

# Voluson S8 2014

## Extraordinary vision: Signature Series

### Product Description

The Voluson™ S8 helps deliver diagnostic confidence through extraordinary image quality, sophisticated fetal assessment tools, easy-to-use automation tools, all combined in an innovative ergonomic design.

### Highlights

- Lightweight and portable
- High Resolution Flat Panel Display 19"
- Real-Time 4D
- HD*live*™
- 3D Multiplanar Display
- 3D Power Doppler
- Automatic Optimization (AO)
- Advanced SRI (Speckle Reduction Imaging)
- CrossXBeam<sup>CR</sup>™ (CRI)
- TUI (Tomographic Ultrasound Imaging)
- HD-Flow™
- VOCAL
- Advanced VCI with OmniView
- STIC
- SonoAVC™*follicle*
- SonoVCAD™*heart*
- SonoVCAD*labor*
- SonoNT
- SonoL&D™
- SonoIT
- SonoBiometry
- SonoRender Start
- Scan Assistant
- Anatomical M-Mode
- Report Editor
- Battery Pack
- On Board Archive including Preview and Pre-selection



## General specifications

### Dimensions and weight

Height: Adjustable	Min.: 975 mm (38.4 in)
	Max. 1725 mm (67.9 in)
Width	620 mm (24.4 in)
Depth	850 mm (33.4 in)
Weight (no peripherals)	198 lb/90 kg

### Electrical power

Voltage	100 – 120 VAC, 220 – 240 VAC
Frequency	50/60 Hz

### Console Design

3 Active Probe Port
1 Parking Port
Integrated HD (500 GB)
3 USB Ports for External Peripherals
2 USB Ports for On-board Peripherals
RJ45 LAN Port
1 HDMI Out Port
1 AUDIO Out Port

## User Interface

### Operator Keyboard

Backlit alphanumeric keyboard
Ergonomic hard key layout
Interactive back-lighting
Programmable print/store/export keys for printing, archiving and exporting.

### Monitor

High-Resolution 19-inch TFT LCD Screen
Resolution 1280X1024
Image size: 960x720
High brightness with 220 cd/m <sup>2</sup> typical
Digital brightness & contrast adjustment.
Brightness/Contrast/Dim Brightness Control

## System overview

### Applications

Obstetrics
Gynecology
Abdominal
Small parts
Vascular
Pediatrics

Cardiology
Urology
Neurology
Musculoskeletal

### Operating Modes

B-Mode (2D)
M-Mode (conventional M-Mode)
AMM (Anatomical M-Mode)
PW Doppler with high PRF (PW)
High PRF Doppler Mode
Color Flow Doppler Mode (CFM)
Power Doppler Mode (PD)
HD-Flow Doppler Mode (HD-Flow)
Tissue Doppler Mode (TD)
B-Flow (BF)
M-Mode Flow Modes (M/CF, M/HD-Flow, M/TD)
Volume Mode (3D/4D):
• 3D Static
• 4D Real Time
• VCI-OmniView
• STIC
• 4D Biopsy
Extended View (XTD View)

### Scanning Methods

Electronic Convex
Electronic Linear
Electronic Sector
Mechanic Volume Sweep

### Transducer Types

Convex Array
Linear Array
Phased Array
CWD pencil probe
Volume probes '4D':
• Convex Array
• Microconvex Array

## System overview *(cont.)*

### System Standard Features

3D/4D Expert
Innovative user interface with onscreen menus
HD-Flow
Automatic Tissue Optimization
Coded Excitation (CE)
Coded Harmonic Imaging with Pulse Inversion Technology
Tissue Doppler
XTD View
Advanced SRI (Speckle Reduction Imaging)
CrossXBeam <sup>CRI</sup> (Compound Resolution Imaging)
SonoNT
SonoIT
Scan Assistant
SonoRender Start
B Mode only
B + Power Doppler Mode
B + CFM Doppler Mode
B + HD-Flow Mode
B + CRI
B + CRI + CFM
B + CRI + PD
B + CRI + HD-Flow
B + B-Flow
DICOM <sup>®</sup> 3
Report Editor
TUI
4D Biopsy
VOCAL
SonoRender Start
Inversion Mode
Focus & Frequency Composite (FFC)
High Resolution Zoom
Pan Zoom
Steering
Virtual Convex
Wide Angle
Beta-View
Patient information database
Image Archive on hard drive
3D/4D data compression (lossy/lossless)
Real-time automatic Doppler calcs
SonoBiometry
• Biparetal Diameter (BPD)
• Head Circumference (HC)
• Abdominal Circumference (AC)
• Femur Length (FL)

Measurement & Calculations including Worksheets/Report for:

- OB
- Vascular
- Abdominal
- Urology
- Musculoskeletal
- GYN
- Cardio
- Small parts
- Pediatrics
- Neurology

### System Options

Advanced VCI (Volume Contrast Imaging) with OmniView	
4D View PC Software	
HD <i>live</i> <sup>™</sup>	
B-Flow	
Anatomical M-mode	
SonoVCAD <i>heart</i>	
SonoAVC <i>follicle</i>	
SonoVCAD <i>labor</i>	
SonoL&D	
4D – Basic STIC:	
• STIC	• STIC + Power Doppler Mode
• STIC + CFM Doppler Mode	• STIC + HD-Flow Mode
• STIC + CRI	• STIC + CRI + CFM
• STIC + CRI + PD	• STIC + CRI + HD-Flow
• STIC + B-Flow	

### Peripheral Options

Integrated Printers:
• B/W Printer
• Color Printer
DVD/USB Recorder with voice recording
Bluetooth Line Printer
ECG Digital Module
Battery Pack
Foot Switch with programmable functionality
Video converter
Isolated Gigabit Ethernet Connection
Isolated USB Connection

### Display Modes

Simultaneous Capability	
• B+PW	
• B+CFM, B+PD, B+TD, B+HD-Flow	
• B+M, B+AMM	• B+3D; B+4D
• B+CRI	• B+SRI
• B+CRI+SRI	• BF+SRI
• B+CRI/3D+CRI	• B+SRI/4D+SRI
• B+CRI/4D+CRI	• B+CRI+SRI/3D+CRI+SRI
• B+CRI/4D+CRI	• B+SRI/4D+SRI
• B+CRI+SRI/4D+CRI+SRI	• B+CRI/STIC+CRI
• B+SRI/STIC+SRI	• B+CRI+SRI/STIC+CRI+SRI
• B/B+SRI	• B/CFM+CRI

- B/CFM+SRI
- B/PD+CRI
- B/PD+CRI+SRI
- B/HD-Flow+SRI
- B/CFM+CRI+SRI
- B/PD+SRI
- B/HD-Flow+ CRI
- B/HD-Flow+CRI+SRI

#### Real-time Triplex Mode

- B/CFM/PW
- B/HD-Flow/PW
- B/M/CFM
- B/M/TD
- B/AMM/HD-Flow
- B/CFM
- B/PD/PW
- B/TD/PW
- B/M/HD-Flow
- B/AMM/CFM
- B/AMM/TD

#### Selectable alternating modes

- B+PW or CW
- B/PD+PW or CW
- B+CFM or PD or HD-Flow or CW
- B/CFM+PW or CW
- B/HD-Flow+PW
- B/TD+PW

#### Multi-image (split, quad)

- Live and/or frozen
- Split: B+B, B/CFM + B/CFM or B/PD+ B/PD or B/TD + B/TD or B/HD-Flow + B/HD-Flow or BF+BF
- Split simultaneous: B+B/CFM or B+B/PD or B+B/HD-Flow
- Split: B+PW or M or CW
- Split: Frame Review / XTD-View
- Quad: B+B+B+B or BF, B/CFM+B/CFM+B/CFM+B/CFM or B/PD or B/TD or B/HD-Flow
- Independent Cine playback
- Quad: A+B+C+3D or 4D
- TUI: 1x1, 1x2, 2x2, 3x2,3x3, 3x4, 4x4
- Segmentation: quad (A/B/C/Segm. Object), single (Segm. Object)
  - Split: TUI Overview + 1 slice

#### Zoom Read/Write (with or without overview image)

#### Colorized Image

- Colorized B
- Colorized PW
- Colorized M
- Colorized 3D

#### Time line display

- Independent Dual B/PW Display
- Display Formats
  - Top/ Bottom selectable format (Size: 1/2:1/2; 1/3:2/3; 2/3:1/3)
  - Left/Right format (Size: 1/2:1/2)

### Display Annotation

#### Patient Name:

- Last: max 32 characters
- First: max 15 characters
- Middle: max 15 characters

#### ID: max 32 characters

#### Secondary patient ID (Citizen Service Number)

#### Accession #: max 16 characters

#### Hospital Name: 30 characters

#### Sonographer (up to 5 characters are displayed depending on font size)

#### Gestational age (OB) or LMP (Gyn)

#### Birth date (selectable)

#### Date: 3 Types selectable

- MM/DD/YYYY
- DD/MM/YYYY

- YYYY/MM/DD

#### Time: 2 types selectable

- 24 hours
- 12 hours

#### Probe Name

#### Application Name

#### Gray Scale bar

#### Depth Scale

#### Focal Zone marker

#### Frame Rate

#### Zoom Start/Depth

#### B-Mode

- User program
- Receiver Frequency
- Dynamic Contrast
- Edge Enhance
- SRI, CRI
- Depth Scale Marker
- Acoustic Power
- Gain
- Gray Map
- Persistence
- Focal Zone Markers
- Probe Orientation

#### M-Mode/ AMM-Mode

- Gain
- Edge Enhance
- M-Cursor, AMM-Cursor
- Dynamic Contrast
- Reject
- Time Scale

#### Doppler Mode

- Acoustic Power
- Angle
- Sample Volume Depth and Width
- Wall Motion Filter
- Spectrum Inversion
- PRF
- Gain
- Doppler Frequency
- Velocity or Frequency Scale
- Time Scale
- HPRF

#### Color Flow Imaging Mode (CFM, PD, TD, HD-Flow)

- Acoustic Power
- Color Balance
- Quality
- PRF
- Color Scale: kHz, cm/s, m/s
- Power and Symmetrical Velocity Imaging
- Spectrum Inversion
- Color Gain
- Color Balance Marker
- Wall Motion Filter
- Color Map

#### 3D/4D Mode

- 3D/4D Sub Program
- Quality
- Mix
- Compression
- TUI.: slice distance (0.5-10mm)
- TUI.: slice position in overview image
- Threshold
- Volume Box Angle
- Acquisition Mode
- Orientation Markers
- SonoVCAD<sup>heart</sup>

#### TGC Curve

#### Cine Frame Number

#### Recorder Status

#### Body Pattern: 130 types organized in 10 anatomical groups

#### Measurement Results

#### Displayed Acoustic Output

- TIS: Thermal Index Soft Tissue
- TIC: Thermal Index Cranial (Bone)
- TIB: Thermal Index Bone
- MI: Mechanical Index

## Display Annotation (con't.)

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Power Output
Biopsy Guide Line
ECG Line
Trackball function
Zoom overview image (zoom box position)
GE Logo

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## System Parameters

### System Setup

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Pre-programmable categories date format
User Programmable Preset Capability, User program etc.
Languages: English, French, German, Spanish, Italian, Norwegian, Dutch, Finnish, Swedish, Danish, Chinese, Japanese, Russian
EUM Languages: English, German, Spanish, Italian, French, Russian
Up to 400 Programmable Annotations organized in 10 anatomical groups
Free programmable Scan assistant lists including Add, Delete, Edit and Reorder of checklist items
Four programmable Px buttons for documentation preferences like Save, DICOM Send, Print, Check, Cine length etc.
Several user configurable functions: <ul style="list-style-type: none"><li>• Clinic Name</li><li>• Display (TGC curve, Screen Lock, Screensaver, Auto Scan Stop, Beeper, 3D/4D Screen Controls)</li><li>• Trackball speed</li><li>• Dim function</li><li>• Zoom: Overview window</li><li>• Patient Info display</li><li>• Title bar settings</li><li>• Start Exam &amp; End Exam Configuration</li></ul>

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### Measure Setup

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M&A Setup including Add, Delete, Edit and Reorder of measure items
Application Setup including several parameters of Measurement, Doppler Trace and Calculation presets
Global Setup including several parameters of Measurement, Cursor and Result window presets

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### Biopsy Setup

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User programmable needle guidelines
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### Pre-Processing

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Write Zoom up to 8x	
B/M-Mode <ul style="list-style-type: none"><li>• Gain</li><li>• Dynamic Range</li><li>• Transmission Focus Position</li><li>• Transmission Frequency</li><li>• Persistence Control</li><li>• Reject</li><li>• M-Cursor position</li></ul>	<ul style="list-style-type: none"><li>• TGC</li><li>• Acoustic Output</li><li>• Transmission Focus Number</li><li>• Edge Enhancement</li><li>• Line Density Control</li><li>• Sweep Speed</li></ul>

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PW-Mode <ul style="list-style-type: none"><li>• Gain</li><li>• Acoustic Output</li><li>• PRF</li><li>• Sample Volume Gate</li><li>• Velocity Scale</li></ul>	<ul style="list-style-type: none"><li>• Dynamic Range</li><li>• Transmission Frequency</li><li>• Wall Motion Filter</li><li>• Length, Depth, Pos</li><li>• Sweep Speed</li></ul>
Color Flow Mode (CFM, PD, TD, HD-Flow) <ul style="list-style-type: none"><li>• Acoustic Output</li><li>• Wall Motion Filter</li><li>• Ensemble</li><li>• Smooth (Rise and Fall)</li><li>• Balance</li><li>• Quality</li><li>• Gain</li></ul>	<ul style="list-style-type: none"><li>• PRF</li><li>• Line density</li><li>• Frequency</li><li>• Line Filter</li><li>• Artifact Suppression</li><li>• Flow resolution</li></ul>

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### Post-Processing

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Read Zoom: 0.8x - 3.4x Zoom (with HD-Zoom functionality up to 22x Zoom )	
B-Mode <ul style="list-style-type: none"><li>• 2D Gain</li><li>• Gray Map</li><li>• Advanced SRI (Speckle Reduction Imaging)</li></ul>	<ul style="list-style-type: none"><li>• Dynamic Contrast</li><li>• Colorized B</li></ul>
M-Mode <ul style="list-style-type: none"><li>• Gray Map</li><li>• Display Format</li></ul>	<ul style="list-style-type: none"><li>• Colorized M</li><li>• Sweep Speed</li></ul>
PW Mode <ul style="list-style-type: none"><li>• Gray Map</li><li>• Angle Correction</li><li>• Scale (KHz, m/s, cm/s)</li><li>• Invert</li></ul>	<ul style="list-style-type: none"><li>• Baseline Shift</li><li>• Colorized D</li><li>• Trace</li><li>• Sweep Speed</li></ul>
Color Flow Imaging Modes (CFM, PD, TD, HD-Flow) <ul style="list-style-type: none"><li>• Color Map</li><li>• Display Mode (V, V-T, T, P, P-T) (CFM only)</li><li>• Scale (CFM and HD-Flow)</li></ul>	<ul style="list-style-type: none"><li>• Display Threshold</li><li>• Baseline</li></ul>
B-Flow <ul style="list-style-type: none"><li>• Gray Map</li><li>• Advanced SRI (Speckle Reduction Imaging)</li><li>• Dynamic Contrast</li></ul>	<ul style="list-style-type: none"><li>• Colorized B-Flow</li></ul>

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### Image Processing and Presentation

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Digital Beamformer
335,127 system processing channel technology
Minimum Depth of Field: 0 - 1 cm (Zoom, probe dependent)
Maximum Depth of Field: 0 - 30 cm (probe dependent)
Transmission Focus 1-5 Focus Points selectable (probe and application dependent)
Focal Zone position, up to 7 steps
Continuous Dynamic Receive Focus/Continuous Dynamic Receive Aperture
256 shades of gray
16,8 Mio Colors 24 bit
Up to 261 dB Processing Dynamic Range
Image Reverse: Right/ Left
Rotation: 0°, 180°

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## Cine Features

Cine Features:

- Dual/Quad Image CINE Display
- CINE Gauge and CINE Image number display
- CINE Review Loop
- Selectable CINE Sequence for CINE Review (by Start Frame and End Frame)
- Side Change in dual CINE Mode
- Measurements/Calculations & Annotations on CINE

Length:

- 2D: 140MB: up to 3 mins and up to 7,000 frames (depending on B-image size and FPS); typical: about 1min./1000 images (with curved array: 15cm depth, angle 81°, 22 FPS)
- M-Mode: 32MB: up to 20 min motion time (depending on sweep speed and depth)
- Doppler Mode: 32MB: up to 10 min motion time (depending on sweep speed)

Cine operation:

- Manual: image by image
- Auto run: speed: 6 to 400% of real-time rate, play repeat mode: forward-forward, forward-backward-forward

## Image/Volume Storage

Image data stored as:

- Raw Data file (proprietary format)
- DICOM file (Single- or Multiframe)

Volume file stored as

- Raw Data file (proprietary format)
- Size: typically: 0.8 - 5MB (depending on probe and adjusted volume size)

Compression

- 2D: JPEG, Lossless, high, mid, low
- 3D/4D: Lossy and lossless compression available. Typical compression rates are 50% with lossless compression, 15% with lossy compression but maximum quality and 5% with lossy compression and reduced quality (approximate values).

Review: Review of current Exam and archived data sets (Single Images and Cine Clips). View Format: Raw data, DICOM data.

Display Formats: 1x1, 2x2, 3x3

Reload:

- Reload of current/ archived data sets: 2D Raw Data (incl. Color Doppler, Spectral Doppler and M-Mode). 3D Raw Data (Single Volume incl. Calc. Cines). 4D Raw Data (Volume Cine)

Export as

- Bitmap files: BMP, TIFF, JPEG
- Raw files: RAW (2D), VOL (Volume data), 4DV (RAW, VOL incl. Patient data)
- Sequence of Bitmaps: BMP, AVI, MOV
- DICOM Files: DCM, DICOM Files with DICOMDIR
- 3D Raw Data: conversion to Cartesian format possible

AVI Codec: MPEG4, MS Video 1, FullFrames

Export to: DVD+ R(W), CD-R, Network, USB devices

Export Anonymous function: yes, available for following image types: AVI, MOV, BMP, TIFF, JPEG

Backup function to: DVD+ R(W) / CD-R, Network, USB devices

Repro function: Settings recall (e.g. Geometry, Gain, Colormap, etc.) from a stored or reloaded picture

Exam History: direct access to images from previous exams; direct access to Measure Reports images from previous exams; Image compare window on screen to compare images from previous exams with current exam image

Hard Drive Data Storage size: about 430 GB

## Connectivity

Ethernet network connection

WLAN network connection

2 USB Ports for hard disks /memory sticks

1 USB Port for FootSwitch / Printer

DICOM support (option)

- Verify
- Store
- Structured Reporting
- MPPS (modality performed procedure step)
- Media Exchange
- Off network / mobile storage queue
- Query/Retrieve
- Print
- Modality Work list
- Storage Commitment

## Scanning Parameters

### B-Mode

B Acoustic Power	1-100%
Scan Angle	Changed in 5° increments (probe dependent)
Frequency range	1-18 Mhz (Depending on the probe, 3 steps high, mid, low)
Frame rate	> 740 fps (depending on probe and application)
GAIN range	+ 15 to - 15 dB
Gray scale values	8 bit
SRI	6 steps (0-5)
CRI	8 steps (1-8)
CRI filter	4 steps off, low, mid, high
CE	On/Off (Probe dependent)
FFC	On/Off (Probe dependent)
Persistence filter	8 steps (pre)
Line filter	3 steps (pre) off, low (12,5/75/12,5%), high (25/50/25%)
Line Density	3 steps (pre) low, norm, high
Reject	51 steps (pre) from 0 to 225
Enhance	6 steps (pre) 0, 1, 2, 3, 4, 5
Gray maps	18
Tint maps	15
Dynamic	12 different dynamic curves C1 - C12
Display Modes	B, XTD

## B-Mode (con't.)

Screen Formats:

- 2D Imaging: Single (B), Dual (B+B), Quad (B+B+B+B)
- XTD View: Single (XTD), Dual (B+XTD)

## M-Mode

Working Modes	M (conventional M-Mode), AMM (Anatomical M-Mode)
Frequency range	1-18 Mhz (Depending on the probe, 3 steps high, mid, low)
M Acoustic Power	1-100%
M Gain	±15 dB range, 1 dB steps
M sweep speeds:	
• 900 / 450 / 300 / 225 / 150 / 100 pixels/sec;	
• 26.44 / 13.22 / 8.81 / 6.61 / 4.40 / 2.94 cm/s in relation to system monitor	
Review (memory times)	>60 s (32 MB)
Signal processing M	
• Dynamic range: 1 to 12	• Reject: 0 to 255
• Enhance: 0 to 5	• Gray maps: 18
• Tint maps: 15	
Display Modes	
• M: 2D+M, 2D+M/CFM, 2D+M/HD-Flow, 2D+M/PD, 2D+M/TD	
• AMM: 2D+AMM, 2D/CFM+AMM/CFM, 2D/HD-Flow+AMM/HD-Flow, 2D/TD+AMM/TD	
• Screen Formats: (window arrangement)	
• 2D+M and 2D+AMM: up/down (horizontal): three different sub formats 40/60, 50/50, 60/40% left/right (vertical): 50/50%	
• 2D+AMM+AMM: left/rt-up/rt-down: 50//25/25%	

## M-Color Flow Mode

Acoustic MCFM Power	1-100%
Frequency range	1-18Mhz (Depending on the probe, 3 steps high, mid, low)
MCFM Color Maps	8 maps
CFM Gain	+/-16dB range, 1 dB steps
CFM Velocity Scale Range:	PRF: 150Hz to 13kHz
Wall Motion Filter	8 – 3000 Hz
Ensemble (color shots per line)	8-16, step size 1
Gentle color filter	
Smooth filter:	
• Rise: 12 steps	
• Fall: 12 steps	
CFM Spectrum Inversion	
CFM Baseline Shift	17 steps
Pre-settable and independently adjustable B-, M and MCFM Gain	
CFM Threshold	1 – 255 steps
Balance	25 – 225, step size 5
Artifact suppression	On/Off
Color Display Mode:	
• V (Velocity)	
• V-T (Velocity + Turbulence)	
• V-P (Velocity + Power)	
• T (Turbulence)	
• P-T (Power + Turbulence)	

Real-time Triplex Mode:

- B + M +MCFM in any depth

## Spectral Doppler Mode (PW, CW)

Operating Modes

- PW (Pulsed Wave Doppler, Single Gate)
- CW (Continuous Wave Doppler)

Frequency range	1.75-16 Mhz (Depending on the probe, 3 steps high, mid, low)
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Pulse Repetition Frequency (PRF):

- PW-Doppler: 0.9 ...22.0 kHz
- CW-Doppler: 1.3...41.7 kHz

Sample Volume (Doppler Gate): Length: 0.7, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15 mm Position: 5 mm to B-scan end Angle correction: - 85° ... 0° ... + 85°

- Position: 5 mm to B-scan end
- Angle correction: - 85° ... 0° ... + 85°

Power control range	1 - 100%
Gain range	+ 15 to - 25 dB (PW)
WMF (wall motion filter)	PW: 30...500 Hz CW: 30...1000 Hz
Zero line shift	± PRF/2, ± 8 steps
Spectrum Analyzer	FFT (Fast Fourier Transformation), max. 256 channels, 255 amplitude levels

PW sweep speeds:

- Simplex (26,44 / 13.22 / 8.81 / 6.61 / 4.40 / 2.94 cm/s)
- Duplex/Triplex (8.81 / 6.61 / 4.40 / 2.94 cm/s)

Review (memory times)	>60 s (32 MB)
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Measurable flow velocities:

- PW: 1cm/s - 8m/s ( $\alpha = 0^\circ$ , 2.0MHz, max. zero shift)  
1cm/s - 16m/s ( $\alpha = 60^\circ$ , 2.0MHz, max. zero shift)
- CW: 1cm/s - 15.40m/s ( $\alpha = 0^\circ$ , 2.0MHz, max. zero shift)  
1cm/s - 30.80m/s ( $\alpha = 60^\circ$ , 2.0MHz, max. zero shift)

Signal processing:

- Dynamic range: 15 steps (10 to 40)
- Gray maps: 18 basic curves
- Tint maps: 5

Scale display:

- Vert.: kHz, cm/s, m/s (selectable)
- Hor.: 1s marker (big), ½ s marker (small)

Screen Formats:

- 2D/D: up/down (horizontal): three different sub formats 40/60, 50/50, 60/40% left/right (vertical): 50/50%. D: pencil probes only

Display Formats: 2D/D (duplex update, simultaneous); 2D+CFM/D, 2D+HD-Flow/D, 2D+PD/D, 2D+TD/D (triplex update, PW or CW). 2D+CFM/PW, 2D+PD/PW, 2D+HDFlow/PW, 2D+TD/PW, (triplex simultaneous, PW only)

Audio-Modes	Stereo (both directions separately in both channels)
Audio Volume	Adjustable, control digipots

## Color Doppler Mode

Screen Formats	2D+CFM (Single, Dual, Quad)
Frequency range	1 – 16 Mhz (Depending on the probe, 3 steps high, mid, low)
Display Modes:	<ul style="list-style-type: none"> <li>• Simultaneous dual mode: 2D/2D+CFM</li> <li>• Triplex mode: 2D+CFM/PW, 2D/M+MCFM</li> <li>• Volume Mode: 3D+CFM</li> </ul>
Color coding steps	65536 steps
Display modes:	<ul style="list-style-type: none"> <li>• V-T (velocity + turbulence)      • V (velocity)</li> <li>• V-P (velocity + power)            • T (turbulence)</li> <li>• P-T (power + turbulence)</li> </ul>
Depth range: axial	
• 0 to B scan range	• Lateral: 0 to B scan range
Baseline shift	17 steps (independent from spectral Doppler)
Inversion of color direction	Yes
Wall Motion Filter	8 steps (low1, low2, mid1, mid2, high1, high2, max1, max2)
Smoothing Filter	
• 12 steps rising time	• 12 steps falling time
Gain control	+15 dB to -15 dB, 0.2 dB step
Line Density (color line density)	10 steps
Ensemble (color shots per line)	CFM: 7 to 31 MCFM: 8 to 16
Flow Resolution	4 steps (low, mid1, mid2, high)
Pulse repetition frequency	
• CFM: 150 Hz to 20.5 kHz, MCFM: 150 Hz to 20.5 kHz	
Color Map	8 different color codes for each probe
Balance	From 25 to 225
Max. meas. velocity	4.23 m/sec
Min. meas. velocity	0.3 cm/sec
Scale	kHz, cm/s, m/s
Automatic moving tissue suppression	Yes

## Power Doppler Mode (PD)

Screen Formats	2D+PD (Single, Dual, Quad)
Frequency range	1-16Mhz (Depending on the probe, 3 steps high, mid, low)
Display Modes:	<ul style="list-style-type: none"> <li>• Simultaneous dual mode: 2D/2D+PD</li> <li>• Triplex mode: 2D+PD/PW</li> <li>• Volume Mode: 3D+PD;</li> </ul>
PD coding	256 color steps
PD window size	
• Lateral: maximum to minimum B mode scan angle	
• Axial: B-scan range	
Display mode	P (power)
Wall motion Filter	8 steps (low1, low2, mid1, mid2, high1, high2, max1, max2)

Smoothing Filter:	
• Rising edge 12 steps	• Falling edge: 12 steps
Gain control	+15dB to -15dB, 0.2dB steps
PD Ensemble	7 to 31
PD Line Density	10 steps
Pulse repetition frequency	150 Hz to 20,5kHz
PD Map	8 different color codes for each probe
Flow Resolution	4 steps (low, mid1, mid2, high)
Balance	From 25 to 225 in 41 steps
Artefact suppression	Yes

## HD-Flow

Screen Formats	2D+HDF (Single, Dual, Quad)
Frequency range	1-16Mhz (Depending on the probe, 3 steps high, mid, low)
Display Modes:	<ul style="list-style-type: none"> <li>• Simultaneous dual mode: 2D/2D+HDF</li> <li>• Triplex mode: 2D+HDF/PW; 2D/M+MHDF</li> <li>• Volume Mode: 3D+HDF</li> </ul>
HD-Flow Coding Steps	256 color steps
HD-Flow window size:	
• Lateral: maximal to minimal B mode scan angle;	
• Axial: B-scan range	
Display mode	P (power)
Wall Motion Filter	8 steps (low1, low2, mid1, mid2, high1, high2, max1, max2)
Smoothing Filter:	
• 12 steps rising edge	• 12 steps falling edge
Gain Control	+15dB to -15dB, 0.2dB steps
HD-Flow Ensemble	7 to 31
HD-Flow Line Density	10 steps
Pulse Repetition Frequency	150Hz to 20.5KHz
HD-Flow Map	8 different color codes for each probe)
Flow Resolution	4 steps (low, mid1, mid2, high)
Balance	From 25 to 225
Artefact suppression	Yes

## Tissue Doppler Mode (TD)

Screen Formats	2D+TD (Single, Dual, Quad)
Display Modes	<ul style="list-style-type: none"> <li>• Simultaneous dual mode: 2D/2D+TD</li> <li>• Triplex mode: 2D+TD/PW, 2D/M+MTD</li> </ul>
TD coding steps	65536 color steps
Depth range:	
• Axial: 0 to B-scan range	• Lateral: 0 to B-scan-range
Zero line shift	17 steps
Inversion of color direction	Yes
Smoothing Filter:	
• 12 steps rising time	• 12 steps falling time



## Tissue Doppler Mode (TD) (con't.)

Gain control	+15 dB to -15 dB, 0.2 dB steps
Line Density (color line density)	10 steps
Ensemble (color shots per line)	3 to 31
Flow Resolution	4 steps (low, mid1, mid2, high)
Pulse repetition frequency	150 Hz to 20,5 kHz
TD Map	4 different color codes for each probe
Frequency range	1 to 16 MHz depending on the probe, adjustable in 3 steps (low, mid, high)
Balance	from 25 to 225
Max. meas. velocity	4.23 m/sec
Min. meas. velocity	0.3 cm/sec
Display Mode	V (velocity)
Scale	kHz, cm/s, m/s

## Volume Scan Mode

Vol. scan size: max. 64 MB for gray volumes; max. 90 MB for color volumes; The required memory space depends on scan parameters (VOL-box size and quality (low, mid1, mid2, high1, high2, max). Typical: 0.8-5 MB

Lines/2D-image: max. 1024 (Typical: 80 to 350)

2D-images/volume: Up to 4096 (Acquisition Mode dependent)

VOL-Frames/sec.: max. 40; The frame rate depends on scan parameters: VOL-Box size, quality and probe.

4D Volume Cine: up to 128 volumes

Display of sectional plane images: synchronous with control setting, arbitrary movement in volume, monitored position in volume.

Rotation: 360°, 1° or 3° increments (X-, Y- and Z-axis)

Magnification: adjustable from 0.3 to a factor of 4.00

Acquisition Modes:

3D Static:

- 3D (2D incl. CRI)
- 3D/PD (incl. CRI)
- 3D/CFM (incl. CRI)
- 3D/HD-Flow incl. CRI)
- 3D B-Flow
- 4D
  - 4D Real time
  - 4D Biopsy
- VCI- OmniView
- STIC
  - Fetal Cardio
  - STIC Angio: B/Power Doppler (incl. CRI),
  - STIC CFM: B/Color Doppler (incl. CRI)
  - STIC HD-Flow: B/HD-Flow (incl. CRI)
  - STIC B-Flow
  - STIC TD

Visualization Modes:

- 3D Rendering (diverse surface and intensity projection modes)
- SonoRender Start
- Sectional Planes
- Multiplanar

- OmniView, actual –and projected view (Option)
- Niche
- SonoVCAD*labor*
- TUI (Tomographic Ultrasound Imaging (overview image + parallel slices)
- TUI Standard
- SonoVCAD*heart*
- Volume Analyses
- VOCAL: semi-auto/ manual segmentation tool (segmentation using touch screen), (3D Static only) Threshold Volume: measure volume below and above a threshold
- SonoAVC*follicle* (Sono Automated Volume Count) with manual, semi-automatic & automatic modes)
- Advanced VCI (Volume Contrast Imaging)

Render Modes:

- Surface texture
- Surface Smooth
- Surface Skin and Smooth
- HD*live* Surface and Smooth
- max-, min- and X-ray (average intensity projection)
- Gradient
- Inversion
- Glass Body
- Mix Mode of two Render Modes

Display graphics:

- Rotation axis, center point;
- ROI box, 3D Frame;
- Temporary display of onscreen controls (rotation, translation)

Gray maps: 18

3D Image: one general map adjustable with bright (-50 – 50) & contrast (-50 – 50)

Tint maps: Slices: 15; 3D Image: 15

Depth render maps: 3

Frequency range: 1 – 8 Mhz (Depending on the probe, 3 steps high, mid, low)

## BF (B-Flow)

Screen Formats	Single (BF), Dual (BF+BF), Quad (BF+BF+BF+BF)
Display Modes	BF, Update: BF/PW
Acoustic Power range	1 – 100%
Scan angle	Taken from 2D
GAIN range	+ 15 to - 15 dB
Gray scale values	8 bit
SRI	Taken from 2D
Persistence filter	8 steps (pre)
S./PRI	1.00, 1.50, 2.00, 3.00, 4.00...15.00
Enhance	6 steps (pre) 0, 1, 2, 3, 4, 5
Quality	3 steps (pre) low, norm, high
Gray maps	18
Tint maps	15
Dynamic	12 different dynamic curves C1 – C12
Accumulation	Off, 0.20, 0.35, 0.50, 0.75, 1.00, 1.50, Infinite

## BF (B-Flow) (con't.)

Background	0, 1, 2
Frequency range	1 – 16 Mhz (Depending on the probe, 3 steps high, mid, low)

## Scanning Features

### Coded Excitation (CE)

Availability depends on probe

### Coded Harmonic Imaging (CHI)

Harmonic Imaging

Available on all probes

### Focus Frequency Composite - (FFC)

Availability depends on probe

### Compound Resolution Imaging (CRI)

Available on all probes except 3Sc-RS and 12S-RS

### Speckle Reduction Imaging

Available on all probes

### Virtual Convex

Available on all linear and sector probes

### Wide Sector

Available on the following probes:

E8C-RS	RAB6-RS
RIC5-9W-RS	4C-RS
C1-5-RS	

## Measurements Tool

### Generic Measurements

Distance

- Distance (Point to Point)
- Distance (Line to Line)
- 2D Trace (Trace Length)
- 2D Trace (Point Length)
- Stenosis (% Dist)

Area/Circumference

- Ellipse
- Trace (Line)
- Trace (Point)
- Stenosis (% Area)
- Area (2 Dist.)

Volume: following Methods:

- 1 Distance
- 1 Ellipse
- 1 Dist. + Ellipse
- 3 Distance
- Multiplane - Planimetric Volume (3D only)

Angle:

- Angle (3 Point)
- Angle (2 Line)

M-Mode

- Distance (Point to Point)
- Time
- Slope
- HR
- Stenosis (% Dist)

Doppler Mode

• Auto & Manual Trace:

- PS (Peak Systole)
- ED (End Diastole)
- MD (Min. Diastole)
- PS/ED (Ratio)
- PI (Pulsatility Index)
- RI (Resistance Index)

• TAmx (Time avg. max. Velocity)

• TMean (Time avg. mean Velocity)

• VTI (Velocity Time Integral)

• Ductus venosus: S, D, a, PI, PLI, PVIV

• Heart Rate

• Single Measurements:

- Velocity
- Acceleration
- RI
- PI
- PS/ED
- Time
- HR

## Calculations

### Abdomen Calculations

Liver

Gallbladder

Pancreas

Spleen

Kidney (right/left)

Renal Artery (right/left)

Aorta (Proximal, Mid, Distal)

Portal Vein

Vessel

Bladder Volume

Summary Reports

### Small Part Default Calculations

Thyroid (right/left)

Testicle (right/left)

Vessel

Summary Reports

### Small Part Breast Calculations

Lesion 1-5 (right/left)

Summary Reports

### Obstetrics Calculations

Fetal Biometry

Early Gestation

Fetal Long Bones

NBL (Nasal Bone Length)

Fetal Cranium

NT Method: SonoNT/Manual

AFI

Uterus

Ovary

Fetal Doppler measurements (Ductus Art., Ductus Ven., Ao, Carotid, MCA, Celiac Artery, Superior Mesenteric Artery, Umbilical Art., Umbilical Vein, Uterine Art., Umbilical Vein, FHR, Atrial FHR)

## Obstetrics Calculations *(con't.)*

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Gestational Age Calculation

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Gestational Growth Calculation

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Fractional limb Volume

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Fetal Weight (FW) Estimation

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Fetal Trend Graph

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Multi-Gestational Calculation & Fetal Compare

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Calculation and Ratios

---

Fetal Qualitative Description (Anatomical survey)

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Fetal Environmental Description (Biophysical profile)

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Summary Reports

---

## Obstetrics Fetal Echo

---

4-Chamber-view

---

Thorax

---

Outflow Tract, Aortic arch

---

Venous

---

Tricuspid valve

---

Mitral Valve

---

Aortic Valve

---

Main Pulmonary Artery

---

Pulmonary Valve

---

Aorta, Ductus Art.

---

Umbilical Vein, Ductus Ven.

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FHR

---

Atrial FHR

---

LVOT

---

RVOT

---

Pulmonary Veins

---

Carotid

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Summary Reports

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## Obstetrics Z-Scores

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Calculation of Z-Scores for:

- Long Axis
  - Aortic Arch
  - Short Axis
  - Obl. Short axis
  - 4 Chambers
  - Summary Reports
- 

## Cardiology

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2D Mode:

- LV Simpson (Single & Bi-Plane)
  - Volume (Area Length)
  - LV-Mass (Epi & Endo Area, LV Length)
  - LV (RVD, IVS, LVD, LVPW)
  - LVOT Diameter
  - RVOT Diameter
  - MV (Dist A, Dist B, Area)
  - TV (Diameter)
  - AV/LA (Aortic Valve/Left Atrium)
  - PV (Diameter)
- 

M-Mode:

- LV (IVS, LVD, LVPW, RVD)
  - AV/LA (Ao Root Diam, LA Diam, AV Cusp Sep., Ao Root Ampl)
  - MV (D-E, E-F Slope, A-C Interval, EPSS)
  - HR (Heart Rate), Atrial HR
- 

D-Mode:

- MV (Mitral Valve)
  - AV (Aortic Valve), TV (Tricuspid Valve)
  - PV (Pulmonary Valve)
  - LVOT & RVOT Doppler (Left & Right Ventricle Outflow Tract)
  - Pulmonic Veins
  - PAP (Pulmonary Artery Pressure measurement)
  - HR (Heart Rate)
- 

C-Mode:

- PISA
  - Tei-Index
- 

Others:

- Diast. Vol (Bi)
  - Syst.Vol.(Bi)
  - Stroke Volume
  - Volume Flow
  - Cardiac Output
  - Ejection Fraction
  - Fractional Fract.
  - Shortening
  - Myocardial Thickness
  - LA/Ao Ratio
  - E/A Peak
  - Peak Gradient Acceleration
  - Mean Gradient
  - Mean Gradient Acceleration
  - VTI
  - TVA
  - PG
  - PHT
  - MVA
  - AVA
  - ERO
  - CVP (Cardio Vascular Profile) Score
- 

Summary Reports

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## Urology

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Bladder

---

Prostate

---

Left/Right Testicle

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Left/Right Kidney

---

Left/Right Renal Artery

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Left/Right Dorsal Penile Artery

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Vessel

---

Summary Reports incl. PSAD, PPSA(1), PPSA(2) calculation

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## Vascular

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Left/Right CCA (Common Carotid Artery)

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Left/Right ICA (Internal Carotid Artery)

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Left/Right ECA (External Carotid Artery)

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## Vascular (con't.)

Left/Right Vertebral Artery
Left/Right Subclav.
Left/Right Bulb
Vessels
Summary Reports

## Gynecology

Uterus
Right/Left Ovary
Right/Left Follicle
Fibroid
Endometrial thickness (Dist, Double Dist.)
Cervix Length
Left/Right Ovarian Artery
Left/Right Uterine Artery
Vessels
Pelvic Floor
FHR
Summary Reports

## Pediatrics

Left/Right Hip Joint
Pericallosal Artery
Summary Report

## Neurology

Left/Right ACA (Anterior Cerebral Artery)
Left/Right MCA (Middle Cerebral Artery)
Left/Right PCA (Posterior Cerebral Artery)
Basilar Artery
A-Com. A (Anterior Com. Artery)
P-Com. A (Posterior Com. Artery)
Left/Right CCA (Common Carotid Artery)
Left/Right ICA (Internal Carotid Artery)
Left/Right Vertebral Artery
Vessels
Summary Reports

## OB Tables

### Age Tables:

- AC: ASUM, CFEF, Hadlock\_82, Hadlock\_84, Hansmann, Hobbins, Jeanty, JSUM, Kurmanavicius, Merz, Nicolaides, Shinozuka, Siriraj, Tokyo
- AD: Persson
- APAD: Merz
- APTD: Hansmann
- APTDxTTD: Shinozuka, Tokyo
- BOD: Jeanty
- BPD: ASUM, ASUM (old), Campbell, CFEF, Chitty (outer-outer) (outer-inner), Chitty, Hadlock\_82, Hadlock\_84, Hansmann, Hobbins, Jeanty, Johnsen, JSUM, Kurmanavicius, Kurtz, Persson, Merz, Nicolaides, OSAKA, Rempen, Sabbagha, Shinozuka, Siriraj, Tokyo, Verburg (outer-outer)
- CLAV: YARKONI
- CRL: ASUM, ASUM(old), DAYA, Hadlock, Hansmann, JSUM, Persson, Nelson, OSAKA, Rempen, Robinson, Shinozuka, Tokyo, Verburg
- EFW: Hadlock, JSUM 2001, Osaka, Shinozuka, Tokyo
- FL: ASUM, ASUM\_OLD, CFEF, Chitty, Hadlock\_82, Hadlock\_84, Hansmann, Hobbins, Hohler, Jeanty, JSUM, Kurmanavicius, Persson, Merz, Nicolaides, O'Brien, OSAKA, Shinozuka, Siriraj, Tokyo, WARDA
- FTA: OSAKA
- FIB: Jeanty
- GS: Hansmann, Hellman, Holländer, Rempen, Tokyo
- HC: ASUM, CFEF, Chitty, Hadlock\_82, Hadlock\_84, Hansmann, Jeanty, Johnsen, Kurmanavicius, Merz, Nicolaides, Siriraj
- HL: ASUM, Hobbins, Jeanty, Merz, OSAKA
- LV: Tokyo
- MAD: EIK-NES, Kurmanavicius
- OFD: ASUM, Chitty, Hansmann, Jeanty, Kurmanavicius, Merz, Nicolaides
- RAD: Jeanty, Merz
- TIB: Jeanty, Merz
- TAD: CFEF, Merz, Chitty, Goldstein, HILL, Hobbins, Nicolaides, Hansmann
- ULNA: Jeanty, Merz

### Growth Tables:

- AC: ASUM, CFEF, Chitty, Hadlock, Hansmann, Jacot-Uillardmod, Jeanty, JSUM, Kurmanavicius, Lessoway, Merz, Nicolaides, Shinozuka, Siriraj, Tokyo, Verburg
- AD: Persson
- AFI: Moore
- Aorta Vmax: Rizzo
- APTDxTTD: Shinozuka, Tokyo
- BOD: Jeanty
- BPD: ASUM, Campbell, CFEF, Chitty, Hadlock, Hansmann, Jacot-Uillardmod, Jeanty, JSUM, Kurmanavicius, Lessoway, Persson, Merz, Nicolaides, OSAKA, Sabbagha, Shinozuka, Siriraj, Tokyo, Verburg
- CLAV: YARKONI
- CM: Nicolaides
- CRL: ASUM, Hadlock, Hansmann, JSUM, Persson, OSAKA, Robinson, Shinozuka, Tokyo
- DV PI, DV PLI, DV PVIV, DV S/a: Baschat
- EFW: Brenner, Doubilet, Hadlock, Hansmann, Hansmann(86), Hobbins/Persutte, JSUM 2001, Persson, Osaka, , Shinozuka, Tokyo, Williams, Yarkoni (Twins) , Ananth (Twins, Monochorionic), Ananth (Twins Dichorionic)

## OB Tables (con't.)

### Growth Tables (con't.):

- FL: ASUM, CFEF, Chitty, Chitty, Hadlock, Hansmann, Jacot-Uillarmod, Jeanty, JSUM, Kurmanavicius, Lessoway, Persson, Merz, Nicolaides, O'Brien, OSAKA, Shinozuka, Siriraj, Tokyo, Verburg, WARDA
- FTA: OSAKA
- FIB: Chitty, Jeanty, Siriraj
- Foot: Chitty
- GS: Hellman, Rempen, Tokyo
- HC: ASUM, CFEF, Chitty, Hadlock, Hansmann, Jacot-Uillarmod, Jeanty, Kurmanavicius, Lessoway, Merz, Nicolaides, Siriraj, Verburg
- HL: ASUM, Chitty, Jeanty, Merz, OSAKA, Siriraj
- LV: Tokyo
- MCA PI, RI: JSUM, Bahlman
- MCA PV: Mari
- MAD: EIK-NES, Kurmanavicius
- MV E/A: HARADA
- NBL: BUNDUKI, SONEK
- OFD: ASUM, Chitty, Hansmann, Jeanty, Kurmanavicius, Merz, Nicolaides
- MainPA Vmax: Rizzo
- RAD: Chitty, Jeanty, Merz, Siriraj
- TAD: CFEF, JACOT-GUILLARMOD, Merz,
- TCD: Goldstein, HILL, JACOT-GUILLARMOD, Nicolaides, Verburg
- TIB: Chitty, Jeanty, Merz, Siriraj
- TTD: Hansmann
- TV E/A: HARADA
- ULNA: Chitty, Jeanty, Merz, Siriraj
- UmbArt PI: JSUM, Merz
- UmbArt RI: JSUM, Merz, Kurmanavicius
- Fractional Limb Avol/Tvol: Lee

### Fetal weight Estimation (EFW)

- Campbell (AC)
- Hadlock (AC, BPD)
- Hadlock 1 (AC, FL)
- EFW
- Hadlock 2 (BPD, AC, FL)
- Hadlock 3 (HC, AC, FL)
- Hadlock 4 (BPD, HC, AC, FL)
- Hansmann (BPD, TTD)
- Merz (AC, BPD)
- Osaka (BPD, FTA, FL)
- Persson (BPD, MAD, FL)
- Persson 2
- Schild (HC, AC, FL)
- Shepard (AC, BPD)
- Shinozuka 1 (BPD, APTD, TTD, FL)
- Shinozuka 2 (BPD, FL, AC)
- Shinozuka 3 (BPD, APTD, TTD, LV)
- Tokyo (BPD, APTD, TTD, FL)

## Fetal ratios

CI (BPD/OFD) (Hadlock)

FL/AC (Hadlock)

FL/BPD (Hohler)

FL/HC (Hadlock)

HC/AC (Campbell)

Va/Hem (Nicolaides)

Va/Hem (Hansmann)

Vp/Hem (Nicolaides)

## Probes

### RAB6-RS

Applications	Abdomen, Obstetrics, Gynecology, Urology, Pediatric
Maximum Bandwidth (-20 dB)	2 – 8 MHz
Number of Elements	192
Convex Radius	47 mm
Volume Sweep Radius	24.11 mm
FOV	63° (B), 63° x 85° (Volume Scan)
Wide	90° (B), 90° x 85° (Volume scan)
Depth	max 26 cm
Footprint	62.2 x 34.0 mm
Centre Freq.	4.4 MHz
Doppler Tx. Frequency.	5.0, 4.0, 3.03 MHz
Harm. Tx. Frequency	3.57, 2.70, 2.63 MHz
Biopsy Guide Available	H48681ML

### RIC5-9W-RS

Applications	Obstetrics, Gynecology, Urology
Bandwidth (-20 dB)	4 – 9 MHz
Number of Elements	192
Convex Radius	11.6 mm
Volume Sweep Radius	11.6 mm
FOV	146° (B), 120°*146° (Volume scan)
Wide	179° (B), 120°*179° (Volume scan)
Depth	max. 16 cm
Footprint	22.4 x 22.6 mm
Centre freq.	6.6 MHz
Doppler Tx. Frequency.	6.25, 5.56, 5.00 MHz
Harm. Tx. Frequency	4.17, 4.17, 4.17 MHz
Biopsy Guide Available	PEC 63, Single-Angle, Reusable; disposable biopsy guide.



**C1-5-RS**

Applications	Abdominal, Obstetrics, Gynecology
Maximum Bandwidth (-20 dB)	2 – 5 MHz
Number of Elements	192
Convex Radius	56.1 mm
Volume Sweep Radius	n/a
FOV	69°
Wide	113°
Footprint	69.3 x 17.2 mm
Depth	max. 30 cm
Centre frequency	3.4MHz
Doppler Tx. Frequency	3.23, 2.86, 2.13 MHz
Harm. Tx. Frequency	2.33, 2.22, 2.08 MHz
Biopsy Guide Available	Multi-Angle, disposable with reusable bracket

**4C-RS**

Applications	Abdominal, Obstetrics, Gynecology
Maximum Bandwidth (-20 dB)	2 – 5 MHz
Number of Elements	128
Convex Radius	60.0 mm
Volume Sweep Radius	n/a
FOV	58°
Wide	81°
Depth	max. 30 cm
Footprint	68.7 x 18.3 mm
Centre frequency	3.1 MHz
Doppler Tx. Frequency	3.23, 2.70, 2.27 MHz
Harm. Tx. Frequency	2.38, 2.27, 2.08 MHz
Biopsy Guide Available	Multi-Angle, disposable with reusable bracket

**E8C-RS**

Applications	Obstetrics, Gynecology, Urology
Maximum Bandwidth (-20 dB)	4 – 10 MHz
Number of Elements	128
Convex radius	11.4 mm
Volume Sweep Radius	n/a
FOV	123°
Wide	161°
Footprint	22.1 x 10.7 mm
Depth	max. 16 cm
Centre Freq.	6.5 MHz
Doppler Tx. Frequency.	6.67, 5.88, 4.76 MHz
Harm. Tx. Frequency	4.55, 4.17, 3.70 MHz
Biopsy Guide Available	Single-Angle, Reusable and Disposable

**8C-RS**

Applications	Abdominal, Small Parts, Cardiology, Peripheral Vascular, Pediatrics
Maximum Bandwidth (-20 dB)	4 – 10 MHz
Number of Elements	128
Convex radius	11.4 mm
Volume Sweep Radius	n/a
FOV	132°
Depth	max. 16 cm
Footprint	22.0 x 12.0 mm
Center Freq.	6.5 MHz
Doppler Tx. Frequency.	6.67, 5.88, 4.76 MHz
Harm. Tx. Frequency	4.55, 4.55, 4.55 MHz

**12L-RS**

Applications	Small Parts, Peripheral Vascular, Pediatrics, MSK
Maximum Bandwidth (-20 dB)	4 – 12 MHz
Number of Elements	192
Volume Sweep Radius	n/a
FOV (Width)	37 mm
Footprint	47.2 x 13.8 mm
Depth	max. 8 cm
Centre Freq.	7.7 MHz
Doppler Tx. Frequency	7.14, 6.25, 5.26 MHz
Harm. Tx. Frequency	5.56, 5.00, 4.55 MHz
Biopsy Guide Available	Multi-Angle, disposable with reusable bracket

**9L-RS**

Applications	Small Parts, Obstetrics, Peripheral Vascular, Pediatrics, MSK
Maximum Bandwidth (-20 dB)	3 – 8 MHz
Number of Elements	192
Volume Sweep Radius	n/a
FOV (Width)	44 mm
Footprint	53.0 x 14.1 mm
Depth	max. 14 cm
Center Freq.	5.3 MHz
Doppler Tx. Frequency	5.27, 4.55, 3.71 MHz
Harm. Tx. Frequency	4.18, 3.87, 3.04 MHz
Biopsy Guide Available	Multi-Angle, Reusable

### 3Sc-RS

Applications	Abdominal, Cardiology, Obstetrics, Pediatrics
Maximum Bandwidth (-20 dB)	1 – 4 MHz
Number of Elements	64
Volume Sweep Radius	n/a
FOV (Width)	90°
Footprint	23.7 x 18.4 mm
Depth	max. 24 cm
Center Freq.	2.8 MHz
Doppler Tx. Frequency	2.5, 2.17, 1.85 MHz
Harm. Tx. Frequency	2.0, 1.92 MHz
Biopsy Guide Available	Multi-Angle, Reusable

### P2D

Applications	Cardiology, Peripheral Vascular, Neurology
Footprint	17 mm
Frequency	2.0 MHz

## External Inputs and Outputs

### Connectivity:

HDMI Out

Network (RJ45)

External Audio Out

USB (2x in front, 1x in rear))

AC Power Input

Probe connector

### Safety Conformance

The Voluson S8 is:

Listed to UL 60601-1 by a Nationally Recognized Test Lab

Certified to CSA 22.2, 60601.1 by an SCC accredited Test Lab

CB-Test report by National Certification Body

CE Marked to Council Directive 93/42/EEC on Medical Devices

Conforms to the following standards for safety:

IEC 60601-1 Electrical medical equipment

IEC 60601-1-1 Electrical medical equipment

IEC 60601-1-2 Electromagnetic compatibility

IEC 60601-1-4 Programmable medical systems

IEC 61157 Declaration of acoustic output

ISO 10993 Biological evaluation of medical devices

NEMA UD3, UD2 Acoustic output display (MI, TIS, TIB, TIC)

IEC 60601-2-37 Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment

IEC60601-1-6 Usability

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