

Voluson *i* BT11

The Compact 4D Choice

Product Description

The Voluson *i* compact ultrasound system combines performance and reliability with innovative Volume ultrasound technology to deploy high-end ultrasound imaging in convenient laptop design.

The Voluson *i* offers premium image quality for a wide variety of applications incorporating advanced features.

Highlights

- Lightweight and portable
- Battery operation
- Real-Time 4D
- 3D Multiplanar Display
- 3D Power Doppler
- Automatic Optimization (AO)
- SRI II (Speckle Reduction Imaging II)
- CrossXBeam (CRI)
- TUI (Tomographic Ultrasound Imaging)
- VOCAL
- VCI (Volume Contrast Imaging)
- XTD (Extended field of View)
- 4D Biopsy
- STIC
- SonoNT
- SonoRenderStart
- SonoAVCT™ *follicle*
- SonoVCAD™ *heart*
- SonoVCAD™ *labor*
- HD-Flow
- HD Zoom



Figure 1. Voluson *i*
Portable Volume
Ultrasound Technology



- Volume Cine

General Specifications

Dimensions and Weight

- Height: 64 mm (2.5 in)
- Width: 358 mm (14.2 in)
- Depth: 313 mm (12.4 in)
- Weight (no peripherals):
 - 12.6 lb/5.7 kg (incl. battery)
 - 11lb/5 kg (w/o battery)

Electrical Power

- Voltage: 100 - 250 V
- Frequency: 47/63 Hz

Console Design

- 1 Active Probe Port
- Integrated HD (80 GB)
- 2 USB Ports
- Rj 45 LAN port
- 1 PCMCIA Slot
- 1 VGA Out Port
- 1 proprietary Docking Port
- 1 proprietary Battery Slot
- Handle

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 15-inch TFT LCD Screen
- Resolution 1024X768
- Image size: 800x600
- High brightness with 400 cd/m² typical, used at 70%
- Wide Image area: 800x560 for Ultrasound images
- Digital brightness & contrast adjustment.
- Brightness/Contrast Control

System Overview

Applications

- Obstetrics
- Gynecology
- Abdominal
- Small-Parts
- Peripher-vascular
- Pediatrics
- Urology
- Oncology
- Orthopedics

Operating Modes

- B-Mode (2D)
- M-Mode (M)
- M-Color-Mode (MC)
- Color Flow Mode (C)
- Power Doppler Imaging (PD)
- HD-Flow Imaging (HD-Flow)
- PW Doppler (PW)
- Extended View (XTD View)
- Volume Mode (3D/4D):
 - 3D Static
 - 3D with Color Flow
 - 4D Real-Time
 - VCI
 - STIC

Scanning Methods

- Electronic Convex
- Electronic Linear
- Mechanic Volume Sweep

Transducer Types

- Convex Array
- Linear Array
- Volume probes '4D' Convex Array
- Volume probes '4D' Linear Array
- Volume probes '4D' Microconvex Array

System Standard Features

- 3D/4D Mode
- Innovative user interface with onscreen menus
- HD-Flow
- Automatic Tissue Optimization (AO)
- Coded Harmonic Imaging

- XTD
- SRI II
- CRI
- Static 3D Mode:
 - B-Mode only
 - B + Power Doppler Mode
 - B + CFM Doppler Mode
 - B + HD-Flow Mode
 - B + CRI
 - B+SRI
 - B + SRI + CFM
 - B + SRI + PD
 - B+ SRI + HD-Flow
- Focus Frequency Composite (FFC)
- High Resolution Zoom (HD Zoom)
- Pan Zoom
- Beam Steering
- Virtual Convex
- Beta View
- SonoNT*
- SonoRenderStart
- Patient information database
- SonoView II: On-board image/data storage software, storage on external USB mass storage or internal hard drive
- Real-Time Automatic Doppler Calculations
- Standby Mode

* regional availability limitation

Measurement & Calculations including Worksheets/Report for:

- Obstetrics
- Gynecology
- Abdominal
- Small-Parts
- Vascular
- Pediatrics
- Urology
- Cardiology
- Neurology
- Orthopedics

System Options

- 3D/4D Expert
- 4D View PC Software
- DICOM 3
- 4D Biopsy

- VCI
- XTD
- TUI – Tomographic Ultrasound Imaging
- Cart with integrated power supply and three probe connectors
- GoPack carrying case
- SonoVCAD™ *heart*
- SonoAVC™ *follicle*
- SonoVCAD™ *labor*
- STIC
- VOCAL

Peripheral

- Printers:
 - B/W Printer
 - Color Printer
 - Bluetooth Line Printer
- External USB DVD Writer
- USB Stick
- USB Hub
- USB Hard Drive
- Video Converter
- PCMCIA WLAN Card
- DVD Recorder
- Secondary Battery
- Battery charger
- Footswitch

Display Modes

- Simultaneous Capability
 - B+PW
 - B+CFM, B+PD, B+HD-Flow
 - B+M
 - B+3D; B+4D
 - B+CRI
 - B+SRI
 - B+CRI+SRI
 - B+SRI/4D+SRI
 - B+CRI/STIC+CRI
 - B+SRI/STIC+SRI
 - B+CRI+SRI/STIC+CRI+SRI
 - B/B+CRI
 - B/B+SRI
 - B/B+SRI+CRI
 - B/CFM+SRI
 - B/PD+SRI
 - B/HD-Flow +SRI
- Real-Time Triplex Mode
 - B/CFM/PW,
 - B/PD/PW
 - B/HD-Flow/PW
- Selectable alternating Modes
 - B+PW
 - B/CFM+PW
 - B/PD+PW

- B/HD-Flow+PW
- B+CFM or PD or HD-Flow
- Multi-image (split, quad)
 - Live and/or frozen split: B+B, B/CFM + B/CFM, or B/PD + B/PD or B/HD-Flow + B/HD-Flow
 - Split simultan: B+B/CFM or B+B/PD or B+B/HD-Flow
 - split: B+PW or M
 - split: frame review/XTD-View
 - quad: B+B+B+B, B/CFM+B/CFM+B/CFM +B/CFM or B/PD + B/PD +B/PD+B/PD or B/HD-Flow+B/HD-Flow+B/HD-Flow+B/HD-Flow
 - Independent Cine playback
 - Quad: A+B+C+3D
 - 3x3: T.U.I overview + 8 parallel slices
 - Quad: T.U.I Overview + 3 slices
- Zoom Read/Write
- Colorized Image
 - Colorized B
 - Colorized M
 - Colorized PW
 - 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)

Display Annotation

- Patient Name:
 - Last: max 32 characters
 - First: max 15 characters
 - Middle: max 15 characters
- ID: max 32 characters
- Accession #: max 16 characters
- Hospital Name: 30 characters max
- Sonographer: max 32 characters
- Gestational age
- Date: 3 Types selectable
 - MM/DD/YY
 - DD/MM/YY

- YY/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
 - Acoustic Power
 - Receiver Frequency
 - Gain
 - Dynamic Contrast
 - Gray Map
 - Edge Enhance
 - Persistence
 - SRI, CRI
 - Focal Zone Markers
 - Depth Scale Marker
 - Probe Orientation
- M-Mode
 - Gain
 - Dynamic Contrast
 - Edge Enhance
 - Reject
 - M-Cursor
 - Time Scale
- Doppler Mode
 - Acoustic Power
 - Gain
 - Angle
 - Sample Volume Depth and Width
 - Wall Motion Filter
 - Velocity or Frequency Scale
 - Spectrum Inversion
 - Time Scale
 - PRF
 - Doppler Frequency
- Color Flow Doppler Mode
 - Acoustic Power
 - Color Gain
 - Color Balance
 - Color Balance Marker
 - Quality
 - Wall Motion Filter
 - PRF
 - Color Map
 - Color Scale: Symmetrical Velocity

- Imaging and Color Velocity Range
 - Spectrum Inversion
- 3D/4D Mode
 - 3D/4D Sub Program
 - Threshold
 - Quality
 - Volume Box Angle
 - Mix
 - Acquisition Mode
 - Compression
 - Orientation Markers
- TGC Curve
- Cine Frame Number
- Body Pattern
- Imaging State (Live, Cine, Update)
- Measurement Results
- Displayed Acoustic Output
 - TIS: Thermal Index Soft Tissue
 - TIC: Thermal Index Cranial (Bone)
 - TIB: Thermal Index Bone
 - MI: Mechanical Index
 - Power Output
- Biopsy Guide Line
- Trackball Status
- System Status (network, battery, printer)
- GE Logo

System Parameters

System Setup

- Pre-programmable categories date format
- User Programmable Preset Capability User program
- Languages: English, French, German, Spanish, Italian, Norwegian, Dutch, Finnish, Swedish, Danish
- Up to 400 Programmable Annotations organized in 10 anatomical groups

Measure Setup

- 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

Pre-Processing

- Write Zoom up to 8x
- B/M-Mode
 - Gain
 - TGC
 - Dynamic Range
 - Acoustic Output
 - Transmission Focus Position
 - Transmission Focus Number
 - Transmission Frequency
 - Edge Enhancement
 - Persistence Control
 - Line Density Control
 - Reject
 - Sweep Speed
 - M-Cursor position
- PW-Mode
 - Gain
 - Dynamic Range
 - Acoustic Output
 - Transmission Frequency
 - PRF
 - Wall Motion Filter
 - Sample Volume Gate Length, Depth, Pos
 - Velocity Scale
 - Sweep Speed
- Color Flow Mode
 - CFM
 - Acoustic Output
 - PRF
 - Wall Motion Filter
 - Line density
 - Ensemble
 - Dynamic
 - Smooth (Rise and Fall)
 - Frequency
 - Balance
 - Line Filter
 - Quality
 - Artifact Suppression

Post-Processing

- Read Zoom: max: 2.4 (with HD-Zoom functionality up to 22x Zoom)
- Max Zoom (Write+Read) up to 16x
- B/M-Mode

- Gray Map
 - Colorized B and M
- PW Mode
 - Gray Map
 - Base Line Shift
 - Angle Correction
 - Colorized D
 - Scale (KHz, m/s, cm/s)
 - Trace
 - Invert
- Color Flow
 - Color Map
 - CFM Display Threshold
 - Display Mode (V, V-T, V-P, P-T, T)
 - Scale
 - Base Line

Image Processing and Presentation

Digital Beam former

- 8448 channels MLA2
- Up to 150 dB Dynamic Range, adjustable by selecting 12 Dynamic Contrast Curves
- Displayed Imaging Depth: 0 - 30 cm
- 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
- Image Reverse: Right/ Left
- Rotation: 0°, 180°

CINE Memory/Image Memory

- CINE Memory: up to 140 MB (up to 3000 2D images)
- Dual Image CINE Display
- Quad Image CINE Display
- CINE image number display
- CINE Review Loop

- CINE Review Speed: 4 speeds: 25/50/100/200%
- Length of CINE Sequence Review selectable (start/end image)
- Measurements/ Calculations & Annotations on CINE Playback

Image/Volume Storage

- On-board data storage: storage of:
 - Images data stored as:
 - Raw Data file (proprietary format)
 - DICOM file
 - Volume files:
 - Format: Proprietary
 - Size: typically: 0.8 -5MB (depending on probe and adjusted volume size)
- Lossy and lossless compression available
- Cine Review
- Single Volume (raw data, conversion to Cartesian format)
- Volume Cine (raw data)
- 3D Movie
- Measure Reports
- Information from past exams
- Export functions:
 - Format:
 - BMP, TIFF or JPEG
 - Volume (proprietary format)
 - Export to: DVD/CD+(RW), Network, USB storage devices
 - E-Mail: data files as attachment
 - Backup function to: DVD/CD+(RW), Network, USB storage devices
 - AVI-Files: conversion and export to: DVD/CD+(RW), Network, USB storage devices
 - Hard Drive Data Storage:70 GB

Connectivity

- Ethernet network connection
- WLAN network connection
- 2 USB ports for hard disks/memory sticks
- DICOM support (option)
- Verify
- Print
- Store

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

Scanning Parameters

B-Mode

- B Acoustic Power: 1-100%
- B Gain: +/-15dB range, 1dB steps
- Slide pots: +/- 15dB
- Dynamic range: max 150 dB, 12 dynamic contrast curves
- Persistence: 8 steps
- B Gray Scale Map: 9 maps
- B Edge Enhancement: 5 steps
- Line Filter: 3 steps
- Reject: range 0-255, step size 5,
- Frequency Selection: 3 steps
- Quality (Line Density): 3 steps
- Scanning Size (FOV or Angle depending on probe)
- B Colorization: 8 chroma maps
- BetaView (Volume probes only)

M-Mode

- M Acoustic 1-100%
- M Gain: +/-15dB range, 1dB steps
- Slide pots: +/- 15dB
- Dynamic range: max 150 dB, 12 dynamic contrast curves
- M Gray Scale Map: 9 maps
- M Edge Enhancement: 5 steps
- M Sweep Speed: 4 types
- M Colorization: 5 chroma maps
- M Reject: range 0-255, step size 5,

M-Color Flow Mode

- Acoustic MCFM Power: 1-100%
- Frequency range: 1-15Mhz (Depending on the probe, 3 steps high, mid, low)
- Color Map: 8 maps
- CFM Gain: +/-15dB range, 0.2 dB steps
- CFM Velocity Scale Range:
- PRF: 100Hz to 13kHz
- Wall Filter: 8 - 3000 Hz

- Ensemble (color shots per line) 8-16, step size 1
- Gentle color filter
- Line Filter: 8 steps
- Smooth filter:
 - Rise: 12 steps
 - Fall: 12 steps
- CFM Spectrum Inversion
- CFM Baseline Shift: 17 steps
- Pre-settable and independently adjustable B-Mode gain in B/CFM mode
- 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
 - 3 scales (kHz, cm/s, m/s)

Spectral Doppler Mode (PW)

- Acoustic Power: 1-100%
- Transmit Frequency Range:
- PW: 1 - 15Mhz
- Gain: +15/-25dB range, 1dB steps
- Displayed dynamic range: 10-40dB (15 steps)
- Gray Scale: 9 maps
- PW Wall Filter: 70 - 500Hz, 7 steps, PRF dependent
- Colorization: 6 chroma maps
- PW PRF: 1.3-22.0 kHz
- PW: Velocity Scale Range: (Depending on probe Frequency)
 - 2 MHz, 0°, max. zero shift range: 1cm/s - 8m/s
 - 2 MHz, 60°, max. zero shift range: 1cm/s - 16m/s
- PW Sweep Speed: 4 types
- Time Resolution:
 - Simplex 2.2, 3.3, 4.4, 6.6,10 m/s
 - Duplex/Triplex 4.4, 6.6,10 m/s
- Gate Size: 0.7mm - 15mm 11 steps
- Spectrum Analyzer (FFT):
 - max 256 channels
 - 255 amplitude levels

- Angle Correction: $\pm 0-85^\circ$, 1° step Available before Freeze and after Freeze
- Steered Linear: $0^\circ - 25^\circ$ (Depending on probe)
- Spectrum Inversion
- Baseline Shift: ± 8 steps from center
- Doppler Auto Trace

Color Flow Mode

- Acoustic Power: 1-100%
- Frequency range: 1-15Mhz (Depending on the probe, 3 steps high, mid, low)
- Color Map: 8 maps
- CFM Gain: 30dB range, 0.2 dB steps
- CFM Velocity Scale Range: PRF: 150Hz to 13kHz
 - less than ± 0.3 cm/s
 - max: ± 5.5 m/s
- Wall Filter: 8 - 3000 Hz
- Ensemble (color shots per line) 7-31, step size 1
- Line Density: 10 steps
- Gentle color filter
- Line Filter: 8 steps
- Smooth filter:
 - Rise: 12 steps
 - Fall: 12 steps
- CFM Window Size: max: same as B-image size
- Maximum Steerable Angle $\pm 25^\circ$ (probe dependent)
- CFM Spectrum Inversion
- CFM Baseline Shift: 17 steps
- Pre-settable and independently adjustable B-Mode Gain in B/CFM-Mode
- 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 + CFM/PW in any depth
 - 3 scales (kHz, cm/s, m/s)

Power Doppler Imaging (PD)

- Acoustic Power: 1-100%

- Frequency range: 1-15Mhz (Depending on the probe, 3 steps high, mid, low)
- PD Map: 8 maps
- Gain: 30dB range, 0.2 dB steps
- Velocity Scale Range:
 - PRF: 150Hz to 13kHz
 - Wall Filter: 8 - 3000 Hz
 - Ensemble (color shots per line) 7-31, step size 1
 - Line Density: 10 steps
 - Gentle color filter
 - Line Filter: 8 steps
 - Smooth filter:
 - Rise: 12 steps
 - Fall: 12 steps
 - PD Window size: max: same as B-image size
 - Maximum Steerable Angle $\pm 25^\circ$ (probe dependent)
 - Pre-settable and independently adjustable B-Mode Gain in B/PD-Mode
 - PD Threshold: 0 - 255 steps
 - Artifact suppression: on/off
 - Balance: 25 - 225, step size 5
 - Real-Time Triplex Mode:
 - B + CFM/PW in any depth

HD-Flow

- Acoustic Power: 1-100%
- Frequency range: 1-16Mhz (Depending on the probe, 3 steps high, mid, low)
- HD Color Map: 8 maps
- HD Gain: ± 15 dB range, 0.2 dB steps
- HD Velocity Scale Range: PRF: 150Hz to 20.5kHz
 - less than ± 0.3 cm/s
 - max: ± 2.12 m/s
- Wall Motion Filter: 8 - 3000 Hz, 7 steps
- Ensemble (color shots per line) 7-31, step size 1
- Line Density: 10 steps
- Line Filter: 8 steps
- Smooth filter: Rise: 12 steps, Fall: 12 steps
- HD Window Size: max: same as B-image size
- Maximum Steerable Angle $\pm 25^\circ$ (probe dependent)
- HD Spectrum Inversion

- Pre-settable and independently adjustable B-Mode Gain in B/HD-Mode
- HD Threshold: 1 - 255 steps
- Balance: 25 - 225, step size 5
- Artifact suppression: on/off
- Real-time Triplex Mode:
 - B + HD-Flow/PW in any depth

Auto Optimization (AO)

Available in:

- B-Mode
- PW-Doppler

Focus Frequency Composite - (FFC)

Available on the following probes:

- 4C-RS
- AB2-7-RS
- E8C-RS
- RAB2-5RS- RAB4-8RS
- RIC5-9RS
- RIC5-9W-RS
- RNA5-9RS

Virtual Convex

Provides a convex field of view for all linear transducers

- 12L-RS
- 9L-RS
- SP10-16-RS
- RSP6-16-RS

Volume Mode (3D/4D)

Acquisition Modes

- 3D Static: B-Mode (incl. CRI)
- 3D Angio: B/Power Doppler
- 3D CFM: B/Color Doppler
- 4D Real-Time
- 4D Biopsy (opt.)
- VCI-A (opt.)
- VCI-C (opt.)
- STIC : Fetal Cardio (opt.) (incl. CRI)
- STIC Angio: B/PD (opt.)
- STIC CFM: B/Color Doppler (opt.)
- STIC HD-Flow: B/HD-Flow (opt.)

Visualization Modes

- 3D Rendering (diverse surface and intensity projection modes)

- Sectional Planes (3 Section planes perpendicular to each other)
- Niche: 3D Static only
- VOCAL (optional): manual segmentation tool + threshold Volume: measure volume below and above a threshold
- T.U.I.(optional): Tomographic Ultrasound Imaging (overview mage + parallel slices)
- VCI Static (optional): 3D Static only (Sectional planes with VCI)
- SonoVCAD *heart* (optional)
- SonoAVC *follicle* (optional)
- SonoVCAD *labor* (optional)
- Cine Calc: 3D rot Cine
3D trans. Cine
3D slice Cine

Render Mode

- Surface texture, Surface Smooth, max-, min- and x-ray (average intensity projection), Gradient, Glass Body, Mix Mode of two render Modes
- 3D Movie
- Curved Render start
- MagiCut: 3D Cut tool
- Display Format
 - Quad: A-/B-/C-Plane/3D
 - Dual: A-Plane/3D
 - Single: 3D or A- or B- or C-Plane
- T.U.I 3x3: overview + 8 parallel slices
- T.U.I Quad: Overview + 3 slices
- 4D Volume Frames/sec: max 25 (typical: 4-10, depending on scan parameters)
- 4D Volume Cine: 128 bitmap images

Measurements / Calculations

Generic B-Mode and 3D

- Distance
 - Distance (Point to Point)
 - Distance (Line to Line)
 - 2D Trace (Trace Length)
 - Stenosis (% Dist)
 - 2D trace (point length)
- Area/Circumference

- Ellipse
- Trace (Line & Point)
- Stenosis (% Area)
- Area 2 Dist.
- Volume
 - 1 Distance
 - 1 Ellipse
 - 1 Dist. + Ellipse
 - 3 Distance
 - Planimetric Volume (3Donly)
- Angle:
 - Angle(3 Point)
 - Angle(2 Line)
 - Hip Joint

Generic M-Mode

- Distance
- Time
- Velocity
- HR
- Stenosis (% Dist)

Generic Doppler Measurements / Calculations

- Auto & Manual Trace:
 - PS (Peak Systole)
 - ED (End Diastole)
 - MD (Min. Diastole)
 - PS/ED (Ratio)
 - PI (Pulsatility Index)
 - RI (Resistance Index)
 - TAmav (Time avg. max. Velocity)
 - VTI (Velocity Time Integral)
 - Heart Rate
- Single Measurements:
 - Vel, Acceleration, RI, PI, PS/ED, Time, HR
- PG (Pressure Gradient)
 - PG mean
 - PG max

Real-Time Doppler Auto Measurements / Calculations

- PS (Peak Systole)
- ED (End Diastole)
- PD (Peak Diastole)
- MnV (Mean Velocity)
- VTI (Velocity Time Integral)
- RI (Resistance Index)
- PI (Pulsatility Index)
- S/D (Ratio)
- HR (Heart Rate)

OB Measurements / Calculations

Gestational Age by:

- AC (Abdominal Circumference)
- APTD (Anterior Posterior Thoracic Diameter)
- APTDxTTD
- BOD (Binocular Distance)
- BPD (Biparietal Diameter)
- CEREB (Cerebellum)
- CLAV (Clavicle)
- CRL (Crown Rump Length)
- EFW (Estimated Fetal Weight)
- FIB (Fibula)
- FL (Femur Length)
- FTA (Fetal Trunk Area)
- GS (Gestational Sac)
- HC (Head Circumference)
- HL (Humerus Length)
- LV (Length of Vertebra)
- MAD (Middle Abdomen Diameter)
- OFD (Occipital Frontal Diameter)
- RAD (Radius)
- TIB (Tibia Length)
- TTD (Transverse Thoracic Diameter)
- ULNA (Ulna Length)

Gestational Growth by:

- AC (Abdominal Circumference)
- APAD (Anterior Posterior Abdomen Diameter)
- APTD (Anterior Thoracic Diameter)
- APTDxTTD
- BOD (Binocular Distance)
- BPD (Biparietal Diameter)
- CEREB (Cerebellum)
- CLAV (Clavicle)
- CM (Cisterna Magna)
- CRL (Crown Rump Length)
- DV (Ductus Venosus)
- EFW (Estimated Fetal Weight)
- FIB (Fibula)
- FTA (Fetal Trunk Area)
- FL (Femur Length)
- GS (Gestational Sac)
- HC (Head Circumference)
- HL (Humerus Length)
- LV (Length of Vertebra)
- MAD (Middle Abdomen Diameter)
- MCA RI, PI, PS

- NBL (Nasal Bone)
- OFD (Occipital Frontal Diameter)
- RAD (Radius)
- TAD (Transverse Abdomen Diameter)
- TIB (Tibia Length)
- TTD (Transverse Thoracic Diameter)
- ULNA (Ulna Length)
- UmArt RI, PI (Umbilical Artery)
- UtArt RI, PI (Uterine Artery)

Estimated Fetal Weight (EFW) by:

- AC
- AC, BPD
- AC, BPD, FL
- AC, BPD, FL, HC
- AC, FL
- AC, FL, HC
- BPD, FTA, FL
- BPD, MAD, FL
- BPD, TTD
- BPD, APTD, TTD, FL
- BPD, APTD, TTD, LV

Calculations and Ratios

- FL/BPD
- FL/AC
- FL/HC
- HC/AC
- CI (Cephalic Index)
- Va/Hem, Vp/Hem
- AFI (Amniotic Fluid Index)

Tables / Calculations by:

- ASUM, Brenner, Campbell, CFEF, Chitty, Daya, Eik-Nes, Goldstein, Hadlock, Hansmann, Hellman, Hill, Hohler, Holländer, Jeanty, Johnsen, JSUM, Kurmanavicius, Kurtz, Marsal, Merz, Nelson, Nicolaides, O'Brien, Osaka, Rempen, Persson, Robinson, Shinozuka, Tokyo University, Shephard, Sabbagha, Warda, Williams, Yarkoni and other authors
- Programmable OB Tables

OB Report including

- Measure results (Calc)
- Measure results (Generic)
- Fetal Qualitative Description (Anatomical survey)

- Fetal Environmental Description (Biophysical profile)
- Fetal Graphical Trending
- Fetal Compare

GYN Measurements / Calculations

- Right Ovary Length, Width, Height
- Left Ovary Length, Width, Height
- Right Kidney Length, Width, Height
- Left Kidney Length, Width, Height
- Uterus Length, Width, Height
- Ovarian Volume
- ENDO (Endometrial thickness)
- Cervix Length
- Follicular measurements (10)
- Ovarian Artery
- Uterine Artery
- Vessel
- Summary Reports
- Pelvic Floor
 - detrusor wall thickness
 - bladder neck position at rest
 - bladder neck stress
 - urethral rotation (degrees)
 - maximal bladder descent
 - maximal uterine descent
 - residual Urine
 - max. descent of rectal. Ampulla
 - rectocele depth
 - levator hiatus stress

Vascular Measurements/Calculations

- CCA (Common Carotid Artery)
- ICA (Internal Carotid Artery)
- ECA (External Carotid Artery)
- Vertebral Artery
- Subclavian
- Bulb
- Vessels
- Summary Reports

Neuro Measurements/Calculations

- ACA (Anterior Cerebral Artery)
- MCA (Middle Cerebral Artery)
- PCA (Posterior Cerebral Artery)
- Basilar Artery

- A-Com. A (Anterior Com. Artery)
- P-Com. A (Posterior Com. Artery)
- CCA (Common Carotid Artery)
- ICA (Internal Carotid Artery)
- Vertebral Artery
- Vessels
- Summary Reports

Cardio Measurements / Calculations

- 2D Mode:
 - Simpson (Single & Bi-Plane)
 - Volume (Area Length)
 - LV-Mass (Epi & Endo Area, LV Length)
 - 2D Measurements (RVD, IVS, LVD, LVPW)
 - LVOT Diameter
 - RVOT Diameter
 - MV (Dist A, B, Area, PISA)
 - TV (Diameter)
 - AV/LA (Ao & LA Diam.)
 - PV (Diameter)
- M-Mode:
 - Left Ventricle (LV): RVD, IVS, LVD, LVPW
 - Aorta/Left Atrium: ARD, Cusp, LAD
 - MV (D-E, E-F Slope, A-C Interval, E-EPSS, E-S Dist.)
 - HR (Heart Rate)
- Spectral Doppler Mode:
 - MV (Mitral Valve)
 - R-R Interval
 - AoV (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)
- CFM Mode:
 - PISA-Radius
 - PISA-Alias Velocity

- Additional Calculations
 - Diast. Vol. (Bi)
 - Syst.Vol. (Bi)
 - Stroke Volume
 - Cardiac Output
 - Eject. Fraction
 - Fract. Shortening FS
 - Myocardial Thickness
 - LA/Ao, Ratio, E/A
 - Peak Gradient
 - Acceleration
 - Mean Gradient,
 - VTI, TVA, PHT, MVA, AVA, ERO, etc

Abdominal Measurements/Calculations

- Liver
- Gallbladder
- Pancreas
- Spleen
- Left/Right Kidney
- Renal Artery
- Aorta
- Portal Vein
- Vessel
- Summary Reports

Small Parts Measurements/Calculations

- Thyroid
- Testicle
- Vessel
- Summary Reports

URO Measurements/Calculations

- Bladder
- Prostate
- Testicle
- Left/Right Kidney
- Vessel
- Summary Reports including PSAD, PPSA(1), PPSA(2) calculation

Pediatric Measurements/Calculations

- Hip Joint

Probes

RAB2-5-RS

- Applications: Abdomen, OB Gyn.
- Maximum Band Width (-20dB): 1 – 4 MHz
- Number of Elements: 192
- Convex Radius: 46.0 mm
- Volume Sweep Radius: 22.6 mm
- FOV: 80° (B), 85° x 80° (Volume scan)
- Depth: max 30 cm
- Foot Print: 63.6 x 38.9mm
- Centre Freq.: 3.2 MHz
- Doppler Tx. Frequency.: 2.0, 2.73, 3.75 MHz
- Harm. Tx. Frequency: 2.0, 2.3 MHz
- Biopsy Guide Available: Single-Angle, Reusable and Disposable

RAB4-8-RS

- Applications: Abdomen, OB Gyn, Paediatric
- Maximum Band Width (-20dB): 2 – 8 MHz
- Number of Elements: 192
- Convex Radius: 46.0 mm
- Volume Sweep Radius: 22.6 mm
- FOV: 70° (B), 85° x 70° (Volume scan)
- Depth: max 26cm
- Foot Print: 63.6 x 37.8 mm
- Centre Freq.: 4.4MHz
- Doppler Tx. Frequency.: 3.0, 3.75, 4.3 MHz
- Harm. Tx. Frequency: 2.7, 3.0, 2.5 MHz
- Biopsy Guide Available: Single-Angle, Reusable and Disposable

RIC5-9-RS

- Applications: OB, GYN, Urology
- Band Width (-20dB): 4-9MHz
- Number of Elements: 192
- Convex Radius: 11.6 mm
- Volume Sweep Radius: 11.6 mm
- FOV: 146° (B), 146°*90° (Volume scan)

- Depth: max 16cm
- Foot Print: 22.4 x 20.5mm
- Centre freq.: 6.6 MHz
- Doppler Tx. Frequency.: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 3.75, 4.3 MHz
- Biopsy Guide Available: Single-Angle, Reusable

RIC5-9W-RS Wide Band Convex Volume Probe

- Applications: OB, GYN, Urology
- Band Width (-20dB): 4-9MHz
- Number of Elements: 192
- Convex Radius: 11.3 mm
- Volume Sweep Radius: 11.6 mm
- FOV: 146° (B), 146°*120° (Volume scan)
- Depth: max 16cm
- Foot Print: 22.4 x 22.6mm
- Centre freq.: 6.6 MHz
- Doppler Tx. Frequency.: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 3.75, 4.3 MHz
- Biopsy Guide Available: Single-Angle, Reusable

RSP6-16-RS

- Applications: Small Parts, Vascular, Pediatrics, Ortho
- Maximum Band Width (-20dB): 6 - 18 MHz
- Number of Elements: 192
- Volume Sweep Radius: 80.7mm
- FOV: 37.4 mm (B); 37.4 mm * 29° (Volume scan)
- Foot Print: 48.6 x 55.9 mm
- Centre Freq.: 11.5MHz
- Doppler Tx. Frequency.: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 6.0, 5.0 MHz
- Biopsy Guide Available: Single-Angle, Reusable and Disposable

RNA5-9-RS

- Wide Band Convex Volume Probe

- Applications: Abdomen, Small Parts, OB, Cardio, Ped.
- Band Width (-20dB): 3 –9 MHz
- Number of Elements: 192
- Convex Radius: 15.4 mm
- Volume Sweep Radius: 15.4 mm
- FOV: 117° (B), 117°*90° (Volume scan)
- Depth: max. 18cm
- Foot Print: 26.7 x 22.9mm
- Centre freq.: 6.1 MHz
- Doppler Tx. Frequency.: 5.0, 4.3, 3.75 MHz
- Harm. Tx. Frequency: 5.0, 4.3 MHz
- Biopsy Guide Available: Single-Angle, Reusable and Disposable

4C-RS

- Applications: Abdominal, Obstetrics, Gyn.
- Maximum Band Width (-20dB): 2 - 5 MHz
- Number of Elements: 128
- Convex Radius: 60.5 mm
- Volume Sweep Radius: n/a
- FOV: 58°
- Depth: max 30cm
- Elevation Aperture: 13mm
- Centre frequency: 3.1MHz
- Doppler Tx. Frequency: 2, 2.73, 3.33 MHz
- Harm. Tx. Frequency: 2 MHz
- Biopsy Guide Available: Multi-Angle, biopsy bracket reusable

AB2-7-RS:

- Wide Band Convex Probe
- Applications: Abdomen, OB, GYN, Urology, Pediatrics
- Maximum Band Width (-20dB): 2 – 8 MHz
- Number of Elements: 192
- Convex Radius: 41.2 mm
- Volume Sweep Radius: n/a
- FOV: 80°
- Foot Print: 58.9 x 23.4 mm
- Depth: max. 28cm
- Centre Freq.: 4.3MHz
- Doppler Tx. Frequency: 2.7, 3.3, 4.3 MHz

- Harm. Tx. Frequency: 2.3, 2.5 MHz
- Biopsy Guide Available: Single-Angle, Reusable (PEC83, PEC71)

E8C-RS

- Applications: OB, GYN, Urology
- Maximum Band Width (-20dB): 4 - 10 MHz
- Number of Elements: 128
- Convex radius: 11.4 mm
- Volume Sweep Radius: n/a
- FOV: 123°
- Depth: max 16 cm
- Elevation Aperture: 5mm
- Centre Freq.: 6.5MHz
- Doppler Tx. Frequency.: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 4.29, 3.75 MHz
- Biopsy Guide Available: Single-Angle, Reusable, disposable

12L-RS

- Applications: Small Parts, Periph. Vascular, Pediatrics, Ortho
- Maximum Band Width (-20dB): 4-12 MHz
- Number of Elements: 192
- Volume Sweep Radius: n/a
- FOV: 37 mm
- Depth: max 8cm
- Elevation Aperture 4mm
- Centre Freq.: 7.7 MHz
- Doppler Tx. Frequency: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 5.0MHz
- Biopsy Guide Available: Reusable, Multi-Angle

9L-RS:

- Wide Band Linear Probe
- Applications: OB, Small-Parts, Periph. Vascular, Paediatrics, Ortho
- Maximum Band Width (-20dB): 3 – 8 MHz
- Number of Elements: 192
- Volume sweep radius: n/a
- FOV: 43mm (width)
- Depth: max. 14 cm
- Foot Print: 53.1 x 13.8 mm
- Centre Freq.: 5.3 MHz

- Doppler Tx. Frequency: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 4.29MHz
- Biopsy Guide available: 9L, Single-Angle, biopsy bracket reusable

SP10-16-RS:

- Wide Band Linear Probe
- Applications: Small Parts, Peripherals. Vascular, Pediatrics, Ortho
- Maximum Band Width (-20dB): 7 – 18 MHz
- Number of Elements: 192
- Volume Sweep Radius: n/a
- FOV: 33.7 mm
- Foot Print: 43.4 x 12.7 mm
- Depth: max. 6cm
- Centre Freq.: 12 MHz
- Doppler Tx. Frequency: 6.0, 7.5, 10MHz
- Harm. Tx. Frequency: 6.0, 7.5 MHz
- Biopsy Guide available: Single-Angle, Reusable (PEC82, PEC64)

IC5-9W-RS*

- Applications: OB, GYN, Urology
- Maximum Band Width (-20dB): 3 - 10 MHz
- Number of Elements: 192
- Convex radius: 11 mm
- Volume Sweep Radius: n/a
- FOV: 197°
- Depth: max 16 cm
- Centre Freq.: 5.9MHz
- Doppler Tx. Frequency.: 5.0, 6.0, 7.5 MHz
- Harm. Tx. Frequency: 4.29 MHz
- Biopsy Guide Available: Disposable

* regional availability limitation

External Inputs and Outputs

Connectivity:

- VGA Out
- Network (RJ45)
- USB (2x)
- DC Power Input
- Probe connector
- Anti-theft lock
- PCMCIA slot
- Battery slot
- Docking Station (Cart)

Safety Conformance

The Voluson i 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