ZONARE

ZS3 Ultrasound System

Specification Sheet

ZONARE

Table of Contents

Specifications

ZONE Sonography™ Technology (ZST) 2
Architecture 2
Applications 2
Site Requirements 2
System Warranty 2
Dimensions 3
System Design 3
Display 3
User Interface 4

Transducers

C4-1 Curved Array 5
C6-2 Curved Array 5
C9-3 Curved Array 6
C10-3 Curved Array 6
L14-5w (Wide Field-of-View) Linear Array 7
L14-5sp (Special Procedures) Linear Array 7
L10-5 Linear Array 8
L8-3 Linear Array 8
E9-4 Endocavity 9
P4-1c Phased Array 9
Transducer Performance Data 10

Imaging Modes

B-Mode 11
M-Mode 11
Color and Power Doppler 12
Pulsed Wave Doppler 12
Contrast Enhanced Ultrasound 13
Dual Imaging 13
Simultaneous Dual Imaging 13
Imaging Mode Combinations 13
Imaging Formats 14
Auto-Opt with ZST 14
Acoustic Zoom 14
Display Zoom 14

Specifications

Image Display 15
Cine Memory 15
IQ Scan – Raw Image Data Capture 15
Exam Management & Presets 16
Image Management 16
Connectivity 17
Optional Peripherals 17
User Editable Worksheets Option 17

Measurements & Analysis

Auto-Dop Trace (Automatic Doppler Measurements) 18
General Capabilities 18
Generic B-Mode Measurements / Calculations 18
(based on cm units)
Generic M-Mode Measurements/Calculations 18
Generic PW Measurements/Calculations 18
(based on cm/sec units)
OB Measurements/Calculations 19
Abdominal Measurements/Calculations 20
Pediatric Hip Measurement 21
B-Mode (Fetal Heart) 21
PW Doppler (Fetal Heart) 21
M-Mode (Fetal Heart) 22
GYN Measurements / Calculations 22
Vascular Measurements / Calculations 22
Carotid 22
Upper Extremity Arterial Calc
Diameter, PW Doppler, Report Page 22
Lower Extremity Arterial Calc (Right/Left)
Diameter, PW Doppler, Report Page 23
Lower Extremity Venous Measurements
Diameter, Checklists, Report Page 23
Upper Extremity Venous Measurements
Diameter, Checklists, Report Page 24

Specifications

Annotation Package 25
Safety and Regulatory 25

Specifications

ZONE Sonography™ Technology (ZST)

ZONE Sonography Technology is an entirely new approach to ultrasound image acquisition and processing. Conventional systems acquire acoustic data line-by-line and focus it with a beamformer using only a small fraction of the actual information contained in the echo data set. **ZONE Sonography Technology** has the ability to utilize all of the information contained in the returning echo data set and as such can cover the field of view in much fewer transmit / receive cycles. While it might be intuitive that simultaneously collecting data from these larger regions would be more efficient, it is understandably less intuitive that fewer acquisitions could result in improved image quality. **ZONE Sonography Technology** enables this performance advantage by retrospectively analyzing these complete echo data sets to synthesize a continuous transmit focus at every image point.

With **ZONE Sonography Technology**, some of the image quality improvements include:

1. **Focused image across the full field of view**
   a. Dynamic transmit & receive focus (Every pixel in the frame is in focus)
      i. No need for transmit focal zone control and resultant frame rate tradeoffs
   b. Enhanced image resolution, uniformity, contrast, and penetration
2. **Faster acoustic acquisition**
   a. Temporal accuracy (reduced motion blur)
   b. Acoustic time available to interleave modes without performance compromise
3. **Patient specific imaging**
   a. Compensating for physiological sound speed variations in patients
4. **Novel Techniques**
   a. Compound contrast imaging
   b. Flexible image formats (phased array imaging on curved transducers, linear on curved, etc.)

Architecture

- > 100,000 dynamic channels per frame
- Frame Rate: > 1000 fps
- Total System Dynamic Range 250 dB
- Boot-up time: < 30 seconds

Languages Supported:

- English
- German
- Spanish
- French
- Italian
- Swedish

Applications

- Abdominal
- Abdominal Vascular (Renal Stenosis, Aorta, Hepatic, Celiac, SMA Studies)
- Anesthesia (Nerve Block)
- Breast
- Contrast Imaging* (CEUS)
- Emergency Medicine (FAST Exam, Central Lines, Peripheral Venous Access)
- Endocavity (Endovaginal, Endorectal)
- Prostate
- Gynecologic (including Endovaginal)
- Intraoperative (Vascular/Superficial)
- Interventional (Guided Needle Procedures)
- Musculoskeletal (MSK)
- Neonatal/Pediatric Abdomen, Echocardiography, Head, Hip
- Obstetrics (all trimesters)
- Ocular
- Superficial Parts
- Testicular/Scrotum
- Thyroid
- Transcranial Imaging with Doppler
- Vascular (Extracranial, Peripheral, Deep)

Site Requirements

- 100-240VAC, 50-60Hz
- 180W (616 BTU/hr) with no peripherals
- 470W (1608 BTU/hr) with peripherals
- Ambient air temperature of 0 – 35˚ Celsius
- Ambient relative humidity of up to 80%, non-condensing
- Ingress Protection Rating: IP 20

System Warranty

- 5 year warranty includes parts for normal wear and failure, labor and technical support
- Includes software updates
- Provides Living Technology that enriches system performance

** CEUS is only available for sale in specific countries. Please contact your local representative for availability.*

Dimensions

- Height:
  - Max operational: 157 cm (62 in)
  - Min operational: 128 cm (50.5 in)
  - Display lowered for transport: 104 cm (41 in)
- Width: 51 cm (20.1 in)
- Depth: 72 cm (28.2in)
- Weight: 66kg or 147lbs

System Design

- Small footprint and light-weight system design for effortless maneuverability and maximum versatility in tight or crowded spaces
- Nitrogen gas shock for vertical height adjustment up to 32 cm (12.5 in) of the user interface console for ergonomic customization
- 13 cm (5 in) diameter wheels with dual shock resistant front and back wheels
- Front wheels are switchable brake, direction lock, and both front and back wheels are full swivel.
- Solid State 120GB Hard Drive for enhanced image storage capabilities
- Import/export of exams to DVD+R or CD-R media
- Monitor mounted hi-fidelity stereo speakers
- Transducer storage – up to 5 transducers
- Convenient cable management
- Gel holders
- Integrated microphone
- Power cord wrap features
- Integrated front handle for transport and position
- Saddle bag storage bins

Display

- 19" (48 cm) high resolution color LCD mounted on articulating arm
- 1280x1024 pixel resolution
- 0.294 mm pixel pitch
- 256 (8 bit) discrete gray levels
- Viewing angle (H/V): 178 degrees typical
- Minimum 400:1 contrast
- Well backlit (280 cd / m2) and low glare for bright environments
- Dynamic feedback sensor for controlling backlight stability and enabling fast warm-up
- Height adjustment via console adjustment as well as articulating arm
- +/- 120˚ horizontal rotation
- 30˚ backward tilt
- Full 90˚ forward tilt into secure transport position
- Integrated Brightness and Contrast controls with on-screen feedback
- Advanced setup parameters via on-screen menu

User Interface

- Streamlined keyboard layout for best user ergonomics
- Home base design for easy access to major modes
- Full size, backlit QWERTY keyboard with non-English accents and characters
- OLEDs display customized controls for selected imaging modes provides for a less cluttered keyboard
- Context-sensitive backlit keys
- (8) DGC slide potentiometers with 45 mm travel
- (4) User-programmable Function keys
  - Unassigned
  - Archive
  - Auto trace
  - Body Patterns
  - B-Mode
  - Bx Guide
  - Compounding
  - Contrast
  - Cursor
  - Custom Preset
  - Display Format
  - Dual
  - Ext. Sync
  - Full Image Display
  - Hide Pt. Bar
  - Image Width
  - Lt/Rt Invert
  - Microphone
  - Power Dop
  - Presets
  - Protocol
  - Record
  - Remove Data Fields
  - Review
  - Simul Dual
  - Transducer
  - Up/Down Invert
- (4) User-programmable Mode keys
  - Unassigned
  - Auto trace
  - Contrast
  - Power Doppler
  - Transducer
- Context-sensitive onscreen menu
- 38mm diameter trackball

New transducer technology, wide bandwidth imaging, and multiple frequency imaging with an expanded range of frequencies including Compound Harmonics. These features provide:

- Increased sensitivity and resolution
- More clinical information and expanded applications

The transducers are lightweight and ergonomically designed to offer easier imaging access, increased operator comfort, and greater overall clinical impact across all patient types.

C4-1 Curved Phased Array Transducer

Primary Applications:	Abdominal, Abdominal Vascular, Obstetrics, Fetal Heart, Gynecologic, CEUS*, Needle Guided Procedures
Secondary Applications:	Peripheral Vascular
Bandwidth:	4-1MHz
Number of Elements:	64
Physical footprint:	35.5x19.5mm
Radius of Curvature:	34mm
Field of View (Adjustable):	80 degrees
Biopsy Guide:	Optional longitudinal type
Depth:	30cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	91 grams
Ingress Protection Rating:	IPX 7
10 Frequencies:	
2D and M-Mode:	3 MHz; 1.75 MHz
Tissue Harmonic:	3.5 MHz; 2.5 MHz
Compound Harmonic:	4 MHz
Color / Power Doppler:	2.25 MHz; 1.75 MHz
PW Doppler:	2.0 MHz; 1.6 MHz

ZONARE PN: Z119-30

C6-2 Curved Array Transducer

Primary Applications:	Abdominal, Abdominal Vascular, Obstetrics, Fetal Heart, Gynecologic, Needle Guided Procedures
Secondary Applications:	Peripheral Vascular
Bandwidth:	6-2MHz
Number of Elements:	128
Physical footprint:	66x18mm
Radius of Curvature:	50mm
Field of View (Adjustable):	65 degrees
Biopsy Guide:	Optional longitudinal type
Depth:	24cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	136 grams
Ingress Protection Rating:	IPX 7
12 Frequencies:	
2D and M-Mode:	5.0 MHz; 3.0 MHz
Tissue Harmonic:	6.0 MHz; 4.0 MHz; 3.0 MHz
Compound Harmonic:	6.0; 4.0 MHz
Compound:	5.0 MHz
Color / Power Doppler:	3.5 MHz; 2.9 MHz
PW Doppler:	2.5 MHz; 2.0 MHz

ZONARE PN: Z111-30

** CEUS is only available for sale in specific countries. Please contact your local representative for availability.*

C9-3 Curved Array Transducer

Primary Applications:	Abdominal, Abdominal Vascular, OB, Pediatric/Small Adult Abdomen, CEUS*
Secondary Applications:	Peripheral Vascular
Bandwidth:	9-3MHz
Number of Elements:	128
Physical footprint:	46x14mm
Radius of Curvature:	33mm
Field of View (Adjustable):	67 degrees
Biopsy Guide:	Optional longitudinal type
Depth:	18cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	91 grams
Ingress Protection Rating:	IPX 7
13 Frequencies:	
2D and M-Mode:	7.0 MHz; 5.5 MHz; 3.5 MHz
Tissue Harmonic:	8.0 MHz; 7.0 MHz; 5.0 MHz
Compound Harmonic:	8.0 MHz; 6.0 MHz
Compound:	7.0 MHz
Color / Power Doppler:	5.0 MHz; 3.5 MHz
PW Doppler:	4.5 MHz; 3.1 MHz

ZONARE PN: Z109-30

C10-3 Curved Phased Array Transducer

Primary Applications:	Neonatal Head, Neonatal Abdominal, Pediatric Echo, Pediatric Abdominal
Secondary Applications:	
Bandwidth:	10-3 MHz
Number of Elements:	64
Physical footprint:	~16 mm
Radius of Curvature:	16 mm
Field of View:	80 degrees
Biopsy Guide:	None available
Virtual Apex Array:	
Depth:	14 cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	45 grams
Ingress Protection Rating:	IPX 7
13 Frequencies:	
2D and M-Mode:	7.5 MHz; 6.0 MHz; 4.0 MHz
Tissue Harmonic:	9.0 MHz; 7.0 MHz
Compound Harmonic:	9.0 MHz; 7.0 MHz
Compound:	
Color / Power Doppler:	5.5 MHz; 4.5 MHz
PW Doppler:	5.0 MHz; 3.5 MHz
Tissue Doppler:	7.0 MHz

ZONARE PN: Z124-30

** CEUS is only available for sale in specific countries. Please contact your local representative for availability.*

L14-5w Linear Array Transducer

(Wide field-of-view)

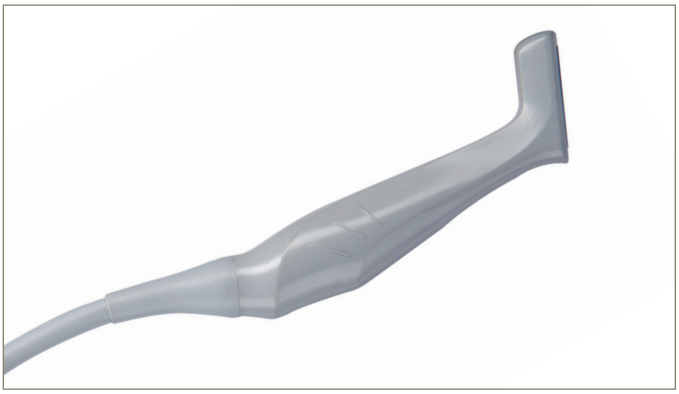
Primary Applications:	Small Parts including Breast, Thyroid, Testes, Superficial Anatomy, CEUS*, Needle Guided Procedures
Secondary Applications:	Superficial Vascular
Bandwidth:	14-5 MHz
Number of Elements:	192
Physical footprint:	62x10mm
Field of View (Adjustable):	55mm
Biopsy Guide:	1. Optional longitudinal type 2. Optional transverse type
Virtual Apex Array:	Wider Field of View
Depth:	10cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	91 grams
Ingress Protection Rating:	IPX 7
11 Frequencies:	
2D and M-Mode:	12 MHz; 7.0 MHz
Tissue Harmonic:	12 MHz
Compound Harmonic:	12 MHz
Compound:	12 MHz
Spatial Harmonics:	12 MHz
Compound Spatial Harmonics:	12 MHz
Color / Power Doppler:	7.0MHz; 6.25 MHz
PW Doppler:	7.0 MHz; 5.0 MHz

ZONARE PN: Z110-30

L14-5sp Linear Array Transducer

(Special procedures)

Primary Applications:	Intraoperative (Endarterectomy Scanning), Saphenous Vein Mapping, Neonatal, Infant, Pediatric Patients, Needle Guided Procedures, Ocular
Secondary Applications:	Small Parts
Bandwidth:	14-5 MHz
Number of Elements:	128
Physical footprint:	37x13mm
Field of View (Adjustable):	26mm
Biopsy Guide:	Optional transverse type
Virtual Apex Array:	Wider Field of View
Depth:	6cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	45 grams
Ingress Protection Rating:	IPX 7
12 Frequencies:	
2D and M-Mode:	12 MHz; 9.0 MHz; 5.5 MHz
Tissue Harmonic:	12 MHz
Compound Harmonic:	12 MHz
Compound:	12 MHz
Spatial Harmonics:	12 MHz
Compound Spatial Harmonics:	12 MHz
Color / Power Doppler:	8.3 MHz; 7.0 MHz
PW Doppler:	8.0 MHz; 5.5 MHz



ZONARE PN: Z107-30

** CEUS is only available for sale in specific countries. Please contact your local representative for availability.*

L10-5 Linear Array Transducer

Primary Applications:	Thyroid, Breast, Scrotum, Pediatric Hips, Superficial Parts, Needle Guided Procedures, Ocular
Secondary Applications:	Peripheral Vascular
Bandwidth:	10-5 MHz
Number of Elements:	128
Physical footprint:	48x11mm
Field of View (Adjustable):	38mm
Biopsy Guide:	1. Optional longitudinal type 2. Optional transverse type
Virtual Apex Array:	Wider Field of View
Depth:	10cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	113 grams
Ingress Protection Rating:	IPX 7
9 Frequencies:	
2D and M-Mode:	8.5 MHz; 6.0 MHz
Tissue Harmonic:	8.0 MHz
Compound Harmonic:	8.0 MHz
Compound:	8.0 MHz
Spatial Harmonics:	8.0 MHz
Compound Spatial Harmonics:	8.0 MHz
Color / Power Doppler:	5.5 MHz
PW Doppler:	4.6 MHz

ZONARE PN: Z102-30

L8-3 Linear Array Transducer

Primary Applications:	Peripheral Vascular, Needle Guided Procedures
Secondary Applications:	Pediatric Hips, Technically Difficult Small Parts
Bandwidth:	8-3 MHz
Number of Elements:	128
Physical footprint:	48x11mm
Field of View (Adjustable):	38mm
Biopsy Guide:	Optional transverse type
Virtual Apex Array:	Wider Field of View
Depth:	10cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	113 grams
Ingress Protection Rating:	IPX 7
12 Frequencies:	
2D and M-Mode:	7.0 MHz; 5.5 MHz; 4.0 MHz
Tissue Harmonic:	7.5 MHz; 6.0 MHz
Compound Harmonic:	7.0 MHz
Compound:	
Spatial Harmonics:	7.0 MHz
Compound Spatial Harmonics:	7.0 MHz
Color / Power Doppler:	5.5 MHz; 4.0 MHz
PW Doppler:	4.6 MHz; 3.5 MHz

ZONARE PN: Z106-30

E9-4 Endocavity Transducer

Primary Applications:	Endovaginal including First Trimester Obstetrics, Gyn (uterus, ovaries)
Secondary Applications:	Endorectal including Prostate, Rectal Wall Needle Guided Procedures
Bandwidth:	9-4 MHz
Number of Elements:	128
Physical footprint:	23x20mm
Radius of Curvature:	12mm
Field of View:	135 degrees
Biopsy Guide:	1. Optional disposable 2. Optional re-useable
Virtual Apex Array:	
Depth:	14cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	159 grams
Ingress Protection Rating:	IPX 7
9 Frequencies:	
2D and M-Mode:	8.0 MHz; 5.0 MHz; 4.0 MHz
Tissue Harmonic:	7.5 MHz; 6.5 MHz
Compound Harmonic:	7.0 MHz
Compound:	7.0 MHz
Color Doppler:	4.5 MHz
PW Doppler:	4.5 MHz

ZONARE PN: Z103-30

P4-1c Phased Array Transducer

Primary Applications:	Transcranial Imaging/Doppler, Trauma (FAST Exams), Deep Abdominal, Abdominal Vascular, Renal, Aorta
Secondary Applications:	Technically Difficult: Obstetrics, Fetal Heart
Bandwidth:	4-1 MHz
Number of Elements:	64
Physical footprint:	27x20mm
Field of View (Adjustable):	84 degrees
Biopsy Guide:	None available
Virtual Apex Array:	
Depth:	30cm
Cable Length:	Approx. 2 meters
Weight (excl. cable and connector):	91 grams
Ingress Protection Rating:	IPX 7
14 Frequencies:	
2D and M-Mode:	4.0 MHz; 3.0 MHz; 2.0 MHz
Tissue Harmonic:	5.0 MHz; 4.0 MHz; 3.5 MHz;
3.0 MHz	
Compound Harmonic:	4.0 MHz
Compound:	
Color / Power Doppler:	2.5 MHz; 2.0 MHz
PW Doppler:	2.0 MHz; 1.8 MHz

ZONARE PN: Z108-30

Transducer Performance Data at -6dB

Transducer	Axial Resolution (mm)	Lateral Resolution (mm)	Elevation Focus (mm)
C4-1	0.6	1.6	80
C6-2	0.4	0.9	70
C9-3	0.3	0.7	45
C10-3	0.2	0.8	35
L14-5w	0.1	0.3	20
L14-5sp	0.2*	0.3	12.5
L10-5	0.2	0.4	18
L8-3	0.2	0.5	25
E9-4	0.3	0.8	35
P4-1c	0.4	2.4	75

B-Mode

Live Imaging Controls

- Auto-Opt with ZST – Adjust Gain/DGC and Sound Speed Correction
- Depth – up to 30cm (see transducers)
- Frequency change
- Tissue Harmonic Imaging
- Acoustic Zoom
- PW Doppler Cursor
- Acoustic Output

Live & Retrospective Imaging Controls

- Auto-Opt with ZST – Gain/DGC
- 2D Gain/DGC
- Display Zoom (pan/zoom on frozen image up to 4X mag)
- Grayscale Map
- B Mode Tints
- Dynamic Range
- Persistence
- Edge Enhancement/Smoothing
- Up/Down Invert
- Left/Right Invert

M-Mode

Live Imaging Controls

- Depth
- Frequency
- Tissue Harmonic Imaging
- Cursor Position
- Acoustic Zoom
- Display Zoom (Zoom on Frozen Image)
- Acoustic Output

Live & Retrospective Imaging Controls

- M Gain/DGC
- Sweep Speed
- Strip Tints
- Display Format (Two B reference image sizes and full screen strip)
- M Map
- M Dynamic Range
- Persistence
- Edge Enhancement/Smoothing
- Up/Down Invert
- Left/Right Invert

Color and Power Doppler

Live Imaging Controls

- ROI Position/Size
- ROI Size – up to full screen
- Velocity Scale
- Wall Filter
- Flash Suppression
- Steering Angle (linear transducers only)
- Acoustic Zoom
- Acoustic Output

Live & Retrospective Imaging Controls

- Color Gain
- Display Zoom (Zoom on Frozen Image)
- Color Map
- Edge Enhancement/Smoothing
- Baseline Shift
- Invert
- Persistence

Pulsed Wave Doppler

Live Imaging Controls

- Triplex Mode (simultaneous live 2D, Color, PW Doppler strip)
- Update (quick switch between live 2D or Color and live PW Doppler strip)
- TDI (Tissue Doppler Imaging)
- Cursor Position
- Gate Size 1-15 mm
- Steering Angle in 1 degree increments
- Velocity Scale, Baseline, Filter
- Acoustic Power
- Sweep Speed

Live & Retrospective Imaging Controls

- PW Gain
- Angle Correct – manual 0 to +/-76 degrees
- Angle Correct – 'Quick 60'
- Baseline Shift
- Wall Filter
- Invert
- Strip Tints
- Display Format (1/2; 1/3; full screen strip)
- Sweep Speed (5 speeds)
- PW Map
- PW Dynamic Range
- Audio Volume

Contrast Enhanced Ultrasound

Contrast Imaging is a harmonic detection mode specifically designed to enhance signals from ultrasound contrast agents Similar to 2D (B-Mode), a suite of additional optimization controls are provided to further enhance contrast agent imaging performance.

Available as option on

- C4-1
- C9-3
- L14-5W

Display Formats

- Single Image display
- Simultaneous Dual Image display
- Non-Simultaneous Dual Image display

Stopwatch Display

- Elapsed time: The duration of time that passes after the stopwatch is started, usually the time elapsed from the injection of the contrast agent.
- Phase time: The duration of time between the start and stop of a phase. Four phase timers are supported.
- Cine elapsed time: This is the elapsed and phase time for the displayed frame/strip within the Cine memory.

Contrast Imaging User Controls

- Frame rate
- Power
- 2D Gain/DGC
- Contrast Gain
- Depth
- Frequency
- Display Zoom (pan/zoom on frozen image up to 4X mag)
- Dynamic Range
- Edge Enhancement/Smoothing
- Persistence
- Maps
- L/R Invert
- U/D Invert
- Auto-Opt with ZST – Gain/DGC
- Tints
- Compounding
- Harmonics

Dual Imaging

- Available for all imaging transducers
- Displays two images side-by-side
- Ability to display two frozen, one active/one frozen, or two active images
- Allows Left/Right switching of the active side of the display, while automatically freezing the other side
- Archiving while in dual image will store both images
- All measurements and calculations can be performed across combined dual images
- Annotations and body markers

Simultaneous Dual Imaging

- Available for all imaging transducers
- Displays two images (same or different modes), side-by-side in real-time
- Simultaneous display of Color Velocity & Power Doppler Imaging
- Allows Left/Right switching of the active side of the display: active side allows optimization, mode changes, while both sides are live simultaneously
- Retrospective processing adjustments affect both images at the same time
- Real-time dual image adjustments
- Dual image archiving will store both images in single frame or loop format

Imaging Mode Combinations

- B+CD/PD
- B+M
- B+PW (real-time duplex)
- B+CD/PD+PW (real-time Triplex)
- B+CW (update mode)
- B+CD+CW (update mode)
- B+ Elastogram (option)
- B+ 3D (C8-33D and E9-33D transducers only)

Acoustic zoom in all imaging modes

Imaging Modes

Imaging Formats

- Convex
- Linear
- Phased
- Micro-Convex
- Virtual Apex Array
- Curved Phased
- Image Width – user selectable width and positioning

Auto-Opt with ZST

- Available on all imaging transducers
- Instantly equalizes tissue gain during live or frozen/Cine images
- Automatically measures the various sound speeds within the body habitus and compensates to determine the most accurate

Acoustic Zoom

Display Zoom

- Available for all imaging transducers
- From 1.25X to 4X magnification on frozen image, with panning capabilities
- Precise measurement of small structures made easier

Image Display

- On-screen display of imaging parameter values
- Frame rate display during live imaging
- On-screen display of acoustic output level and Mechanical Index (MI) and Thermal Index (TI) values per NEMA guidelines
- Patient demographics summary
- Date & Time
- Network and disk activity indicators
- Transducer orientation graphic
- Depth marker graphics
- Optional DGC display
- User interface prompts
- On-screen biopsy graphics

Screen Display

- Analog clock/drive capacity
- Current exam: Images/Clips/Queue
- Recent measurements: Last 3 displayed on screen
- Patient schedule: (works from modality worklist)
- Department schedule: (works from modality worklist)
- Battery capacity
- Hard drive capacity
- Reference image is ¼ size of original image
- Full screen live imaging display

Cine Memory

- Capacity:
  - Store image clips up to 300 seconds
- Cine scroll via trackball control
- Dynamic playback, including duplex & triplex
- Manual trim of Cine loops
- 'Last half' quick trim
- All retrospective imaging parameters available in cine

Cine Loop Storage

- Ability to store Cine loops to internal hard drive

IQ Scan – Raw Image Data Capture

- Customized image review (Retrospective processing on 2D, Color, and Spectral Doppler)
- Research and post-process image analysis
- Stills, cine clips, and strip modes
- Playback cine clips and perform retrospective processing
- Playback PW/CW strips with audio and perform retrospective processing
- Playback M-Mode strips and perform retrospective processing

Exam Management & Presets

- Multiple Exam Types supported:
  - Abdominal
  - Echocardiography
  - Gynecology
  - Obstetrics
  - Pediatric
  - Small Parts
  - Vascular
- Exam Type selection automatically customizes:
  - Patient demographics data forms
  - Calculations
  - Annotations & Body Patterns
  - Imaging Presets
- Factory Imaging Presets for all exam types
- Unlimited user-programmable Imaging Presets
- System Configuration Setup Presets
- Backup and restore capabilities for all system and imaging presets
- Patient demographic information can be populated via manual typing, replicating an archived exam, or DICOM worklist (option)
- International character and accent support via QWERTY keyboard
- Password controlled access to patient information and/or system imaging to aid in HIPAA compliance
- Quick close functionality for designating a complete DICOM study and to aid in HIPAA compliance
- Restart exam capability

Image Management

- Storage capacity: Internal Hard Drive
- Storage capacity
  - 120GB Solid State Drive (or greater)
    - DICOM uncompressed: ~300,000 images
    - DICOM RLE: ~1,000,000 images
- Protocol Key – selectable Clip capture by time (seconds) or beats; programmable to presets
- Full size archived image review or 9 on1 Thumbnail review
- Interactive exam selection table to aid in quickly selecting archived exam
- Configurable formats:
  - DICOM uncompressed
  - DICOM RLE
  - JPEG
- Measurements and Annotations on archived images
- Removable USB Memory Stick media for transfer to a PC
- Import/export of exams to DVD+R or CD-R media
- Support for ShowCase Viewer burning to export media
- Ability to export images in non-DICOM format (jpeg, tiff)

Connectivity

Inputs & Outputs

- DVI (HDMI style Connector)
- USB 4 ports
- SATA connection
- Ethernet (10/100 Base T)
- Optional Audio Video Extension Device
  - DVI input
  - DVI to external display
  - VGA Out
  - S-Video Out
  - Composite Video Out
  - Analog Audio Out
  - TOSLINK (digital audio) Out

DICOM Option

- Verify Service Class
- Print Service Class
- Store Service Class
- Basic Modality Worklist Query
- In Progress
- Queue for mobile exams with autosend feature upon network connection
- Exam push to DICOM from onboard archive
- Variable compression settings
- Configuration Setup
- Structured Reporting – Vascular
- Structured Reporting – Cardiac
- Structured Reporting – OB / GYN

DICOM Removable Media

- USB Memory Stick
- DVD+R or CD-R media

Optional Peripherals

- Sony UP-D711MD B/W Thermal Printer
  - Printer and Mounting Kit (Bracket): ZONARE PN: Z417-00
  - Mounting Kit only (Bracket): ZONARE PN: Z418-00
- Datalogic Barcode Reader
  - Reader: ZONARE PN: Z373-00

User Editable Worksheets Option

Offline created worksheets can be imported into the system. There is no capability to modify the worksheet template once uploaded onto system. Data and worksheet template is exported in XML format.

Auto-Dop Trace (Automatic Doppler Measurements)

- Automatic tracing of spectral Doppler waveform
- Derived from heart cycle or time
- Independent of PW gain
- Integrates data into Calc Package
- Requires Auto-Opt with ZST option
- Available measurements: RI, PI, Accel, S/D, HR, AT, TAMX, TAMN

General Capabilities

- Interactive worksheets for reviewing and editing in-process results
- Formatted reports for Obstetrics, Gynecology, Echocardiography and Vascular
- Multiple measurements can be used to derive final results (average, last, max)
- Dynamic display of measurement results
- Reposition caliper
- Configurable, customizable calc menus
- Export data feature to third party software
- Export serial data

Generic B-Mode Measurements / Calculations (based on cm units)

- Distance: up to 4 diameters
- Circumference/Area (Ellipse or Trace)
- Volume (3 distance)
- % Stenosis (Area or Diameter)
- Depth (from transducer face)

Generic M-Mode Measurements/Calculations

- M distance (cm)
- Heart Rate (bpm – beats per minute)
- AV Plane

Generic PW Measurements/Calculations (based on cm/sec units)

- Velocity
- Velocity Pairs
- RI (Resistive Index)
- PI (Pulsatility Index)
- Acceleration / Slope
- S/D (Systolic / Diastolic ratio)
- A:B (Generic velocity ratio)
- HR (Heart Rate)
- AT (Acceleration Time)
- TAMX (Time Average Max)
- TAMN (Time Average Mean)

OB Measurements/Calculations

- OB Growth trending with graphs [entries for up to 5 previous studies]
- Biophysical Profile scoring
- Fetal and Maternal Anatomical survey checklists with 5 user programmable anatomy labels
- Biometry percentile reporting with range graphics
- Multiple gestation reporting, up to 5 fetuses
- User programmable Biometry sequence (see below)

Fetal Age

GS (Gestational Sac)	**Nyberg (1987)***
CRL (Crown Rump Length)	**Hadlock (1992)** JMedUltra (2003) Persson (1996)
BPD (Biparietal Diameter)	**Hadlock (1984)** Hunsmann (1985) JMedUltra (2003) Jeanty (1984) Perrson (1986) TokyoShino (1996)
OFD (Occipital Frontal Diam.)	**Hansmann (1985)** Perrson (1986)
HC (Head Circumference)	**Hadlock (1984)**
CEREB (Cerebellar Diamater)	**Goldstein (1987)**
BOD (Binocular Diameter)	**Jeanty (1984)**
AC (Abdominal Circumference)	**Hadlock (1984)** JMedUltra (2003) TokyoShino (1996)
TTD (Transverse Trunk Diam.)	**Hansmann (1985)**
AD (Abdominal Diameter)	**Perrson (1996)**
FL (Femur Length)	**Hadlock (1984)** JMedUltra (2003) Perrson (1986) TokyoShino (1996)
TIB (Tibial Length)	**Jeanty (1984)**
FIB (Fibular Length)	None
HL (Humerus Length)	**Jeanty (1984)**
RAD (Radial Length)	None
ULNA (Ulnar Length)	**Jeanty (1984)**
FTA	None
APTD x TTD	**TokyoShino (1996)**
EFW (Estimated Fetal Weight)	**Hadlock (1984)** JMedUltra (2003) Perrson (1986) Shepard (1982)

** Default authors indicated by bold type*

Fetal Growth

NBL (Nasal Bone Length)	Bunduki (2003) **Sonek (2003)***
GS (Gestational Sac)	**Nyberg (1987)**
CRL (Crown Rump Length)	JMedUltra (2003) Osaka (1983) Persson (1996)
BPD (Biparietal Diameter)	**Hadlock (1984)** Hunsmann (1985) JMedUltra (2003) Jeanty (1984) Osaka (1983) Persson (1996) TokyoShino (1996)
OFD (Occipital Frontal Diam.)	**Hunsmann (1985)** Persson (1986)
HC (Head Circumference)	**Hadlock (1984)**
CEREB (Cerebellar Diamater)	**Goldstein (1987)** Hata (1992) Nicolaides (1994)
BOD (Binocular Diameter)	**Jeanty (1982)**
AC (Abdominal Circumference)	**Hadlock (1984)** JMedUltra (2003) TokyoShino (1996)
TTD (Transverse Trunk Diam.)	**Hansmann (1985)**
AD (Abdominal Diameter)	**Persson (1996)**
FL (Femur Length)	**Hadlock (1984)** JMedUltra (2003) Osaka (1983) Persson (1996) TokyoShino (1996)
TIB (Tibial Length)	**Jeanty (1984)** Merz (1996)
FIB (Fibular Length)	**Jeanty (1985)** Merz (1996)
HL (Humerus Length)	**Jeanty (1984)** Osaka (1983)
RAD (Radial Length)	**Jeanty (1983)** Merz (1996)
ULNA (Ulnar Length)	**Jeanty (1984)** Merz (1996)
FTA	**Osaka (1983)**
APTD x TTD	**TokyoShino (1996)**
EFW (Estimated Fetal Weight)	**Hadlock (1984)** JMedUltra (2003) Osaka (1983) Persson (1996) TokyoShino (1996) Williams (1982)

OB Measurements/Calculations *(continued)*

Other Measurements/Calculations

- NT (Nuchal Translucency]
- NBL (Nasal Bone Length)
- AFI (Amniotic Fluid Index)
- HR (Heart Rate): M-Mode or PW
- CI (Cephalic Index)
- FL/AC ratio
- HC/AC ratio
- EFW (Estimated Fetal Weight) by Average Ultrasound Age [AUA] or Composite Ultrasound Age [CUA] [Hadlock, 1984]
- User selectable contributing measurements for CUA / AUA
- User assignable authors: Hadlock, Hansmann, Hellman, Jeanty, Nyberg, Osaka, Tokyo

Doppler

- UT (Uterine) S/D ratio
- Cord S/D ratio
- Umb A (Umbilical Artery) S/D ratio
- Plac (Placenta) peak velocity
- Ut A (Uterine Artery) peak velocity
- Fetal Aorta peak velocity
- MCA (Middle Cerebral Artery) peak velocity

Abdominal Measurements/Calculations

- Free Fluid Checklist
- Aorta [B-Mode]
  - Aorta [prox / mid / distal]
  - R Com Iliac [prox / mid / distal]
  - L Com Iliac [prox / mid / distal]
- Bowel
  - Appendix
  - Appendix Wall
  - Pylorus
  - Pylorus Wall
- GB
  - GB Volume
  - GB Wall
  - CBD [prox / mid / distal]
- Liver-Spleen
  - Liver Volume
  - Shunt
  - Spleen Volume
  - Main Portal Vein
  - Hepatic Vein
  - PS Confluence
  - Sup Mesenteric Vein
  - Splenic Vein
- Pancreas
  - Pancreas Head
  - Pancreas Neck
  - Pancreas Body
  - Pancreas Tail
  - Panc Duct [prox / mid / dist]

Abdominal Measurements/Calculations *(continued)*

- Renal
  - Right / Left
  - Renal Volume
  - Renal Vein
  - Adrenal Volume
  - Ureter [r plv / prox / mid / dist]
- Bladder Volume

Abdominal Doppler

- Aorta
  - Aorta [prox / renl / mid / distal]
  - Celiac Artery [1 /2]
  - SMA [1 /2]
  - Hepatic Artery
  - Splenic Artery
  - GDA
  - IMA
- Renal
  - Right / Left
  - Renal RI [orig / prox / mid / distal]
  - Renal AT [orig / prox / mid / distal]
  - Ren A1 RI [orig / prox / mid / distal]
  - Ren A1 AT [orig / prox / mid /distal]
  - Ren A2 RI [orig / prox / mid / distal]
  - Ren A2 AT [orig / prox / mid /distal]
  - Interlob RI [sup / mid / inf]
  - Interlob AT [sup / mid / inf]
  - Arcuate RI [sup / mid / inf]
  - Arcuate AT [sup / mid / inf]

Pediatric Hip Measurement

- Right / Left
- Hip Angle [Baseline / Bony / Cart]
  - Alpha / Beta angles

B-Mode (Fetal Heart)

- Asc Aorta diameter
- MPA (Main Pulmonary Artery) diameter
- Duct Art (Ductus Arteriosis) diameter
- LA (Left Atrium) distance
- RA (Right Atrium) distance
- RV (Right Ventricle) Wall distance (S/D)
- RVID (Right Ventricle Internal Diameter) (S/D)
- IVS (Interventricular Septum) distance (S/D)
- LVID (Left Ventricle Internal Diameter) (S/D)
- LVPW (Left Ventricle Posterior Wall) distance (S/D)
- Heart Circ (circumference)
- Thor Circ (thorax circumference)

PW Doppler (Fetal Heart)

- MV (Mitral Valve) peak velocity (E/A)
- TV (Tricuspid Valve) peak velocity (E/A)
- Asc Aorta peak velocity
- Desc Aorta peak velocity
- MR (Mitral Regurgitation) peak velocity
- TR (Tricuspic Regurgitation) peak velocity
- MPA (Main Pulmonary Artery) peak velocity
- Duct Art (Ductus Arteriosis) peak velocity
- IVC (Inferior Vena Cava) peak velocity
- Duct Ven (Ductus venosis) peak velocity

M-Mode (Fetal Heart)

- RV (Right Ventricle) Wall (S/D)
- RVID (Right Ventricle Internal Diameter (S/D)
- IVS (Interventricular Septum) distance (S/D)
- LVID (Left Ventricle Internal Diameter) (S/D)
- LVPW (Left Ventricle Posterior Wall) distance (S/D)

GYN Measurements / Calculations

- Uterine Volume
- Endometrial Thickness
- Cervical Length
- Ovary Volume (Right & Left)
- Up to (10) Right + (10) Left Follicles: reports either volumes calculated from 1, 2, or 3 distances or average distance
- Ov RI (Ovarian RI, Right & Left)
- Ov PI (Ovarian PI, Right & Left)
- Ut RI (Uterine RI)
- Ut PI (Uterine PI)

Vascular Measurements / Calculations

(R/L = Right and Left assignment)

(P/M/D = Proximal, Mid, and Distal assignment)

- % Stenosis (R/L)

Carotid

- CCA (Common Carotid Artery: P/M/D, R/L, PSV/EDV)
- Bulb (R/L, PSV/EDV)
- ICA (Internal Carotid Artery: P/M/D, R/L, PSV/EDV)
- ECA (External Carotid Artery: R/L, PSV/EDV)
- Vertebral (R/L, PSV/EDV)
- ICA/CCA ratio (R/L)
- Subclavian (R/L, PSV/EDV)
- User programmable Carotid Sequence

Upper Extremity Arterial Calc Diameter, PW Doppler, Report Page

- Subclavian (R/L)
- Axillary (R/L)
- Brachial (R/L)
- Radial (R/L)
- Ulnar (R/L)
- Graft Native Inflow
- Graft Prox Anastomosis Pre Velocity
- Graft Prox Anastomosis Max Velocity
- Graft Prox Anastomosis Post Velocity
- Graft Prox Velocity
- Graft Mid Velocity
- Graft Dist Velocity
- Graft Dist Anastomosis Pre Velocity
- Graft Dist Anastomosis Max Velocity
- Graft Dist Anastomosis Post Velocity
- Native Outflow Velocity
- Graft Native Inflow Volume Flow
- Graft Porx Anastomosis Volume Flow
- Graft Prox Volume Flow
- Graft Mid Volume Flow
- Graft Distal Volume Glow
- Graft Dist Anastomosis Volume Flow
- Graft Native Outflow Volume Flow

Lower Extremity Arterial Calc (Right/Left) Diameter, PW Doppler, Report Page

- CIA Stenosis
- EIA Stenosis
- CFA Stenosis
- PFA Stenosis
- FA Prox Stenosis
- FA Mid Stenosis
- Popliteal Stenosis
- ATA Stenosis
- Peroneal Stenosis
- PTA Stenosis
- Dorsalis Pedis Stenosis
- Graft Native Inflow
- Graft Dist Anastomosis Pre Velocity
- Graft Dist Anastomosis Max Velocity
- Graft Dist Anastomosis Post Velocity
- Native Outflow Velocity
- Graft Native Inflow Volume Flow
- Graft Prox Anast Volume Flow
- Graft Prox Volume Flow
- Graft Mid Volume Flow
- Graft Dist Volume Flow
- Grat Dist Anast Volume Flow
- Dfaft Native Outflow Volume Flow
- CIA (Common Iliac Artery) (R/L)
- EIA (External Iliac Artery) (R/L)
- CFA (Common Femoral Artery) (R/L)
- SFA (Superficial Femoral Artery) (P/M/D) (R/L)
- PFA (Profunda Femoris Artery) (R/L)
- Pop (Popliteal) (R/L)
- ATA (Anterior Tibial Artery) (R/L)
- Peroneal (R/L)
- PTA (Posterial Tibial Artery) (R/L)
- Dorsalis Pedis (R/L)

Lower Extremity Venous Measurements Diameter, Checklists, Report Page

- Deep
  - IVC (Inferior Vena Cava)
  - CIV (Common Iliac Vein)
  - EIV (External Iliac Vein)
  - CFV (Common Femoral Vein)
  - FV (Femoral Vein) Proximal
  - FV (Femoral Vein) Mid
  - FV (Femoral Vein) Distal
  - DFV (Deep Femoral Vein)
  - Popliteal Vein
  - PTV (Posterior Tibial Vein)
  - Peroneal Vein
  - ATV (Anterior Tibial Vein)
- Superficial
  - SF Junction (Sapheno-Femoral)
  - GSV (Greater Saphenous Vein)Thigh Proximal
  - GSV Thigh Mid
  - GSV Thigh Distal
  - GSV Knee
  - GSV Calf (P/M/D)
  - SP Junction (Sapheno-Peroneal)
  - SSV (Small Saphenous) Proximal
  - SSV (Small Saphenous) Mid
  - SSV (Small Saphenous) Distal
- Reflux Time PW Doppler Calc
  - Available with all Venous Lower Extremity Presets

Upper Extremity Venous Measurements Diameter, Checklists, Report Page

- Deep
  - Internal Jugular Vein
  - Innominate Vein
  - Subclavian Vein
  - Axillary Vein
  - Brachial Vein (Prox, Mid, Dist)
  - Radial Vein
  - Ulnar Vein
  - Volar
- Superficial
  - CA Junc
  - Upper Cephalic (Prox, Mid, Dist)
  - Lat Antecubital Vein
  - Lower Cephalic Vein (Prox, Mid, Dist)
  - BA Junc
  - Upper Basilic Vein (Prox, Mid, Dist)
  - Medial Antecubital Vein
  - Lower Basilic Vein (Prox, Mid, Dist)
  - Digital

Annotation Package

Text Annotation

- Annotation on live, frozen, & archived images
- Selectable Insert and Overwrite modes
- User-programmable home position
- Selection, modification, & deletion of individual words
- Ability to reposition text groups
- Pre-programmed quick orientation keys:
  - Right / Left
  - Prox / Mid / Distal
  - Long / Trans / Sagittal / Coronal
- (3) user programmable annotation libraries per preset [Factory and User]

Body Pattern Graphics

- 24 body pattern graphics
- Graphics organized by application type
- Default graphic customizable in user imaging presets
- Transducer location graphic with adjustable location and orientation

Arrows

- Available on live, frozen & archived images
- Tint of Arrow is selectable
- Different Arrow Styles are selectable
- Size of Arrow is selectable
- Up to 15 arrow graphics per image
- User controlled location & orientation

Safety and Regulatory

The ZS3 Ultrasound platform has been designed, manufactured, and tested to comply, at a minimum, with the following regulations internationally recognized standards:

- FDA CFR 21 Part 820 QSR
- EU MDD/CE marking (Class IIa)
- ISO 13485
- Health Canada CMDCAS/CSA
- Japan PAL
- IEC 60601-1: Medical Equipment safety
- IEC 60601-1-1: Safety Requirements for Medical Electrical
- IEC 60601-1-2: Electromagnetic compatibility
- IEC 60601-1-4: Programmable medical device
- IEC 60601-2-37: Particular requirements for the safety of ultrasonic medical diagnostic and monitor equipment
- CISPR 11: Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment: Group 1, Class A
- NEMA UD2: Acoustic Output Measurement Standard for Diagnostic Ultrasound Equipment
- NEMA UD3: Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices On Diagnostic Ultrasound Equipment
- IEC 61157: Requirement for the declaration of the acoustic output of medical diagnostic ultrasonic equipment
- JIS T 1501: General methods of measuring the performances of ultrasonic Pulse-echo diagnostic equipment

Caution: Federal law (USA) restricts this device to sale by or on the order of a physician and/or licensed veterinarian.
See the appropriate technical manual for detailed information regarding instructions for use, indications, warning and cautions.

ZONARE Medical Systems, Inc.

420 N. Bernardo Avenue
Mountain View, CA 94043-1839

877-966-2731
650-230-2800

email: info@zonare.com
zonare.com