Module (option)

  Model: PEM-21

  The standard transducer in the main unit extends to three ports by the probe extend module.

  The probe extend module need the UMT-300 with the power module when use the 4D probe.

- I/O Extend Module(iDoc^{TM}, option):

  Model: IOM-21

  Apply the additional input and out ports. Including:

  - 2 USB Port
  - 1 ECG Port
  - 1 Serial Port
  - 1 Audio Output Port: Left/Right
  - 1 Mic In port (Connect to the Microphone)
  - 1 Remote Control Port
  - 1 Composite Video Output Port
  - 1 DVI-I (Digital Video Interface-Integrated) Output Port

- V/A Extend Module (option)

  Model: VAM-21

  Connect to the USB port and apply the additional Video and Audio input ports. Including:

  - Audio Input Port Left/Right
  - Composite Video Input Port
  - Separate Video Input Port

- ECG module (option)

  Model: ECG-21

  Connect to the I/O (Input/Output) Extend Port and apply the ECG function.

  - ECG Lead port
  - Connection port: to connect to I/O extend module

- Should be configured with I/O extend module
- USB Port: 2
- Ethernet Port : Connect to the network
- S-Video Separate Video Output
- External Wireless Ethernet adapter Support
- Mobile Trolley:
  - UMT-200
  - UMT-300

    15-inch Extra LCD Display (Option)
    Power supply module (Option)
    External DVD R/W Storage (Option)

Peripherals Supported

M7 support the following peripheral equipments.

- Black / White Video Printer (Digital)
  - SONY UP-D897
  - MITSUBISHI P93DC
  - MITSUBISHI P95DW-N
- Color Video Printer (Digital):
  - SONY UP-D23MD
- Graph / Text Printer
  - HP Deskjet ^{TM}D2568
  - HP OfficeJet ^{TM}J3600   (HP Officejet ^{TM}J3608 All-in-One)
  - HP Color LaserJet ^{TM}CM1015

Mindray only support the following peripheral equipments as the option.

  - SONY UP-D897
  - MITSUBISHI P93DC

System Application

M7 can provide a variety of clinical applications, and add new applications easily. In every application, user can choose a variety of exam modes. These applications including:

- Abdomen
- Obstetrics
- Gynecology
- Cardiology
- Small Parts
- Urology

- Vascular
- Pediatrics
- Nerve
- EM (Emergency)

Imaging Features

- Octal beam-former
- System scanning depth
  - Minimum: 18mm (Probe Dependent)
  - Maximum: 388mm(Probe Dependent)
- Gray scale Level:256
- The Max. system frame rate
  - B mode: ≥640 (Probe Dependent)
  - Color mode: ≥360(Probe Dependent)
- System processing channels: 2048
- System dynamic range: ≥160dB ，A/D 12Bit
- Maximum frame rate in 4D reaches 30 volumes/s
- System Focusing:
  - Transmission: 8 Steps
  - Reception：Continuous
- The System Focus Number: 1 – 16 adjustable
- The System Focus Positions: 16 Max. adjustable
- The Max. PRF (Pulse Repeat Frequency , Probe dependent)
  - Color mode: 14.3kHz
  - PW mode: 24kHz
  - CW mode: 160kHz
- The Max. Flow Velocities (Transducer dependent)
  - Color mode: 226cm/s
  - PW mode: 462cm/s
  - CW mode: 3080cm/s
- The Max.WF (Wall Filter, 1-7 levels adjustable)
  - Color mode: 7707Hz
  - PW mode: 6600Hz
  - CW mode: 44000Hz
- Magnification factor：
  - Spot: 1-10 Times
  - Pan: 1-10 Times Frame compare

Imaging Mode

- B-Mode
  - Fundamental Imaging
  - Tissue Harmonic Imaging
  - Phase Shift Harmonic Imaging

- M –Mode
  - M-Mode
  - Free Xros M(Anatomical M) with Max.3 sampling lines
  - Color M Mode (CM)
- Color Doppler Imaging
- Power Doppler Imaging
  - Power Doppler Imaging
  - Dir-Power Doppler Imaging
- Spectrum Doppler
  - PWD (Pulse Wave Doppler)
  - HPRF (High Pulse Repetition Frequency)

Display Mode
  - Single Window
  - Dual-Split
  - Quad-Split
  - Dual Live
  - Triplex Live

Special Imaging Technique and Functions
- B Steer for linear transducer.
- ExFOV Imaging: Extend imaging for convex transducer
- Trapezoid imaging for linear transducer
- TDI (Tissue Doppler imaging)
  - TVI (Tissue Velocity Imaging)
  - TEI (Tissue Energy Imaging)
  - TVD (TDI-PW)
  - TVM (Tissue Doppler Velocity M Mode)
- Free Xros CM (Curved Free Xros M Mode) (TDI is necessary, Option)
- TDI Quantitative Analysis Package：Provide the quantitative tools to evaluate the movement state of the myocardium
- Smart 3D (Freehand 3D) (Option)
  Rendering Mode: Surface, Mix, Min,X-Ray, Inversion,
  3D Navigation: Wire Cage
- 4D module (Volume transducer is necessary, Option)
  Rendering Mode: Surface, Mix, Min, X-Ray, Inversion which are all with wire cage. (4D Navigation)
- Static 3D (4D module is necessary, Option)
  Rendering Mode: Surface, Mix, Min, X-Ray, Inversion which are all with wire cage (3D

Navigation)

- iScape™(Option)

  Panoramic view imaging function in all type transducers. Maximum iScape™ imaging length: 110cm (Transducer dependent)

- iBeam™ (Spatial compounding imaging for linear and convex transducers)

- iClear™: (Adaptive speckle suppression imaging for all probes)

- iTouch™ (Instant image optimization technology in B/PW/ CW/Color/TDI mode+ Auto TGC)

- TSI (Tissue Specific Imaging)

- iZoom™

  Intelligent high quality real-time image zoom in function.

  (Zoom in the image area only for full screen; zoom in the image area with the image parameters for full screen)

- Multi-frequency probes for 2D and Doppler imaging mode

System Language

- Software display and keyboard input available:

  - Chinese/English/German/Spanish/French/Italian /Portuguese/Russian/Czech/Polish

- Keyboard input available only:

  - Icelandic/Norwegian/Swedish/Finnish/Turkish/ Danish

- Control panel overlay available:

  - Chinese/German/Spanish/French/Italian/Portuguese/Russian/Czech/Polish

- Operation manual available:

  - Chinese/English/German/Spanish/French/Italian /Portuguese/Russian

System Configuration

- **Standard Configuration**
  - High resolution 15 inch LCD Monitor
  - B Mode
  - M Mode
  - PWD (Pulse Wave Doppler)
  - HPRF (High Pulse Repeat Frequency)

- Color Doppler Imaging
- Power Doppler Imaging
- Directional Power Doppler Imaging
- Tissue Harmonic imaging
- Phase Shift Harmonic Imaging
- Trapezoid Imaging
- iBeam™
- iTouch™
- iStation™
- 320G Integrated Hard Disk
- Multi-language screen display and control panel overlay
- DVD-RW
- Net Storage Function

  Have the capability to direct transfer data through a network cable to PC or another M7 system. No special software dependent.

- Travelling case

- **Options**
  - External USB DVD-RW: SE-S224Q
  - I/O extend module: IOM-21
  - Probe extend module: PEM-21
  - V/A extend module: VAM-11
  - ECG module: ECG-21
  - ECG lead
  - Footswitch:

    971-SWNOM (2-pedal)

    SP-997-350 (3-pedal)

  - Mobile trolley
    - ✓ UMT-200

      Weight: 21kg, Width: 470mm, Depth: 657mm,

      Height selective (not available after installed)

      Platform: 810-870mm

      Handle position: 890-950mm

    - ✓ UMT-300

      Without LCD module (with power module and DVD):

      Weight: 43kg, Width: 514mm,Depth: 653mm

      Height: 855-1015mm

      With LCD module (with power module and DVD):

      Weight: 52kg Width: 514mm Depth:

653mm

Height: 1550-1830mm

Platform height (adjustable): 855-1010mm

- Pack
- Handbag
- Dust-Proof Cover
- Battery Pack (LI23I001A)
- Wireless Ethernet adapter
- Transducers
- Needle-guided brackets
- iClear™
- CWD (Continuous Wave Doppler)
- iScape™ Module
- Free Xros M (Anatomical M)
- Smart 3D Module
- 4D Module(Including: Static 3D, Volume Transducer is necessary)
- IMT (Intima-Media Thickness)
- TDI(Tissue Doppler imaging) Module (Including: TVI,TEI,TVM)
- Free Xros CM (Curved Anatomical M-Mode, TDI is necessary)
- TDI Quantitative Analysis(TDI Module is necessary)
- Abdominal Package (Including related exam mode, comments, measurements, body marks and report)
- Obstetrical Package (Including related exam mode, comments, measurements, body marks and report)
- Gynecological Package (Including related exam mode, comments, measurements, body marks and report)
- Cardiac Package (Including related exam mode, comments, measurements, body marks and report)
- Small Parts Package (Including related exam mode, comments, measurements, body marks and report)
- Urological Package (Including related exam mode, comments, measurements, body marks and report)
- Vascular Package (Including related exam mode, comments, measurements, body marks and

report)
- Pediatric Package (Including related exam mode, comments, measurements, body marks and report)
- Nerve Blocks Package (Including related exam mode, comments, measurements, body marks and report)
- Emergency Medicine Package (Including related exam mode, comments, measurements, body marks and report)
- DICOM Basic Function Module (Including: task management, DICOM storage, DICOM print, DICOM,Storage commitment, DICOM media storage (including DICOM DIR), etc.)
- DICOM Worklist
- DICOM MPPS
- DICOM OB/GYN structured report
- DICOM vascular structured report
- DICOM cardiac structured report
- DICOM Query/Retrieve

Display Annotations

- Manufacturer logo
- Hospital name
- Exam date
- Exam time
- Acoustic output indices: MI, TIC, TIS, TIB
- Freeze icon
- Gender
- Age
- ID
- Name
- Transducer model
- Current exam mode
- ECG icon
- Accession
- Operator
- Menu
- Image
- ECG trace
- Transducer orientation mark
- Time line
- Coordinate axis, including depth, time, velocity/frequency
- TGC curve

- Focus
- Comment
- Body Mark
- Measure caliper
- Gray/ Color scale bar
- Thumbnail
- Cine icon
- Trackball functionality status icon
- Help information
- Soft Menu
- Status icons
- Biopsy guideline
- Measure result window
- Image parameters

Comments and Body Mark

- Comment
  - Text comment
    Comment text (Vary by Option), including:
    Abdomen
    OB
    Cardiology
    GYN
    Vascular
    Urology
    SMP
    Pediatrics
    Nerve blocks
    EM
  - User-Defined Comments
    Add & Delete
  - Arrow
    Arrow size adjustable
    Arrow position adjustable
    Arrow orientation adjustable
  - Trace
    Control panel operation (Track ball)
  - Body Mark
    In M7 system, amount and type of the Body Mark are related with the application package.
  - Application package (Option)
    Abdomen
    OB
    Cardiology
    GYN

Vascular
Urology
SMP
Nerve Blocks
EM
- User-defined
New
Copy
Export
Load
Delete
Edit

Storage and Connectivity

- iStation^{TM} (Intelligent Patient Data Management Unit)
  - Integrated search engine for patient data.
  - Detailed patient information view
  - Intelligent data backup/restore
  - Patient data/image sending
  - Patient data delete
  - Exam managing: create new exam, activate exam and continue exam
  - Recycle Bin
  - Patient task management
- 320G Integrated Hard Disk (DVD+R, DVD+RW, CD-R, CD-RW, DVD-R, DVD-RW)
- External DVD-R/W (Optional)
- USB ports
- Image archive on Hard Disk and DVD, temporary saving in cine memory
- Cine loop
  Real-time save to hard disk
  Retrospective (1-120s, or 1-120 cycles, presettable);
  Prospective (1-120s, or 1-120 cycles, presettable)
- Thumbnail
- Single image formats: BMP, JPG, DCM, FRM (supports off-line analysis)
- Multi-frame images formats: AVI, DCM, CIN (supports off-line analysis)
- Storage area:
  - Image area: 640×480
  - Standard area: 800×600
  - Full-screen: 1024×768

- iVision^{TM}
- Cine review: Auto (Auto review segment can be set), Manual, Simultaneous review for 2D, M/D images.
- Send/ Print image after End Exam
- Max. frames in HDD
  - ≥10,000,000 frames   (JPG format)
  - ≥100,000 frames   (FRM format)
- DICOM:
  - DICOM Storage
  - DICOM print
  - DICOM Worklist
  - Query/ Retrieve
  - Structured Report (SR)
  - Storage Commitment
  - MPPS
  - Media review

Measurement*
- Caliper
  - 2D-Mode(B-Mode)
    - Depth
    - Distance
    - Angle
    - Area
    - Volume
    - Cross
    - Parallel
    - T Length (Trace Length)
    - Ration (D)
    - Ratio (A)
    - B-Hist (B-Histogram)
    - B-Profile
    - Color Vel (Color Velocity)
    - VF Diam (Vessel Flow Diameter)
  - M-Mode
    - HR
    - Slope
    - Distance
    - Time
    - Velocity
  - Doppler mode
    - D Velocity
    - HR
    - Time

Acceleration

D Trace

PS/ED

*Calcification and Study item please refer to the user manual.

Diagnostic Report
- View/add images
- Edit report
- Obstetric/vascular analysis
- Fetal growth curve
- Print report
- Import/export report
- View history report

Transducer List
- C5-2s

  Convex, Biopsy Guide Available

  Application: Gynecology,   Obstetrics, Abdominal, Vascular, Nerve
- V10-4s

  Cavity Convex, Biopsy Guide Available

  Application: Gynecology, Obstetrics, Urology
- V10-4Bs

  Cavity Convex, Biopsy Guide Available

  Application: Gynecology, Obstetrics, Urology
- 6C2s

  Micro Convex , Biopsy Guide Available

  Application: Pediatric, Cardiac, Abdominal, Cephalic, Nerve, Vascular
- 4CD4s

  Abdominal Volume

  Application: Abdominal, OB/GYN
- L14-6s

  Linear Biopsy, Guide Available

  Application: Small   parts,   Vascular, Musculoskeletal, Abdominal, Cephalic Pediatric
- L14-6Ns

  Linear Biopsy, Guide Available

  Application: Small   parts,   Vascular, Musculoskeletal, Abdominal, Cephalic Pediatric
- L12-4s

  Linear, Biopsy Guide Available

  Application: Small parts, Vascular, Orthopedics, Musculoskeletal, Abdominal, Cephalic, Pediatric

- 7L4s

  Linear, Biopsy Guide Available

  Application: Small parts, Vascular, Orthopedics, Musculoskeletal, Abdominal, Cephalic, Pediatric

- L7-3s

  Linear, Biopsy Guide Available

  Application: Small parts, Vascular, Abdominal, Pediatric

- 7L5s

  Linear, Biopsy Guide Available

  Application: Small organ, Vascular Orthopedics, Nerve, Musculoskeletal,

- P4-2s

  Phase Array, Biopsy Guide Available

  Application: Cardiac, Abdominal, Pediatric, Trans cranial

- P7-3s

  Phase Array

  Application: Cardiac, Abdominal, Pediatric, Transcranial

- P12-4s

  Phase Array

  Application: Cardiac, Abdominal, Pediatric, Transcranial

- CW2s

  Pencil probe

  Application: Transcranial, cardiology, pediatrics

Safety & Conformance

- **Quality Standards**
  - ISO 9001:2000
  - ISO 13485:2003
- **Design Standards**
  - UL 60601-1
  - CSA C22.2 No. 601-1
  - EN 60601-1 and IEC 60601-1
  - EN 60601-1-1 and IEC 60601-1-1
  - EN 60601-1-2 and IEC 60601-1-2
  - EN 60601-2-37 and IEC60601-2-37
  - EN60601-1-4 and IEC60601-1-4
  - EN60601-1-6 and IEC60601-1-6
- **CE Declaration**

  M7/ M7T 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.

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

No part of this manual may be copied or printed, in whole or in part, without written permission.

The contents of this manual are subject to change without prior notice and without our legal obligation.

Note: the contents in this datasheet are applied to Version 2.0 of system software for M7/M7T diagnostic ultrasound system.