TE7

Color Doppler Ultrasound System

Specification

Release V1.0

Version 1.0 Jan. 2015

mindray
healthcare within reach

1 System Overview

1.1 Application

- Emergency
- Nerve
- Musculoskeletal
- Critical Care
- Abdomen
- Cardiology
- Obstetrics
- Gynecology
- Urology
- Smart part
- Vascular
- Others

1.2 Transducer types

- Curved array transducer
- Linear array transducer
- Phased array transducer

1.3 Imaging modes

- B-Mode
- THI and PSH™ (Phase Shift Harmonic Imaging)
- M-Mode
- Color Doppler Imaging
- Power Doppler Imaging/Directional PDI
- Pulsed Wave Doppler
- Continuous Wave Doppler
- Left Ventricular Opacification

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 Compound Imaging)
- iClear™ (Speckle Suppression Imaging)
- iTouch™ (Auto Image Optimization)
- Smart Track
- Zoom/iZoom (Full Screen Zoom)
- FCI (Frequency Compound Imaging)
- B steer
- ExFOV (Extended Field of View)
- Post Processing
- Echo Boost™
- 3 or 1 active universal probe ports(optional)
- 120GB SSD
- Built-in wireless adapter
- Built-in battery
- 4 USB 3.0 ports
- Touch Gestures
- iStorage
- MedSight

1.5 Optional features

- Continuous Wave Doppler
- DICOM
- Shared Service Package
- Left Ventricular Opacification (LVO)
- iNeedle™ (Needle Visualization Enhancement)
- Cart
- Table stand/ Wall mount

1.6 Language support

- Software: English, Chinese, German, Spanish, French, Italian, Portuguese, Russian, Czech, Polish, Turkish, Norwegian, Serbian
- User manual: English, Chinese

2 Physical Specification

2.1 Dimension and weight

- Depth: 97mm
- Width: 295mm
- Height: 380mm
- Weight: Approx. 6.1Kg (three probe socket configuration, with probe holders, no peripherals or batteries) (battery weight: 0.9Kg)

2.2 Monitor

- 15-inch high resolution color LED monitor
- Resolution: 768*1024

- Viewing angle: 85° left/right; 85° up/down
- Digital on-screen display of brightness and contrast controls
- Frame rate (Hz): 60Hz

2.3 Cart (Option)

- DCU independent tilt of 50 degrees up, 5 degrees down.
- Dimension and Weight(with DCU)
  - Height: 1266-1556mm
  - Width: 535mm
  - Depth: 620mm
  - Weight: approx. 50Kg
- Wheels
  - Diameter: 125mm
  - Castors (4ea): total lock and break
- Towelette holster
- Gel holder
- Printer holder
- Storage bin

2.4 Table stand (Option)

- DCU independent tilt of 50 degrees up, 5 degrees down.
- Dimension and Weight(with DCU)
  - Height: 248mm
  - Width: 196mm
  - Depth: 239mm
  - Weight: approx. 2.5 Kg

2.5 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

2.6 Built-in Battery

- Replaceable and rechargeable lithium battery
- Light indicator
- Full battery lasts more than 22h in standby mode
- Empty battery recharged to full in less than 4h
- Continuous work time: more than 2 hours
- Lithium-Ion Battery Pack 14.8V, 5800mAh (single battery)

2.7 Probe port and holder

- Probe ports: max. 3 active ports
- Detachable probe holder: 4

2.8 Electrical power

- Voltage: 100-240V~
- Frequency: 50/60 Hz
- Input current: 2.0A (115VAC)

2.9 Operating Environment

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

2.10 Storage & Transportation Environment

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

3 User Interface

3.1 System boot-up

- Boot-up from complete shut-down in less than 25 sec
- Shut-down in less than 15 sec
- Restore from standby mode：about 3 sec

3.2 Comments

- Supports text input and arrow
- Support freehand marking on touch screen
- Covers various applications
- User customizable

3.3 Body mark

- 144 bodymarks for versatile application

3.4 Numbers of exam mode presets: 29 system exam modes (unlimited number for user-defined ones)

3.5 Screen information*

- Common info:
  - Mindray logo
  - Hospital name,
  - Acoustic power
  - Mechanical index
  - Tissue thermal index
  - ID, Last name, First Name, Middle initial, Gender, Age
  - Probe model
  - Operator
  - Focus position
  - Imaging parameters

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

4 Imaging Parameters

4.1 Overview

- Echo-enriched Beamforming
- Up to 55296 channels
- Up to 8-beamforming

4.2 B-mode

- Display formats
- iClear™
- iBeam™
- iTouch™
- FCI
- Echo Boost™
- Image quality
- B steer: available on linear transducers
- ExFOV: available on convex, linear, and volume transducers
- Depth
- Max. frame rate
- Acoustic output power
- TGC
- Dynamic range
- Gain
- Focus number
- Focus position
- FOV
- Line density
- Persistence
- Horizontal Scale
- L/R flip and U/D flip
- Rotation
- TSI
- Gray Map
- Tint map

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

4.4 M-mode

- Display formats
- Acoustic output power
- Dynamic range
- Gain
- M sweep speeds
- M soften
- Tint maps
- Gray Map
- Edge enhance

4.5 Color Doppler Imaging

- Steer
- Image quality
- Max. frame rate
- Acoustic output power
- Gain
- ROI size/position
- Scale
- Baseline
- Wall filter
- PRF
- Packet size
- Flow state
- Smooth
- B/C align
- Priority
- Color map
- Invert
- Persistence

- Line density
- Smart track

4.6 Power Doppler Imaging

- Support directional power doppler
- Image quality
- Acoustic output power
- Dynamic range
- Gain
- ROI size/position
- Scale
- Wall filter
- PRF
- Packet size
- Flow state
- Smooth
- B/C align
- Priority
- Power map
- Directional power map
- Persistence
- Line density

4.7 PW/CW-Mode (CW mode is an option)

- Display formats: V2:3,V3:2,V3:1,FULL(V: vertical)
- Image quality
- Sample volume size
- SV position
- PW Scale
- CW Scale
- Baseline
- PW Steer
- Volume
- PW PRF
- CW PRF
- Gain
- Dynamic range
- Sweep speed
- Wall filter
- Invert
- Auto invert
- Angle correction
- Quick angle
- Gray map
- Tint map
- Time/frequency resolution
- Auto calc
- Auto calc cycle
- Trace area
- Trace sensitivity
- Trace Smooth
- Duplex/Triplex

4.8 LVO(option)

- Only available on P4-2s
- Dedicated left ventricle contrast imaging tool

4.9 iTouch™

- Auto image optimization
- B-mode: gain, TGC
- Color: gain
- Power: gain
- PW: baseline, scale, PRF, WF
- For L12-4s under vascular, EM Vas and carotid exam mode: iTouch also optimizes Color ROI and PW sampling line

4.10 Smart Track

- Continuously track the flow and detect the best color box position and angle in real time scanning
- Only for L12-4s under vascular, EM Vas and carotid exam mode

4.11 Zoom

- Zoom: Pan zoom (read zoom)
- iZoom: Expand the image to full screen

4.12 Quick Save

- Create a new exam mode by quickly saving current image parameter settings

4.13 iNeedle (option)

- Needle visualization enhancement
- Available on all linear transducers
- Needle steer: -50, -40, -30, -20, 20, 30, 40, 50 degrees (also supports slight adjustment in 2° increments)

5 Cine Review and Post Processing

5.1 Cine review

- Available in all modes
- Frame by frame manual cineloop review or auto playback with variable speed
- Maximum cine memory up to 32346 frames or 427s (M/PW)
- Retrospective and prospective storage are available and length is pre-settable (Prospective: Max. time 480s; Retrospective: Max. time: 120s)

5.2 Post processing

- B-mode:
  Dyn Ra.
  Gray Map
  Tint Map
  iClear
  L/R Flip
  U/D Flip
  Rotation
  H Scale
  Echo Boost
- M-mode:
  Speed
  Dyn Ra.
  Gray Map
  Tint Map
  Edge Enhance
- Color:
  Baseline
  Smooth
  Color Map
  Priority
  Invert
- Power:
  Smooth
  Dynamic range
  Color Map
  Priority
  Invert
- PW:
  Baseline
  Volume
  Angle
  Speed
  Dyn Ra.
  Gray Map
  Tint Map
  Invert
  WF
  Quick Angle
  Auto Calculate
  T/F Res
  Auto Calc Cycle
  Auto Calc Parameter
  Trace Sensitivity
  Trace Smooth
  Trace Area
- CW
  Baseline
  Audio
  Angle
  Quick Angle
  Speed
  Dyn Ra.
  Gray Map
  Tint
  Tint Map
  Invert
  WF
  T/F Res
  Angle
  Quick Angle

6 Measurement/Analysis and Report*

6.1 Basic measurements

- Depth
- Distance
- Angle
- Area: Ellipse, Trace
- Volume :3-Distance
- Length Ratio
- Area Ratio
- Time
- Slope
- Heart Rate

- Velocity
- D Trace
- PS/ED

- 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
  - Iliac Diameter
  - Gall Bladder: Length, Height, Wall Thickness
  - Common Bile Duct
  - Prox Abdominal Aorta Diameter
  - Mid Suprarenal Abdominal Aorta Diameter
  - Mid Infrarenal Abdominal Aorta Diameter
  - Distal Abdominal Aorta Diameter
  - Mid Suprarenal ABD Aorta
  - Mid Infrarenal ABD Aorta
  - Abdominal Aorta Bifurcate Diameter
  - Inferior Vena Cava
  - Distal Abdominal Aorta
  - Spleen: Length, Height, Width
  - Left/Right Kidney: Length, Width, Height, Volume, Cortical Thickness
  - Bladder: Length, Width, Height, Volume, micturition volume
  - Ureter Diameter
  - Pleural: Length, Width, Height, Volume
  - Left/Right UQ: Length, Width, Height, Volume
  - Left/Right Iliac Aneurysm: Length, Width, Height
  - Pelvis: Length, Width, Height, Volume
  - Pericardial Sac: Length, Width, Height, Volume
  - Prox Aorta Aneurysm: Length, Width, Height
  - Mid suprarenal Aorta Aneurysm: Length, Width, Height
  - Mid Infrarenal Aorta Aneurysm: Length, Width, Height
  - Distal Aorta Aneurysm: Length, Width, Height
  - Aorta Bif Aneurysm: Length, Width, Height
- Gynecology
  - Cervix: Length, Width, Width
  - Uterus: Length, Width, Height, Volume, Uterus Sum, Endometrium Thickness
  - UT-L/CX-L
  - Ovary: Length, Width, Height, Volume
  - Follicle: Length, Width, Height, Average Diameter, Volume
- Obstetrics
  - Early OB: CRL, BPD, FL, HUM, HC, AC, Amniotic Fluid
  - 2nd- 3rd Trimester: BPD, HC, OFD, FL, AC, AF, HUM, FTA, THD, Cervix L(Trace available), Ut A, Ovarian A, Ovarian V, FHR
  - Gestational Age
  - Estimated Fetal Weight
  - Fetal Biophysical Profile
  - Gestational Age and Fetal Weight OB tables
  - Weight Percentile
- Cardiology
  - LV Function (2D and M): Teichholz
  - Mitral Valve: MV VTI, MR VTI, MV E/A
  - Aorta Valve: AV VTI, AR DecT

- PAEDP
- RVSP
- CO(LVOT)
- Left Atrium Diam/Aorta Diam

- Urology
  - Prostate: Length, Width, Height, Volume
  - PPSA, PSAD
  - Scrotal Wall
  - Left/Right Ureter Diameter
  - Renal: Length, Width, Height, Volume
  - Bladder: Length, Width, Height, Volume, micturition volume
  - Left/Right Kidney: Length, Width, Height, Volume, Cortical Thickness
  - Left/Right Testis: Length, Width, Height, Volume
  - Left/Right Testicular: Length, Width, Height, Volume
  - Left/Right Epididymis: Length, Width, Height
  - Left/Right Epididymis: Aorta, Vein
  - Left/Right Testicular: Aorta, Vein
- Vascular
  - Carotid: CCA, ECA, ICA, Bulb, Vert A Stenosis D, Stenosis A, ICA/CCA
  - Lower Extremity Vein: C.Iliac V, Ex.Iliac V, Pop V, TP Trunk V, Peroneal V, P.Tib V, A.Tib V
  - Femoral Vein: CFV, SFV, DFV
  - TCD (Transcranial Doppler): ACA, MCA, PCA, AComA, PComA, Vertebral A, Basilar A
- Small Parts:
  - Thyroid: Length, Height, Width, Volume
  - Isthmus Height
  - Testis: Length, Height, Width, Volume
  - Left/Right Testicular: Length, Width, Height, Volume
  - Left/Right Epididymis: Length, Width, Height
  - Breast Mass: Length, Height, Width, Nip. Distance, Skin Distance
  - Left/Right Thyroid Cyst: Length, Width, Height, Volume
  - Left/Right Epididymis: Aorta, Vein
  - Left/Right Testicular: Aorta, Vein

6.3 Report

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

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

7 Exam Storage and Management

7.1 Exam storage

- 120GB SSD. More than 74GB internal hard drive for patient data storage
- Capable to store up to approximate 354313 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, Activate exam, 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 (hide patient information); support back up to DVD-RW media (ASUS DVD).

8 Connectivity

8.1 Ethernet Network Connection

- Cable connection
- Wireless connection: built-in wireless adaptor

8.2 DICOM 3.0

- DICOM basic (option)
  -Verify (SCU, SCP)
  -Print
  -Store
  -Storage Commitment
  -Media Exchange
- DICOM Worklist (option, HL7 supported)
- DICOM Query/Retrieve (option)
- DICOM Modality Performed Procedure Step - MPPS (option)
- DICOM OB/GYN structure report (option)
- DICOM Cardiac structure report (option)
- DICOM Vascular structure report (option)
- DICOM Breast Report (option)

8.3 iStorage(included in UltraAssist)

- Direct network storage tool between ultrasound system and personal computer

8.4 MedSight

- DICOM Basic is mandatory
- Needs to be installed on mobile terminal
- Support IOS 5.0 or above mobile terminal
- Transfer PC format images or clips from system to mobile terminal through WiFi

9 Transducers

9.1 Curved array

- C5-2s
  - Application: Abdomen, Gynecology, Obstetrics, Urology, Emergency
  - Bandwidth:
    2.1-5.1MHz (-6dB)
    1.5-5.6MHz (-20dB)
  - Number of Elements:128
  - Biopsy Guide: NGB-015, multi angle, reusable
- C11-3s
  - Application: Small Part
  - Bandwidth:
    4-10MHz (-6dB)
    3-11.2MHz (-20dB)
  - Number of Elements: 128
  - Biopsy Guide: NGB-018, multi angle, reusable
- V11-3Ws
  - Application: Obstetrics, Gynecology, Urology
  - Bandwidth:
    4-10MHz (-6dB)
    3-11.2MHz (-20dB)
  - Number of Elements: 160
  - Biopsy Guide: NGB-004, single angle, reusable

9.2 Linear

- L12-4s
  - Application: Vascular, Small part, Nerve, MSK
  - Bandwidth:
    4.2-11.8MHz (-6dB)
    3-13MHz (-20dB)
  - Number of Elements: 192
  - Biopsy Guide: NGB-007, multi angle, reusable
- L14-6Ns
  - Application: Vascular, Small part, Nerve, MSK
  - Bandwidth:
    5.1-12.5MHz (-6dB)
    3.5-16MHz (-20dB)
  - Number of Elements: 192
  - Biopsy Guide: NGB-007, multi angle, reusable
- L14-6s
  - Application: Vascular, Small part, Nerve, MSK

- Bandwidth:
  5.1-12.5MHz (-6dB)
  3.5-16MHz (-20dB)
- Number of Elements: 128
- Biopsy Guide: NGB-016, multi angle, reusable

- L7-3s
  - Application: Vascular, Small part, Nerve, MSK
  - Bandwidth:
    3.4-6.9MHz (-6dB)
    2.7-8.3MHz (-20dB)
  - Number of Elements: 128
  - Biopsy Guide: NGB-007, multi angle, reusable
- 7LT4s
  - Application: Intraoperative, MSK, Vascular
  - Bandwidth:
    5-10MHz (-6dB)
    3.5-13.5MHz (-20dB)
  - Number of Elements: 128
  - Biopsy Guide: NGB-010, multi angle, reusable

9.3 Phased array

- P4-2s
  - Application: Cardiology, TCI, Abdomen, LVO
  - Bandwidth:
    1.7-4.1MHz (-6dB)
    1.3-4.7MHz (-20dB)
  - Number of Elements: 64
  - Biopsy Guide: NGB-011, multi angle, reusable
- P7-3Ts
  - Application: Cardiology
  - Bandwidth:
    3.1-7.2MHz (-6dB)
    1.9-8.2MHz (-20dB)
  - Number of Elements: 64
  - Biopsy Guide: not available

10 Peripheral Devices and Accessories (Option)

10.1 Black/white digital video printer
- SONY UP-D897, MITSUBISHI P95DW-N

10.2 Color digital printer
- SONY UP-D25MD

10.3 Graph/text printer
- HP Deskjet 1050 J410 series, HP Officejet 7000 wide format, HP Officejet Pro 8100

10.4 Wireless printer
- HP Officejet Pro 8100

10.5 Footswitch
- USB port: 971-SWNOM (2-pedal)
- USB port: 971-SWNOM (3-pedal)
- Wireless: WFREC-1(Receiver) + WFSW-2/WFSW-3 (Footswitch)

10.6 Barcode reader
- Laser barcode scanner
- Model: SYMBOL LS2208, DS6067

11 System Inputs and Outputs

- HDMI: 1 Port
- ECG connector: reserved
- USB: 4 USB 3.0 ports
- Ethernet: 1 port

12 Safety and Conformance

12.1 Quality standards
- ISO 9001
- ISO 13485

12.2 Design standards
- 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

TE7 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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