



Data sheet

ACUSON Redwood Ultrasound System

Version VA20C SW

siemens-healthineers.com/redwood



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ACUSON Redwood ultrasound system

ACUSON Redwood is an ultrasound system that delivers excellent clinical outcomes against the restraints of tight budgets. You get premium image quality, exceptional performance, greater workflow efficiency and the bottom-line value for your organization needs.

System Overview

All-digital signal processing and multi-beam formation technology provide best-in-class¹ imaging in all modes and eParallel Quad beam processing of the RF signal data in the time and amplitude domains with new generation all digital beamformer technology – 2D-mode line density:

- Operating System Windows 10
- Up to 512 lines
- Total system dynamic range: >334 dB
- Frame Rate: 2104 fps
- Channel Count : 8,847,360
- Volume Rates: up to 40 fps
- Depth Display 1–40 cm (transducer dependent)

Display

- 21.5" LCD Monitor
- 13.3" Touch Display
- 1920 x 1080 pixel display resolution for both monitor and touch-screen
- Scan frequency: 60 Hz

Operating Modes

- 2D mode
 - 2D-mode with Harmonics imaging
- Color flow Doppler
 - Color (velocity)
 - Power (energy)
- Pulsed Wave Doppler
 - Pulsed Wave Doppler Tissue Imaging
 - High Pulsed Repetition Frequency Pulsed Wave Doppler

¹ When compared to ACUSON S Family ultrasound systems.

Shared Service Cardiology

- Customizable measurement package
- Stress Echo
- Cardiac Strain
- 2D TEE transducer
- Adult and Pediatric imaging

UltraArt Universal Image Processing

- Ultrasound the way you want – Simple intuitive quad view for image effects

Service Delivering Optimal Care

- Advanced Diagnostics Dashboard
- System and transducer diagnostic tests and reports
- Fast recovery with software partition
- Real-time customer support with eSieLink

Portability

- Lightweight (87 kg, 191.80 lbs)
- Quiet Operation
- Hibernate and quick boot functionality without the need for a battery



21.5" LCD Monitor

- High-resolution LCD flat panel ideal for flexibility
- Optimized for exceptional performance, gray scale utilization and auto calibration

Harmonized User Interface

- Control panel and workflow alignment with ACUSON Sequoia platform embracing Siemens Healthineers User Interface (SHUI) design methodologies

Virtual Touch Modes

- Strain, pSWE and 2D shear wave technologies

Contrast Enhanced Ultrasound

- General Imaging and LVO Applications
- Bubble longevity and sensitivity
- Increased ultrasound utilization

Interchangeable Transducers

- Shared transducer portfolio with ACUSON Sequoia platform

- 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
- DTI Doppler tissue imaging capability
- 3D/4D imaging capability

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 for echo exams

- 2D/Anatomical M-mode
- 2D/DTI (for cardiac)
- 2D/DTI/PW DTI (for cardiac)
- 2D/DTI/Color Doppler M-mode (for cardiac)

Formats

- Single, dual, live dual, and seamless dual image display format
- Display formats for M-mode and Doppler
 - 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 x 1, 2 x 2, 3 x 3, 4 x 4, 1 x 2 and 5 x 5

2D-mode Features

- Adjustable size and position of field of view
- Magnification in frozen, cine, or real-time imaging
- Cine capture: up to 60 seconds with 20 fps (frames per second)
- Acquired 2D-mode frame rates, depending on the transducer and imaging depth: up to 2104 fps (frames per second)
- Fundamental and harmonic transmit frequencies: transducer dependent
- Frequency range 1~21 Mhz
- User-selectable transmit frequencies: up to 13.3 MHz
- Multi-line signal parallel processing
- Linear array transducer beam steering
- 2D/Doppler refresh, update, and triplex functions
- Gain in one decibel increments: -20 dB to 20 dB
- Dynamic range in one decibel increments: transducer dependent (10 dB to 90 dB)
- 2D-mode with Harmonics imaging, Compounding imaging, and TEQ technology
- Grayscale and colorization (tint) maps
- Persistence levels: 1 to 4
- Speed of sound: 1 to 2
- 4B-mode
- Line density: transducer dependent
- UltraArt universal image processing: Off, 1 to 3
- Clarify: Off, 1 to 7
- Maps: A, B, C, D, E, F, G
- Tints: 1 to 10
- Auto Tissue Equalization (TEQ) gain: -5 to 5
- Edge enhancement on real-time images

Color Features

- Gain in one decibel 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: transducer dependent
- Persistence levels: 1 to 4
- 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: 1 to 4
- Pulse repetition frequency range: 100 Hz to 39,062 Hz
- Maps: A, B, C, D, E, F, G, H, I
- Smoothing levels: 1 to 4
- 4B-mode with Color imaging
- Linear array transducer beam steering

Power Features

- Power gain in one decibel increments: -20 dB to 20 dB
- Independent controls for power gain, pulse repetition frequencies, invert, baseline, line density, persistence, priority, filter, and smoothing
- User-selectable transmit frequencies: transducer dependent
- Maps: A, B, C, D, E, F, G, H, I
- Persistence levels: 1 to 4
- Smoothing levels: 1 to 4
- Pulse repetition frequency range: 100 Hz to 39,062 Hz
- Adaptive wall filter: 1 to 4
- User-selectable power flow states: low, general, high, and anatomy specific, for example, kidney or aorta
- Linear array transducer beam steering

Pulsed Wave Doppler Features

- Fast Fourier Transformation (FFT) processing: up to 256 points
- User-selectable transmit frequencies per transducer: transducer dependent
- 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 image processing and TEQ technology
- Angle correction in one degree increments: 0° to 89°
- Transmit frequencies: 1.8 MHz to 10.0 MHz
- Pulse repetition frequencies (PRF) and high-pulse repetition frequency (HPRF) Doppler: 100 Hz to 52,083 Hz
- Wall filter selections: transducer dependent (0.5 Hz to 8,073 Hz)
- Adjustable Doppler gate size, depending on the transducer: 0.05 cm to 2.0 cm
- 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 60 seconds of Doppler data
- Sweep speed selections: 8 mm/s to 200 mm/s
- Gain in one decibel increments: -30 dB to 30 dB
- Dynamic range in five decibel increments: 10 dB to 90 dB
- Doppler gain, baseline, spectral invert, sweep speed, wall filter, edge, UltraArt universal image processing, 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 17 levels
- Pulsed wave Doppler tissue imaging available for all cardiac exams on phased array transducers
- Maps: A, B, C, D, E, F, G, H
- Tints: 1 to 11
- Linear array transducer beam steering

Continuous Wave Doppler Features

- Fast Fourier Transformation (FFT) processing: up to 256 points
- User-selectable transmit frequencies per transducer: transducer dependent
- User-selectable Doppler update mode
- User-adjustable Doppler scale and baseline position controls
- User-adjustable Doppler UltraArt universal image processing
- 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 5.0 MHz
- **Pulse repetition frequencies (PRF): 100 Hz to 52,083 Hz**
- Wall filter selections: 0.5 Hz to 8,073 Hz
- Doppler cine control feature: up to 60 seconds of Doppler data can be stored
- Sweep speed selections: 8 mm/s to 200 mm/s
- Gain in one decibel increments: -30 dB to 30 dB
- Dynamic range in five decibel increments: 10 dB to 90 dB
- Doppler gain, baseline, spectral invert, sweep speed, wall filter, edge, UltraArt universal image processing, 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 17 levels
- Tints: 1 to 11

M-mode Features

- Independent controls for M-mode gain and sweep speed
- Dynamic range display in one decibel increments: 10 dB to 90 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 13.3 MHz
- Maps: A, B, C, D, E, F, G
- Tints: 1 to 10
- Anatomical M-mode for the cardiac exam supports visualization of an M-mode sweep by rotating the M-mode cursor off axis
- M-mode with Harmonics imaging
- Linear array transducer beam steering
- Edge enhancement on real-time or frozen images

Cybersecurity

Your ultrasound system includes a security package to protect patient confidentiality and system security.

Patient Data Encryption Option

- Data storage encryption with eSieCrypt software
 - 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-based 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

Clinical Applications

General	General
Abdomen	<ul style="list-style-type: none"> • Abdomen • Renal
Small Parts	<ul style="list-style-type: none"> • Breast • Testis • Penile • Thyroid
Cardiac	<ul style="list-style-type: none"> • Cardiac • Ped Cardiac (Pediatric cardiac) • Neo Cardiac (Neonatal cardiac)
Gynecology	<ul style="list-style-type: none"> • GYN (Gynecology)
Vascular	<ul style="list-style-type: none"> • Carotid (Cerebrovascular) • UEA (Peripheral vascular arterial, upper extremity) • UEV (Peripheral vascular venous, upper extremity) • LEV (Peripheral vascular venous, lower extremity) • LEA (Peripheral vascular arterial, lower extremity)
Musculoskeletal	<ul style="list-style-type: none"> • MSK (Musculoskeletal)
Obstetrics	<ul style="list-style-type: none"> • OB (Obstetric) • Early OB (Early obstetric) • Fetal Echo
Pediatric	<ul style="list-style-type: none"> • Ped Abdomen (Pediatric abdomen)
Urology	<ul style="list-style-type: none"> • Pelvis • Prostate
Neonatal	<ul style="list-style-type: none"> • Neonatal Head

Imaging Features

Harmonics

- Available for all imaging transducers
- Harmonic transmit frequencies per transducer: up to 4

Compounding

- 2D image optimization technique for enhanced viewing of tissue differences by detection of subtle lesions and enhanced tissue differentiation

Biopsy

- Available for transducers compatible with needle guide attachments

Please see transducer flyer for additional information.

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

UltraArt Universal Image Processing

- Reduces speckle and enhances contrast to provide a realistic tissue presentation and patient-specific processing that adapts to differences in tissue

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

- Optimizes the 2D image by adjusting the speed of sound
- Available only with the following exams: 18L6 Breast, 5C1 General

Panoramic Imaging

- Panoramic images may be created up to 221 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 image processing 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.

- Acquires two-dimensional ultrasound images with a composite, extended field of view
- Compatible transducers: 10L4, 14L5, 18L6, 18H6, 5C1, 9C3, 9EC4, 9VE4
- Supported studies: All exams

Clips

- Prospective capture of motion image data
- Retrospective capture of motion image data
- Variable clip length (1 to 300 seconds)
- Clip formats
 - AVI
 - Multi-frame DICOM
- Supports storing of individual images within clips

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
- Pause and resume a protocol
- Create new protocols or modify existing protocols
- Import or export protocols using a USB storage device

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 44 measurements. The ultrasound system copies only the five most recently labeled measurements to the report.

General Functions

- 2D mode and M-mode have various sets of measurement markers per image for distance measurements
- Doppler has up to 20 sets of measurement markers per image for velocity measurements
- Label then measure or measure then label workflow for individual labels
- Customizable reports

General 2D-mode Measurements and Calculations

- Distance
- Multi-point distance
- Distance average
- Angle
- Circumference
- Area
- Volume
- Disk volume
- Stenosis
- Volume flow
- Ratio
- Pediatric Hip

Pediatric Hip

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

General M-mode Measurements and Calculations

- Distance
- Multi-point distance
- Heart rate
- Slope
- Time
- Distance or time ratio

General Doppler Measurements and Calculations

- Velocity
- Heart rate
- Resistive index
- Pulsatility index (system-generated or manual)
- Pressure half time
- Pressure half time guide
- Velocity time integral
- Velocity time integral trace
- Volume flow
- Acceleration
- Time
- Time or velocity ratio
- Deceleration pressure over deceleration time
- E velocity over A velocity with deceleration time

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)

eSieCalcs Software

- Provides area, circumference, and maximum diameter measurements using a border detection algorithm on 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.

- SSD Drive capacity is 500 GB

Mobility

- Hibernate decreases the time to power on and off the ultrasound system. The system is ready for use in approximately 30 seconds.
- Compact and lightweight industrial design
- Steering handle for portability and maneuvering
- Rear handle for transport of system from behind
- Four locking swivel wheels
- Transducer holders and cable management
- Tilt down monitor
- Locking arm for monitor
- Locking control panel
- Document for patient folder or tablet on the back of the monitor

Maximum Physical Dimensions

Width: 53 cm (20.87 in)

Height: 110 cm to 169 cm (43.3 in to 66.54 in)

Depth: 86 cm (33.86 in)

Weight: 87 kg (191.80 lbs)

The weight of the system is based on the system unpacked and ready for connecting transducers and using in a patient examination.





User-Accessible Connections

- USB port under the control panel for importing and exporting protocols and exams, archiving, and serviceability (quantity 1)
- USB ports on the left side of touch screen for importing and exporting protocols and exams, archiving, and serviceability (quantity 2)
- USB ports on the input/output panel for peripheral devices (quantity 4)
- DC power sockets under the control panel for the gel warmer (quantity 1)

Operator Control Panel

- Height and swivel adjustable (90° both right and left)
- Control panel stops at every 5.6 degree
- Context sensitive back lighting
- 8 TGC controls
- Integrated touch panel with display and ergonomic adjustment (30–60 degrees articulation)

Monitor

- 21.5-in. high-resolution flat panel
- Articulating monitor arm
- Monitor tilt 90° forward; 15° backward
- Document sleeve on backside

Transducer Technology and Design Attributes

- Multi-D array transducer technology
- Single crystal array transducer technology
- Lightweight, ergonomic transducer design
- Touch screen transducer selection
- Four array transducer ports
- One auxiliary continuous wave transducer port
- Compact-pinless connectors
- Integrated storage shelf for transducer connectors
- Transducer holders for all transducer designs and gel bottle storage
- Gel warmer
- Virtual format imaging
- User-adjustable display depth: transducer dependent
1 cm to 40 cm (0.39 in x 11.8 in)
- Range of operating frequencies
 - 2D-mode includes fundamental and harmonic imaging, without contrast
 - Doppler includes pulsed wave, continuous wave, and color imaging

For detailed transducer information please refer to the ACUSON Redwood transducer flyer.

Accessories and Options

The Siemens Healthineers-authorized accessories and options for your ultrasound system are listed in this chapter. 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

3D/4D Imaging (Option)

This software feature provides transition between 2D imaging and 4D studies. 3D data volumes are acquired by sampling several 2D arrays sequentially. These 3-dimensional volume data sets are used to generate qualitative 3-dimensional reconstruction and/or 3D surface rendered displays (gradient and texture shading) or optional multiplane reconstruction where cross sections of the 3D volume set can be displayed.

Multi-planar Reformating (MPR)

An MPR is the computation and simultaneous display of 2D image planes from a volume. MPRs provides the following:

- Allows the user to visualize multiple orthogonal scan planes simultaneously.
- Allows user to visualize scan planes that are not easily obtainable by adjusting the transducer position (i.e. coronal plane).
- The user can make measurements on the MPR images.

Volume Rendering (VR)

Volume Rendering displays a 2D projection of the volumetric data from a particular viewing angle. Volume allows user to visualize volume as a whole (not just slices from the volume).

Volume Rendering has the following features and characteristics:

- Includes editing tools which allow the user to create a window into the data and/or exclude data that obscures anatomy-of-interest.
- VR orientation can be adjusted to allow the user to visualize the volume from all angles.

Freehand 3D (Option)

Freehand 3D imaging enables volume imaging through real time capture and display of B-mode data using traditional transducers.

Volume data sets are acquired by capturing of a traditional 2D ultrasound probe as a clinician moves it across an object of interest.

The rendering and edit tools are identical to 3D imaging which configured from mechanically swept volumes.

Virtual Touch Strain Imaging (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: 9EC4
Supported studies: Prostate, General
- Compatible transducers: 10L4, 14L5, 18L6
Supported studies: Breast, Thyroid, General

Virtual Touch Point Shear Wave (Option)

- Measures tissue shear velocity (V_s) 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: 4V1, 5C1
Supported studies: Abdomen, General
- Compatible transducers: 10L4
Supported studies: Abdomen

Virtual Touch Shear Wave (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: 10L4
Supported studies: Breast, Thyroid, General

Contrast Agent Imaging (Option)

- Supports the following contrast agent destruction techniques: Burst, Flash Sequencing
- Compatible transducers: 10L4
Supported studies: Abdomen, Arterial, Breast, Carotid, Musculoskeletal, Testis, Thyroid, Venous, General
- Compatible transducers: 18L6
Supported studies: Breast, Musculoskeletal, Testis, Thyroid, General
- Compatible transducers: 18H6
Supported studies: Musculoskeletal, General
- Compatible transducers: 5C1, 9C3, 4V1
Supported studies: Abdomen, Gynecology, General
- Compatible transducers: 9EC4
Supported studies: Gynecology, Prostate, General
- VueBox Option
 - Requires clips acquired during contrast agent imaging and stored in DICOM format
 - Enables 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: 10L4, 18L6, 18H6, 5C1, 9C3, 4V1, 9EC4

Note: 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 regulation for the country where you are using this ultrasound system.

eSie OB Measurements (Option)

- Provides system-generated measurements of 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

eSie Follicle (Option)

- Up to 20 follicle measurements can be available for eSie Follicle options

Stress Echo (Option)

The stress echo package provides tools for ECG-triggered acquisition, display, selection comparison, evaluation and archiving of multiple cardiac loops during various stages of a stress echo examination.

- Standard acquisition protocols for pharmacology, treadmill and bicycle stress including:
 - Multiple factory default stress echo protocols
 - Customizable stress echo protocols
 - Flexible combination of imaging modes while in stress echo package
 - Ability for customized studies through Protocol
- Editor, with up to 20 stages, 30 views per stage
 - Full screen or ROI (region of interest) acquisition
- Complete R-R capture with clip editing
- Easy workflow
- Stage Timer and additional Manual Timer
- Prospective or retrospective labeled and continuous capture
- Reference image display during acquisition
- Immediate review of acquired loops
- Flexibility to skip views or stages
- Flexibility to re-acquire and overwrite already acquired clips
- Indication of current view, acquired views and skipped views in the workflow diagram
- Wall Motion Scoring, 16/17 segment model with graphical display and report printing
- All cardiac Measurements with report printing

eSie Measure Workflow Acceleration Package (Option)

The eSie Measure workflow acceleration package is the first innovative application that provides semi-automated measurements for routine echo exams, improving efficiency and consistency for end users. Based on a knowledge base of over a thousand expert-traced datasets, the eSie Measure package improves accuracy and reproducibility. Manual measurement accounts for a large portion of an echo exam time and requires repetitive key strokes which can lead to long term stress injury. With a push of a button, the eSie Measure package semi-automatically generates reliable measurement data for 2D, M-mode and spectral Doppler, increasing consistency, reproducibility and accuracy of each exam, while reducing key strokes.

eSie Left Heart Measurement Package (Option)

eSie Left Heart Measurement Package utilizes knowledge based technologies specifically designed to identify and measure contours on a typical transthoracic exam of left ventricle and atrium in an automated manner. The algorithms are trained on a large image database of apical 4CH and 2CH adult transthoracic 2D echo views annotated by clinical experts and provide a quick and easy measurement of EF, EDV and ESV for both LV and LA. The application is available both on and off the system and is trained on apical 4CH and 2CH transthoracic 2D echo views. eSie Left Heart enables improvement in efficiency and workflow in a routine clinical setting.

Left Ventricular Opacification (LVO) (Option)

LVO is a low-MI contrast agent imaging mode that improves detectability of contrast agents by increasing the brightness of the contrast agent relative to the tissue brightness. Contrast harmonic imaging (CHI) is available for LVO on the 5V1 transducer to improve image quality ensuring high specificity and high sensitivity.

Larger Gel Holder (Option)

- 1 large gel bottle (1000 ml) holder

syngo® Velocity Vector Imaging (Option)

- Tracks and estimates tissue velocity and other motion and deformation parameters at selected points on a user-defined outline of a structure
- Assists analysis of rotation, displacement, and radial strain of the left ventricle
- Assists evaluation of adult cardiac contraction by analyzing the systolic and diastolic ventricular strain and rotation

Retractable Keyboard (Option)

Language-specific alphanumeric keyboard available in: English, German, French, Spanish, and Italian.

Footswitch (Option)

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

Printer (Option)

- **Black and white printer assembly, UP-D711MD, Sony**
- Print media, UP-D711MD thermal printer paper

Blu-ray/DVD/CD 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

Physio Module (Option)

- Includes the ECG function, which contains the ECG cable and leads
 - ECG leads, standard U.S.A.
 - ECG leads, standard European

eSiePrep SRS Preconfiguration (Option)

Factory pre-configuration of settings enabling Smart Remote Services (SRS) connection without additional on-site configuration for systems using an internet-based, non VPN network.



Service Options

Connect Platforms

- Smart Remote Services (SRS)

Real time remote service that connects your ultrasound system with Siemens Healthineers global team of technical and application experts. Delivered through a secure, high-speed network, SRS supports your system by resolving issues as they arise, to prevent unscheduled service visits.

 - Remote Assist: Real-time interaction between clinical staff and clinical application experts whenever a clinical support need arises
 - Remote Technical Support: Remote error identification, diagnosis and repair using specialized diagnostic tools
 - Requires using the phone number provided by your Siemens Healthineers representative to initiate remote assistance
 - Headset, camera, and camera attachment are optional
- teamplay Fleet

Online portal that allows you to manage the performance and maintenance of your Siemens Healthineers equipment, 24/7, from any device.
- PEPconnect/PEPconnections

Personalized education and performance experience for healthcare professionals to increase staff competency, efficiency, and productivity.

 - Engaging learning activities including e-learnings, webinars, job aids, videos, virtual instructor led events, and more
 - Create own learning experience with an individual profile, plan and transcript to record education
 - Connect, communicate and be part of social learning groups
- teamplay

Make fast, well-informed decisions and optimize workflow by connecting to teamplay to compare your performance data to benchmarks and to collaborate with healthcare professional world-wide.

Clinical Measurement Range and Accuracy

The following table describes the variability in accuracy for each parameter. The system assumes a speed of sound of 1,540 m/sec 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/sec 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/sec speed of sound Curved transducer: 8% of the distance or 2.5 mm; whichever is greater assuming 1,540 m/sec speed of sound.
Trace Area	0 cm ² to 1236 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/sec speed of sound.
Time	0 sec to 9.0 sec	Less than $\pm 1\%$ of the sweep speed or ± 10 msec, whichever is greater.
Velocity	0 cm/sec to 2200 cm/sec	10% of the velocity or 5 cm/s; whichever is greater using a calibrated flow phantom.

System Requirements

Power Supply Requirements

Mains Voltage	100–240 V~
Maximum Current	5–2.5 A
Frequency	50/60 Hz
Noise Level	34 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	Input/output panel	Ethernet RJ45, 10BaseT/100BaseT/1000BaseT	Bi-directional
USB 3.0-A (two ports) USB 2.0-A (two ports)	Input/output panel	USB storage device, footswitch, headset and camera for virtual communication with a Siemens Healthineers service representative	Bi-directional
HDMI	Input/output panel	External monitor	Output
S-Video	Input/output panel	Separate video and Y/C (analog)	Output
USB 3.0-A (two ports)	Left side of the touch screen	USB storage device, headset and camera for virtual communication with a Siemens Healthineers service representative	Bi-directional
ECG connector	Physio panel	ECG leads	Input
Aux connector	Physio panel	ECG external DC input	Bi-directional
USB 2.0-A	System internal port	B/W printer	Bi-directional
SATA port	System internal port	Blu-ray/DVD/CD combination drive	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
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 to 1060 hPa	500 to 1060 hPa
Relative humidity	10 to 80%, non-condensing	10 to 95%, non-condensing
Temperature		
System without a printer	+10°C to +40°C	-10°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	700 to 1060 hPa	500 to 1060 hPa
Relative humidity	20 to 80%, non-condensing	10 to 95%, non-condensing
Temperature	+10°C to +40°C	-10°C to +50°C

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

Protective Measures

Explosion protection: This product is not designed for operation in areas subject to explosion hazards.

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 CF defibrillation-proof applied part for ECG
- 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

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 B)
- 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
- AIUM/NEMA UD-2, Acoustic Output Measurement Standard for Diagnostic Ultrasound Equipment
- AIUM/NEMA UD-3, Standard for Real Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment

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 301 893
- ETSI EN 301 489-1
- ETSI EN 301 489-17

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.

EU Authorized Representative

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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.

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At Siemens Healthineers, we pioneer breakthroughs in healthcare. For everyone. Everywhere. By constantly bringing breakthrough innovations to market, we enable healthcare professionals to deliver high-quality care, leading to the best possible outcome for patients.

Our portfolio, spanning from in-vitro and in-vivo diagnostics to image-guided therapy and innovative cancer care, is crucial for clinical decision-making and treatment pathways. With our strengths in patient twinning, precision therapy, as well as digital, data, and artificial intelligence (AI), we are well positioned to take on the biggest challenges in healthcare. We will continue to build on these strengths to help fight the world's most threatening diseases, improving the quality of outcomes, and enabling access to care.

We are a team of 66,000 highly dedicated employees across more than 70 countries passionately pushing the boundaries of what's possible in healthcare to help improve people's lives around the world.

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