



Data sheet

ACUSON Sequoia ultrasound system

(v3.9)

siemens-healthineers.com/acuson-sequoia



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Clarify with confidence

ACUSON Sequoia is an ultra-premium ultrasound system designed for clinicians who need the highest level of performance in nearly every clinical scenario whether it is Radiology, OB/GYN, or Cardiology.

Exclusive innovations

Ultrasound-derived fat fraction (UDFF) for liver fat quantification, Auto pSWE for single-capture liver fat and stiffness quantification, next-generation 2D SWE for the assessment of breast lesions, and Gesture Detection transducer technology to improve workflow.

Proprietary artificial intelligence tools

Proprietary AI-powered tools onboard ACUSON Sequoia include AI Abdomen to streamline standard abdominal exams, and AI-powered view classification, measurement, and calculation tools for Cardiology and OB exams. With ACUSON Sequoia, you can elevate your diagnostic confidence across use cases without compromise.

System overview

You need a better, smarter system with the ability to help scan more patients in less time all while delivering clearer results.

The ACUSON Sequoia is designed for the best-in-class image quality and boasts advanced hardware and components for greater depth and resolution.

Operating modes

- 2D mode
 - 2D mode with Harmonics imaging
- Color flow Doppler
 - Color
 - Power
 - Directional Power
 - Slow Flow State
- Pulsed Wave Doppler
 - High Pulsed Repetition Frequency
 - Pulse Wave Doppler Tissue Imaging (DTI)
- Continuous Wave Doppler
 - Steerable Continuous Wave Doppler for phased array transducers
 - Auxiliary Continuous Wave Doppler for pencil transducers
- M-mode
 - M-mode with Harmonics imaging
 - Anatomical M-mode

Barco medical-grade monitor

60.9 cm (24 in) medical-grade monitor brings image consistency from the exam room to the reading room

Convenient storage areas

Multiple on board storage options include storage bin, storage shelf, double wipes barrel storage, and back pocket

Easy-access air filter

on the side

Mobility

Lightweight 125 kg (276 lbs) and small foot print design with integrated central locking break

Lockable swivel wheels

for maneuvering through tight spaces



33.7 cm (13.3 in) touch control panel
Adjustable 30–60 degrees

Adjustable controls
The main controls can be raised and lowered while powered off, and can swivel 180 degrees for ergonomics in tight spaces

Quiet operation
Less than a library

4 compact pinless connector ports
Easy access transducer connector ports and integrated storage shelf

Enclosed wheels
help prevent cable entanglement

Combined modes

- 2D mode with color
- 2D mode with power
- 2D/Doppler
- 2D/Doppler with color
- 2D/Doppler with power
- 2D/M-mode
- 2D/M-mode with color
- 2D/Anatomical M-mode

Formats

- Single, dual, live dual, and seamless dual image display format
- Display formats for M-mode and Doppler can be modified from live and frozen images
 - Full screen
 - Side by side
 - 1/2 2D with 1/2 trace
 - 1/3 2D with 2/3 trace
 - 2/3 2D with 1/3 trace
- Virtual format imaging: linear, steered, or trapezoidal
 - format
- Curved sector, linear, and phased-sector data acquisition and display formats
- Image display formats during review: 1 × 1, 2 × 2, 3 × 3, and 4 × 4

2D mode features

- One 0.5 TB SSD Hard Drive, and one 1.0 TB SSD Hard Drive dedicated to patient data
- Hard Drive Speed: up to 100,000 IOPS
- Physical channels: 384
- Digital processing channels: 11,404,800
- RAM Amount: 32 GB
- CPU: Intel Core i7-7820EQ CPU @ 3.00GHz (Quad core)
- GPU: Nvidia Quadro A4000, P4000
- Beamformer A/D converter bits: 14 bit ADC
- Adjustable size and position of field of view
- Magnification in frozen, cine, or real time imaging
- **Cine capture: up to 80,000 frames or 300 seconds**
- Imaging Rate: Data acquisition rate of ultrasound sequences to support image formation of up to 35,714 Hz
- Acquired 2D mode frame rates, depending on the transducer and imaging depth: up to 250 fps (frames per second)
- Imaging depth transducer-dependent up to 55 cm
- Fundamental and harmonic transmit frequencies, transducer-dependent
- System frequency range 1–22 MHz
- User-selectable transmit frequencies: up to 15.0 MHz
- Multi-line signal parallel processing
- Linear array transducer beam steering
- System dynamic range 383 dB
- Shades of gray: 256
- 2D/Doppler refresh, update, and triplex functions
- Gain in one decibel increments: – 20 dB to 20 dB
- Dynamic range in one decibel increments: 10 dB to 80 dB
- 2D mode with Harmonics imaging
- 8 depth gain compensation controls
- InFocus dynamic transmit focusing
- Doppler grayscale and colorization (tint) maps
- Persistence levels: up to 4
- Steering angles: up to 5
- Speed of sound, exam-dependent: up to 4
- Line density: up to 3
- UltraArt universal imaging: Off, 1 to 5
- Clarify: up to 5
- Maps: up to 9
- Tints: up to 15

- Overall gain, depth gain compensation, dynamic range, colorization (Tint) map, grayscale map, UltraArt Image Processing, zoom can be adjusted on real time or frozen images

Color features

- Gain in 0.5 dB increments: – 20 dB to 20 dB
- User-adjustable color region of interest (ROI), size, and position
- Independent controls for color gain, pulse repetition frequencies, invert, baseline, line density, persistence, priority, filter, and smoothing
- User-selectable transmit frequencies: up to 5 and Auto (Dynamic MultiHertz)
- Color On/Off invert and baseline shift functions
- User-selectable color flow states: low, general, high, and anatomy specific, for example, kidney or aorta
- Color adaptive wall filter
- Pulse repetition frequency range: 200 Hz up to ~ 35,000 Hz (transducer-dependent)
- 8 bit color
- Color velocity maps, exam-dependent: up to 10 – includes a velocity variance map
- Color Variance Map
- Dynamic multi-hertz imaging
 - Compatible transducers: 5C1
Supported studies: Abdomen, Abdomen-Difficult
 - Compatible transducers: 10L4
Supported studies: Arterial, Venous
- Color Maps, invert, priority, background (color only) can be adjusted on real-time or frozen images

Power Doppler features

- Power Doppler gain in 0.5 dB increments: – 20 dB to 20 dB
- Independent controls for power gain, pulse repetition frequencies, invert, baseline, line density, persistence, priority, filter, smoothing, and directional display
- User-selectable transmit frequencies: up to 5
- User-selectable Power map selections: up to 5 and Auto (Dynamic MultiHertz)
- Persistence levels: up to 4
- Power smoothing levels: up to 4
- Pulse repetition frequency range: 200 Hz to 10,000 Hz
- Adaptive wall filter
- Slow Flow State: applies smart filters and adaptive signal enhancement to image smaller low-flow vessels further into tissue

- Directional Power Doppler flow states: slow, low, general, high, and anatomy specific, for example, kidney or aorta
- Power Doppler maps, priority, background (color only), Directional Power can be adjusted on real-time and frozen images
- Linear array transducer beam steering

Pulsed Wave Doppler features

- Fast Fourier Transformation (FFT) processing: up to 256 points
- FFT speed: up to 2,880 FFTs per second
- User-selectable transmit frequencies per transducer: up to 3
- Simultaneous 2D mode and Doppler display and 2D/Doppler with color (Triplex)
- User-selectable 2D/Doppler refresh
- User-adjustable Doppler scale and baseline position controls
- User-adjustable Doppler UltraArt universal imaging and edge controls
- Angle correction in one degree increments: 0° to 89°
- Transmit frequencies: 1.25 MHz to 10 MHz
- Pulse repetition frequencies (PRF) and high-pulse repetition frequency (PRF) Doppler: 100 Hz to 35,714 Hz
- Wall filter selections: 1 Hz to 4,375 Hz
- Adjustable Doppler gate size, depending on the transducer: 0.5 mm to 30 mm
- Doppler signal processing enables calculation of waveform statistics during real-time imaging
- Derived waveform Doppler trace function analyzes real-time or frozen Doppler spectrum for maximum velocity information. Waveform may be set to trace above baseline, below baseline, or both
- Doppler cine control feature: stores up to 30 seconds of Doppler data
- Sweep speed selections: up to 12
- Gain in one decibel increments: – 30 dB to 30 dB
- Dynamic range in five decibel increments: 10 dB to 80 dB
- Doppler gain, scale, baseline, spectral invert, sweep speed, wall filter, edge, UltraArt universal imaging, grayscale map, colorization (tint) map, flow angle correction, and dynamic range adjustment on real time or frozen images
- Adjustable audio volume with different levels and a mute control: up to 21 levels
- Auto Spectral: automatic optimization of scale, baseline, gain and dynamic range upon entering freeze

- Pulsed wave Doppler Tissue Imaging (DTI) available for all cardiac and fetal echo exams on phased and curved array transducers

Continuous Wave Doppler features

- Fast Fourier Transformation (FFT) processing: up to 256 points
- FFT speed: up to 2,880 FFTs per second
- User-selectable transmit frequencies per transducer: up to 2
- Simultaneous 2D mode and Doppler display
- User-selectable Doppler update mode
- User-adjustable Doppler scale and baseline position controls
- User-adjustable Doppler UltraArt universal imaging and edge controls
- Angle correction in one degree increments: 0° to 89°
- Flow angle correction on real time or frozen images, with velocity readout update
- Transmit frequencies: 1.8 MHz to 5 MHz
- Pulse repetition frequencies (PRF): 2,000 Hz to 50,000 Hz
- Wall filter selections: 40 Hz to 1,000 Hz
- Doppler cine control feature: up to 30 seconds of Doppler data can be stored
- Sweep speed selections: up to 12
- Gain in one decibel increments: – 30 dB to 30 dB
- Dynamic range in five decibel increments: 10 dB to 80 dB
- Doppler gain, scale, baseline, spectral invert, sweep speed, wall filter, edge, UltraArt universal imaging, grayscale map, colorization (tint) map, flow angle correction, and dynamic range adjustment on real time or frozen images
- Adjustable audio volume with different levels and a mute control: up to 21 levels
- Automatic optimization of scale, baseline, gain and/or dynamic range selected manually or upon entering freeze

M-mode features

- Independent controls for M-mode gain and sweep speed
- Dynamic range display in one decibel increments: 10 dB to 80 dB
- Gain in one decibel increments: – 20 dB to 20 dB
- Sweep speed selections: 8 mm/s to 200 mm/s
- User-selectable transmit frequencies: up to 15.0 MHz

- User-selectable edge enhancement selections: up to 4
- Maps: up to 9
- Tints: up to 15
- Anatomical M-mode for the cardiac exam supports visualization of an M-mode sweep by rotating the M-mode cursor off axis

Volume imaging features

- Description: Acquires and enables static or real time viewing of three-dimensional images for assessing structures
- Exam types supported: Abdomen, Cardiac, Obstetric, Gynecology
- Transducer supported: 7VC2, 5Z1, 9VE4, Z6T
- Max volume rate: up to 250 volumes per second

Mechanical volume arrays

3D mode features

- Acquires three-dimensional images and maximizes resolution for assessing structures
- User-adjustable region of interest and volume of interest during setup (ROI/VOI), for size, position, and curve (VOI only) and position
- Available in combination with 2D mode or 2D mode with color

Note: 2D mode with color is only available for the following transducers: 7VC2

- Requires the compatible transducers: 7VC2
Supported studies: Abdomen, Obstetric
- Requires the compatible transducers: 9VE4
Supported studies: Gynecology
- Sweep speed quality selections: up to 3
- Layouts: 1-up, 2-up, 3-up and 4-up
- Sweep angle selections:
 - 7VC2: 20° to 85° in increments of 5°
 - 9VE4: 20° to 145° in increments of 10°, 145° maximum
- VR Rotation: X (M knob), Y (PW/CW knob), and Z (C knob)
- VR Fixed rotation: 0°, 90°, 180° and 270°
- VR Flip: Up/Down, Front/Back, Left/Right, Down/Up, Back/Front, and Right/Left
- VR Reset: All, Curve and Orientation
- Volume slice selection using 3D/4D knob
- MPR Maps: A to G
- MPR Tints: 1 to 10

- MPR DR: 10 to 80 (increments of 1)
- VR Tints: 1 to 10
- VR Contrast Settings: 25 to 95 (increments of 1)
- VR Brightness Settings: – 100 to 100 (increments of 1)
- VR Smooth: 0 to 3
- VR Threshold: 0 to 255 (increments of 1)
- VR Opacity: 0 to 86 (increments of 2)
- VR Rendering methods: Surface, Vascular (minimum intensity projection), Skeletal (maximum intensity projection), LightSource
- Curved VOI allows the straight line of the render direction to be adjusted to contour the shape of the view plane of the Volume of Interest
- Inversion mode allows rendering of anechoic structures to appear echogenic and echogenic structures to appear anechoic, thereby enhancing the visualization of internal surfaces
- Multi-Slice function allows the user to select range, slice spacing and display format for viewing each slice in review. The Multi-Slice function supports up to 17 slices at once
- Volume Editing tools are provided to support visualization: line, open spline, and closed spline tools
- Images of volume objects are available for review on the system and to export to other devices for the purposes of documentation
- Freeze during 3D imaging, stops the volume acquisition, and displays a partial volume
- FlexPlane function to create slices of a reference image for review of anatomy
 - You can draw up to three orthogonal or non-orthogonal slices using a line, trace, or spline on the reference image. As you draw on the reference image, an image extends in the active slice
 - You can change the thickness of the slice to emphasize internal structures and tissue
- MPR: Gain, dynamic range, grayscale map, colorization map (tint), rotation and visualization in X, Y, Z axis, rendering modes, inversion mode, multi-slice editing, Slice thickness, FlexPlane editing, volume editing (removal tools), animation can be adjusted in real time, on frozen images, and saved volumes
- VR: Gain, threshold, opacity, smooth, brightness, contrast, colorization map (tint) rotation and visualization in X, Y, Z axis, rendering modes, inversion mode, multi-slice editing, slice thickness, FlexPlane
- Editing, volume editing (removal tools), animation can be adjusted in real time, on frozen images, and saved volumes

4D mode features

- Acquires and enables simultaneous viewing of three-dimensional images in real-time with up to 18 volumes per second for assessing motion
- User-adjustable region of interest and volume of interest during setup (ROI/VOI), for size, position, and curve (VOI only)
- Available in combination with 2D mode
- Requires the compatible transducers: 7VC2
Supported studies: Abdomen, Obstetric,
- Requires the compatible transducers: 9VE4
Supported studies: Gynecology
- Sweep speed quality selections: up to 3
- Layouts: 1-up, 2-up, 3-up and 4-up
- Sweep angle selections:
 - 7VC2: 20° to 85° in increments of 5°
 - 9VE4: 20° to 80° in increments of 10°
- VR Rotation: X (M knob), Y (PW/CW knob), and Z (C knob)
- VR Fixed rotation: 0°, 90°, 180° and 270°
- VR Flip: Up/Down, Front/Back, Left/Right, Down/Up, Back/Front, and Right/Left
- VR Reset: All, Curve and Orientation
- VR slice selection using 3D/4D knob
- MPR Maps: A to G
- MPR Tints: 1 to 10
- MPR DR: 10 to 80 (increments of 1)
- VR Tints: 1 to 7
- VR Contrast Settings: 25 to 95 (increments of 1)
- VR Brightness Settings: – 100 to 100 (increments of 1)
- VR Smooth: 0 to 3
- VR Threshold: 0 to 255 (increments of 1)
- VR Opacity: 0 to 86 (increments of 2)
- VR Rendering methods: Surface, Vascular (minimum intensity projection), Skeletal (maximum intensity projection), LightSource
- Volume Editing tools are provided to support visualization: line, open spline, and closed spline tools
- Clips stored of volume objects are available for review on the system and to export to other devices for the purposes of documentation
- Cine capture: up to 10 seconds
- Cine Prospective Capture: 1–10 s
- Cine Retrospective Capture: 1–5 s

- Acquire higher resolution 3D volume by pressing 3D button on touchscreen
- Freeze during 4D imaging, pauses the volume acquisition for review and editing of volumes in cine
- FlexPlane surface enhances visualization of the volume with a surface of varying opacity
- Vascular enhances visualization of the volume with the minimum intensity projection, for example, for viewing vascular structures
- Skeletal enhances visualization of the volume with the maximum intensity projection, for example, for viewing skeletal structures
- LightSource Rendering enhances visualization of the volume dataset by enabling a light source which can be manipulated by the user to improve visualization of anatomy
- Animation defines the range, direction, and speed of animation to view the volume
- MPR: Gain, dynamic range, grayscale map, colorization map (tint), rotation and visualization in X, Y, Z axis, rendering modes, inversion mode, multi-slice editing, Slice thickness, FlexPlane editing, volume editing (removal tools), animation can be adjusted in real time, on frozen images, and saved volumes
- VR: Gain, threshold, opacity, smooth, brightness, contrast, colorization map (tint) rotation and visualization in X, Y, Z axis, rendering modes, inversion mode, multi-slice editing, slice thickness, FlexPlane editing, volume editing (removal tools), animation can be adjusted in real time, on frozen images, and saved volumes

Phased volume arrays

4D mode features

- Acquires and enables simultaneous viewing of three-dimensional images in real-time with up to 250 volumes per second for assessing motion
- User-adjustable region of interest
- Requires the compatible transducers: Z6T, 5Z1
- Supported studies: Cardiac (Z6T and 5Z1), Abdomen and Gynecology (5Z1)
- Biplane
- Line Density selections: Low, Mid, High
- Layouts: 10 layouts: 2 : 4-up, 2 : 3-up and 4 : 1-up, Single V and Dual V layouts
- VR Rotation: X (M-mode knob), Y (PW-CW knob), and Z (Color knob, only when image is frozen)

- Color 4D
 - Scale and Baseline controls
 - CROI Size: Lateral, Elevational, Axial
 - CROI Position: Lateral, Elevational, Axial
 - Filters: 1–4
 - Smooth: 1–4
 - Line Density: 1–3
 - Priority: 1–4
 - Color Volume Enhance: 0–3
 - MPR Maps: A–J
 - VR Maps: A–J
 - Biplane
- MPR Maps: A to G
- MPR Tints: 1 to 11
- DR: 10 to 90 dB (increments of 1)
- VR Maps: A to G
- VR Tints: 1 to 10
- VR labeling: labeling tools allow for structure identification within the volume
- Clips stored of volume objects are available for review on the system and to export to other devices for the purposes of documentation
- Cine capture: up to 10 seconds
- Cine Prospective Capture: 1–10 s or 1–8 beats
- Cine Retrospective Capture: 1– 5 s or 1–5 beats
- Acquire higher resolution 4D volume by pressing 4D zoom button on touchscreen
- MPR: Gain, dynamic range, grayscale map, colorization map (tint), rotation and visualization in X, Y, Z axis, rendering modes, inversion mode, multi-slice editing, Slice thickness, volume editing (removal tools), animation can be adjusted in real time, on frozen images, and saved volumes
- VR: Gain, threshold, opacity, smooth, brightness, contrast, colorization map (tint) rotation and visualization in X, Y, Z axis, rendering modes, inversion mode, multi-slice editing, slice thickness, volume editing (removal tools), animation can be adjusted in real time, on frozen images, and saved volumes
- MPR Thickness: 0–20 mm
- Mitral Valve button: rotates and positions MPR C and syncs VR to MPR C
- Multislice: function allows the user to select range, slice spacing and display format for viewing each slice in review or live
 - Slice range: 1–17 slices, distance: 0.5–50 mm, and position of slices: Covering FOV, Direction: General, parasternal, and apical C
- Auto TEQ available
- MPR/VR tools
 - Cut plane on/off
 - MPR lines on VR: on/off
 - Slice Sync: on/off
 - 3D Caliper
 - MPR lock
- Free Plane: Position plane, and retain crop and undo crop is available after retain crop is active

Cybersecurity

ACUSON Sequoia is developed with state-of-the-art secure architecture, coding, and testing methods. In addition, the system provides a set of cybersecurity controls to assure medical device cybersecurity and maintain medical device functionality and safety throughout its life cycle.

Patient data encryption option

- Data storage encryption
 - Protects patient information and system settings stored on the ultrasound system by preventing unauthorized access
 - Includes a USB storage device with the recovery key for recovering encrypted data

System operating software

- Windows 10 version 1809 long support operating software
- Multi-language capability
- User-modifiable configuration settings, including libraries of annotations and body markers
- User-defined exam, transducer, and image parameter settings
- Supports DICOM file format
- Supports PC file format
- Compatible with remote update handling for remote application support and remote troubleshooting

Imaging features

User-programmable system parameter settings

- Supports up to 100 user programmable image presets

Harmonics

- Phase Inversion (PI)
- Alternating Phase Line (APL) Harmonic Imaging
- Available for all imaging transducers
- Harmonic transmit frequencies per transducer: up to 4

InFocus Coherent Image Formation

InFocus coherent image formation focuses the image at all depths and exploits high beamformer output capacity, which increases image uniformity. More information is harvested from the usual transmit sequence, using massive overlapping multibeam groups rather than individual or close parallel beam lines as in conventional systems. This secondary beamforming enabled with InFocus, physics-based delay, phase and amplitude corrections can be made across transmit events to significantly sharpen the image and improve spatial resolution beyond what is typical for a given transducer frequency.

Compounding

With InFocus Coherent Image Formation and electronic beam steering (Compounding), the system supports a Compounding Factor of up to 80.

Auto TEQ (Tissue Equalization) technology

- Optimizes the overall field of view (FOV) image brightness uniformity by changing the depth gain compensation and overall gain
- Supports 2D mode and Pulsed Wave Doppler
- Auto Tissue Equalization Optimization continuously applies the TEQ technology to a 2D mode image

Auto Flash Color Artifact Suppression

Proprietary technology to detect and prevent motion artifacts and reduce noise, simultaneously enhance color sensitivity.

UltraArt Universal Image Processing

Next generation algorithm reduces speckle and enhances edges and contrast at each depth, to provide realistic

tissue presentation and processing optimization that adapts to differences in tissue.

- Can be performed in real-time or on frozen images
- Available in B-mode, PW and contrast modes

Wide Field of View (FOV)

Enables Field of View (FOV) expansion for extended visualization and measurement of anatomy in B-mode.¹

- 5C1 transducer standard FOV 70 degrees, Wide FOV up to 100 degrees
- 11M2 transducer standard FOV 25–100 degrees, Wide FOV 100–130 degrees, default FOV 85 degrees
- DAX transducer standard FOV 70 degrees, Wide FOV 100 degrees

Clarify technology

Clarify can decrease artifacts in the 2D mode image, resulting in an improved view of anatomical structures. Decreased artifacts can enhance definition of both tissue and vessel walls by increasing contrast resolution and improving boundary detection. Clarify uses flow information to eliminate noise and reverberation from vessels.

Speed of Sound (SoS)

- Exam-dependent: up to 4
- Optimizes the 2D image by adjusting the speed of sound
- Available only with the following exams: Breast, MSK, Abdomen Difficult

Panoramic imaging

- Panoramic images may be created up to 60 cm in length and up to 360° when the depth is less than the radius of the target area being scanned
- Cine display of frame-by-frame review of individual data frames within the panoramic image
- Reverse during acquisition
- Zoom and pan capabilities
- Compatible with UltraArt universal imaging tissue contrast enhancement technology
- Color Panoramic imaging is a combination of real-time panorama imaging and real-time power mode acquisition. All power information is preserved during image acquisition, and the peak of the signal is saved for the color panoramic image

¹ Data on file

Modality compare

- Displays images from a previous exam side-by-side with images from the current exam
- Supported modalities for previous exams
 - Mammography
 - Computed tomography
 - Magnetic resonance imaging
 - Ultrasound

Freehand 3D

Freehand 3D delivers efficient volume imaging using standard transducers instead of having to use specialized phased or mechanical probes.

- Compatible with FlexPlane manipulation and draw-through reconstruction tool, and LightSource tints for photo-realistic perception of depth
- Compatible transducers: 10L4, 15L4, 18L6, 18H6, HLX, 11M2, 11M3, 9EC4, 10EV3, 5C1, 9C2
- Displays tool for viewing multiple cross-sectional slices at the same time in any plane

Needle enhancement

During complex needle procedures, clinicians need to see the needle in real time as it progresses towards target anatomy. Visualize the needle for improved confidence during biopsies and complex needle procedures.

- One-touch on/one-touch off touchscreen button operation
- Compatible transducers: 10L4, 15L4, 18L6, HLX

Biopsy

- Available for transducers compatible with needle guide attachments
- Advanced image formation to improve the display of the needle
 - Available on HLX, 10L4, 15L4, 18L6 transducers

Please see transducer flyer for additional information.

Clips

- Prospective capture of motion image data
- Retrospective capture of motion image data
- Acoustic Rate Capture
- Variable clip length (1 to 300 seconds)
- Clip formats
 - Compressed JPEG Lossy
 - Uncompressed Clips
 - AVI and JPEG
 - DICOM
- Supports storing of individual images within clips

Workflow protocols

A protocol is a predefined checklist that guides you through a clinical workflow.

- Define protocol views that include an image or clip with measurements and annotations
- Change the sequence of views during a protocol
- Pause and resume a protocol
- Activate a clinical application program during a protocol
- Create new protocols or modify existing protocols
- Import or export protocols using a USB storage device

Zoom

- Magnification: up to 11.5x zoom with up to 36 steps
- Supports magnification in frozen, cine, or real time imaging

Image rotate

Enables the ability to rotate the clinical image 90 degrees

DICOM

DICOM 3.0 standard

Measurements, calculations, and reports

The measurement function is available during a patient exam or with stored images. Each measurement label supports up to 5 measurements. The ultrasound system copies only the five most recently labeled measurements to the report.

General functions

- 2D mode and M-mode have unlimited sets of measurement markers per image for distance measurements
- Doppler has unlimited sets of measurement markers per image for velocity measurements
- Label then measure or measure then label workflow for individual labels
- Customizable reports
- Institution logo, export to PDF

General 2D mode measurements and calculations

- Distance
- Depth
- Angle
- Circumference (using a trace or ellipse measurement tool)
- Area (using an ellipse or trace measurement tool)

- Volume and stenosis
- Volume flow (using an area or diameter measurement tool with a Doppler measurement)
- Ratio calculations (using two area, two distance measurements)
- Pediatric Hip
- Transcranial Doppler (TCD)

Transcranial Doppler

- Supports pediatric and adult use cases

Auto IMT

- Supports automated Carotid intima-media thickness measurement
- Used as a tool for communicating with patients about the relative state of their cardiovascular system

Pediatric hip

- Supports alpha angle, alpha and beta angle, femoral head coverage
- Sonometer report option

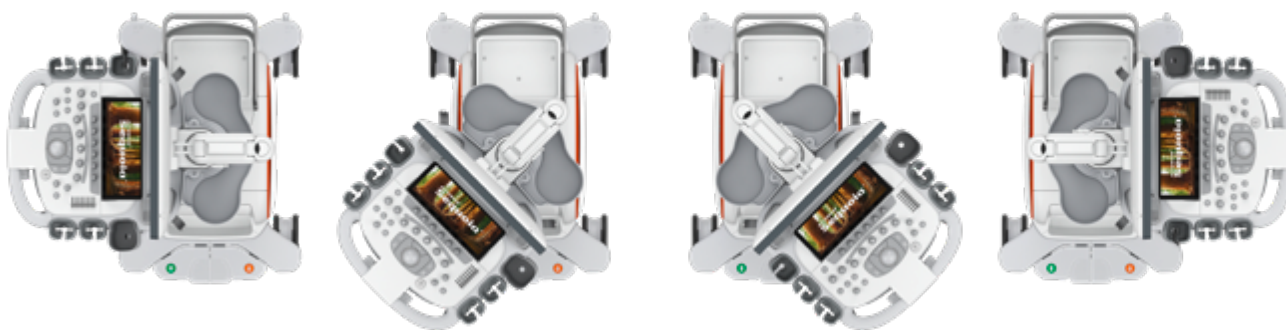
General M-mode measurements and calculations

- Distance/depth
- Heart rate
- Slope
- Time



Maximum physical dimensions

Width	60 cm (23.62 in)
Height	120 cm to 175 cm (47.24 in to 68.90 in)
Depth	94 cm to 108 cm (37.01 in to 42.52 in) Minimum depth for storage: 108 cm (42.52 in)
Weight	125 kg (276 lbs) Not to exceed 155 kg (342 lbs) The weight of the system is based on the system unpacked and ready for connecting transducers and using in a patient examination. The weight includes documentation devices, such as printers, installed on the system.



General Doppler measurements and calculations

- Measurements on a frozen or cine image including velocity
- Heart rate
- Heart cycle
- Systolic/diastolic ratio
- Resistive index
- Pulsatility index
- Time averaged velocity
- Time averaged mean velocity
- Time averaged maximum velocity
- Acceleration
- Time
- Doppler statistics (system-generated waveform trace) for real-time and cine display of Doppler spectral measurements and calculations, including PS, ED, S/D, PI, RI, TAMx, TAMn
- Ratio calculations (two velocity measurements)

Exam-specific measurements and calculations

- The measurement function is arranged by exam type and is available for use with all exam types. All exam types support the following measurement and report features
- All general measurements and calculations
- Exam-specific patient report (editable)

Auto Calcs software

- AI-powered semi-automated measurement tool which provides the area, volume, diameter and length from a user defined region of interest
- Can be used wherever manual trace is available

Wireless data transfer

Enable wireless capabilities on the ultrasound system.

Storage and archiving

The ultrasound system supports data storage and review of completed ultrasound studies, including static images, dynamic clips, measurements, calculations, and reports.

- Supports append, pause, resume, and discontinue exam options to support clinical care interruptions without the need to end the DICOM study

Hibernate

- Decreases the time to power on and off the ultrasound system
- Boot-up from Hibernate mode in as few as 23 seconds
- Hibernate in as few as 10 seconds
- Cold boot: 2 minutes, 10 seconds

Mobility

- Compact and lightweight industrial design
- Steering handle for portability and maneuvering
- Rear handle for repositioning the ultrasound system
- Central steering and locking break
- Four locking swivel wheels
- Transducer holders and cable management
- Tilt down monitor
- Locking arm for monitor
- Locking control panel

User-accessible connections

- USB ports on the input/output panel for peripheral devices (quantity 4)
- USB ports on the left side of touch screen for importing and exporting protocols and exams, archiving, and serviceability (quantity 2)

- DC power sockets on the input/output panel for on-board peripherals (quantity 2)
- DC power sockets on each side of the control panel for the gel warmer (quantity 2)

Operator control panel

- Backlit controls and keys
- Control panel adjustment for standing and sitting positions
 - Left/right swivel: $\pm 90^\circ$
 - Range of height: 74 cm to 97 cm (29.13 in to 38.18 in)
- Control panel text available in: English, German, French, Spanish, Italian
- Control panel layout supports ambidextrous operation
- LCD Touch Screen
 - 33.782 cm (13.3 inch) diagonal widescreen
 - Full high-definition video
 - 1,920 × 1,080 pixels resolution
 - Variable tilt angle: 30° to 60°
 - Touch screen for use with gloved hands

Gel warmer

- Continuously warms a bottle of gel when the ultrasound system and gel warmer are powered on
- Connects to the ultrasound system in place of a transducer holder and with a power cable

Monitor

- Barco medical-grade imaging, full high-definition video display
 - 60.9 cm (24 in) high dynamic range color dual layer LCD display
 - 16:9 widescreen format
 - HD resolution at 1,920 × 1,080 pixels
 - 1024 × 768 image screen capture for images and reports
 - Shades of color: 16,000,000 (24 bit)
 - Maximum white luminance: 320 Cd/m²
 - Monitor contrast ratio: 200,000 : 1
 - $\pm 89^\circ$ angle of view
- Adjustable position for optimal viewing
 - Height: at least 30 cm
 - Multi-directional articulating arm:
 - Lateral adjustment $\pm 360^\circ$ around the system
 - Swivel: $\pm 45^\circ$ left and right
 - Tilt: up to 90° forward and up to 15° backward

- Monitor Performance Optimization
 - Integrated sensor with for luminance stabilization, luminance tracking and auto calibration functionality
 - Supports QAWeb for monitor quality assurance and reporting, calibration and asset management
- Monitor outputs: Linear Gamma, DICOM GSDF Dark Room, DICOM GSDF Office, DICOM GSDF OR
- Transport position
 - Monitor folded down
 - Locks secure the top and bottom adjustable arms in the center position

Transducer technology and design attributes

For detailed transducer information please refer to the ACUSON Sequoia Transducer Flyer.

- Lightweight, ergonomic transducer design
- Touch screen and gesture transducer selection
- Four array transducer ports
- Auxiliary continuous wave transducer port (option)
- Compact-pinless connectors
- Integrated storage shelf for transducer connectors
- Transducer holders for all transducer designs and gel bottle storage

Gesture Detection transducer technology

- Our unique multi-touch sensors allow you to double tap on the transducer to activate it and start scanning quickly
- Gesture sensors embedded in the transducer allow activation directly from the probe
- Gesture Detection helps improve workflow and ergonomics
- Available on 5V1, 5Z1, DAX, 5C1, 9C2, 9C3, 11M2, HLX, 18L6, 15L4, 10L4, 14L5, 7VC2, 9EC4, 9VE4, 10EV3, and 7L2 transducers



Accessories and options

The Siemens Healthineers-authorized accessories and options for your ultrasound system are listed in this section. The available options depend on the licenses purchased for your ultrasound system.

Language-specific operating system

Includes the operating and general imaging system software and system user and reference manuals.

- English Language Operating System
- International English Language Operating System
- German Language Operating System
- French Language Operating System
- Spanish Language Operating System
- Italian Language Operating System

Retractable keyboard (Option)

- Medical-grade keyboard sealed to prevent liquid or disinfectant ingress
- Silicone elastomer material of the keys also helps with long-term wear and durability
- Lock function allows for easy cleaning without accidental keystrokes
- Users can control lighting levels directly from the keyboard for improved visibility
- Language-specific alphanumeric keyboard available in: English, German, French, Spanish, Italian, Danish, Swedish/Finnish, and Norwegian

Footswitch (Option)

- Configurable three-pedal footswitch
- Attaches to a USB port on the ultrasound system

Printer options

- Integrated black and white printer assembly, Model: UP-D898DC, Sony
- External black and white printer, UP-X898MD, Sony
- External color printer, UP-D25MD, Sony

Optical combination drive (Option)

- Recordable disc drive for storage, review, and archival of patient and image data
- Compatible only with Blu-ray disc (BD) or medical grade digital video disc (DVD) media
- Disk media
 - The combination drive supports the following media: BD R, BD-RW, DVD-R, DVD RW, DVD+RW, DVD+R
 - The following media brands are recommended for use with the combination drive: Panasonic, TDK, Maxell

Universal video converter² (Option)

Converts digital video signals from the ultrasound system to analog video signals to support an external display device. Includes the following cables:

- DVI cable
- Power cable

Auto Doppler (Option)

Auto Doppler offers workflow automation tools by updating the imaging parameters including color box position and steering angle, PW gate position, steering angle, and angle correction. Auto Doppler algorithm analyzes flow signal, selects the largest vessel with appropriate flow direction, and automatically adjusts the following imaging parameters:

- Color box position: centered to the selected vessel
- Color box steering angle: steered along the selected vessel
- PW gate position: placed in the center of the selected vessel
- PW gate angle correction: aligned to the centerline of the flow object
- PW gate steering angle: steered to get 60-degree angle correction (or smallest angle probe can provide)

Auto OB measurements (Option)

- AI-powered measurements of crown rump length, biparietal diameter, head circumference, abdominal circumference, femur length, humerus length, and occipital frontal diameter
- Supports biparietal diameter outer-to-outer or outer-to-inner measurements

² Not commercially available in all countries. Contact your local representative regarding local availability.

Fusion imaging (Option)

- Fusion imaging aligns reference data with a real-time ultrasound image for diagnosis and interventional procedures
- Supported reference data: computed tomography, magnetic resonance imaging
- Compatible transducers: 4V1, 5C1, DAX
Supported studies: Abdomen
- Compatible transducers: 10L4
Supported studies: Musculoskeletal
- Fusion supports the following components
 - Ascension Technologies Corporation DriveBAY 2 electromagnetic tracking system
 - Ascension Technologies Corporation Mid-Range Transmitter (for the DriveBAY 2)
 - GCX pole to support mid-range transmitter
 - CIVCO General Purpose 8 mm sensors

Note: For information on the installation, care, and operation of hardware components, refer to the manufacturer's operating instructions that accompanied the device.

Fusion imaging accessories (Option)

- CIVCO eTrax Needle Sensor supports 12, 14, 16, and 18-gauge needles
- Transducer-specific tracking brackets with needle guides

Strain Elastography – SE (Option)

- Provides a qualitative representation of relative tissue stiffness for the region of interest
- Strain Ratio provides a quantifiable method to compare the relative stiffness of tissue within two user selectable regions of interest
- Compatible transducers: HLX, 10L4, 14L5, 15L4, 18L6
Supported studies: Breast, Thyroid
- Compatible transducers: 9EC4
Supported studies: Prostate

Next-generation 2D Shear Wave Elastography – 2D SWE (Option)

- Uses acoustic radiation force impulse (ARFI) technology of diagnostic ultrasound to induce tissue displacement
- Qualitatively depicts shear velocity for a selected region of interest on a 2D image
- Provides quantitative measurements of shear velocity (Vs) and elasticity (E) for selected points within the region of interest
- Compatible transducers: 5C1, DAX, 9C2
Supported studies: Abdomen
- Compatible transducers: 10L4
Supported studies: Breast, Thyroid, MSK
- Compatible transducers: 18L6, 15L4
Supported studies: Breast, Thyroid

Dual 2D Shear Wave Elastography – 2D SWE (Option)

- Dual 2D SWE display format to demonstrate two different maps on the screen simultaneously

Point Shear Wave Elastography – pSWE (Option)

- Measures tissue shear velocity (Vs) and elasticity (E) for a selected region of interest using acoustic radiation force impulse (ARFI) technology of diagnostic ultrasound to induce tissue displacement
- Provides measurement labels for sites, lesions, and liver segments
- Compatible transducers: 5C1, DAX, 4V1, 9C2
Supported studies: Abdomen
- Compatible transducers: 10L4
Supported studies: Abdomen

Automatic Point Shear Wave Elastography – Auto pSWE (Option)

- Simultaneously acquires a series of multiple point shear wave elastography (pSWE) measurements within individual regions of interest
- Measurements per label: up to 15
- Compatible transducers: DAX, 9C2
- Supported studies: Abdomen

Ultrasound-derived fat fraction – UDFF (Option)

- Measures tissue in a selected region of interest and calculates the ultrasound-derived fat fraction (UDFF) index for quantification of liver fat content to help manage patients with hepatic steatosis
- Measurements per label: up to 20
- Compatible transducers: DAX, 9C2, 5C1
- Supported studies: Abdomen

Virtual workstation (Option)

- Provides remote access to your facilities applications such as PACs, Worklist, EMR directly from the ultrasound system
- Includes connection options for a web browser connection or a remote desktop session

Contrast agent imaging³ (Option)

- Supports the following contrast agent destruction techniques: Burst, Flash Sequencing
 - Compatible transducers: HLX, 7L2, 10L4, 14L5*, 18L6*, DAX, 5C1, 9C3, 18H6, 11M2, 11M3, 4V1, 5Z1, 5V1, 8V3, 10V4, 9EC4*, 9VE4*, 9C2, 10EV3*, 15L4*, 7VC2
- Note: Transducers indicated with an asterisk (*) are not compatible with contrast agent imaging in the United States of America.*
- VueBox Support
 - Requires clips acquired during contrast agent imaging and stored in DICOM format
 - Supports compatibility with the VueBox software application from Bracco. The software is used to perform qualitative and quantitative analysis of linear data. For information regarding the software application, refer to the manufacturer's instructions
 - Compatible transducers: HLX, 7L2, 10L4, 14L5, 18L6, DAX, 5C1, 9C3, 18H6, 11M2, 11M3, 4V1, 5Z1, 5V1, 8V3, 10V4, 9EC4, 9C2, 7VC2, 15L4, 9VE4, 10EV3

Physio module (Option)

- Includes the ECG function, which contains the ECG cable and leads
 - ECG leads, standard U.S.A.
 - ECG leads, standard European
- Includes both ECG and Respiratory trace from the ECG leads. An Aux cable is available as an option to import signals from a third-party device

Cardiac imaging (Option)

- Cardiac imaging
- Pulsed Wave DTI (Doppler tissue imaging) capability
- Supports from 500 and up to 25,000 Hz
- Continuous Wave (CW) capabilities
- Cardiac measurements and reports
- Includes Physio module
- Compatible transducers: 5Z1, 5V1, 8V3, 10V4, CW2, Z6T

Stress echo (Option)

- Provides tools for ECG-triggered acquisition, display, selection, comparison, evaluation and archiving of multiple cardiac loops during various stages of a stress echo examination
- Supports parameter memory by view for enhanced workflow

AI Measure (Option)

- Enables AI-powered semi-automated measurements for routine echo exams to reduce keystrokes required to complete cardiac measurements
- Supports cardiac measurements for B-mode, M-mode, Continuous Wave, Pulsed Wave, and Pulsed Wave Doppler Tissue Imaging (DTI)

2D Heart^{AI} (Option)

Basic analysis with ED and ES functionality of all 4 chambers up to an average of 5 cardiac cycles.

³ At the time of publication, the United States Food and Drug Administration has cleared ultrasound contrast agents only for use in left ventricular opacification (LVO), liver, and vesicoureteral reflux (VUR). Check the current regulations for the country where you are using this ultrasound system for contrast agent clearance.

2D Heart^{AI}+ (Option)

Dynamic analysis with advanced quantification including volume curves, segmental strain, and global strain.

- 2D Heart^{AI} is an application designed to understand and help manage the complexity of the task, structuring and interpreting the available data to highlight key clinical metrics in an efficient workflow. 2D Heart^{AI} leverages AI to perform and coordinate multiple tasks, and incorporating clinical experts' knowledge through a large database of annotations and state-of-the-art artificial intelligence techniques
- AI-enabled classification of apical views (A2C, A3C, A4C) achieved 100% accuracy⁴ when evaluated on over 45 clips, with or without contrast opacification, by 4 expert sonographers
- 2D Heart^{AI} provides 2,890 AI-powered measurements
- 2D Heart^{AI} has a 99% accuracy rate for detecting LVEDV & LVESV between different users
- 2D Heart^{AI} has a 94% accuracy rate for detecting LA-ESA between different users
- Contour Accuracy (DICE coefficient) of 93%⁴ over all apical views (A4C, A3C, A2C) with and without contrast
- Contour Accuracy (DICE coefficient) of 92%⁵ over all four chambers (LV, LA, RV, RA)
- RV Chamber Accuracy: 92% for TTE
- The mean GLS correlation coefficient 98%⁴ for each supported cardiac view (A4C, A3C, A2C, with and without contrast agent (i.e., LVO))
- AI ED/ES selection without Physio (A4C, A3C, A2C) was accurate in 80% of the verification data sets
- Supports AI-powered automated assessment of ejection fraction, GLS, PSD, AVC, Cardiac Output, EDV and ESV
- Strain/Segmental strain for LV in TTE
- 2D strain with contrast for the LV-GLS (Global) and segmental
- RV and RA Strain
- Multi beat quantification – up to 5 beats for GLS, EF, and volume analysis for 2D Heart^{AI}
- Compatible with contrast agent imaging
- No ECG needed as the deep learning artificial intelligence recognizes the anatomy of the cardiac chambers and their sizes all through the cardiac cycle to determine the largest and smallest chamber volumes for quantification

Cardiac volume imaging (Option)

- Enables 4D TEE imaging functions for Z6T Transesophageal Echo (TEE) phased transducer
- Enables 4D Volume imaging for 5Z1 phased array transducer
- Includes labeling tools to allow for structure identification within the volume

4D Heart^{AI} (Option)

4D Heart^{AI} is a deep-learning, artificial intelligence-based application using multiple layers of a neural network to enable chamber autocontouring. This includes automated recognition and identification of cardiac chambers, valves, and great vessels, with instantaneous, automated measurement and quantification of cardiac chamber volumes, as well as global and segmental strain, throughout all phases of the cardiac cycle using 4D volume acquisitions.

- This application uses AI to detect specific cardiac views and to determine semi-automated chamber contours. If the clip does not have ECG information for ED and ES determination, an AI algorithm selects ED/ES frames. The user can edit contours from the 2D MPR views. They can also reselect ED/ES frames as needed
- Chamber volumes at ED and ES are computed from these meshes as well as EF (%) and GLS (%). Bullseye plot for segmental strain (%) can be displayed as well as segmental strain and chamber volume curves
- 4D Heart^{AI} using both TTE and TEE has a up to 96% accuracy rate for detecting LV ED and ES volumes between manual contours and 4D HeartAI
- 4D Heart^{AI} has a 98% MPR Identification and Alignment accuracy
- Supports AI-powered automated assessment of ejection fraction, GLS, Circumferential strain, PSD, AVC, Cardiac Output, EDV and ESV
- 4D Heart^{AI} provides 2,659 AI-powered measurements
- Multi beat quantification – up to 5 beats for GLS, EF, and volume analysis
- No ECG needed as the deep learning artificial intelligence recognizes the anatomy of the cardiac chambers and their sizes all through the cardiac cycle to determine the largest and smallest chamber volumes for quantification

⁴ 11658867-ETP-001-01 – Accuracy and Verification Test Report, p. 13

⁵ Average accuracy for all views

AI Assist (Option)

- For Clinical users who perform TTE Exams, the TTE AI Assist Feature (automated placement of Color Region of Interest (ROI) and Doppler Region of Interest (ROI)) has the potential to improve workflow, reduce keystrokes, reduce exam time, reduce repetitive motion and increase exam standardization and repeatability
- AI Assist for 12 standard Echocardiogram views has a 99% accuracy⁶ rate for proper view classification and Doppler placement on 23 anatomical and hemodynamic targets
- AI Assist leverages advances in the field of AI, specifically the computer vision techniques of Image Classification and Object Detection. A deep convolutional neural network for Image Classification is trained to identify standard TTE cardiac views. Additional deep learning networks perform
- Object Detection to identify locations of important anatomical regions in each view

Trace^{AI} (Option)

- AI-powered, semi-automated workflow for measuring ovoid/orifice-type structures on 2D MPRs generated from volume rendered images
- Integrated into 3D Caliper tool
- Available on cardiac 4D volume transducers, 5Z1, and Z6T
- Reshapes and snaps the circle contour to the borders of the structure being measured
- Provides area, circumference, and minimum/maximum diameter measurements

AI Abdomen (Option)

The proprietary AI Abdomen feature is an AI-powered image recognition tool that provides real-time view classification and landmark detection of standard abdominal views. It provides automated labeling for 17 standard views acquired in an adult abdominal exam and provides automated caliper placement for 12 distance measurements.

- AI Abdomen automatically recognizes 17 anatomical views including Right Liver Sagittal, Right Liver Transverse, Left Liver Sagittal, Left Liver Transverse, Right Kidney Sagittal, Right Kidney Transverse, Left Kidney Sagittal, Left Kidney Transverse, Pancreas Sagittal, Pancreas Transverse, Aorta, IVC, Gall Bladder Sagittal, Gall Bladder Transverse, Spleen Sagittal, Spleen Transverse, Common Bile Duct
- AI Abdomen supports 12 key measurements: Liver Length, Right Kidney Length, Right Kidney AP, Right Kidney Width, Left Kidney Length, Left Kidney AP, Left Kidney Width, Gall Bladder Thickness, Spleen Length, Spleen AP, Spleen Width, Common Bile Duct
- Can be used with or without system protocol scanning
- Compatible with transducers featuring Abdomen and Abdomen Difficult presets: DAX, 5C1, 9C2, 9C3, 7VC2, 4V1, 8V3, 10V4, 7L2, 10L4, 11M2, 11M3

⁶ 11658871-ETP-001-01 – Overall accuracy 1732/1745, pg. 3

Transducer options

Refer to the following table to identify transducers compatible with your ultrasound system.

Options	Description
Transducers, Curved Array	• 9C3
	• 9C2
	• 5C1
	• 7VC2
	• DAX
Transducers, Linear Array	• HLX
	• 18H6
	• 18L6
	• 15L4
	• 14L5
	• 10L4
Transducers, Phased Array	• 7L2
	• 10V4
	• 8V3
	• 5Z1
Transducers, Micro-convex	• 5V1
	• 4V1
	• 11M2
Transducers, Endocavity	• 11M3
	• 10EV3
	• 9EC4
Transducers, Continuous Wave (CW)	• 9VE4
Transducer, Volume Transesophageal (TEE)	CW5, CW2 (dependent on cardiac imaging option)
Transducer Accessories (Reusable bracket and disposable needle guides)	Z6T (phased array)
	• Verza Guidance System
	- Biopsy and needle guide set, 7L2, 9C2, 14L5, 15L4
	- Biopsy and Fusion needle guide set, DAX, 5C1, 10L4
	• Needle guides
	- Infiniti Plus needle guide set, HLX
	- In-plane ultrasound needle guide, Ultra-Pro II
	- Fusion needle guide set, 4V1
	- Biopsy needle guide set, 18L6
	- Biopsy needle guide set, 9C3
- Reusable endocavity needle guide, 9EC4, 10EV3	
- Disposable endocavity needle guide, 9EC4, 9VE4, 10EV3	



Customer Service Solutions designed for maximum performance

With Siemens Healthineers, you have options when it comes to protecting your ultrasound investment with a service contract. Whether you choose our full service support that gives you peace of mind, a shared service contract that empowers your in-house biomedical engineers, or something in-between, our experts are here when you need them.

Kinectus Remote Services

Kinectus remote service is a secure, easy-to-use, cloud-based solution that keeps your ultrasound system connected, your software up to date, all while minimizing service costs and adhering to current security and compliance guidelines.

Powered by AWS (Amazon Web Services), Kinectus enables quicker resolution via remote technical support and remote application support. It also provides faster updates through on demand and automatic remote software updates – all with a secure connection.

Software Upgrades

TechUp 18 protects your investment with a service contract including a software upgrade program.

This program guarantees eligible customers to receive at least one software upgrade every 18 months. Software upgrade may include enhancements to existing software licenses and workflow improvements.

TechUp Now is our newest and most flexible software upgrade package. Extend the lifespan of your ACUSON Sequoia ultrasound fleet with regular software upgrades throughout your service contract. TechUp Now also gives you the freedom to choose whether to upgrade when a new software release comes out, allowing you to maintain uninterrupted staff workflow.

TechUp 18 and TechUp NOW are add-on options for qualifying service contracts to help enhance the investment in your Siemens Healthineers ultrasound system.

Clinical measurement range and accuracy

The system assumes a speed of sound of 1,540 m/s for all measurements.

Direct measurement	Range	Accuracy
Distance	0 cm to 40 cm	3% of the distance or 1.5 mm; whichever is greater assuming 1,540 m/s speed of sound. Does not apply to trace tool. Distance tolerance using trace tool is user-dependent.
Distance using extended field of view	0 cm to 27.5 cm	Linear transducer: 5% of the distance or 2.5 mm; whichever is greater assuming 1,540 m/s speed of sound. Curved transducer: 8% of the distance or 2.5 mm; whichever is greater assuming 1,540 m/s speed of sound.
Trace Area	0 cm ² to 1170 cm ²	6% of the area or 1.5 cm ² ; whichever is greater, assuming minimal operator error in tracing the desired object and assuming 1,540 m/s speed of sound.
Trace Distance	0 cm to 139 cm	5% of the distance or 6 mm; whichever is greater, assuming minimal operator error in tracing the desired object and assuming 1,540 m/s speed of sound.
Trace Circumference	0 cm to 139 cm	5% of the circumference or 6 mm; whichever is greater, assuming minimal operator error in tracing the desired object and assuming 1,540 m/s speed of sound.
Time	0 s to 9.0 s	Better than $\pm 1\%$ of the sweep speed or ± 10 msec., whichever is greater.
Velocity	1 cm/s to 2000 cm/s	10% of the velocity or 5 cm/s; whichever is greater using a calibrated flow phantom.

System requirements

Power supply requirements

Mains Voltage	100 V ~ to 240 V ~
Maximum Current	5.4 to 13.0 amps
Frequency	50 to 60 Hz

Noise Level

35 to 38 dB

Possible combinations with other equipment

Only the peripheral devices listed in this chapter are approved for use with the ultrasound system. Any use of other devices with the system will be at the user's risk and may void the system warranty.

On-board peripheral devices must be installed by an authorized Siemens Healthineers representative or approved third party. Check with your sales representative.

Input and output signals for audio, video, and data transmission connections

Port	Location	Example of connection	Signal
RJ-45	On rear panel	Ethernet RJ45, 10BaseT/100BaseT/1000BaseT	Bi-directional
USB-A (four ports)	Input/output panel	Printer, Fusion electronics unit, footswitch, Blu-ray/DVD/CD combination drive	Bi-directional
DisplayPort	Input/output panel	External monitor	Input
USB-A (two ports)	Left side of the touch screen	USB storage device, headset and camera for virtual communication with a Siemens service representative	Bi-directional
ECG connector	Physio panel	ECG leads	Input
Aux connector	Physio panel	ECG external DC input	Bi-directional

Wireless network connections

The ultrasound system supports the following options for connection to wireless networks.

Network standard	<ul style="list-style-type: none"> • 802.11a • 802.11b • 802.11ac • 802.11g • 802.11n 	<ul style="list-style-type: none"> • Wired Network DHCP (RFC2131), as implemented by Windows 10 MAB • WIFI Network DHCP (RFC2131), as implemented by Windows 10 MAB
Frequency bandwidth	<ul style="list-style-type: none"> • 2.4 GHz • 5 GHz 	
Authentication	<ul style="list-style-type: none"> • WPA • WPA2 • WPA PSK • WPA2 PSK • Open 	
Encryption	<ul style="list-style-type: none"> • None • TKIP • AES 	
Extensible Authentication Protocol (EAP)	<ul style="list-style-type: none"> • PEAPv0 (PEAP-MSHCAPv2) • TLS 	

Environmental requirements

Electromagnetic Compatibility (EMC) Note: Operating the ultrasound imaging system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to

interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

Ultrasound system	During Operation	During Storage or Transportation
Atmospheric pressure	700 hPa to 1060 hPa	500 hPa to 1060 hPa
Relative humidity	20% to 80%, non condensing	10% to 90%, non condensing
Temperature	–	–
System without a printer	+10°C to +40°C	–20°C to +60°C
System with a printer	+10°C to +35°C	–10°C to +60°C

Note: Print media, for example, printer paper, is excluded from the environmental requirements. Refer to the ranges included on the manufacturer's label.

Transducers	During Operation	During Storage or Transportation
Atmospheric pressure	–	–
All transducers, except 7VC2, 9VE4	700 hPa to 1060 hPa	500 hPa to 1060 hPa
7VC2, 9VE4	700 hPa to 1060 hPa	700 hPa to 1060 hPa
Relative humidity	–	–
All transducers, except 7VC2, 9VE4	10% to 80%, non condensing	10% to 95%, non condensing
7VC2, 9VE4	10% to 80%, non condensing	10% to 90%, non condensing
Temperature	–	–
All transducers, except 7VC2, 9VE4, Z6T, 5Z1, HLX	+10°C to +40°C	–10°C to +50°C
7VC2, 9VE4	+20°C to +40°C	–5°C to +50°C
Z6T, 5Z1	+10°C to +35°C	–10°C to +50°C
HLX	+10°C to +40°C	–40°C to +60°C

Note: Needle guides are excluded from the environmental requirements. Refer to the ranges included on the manufacturer's label.

System classifications

- Type of protection against electrical shock:
Class I, external powered
- Degree of protection against electrical shock:
 - Type BF applied part for endocavity, linear, curved, and phased array transducers
 - Type B applied part for Fusion transducer sensors and needle tracking sensors
 - Type BF defibrillation-proof applied part for ECG connections on the physio module
 - Type CF defibrillation-proof applied part for ECG connections on the physio module
- Degree of protection against harmful ingress of water:
Ordinary equipment
- Degree of safety of application in the presence of a flammable anesthetic material with air or with oxygen or nitrous oxide:
Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
- Mode of operation:
Continuous operation
- Ingress protection levels:
 - Transducers: IPX8
 - Footswitch: IPX8
- Country of Origin ACUSON Sequoia ultrasound system
 - United States
 - Slovakia

Standards compliance

The diagnostic ultrasound system is in compliance with the following standards, including all applicable amendments at the time of product release.

Quality standards

- FDA QSR 21 CFR Part 820
- EN ISO 13485 and ISO 13485
- ISO 9001

Design standards

- ANSI/AAMI ES 60601-1
- CAN/CSA-C22.2 No. 60601-1
- EN 60601-1 and IEC 60601-1
- EN 60601-1-2 and IEC 60601-1-2 (Class A)
- EN 60601-1-6 and IEC 60601-1-6
- EN 60601-2-18 and IEC 60601-2-18
- EN 60601-2-37 and IEC 60601-2-37
- EN 62304 and IEC 62304
- EN 62366-1 and IEC 62366-1
- EN ISO 14971 and ISO 14971

Acoustic output standards

- IEC 62359, Test Methods for the Determination of Thermal and Mechanical Indices Related to Medical Diagnostic Ultrasonic Fields

Radio and telecommunications standards

- CFR 47 FCC Part 15.247
- CFR 47 FCC Part 15.107
- CFR 47 FCC Part 15.109
- ETSI EN 300 328
- ETSI EN 301 489-1
- ETSI EN 301 489-17
- ETSI EN 301 893

CE declaration



This device bears a CE mark in accordance with the provisions of EU Regulation 2017/745 of April 5, 2017 concerning medical devices and the Council Directive 2011/65/EU of June 08, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The CE marking applies only to Medical Devices which have been put on the market according to the above mentioned EU Regulation and EU Directive.

Unauthorized changes to this product are not covered by the CE mark and the related Declaration of Conformity.

The products/features mentioned in this document may not be commercially available in all countries. Due to regulatory reasons their future availability cannot be guaranteed. Please contact your local Siemens Healthineers organization for further details.

* At the time of this data sheet finalization, the ACUSON Sequoia version 3.9 may be pending shipment in some countries. Available based on country registration approval. Please consult with your local Siemens Healthineers representative.

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