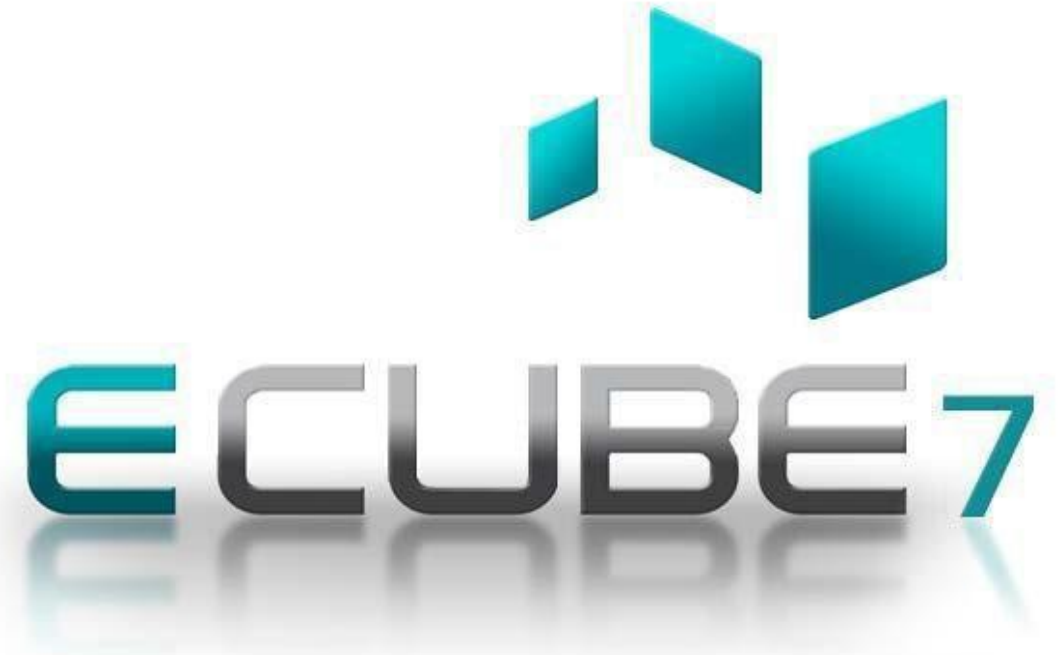

TECHNICAL SPECIFICATION

Version 4.0

ALPINION
MEDICAL SYSTEMS
www.alpinion.com

All-in-One Solution for Top Performers

Optimal solution for multiple applications

Embedded with ALPINION's core imaging technology and imaging platform.
The E-CUBE 7 is the only system in its class that provides high featured transducers like single crystal convex and phased array.
The smart and intuitive application software and features of the E-CUBE 7 empower clinicians to make diagnostic decision with confidence.

GENERAL OVERVIEW

System overview

Physical dimension

Weight	57kg
Height	1355(short)/1425(tall)mm (minimum-monitor folded: 1070(short)/1140(tall)mm)
Width	509mm
Depth	670mm

System specification

Memory	*385* GB hard disk drive
Electrical power	• Voltage: 100 - 120V, 220 - 240V • Frequency: 50/60Hz • Power: Max. 600 VA with Built-in and On-Board Peripherals
System response time	• Boot time: 120 sec • Shutdown time: 30 sec • Response time: 0.2 sec (2D mode > Duplex mode), 0.4 sec (2D mode > Triplex mode)
Digital Channel	98304 Digital Processing Channel

Monitor

Physical size	19.5" wide LED display
Tilt	15 degree up, 90 degree down, ±135 degree swivel
Screen technology	IPS (In plane switching) technology
Screen resolution	1366 X 768
Image resolution	880 X 660
Image adjustment	Brightness/Contrast adjustment by OSD buttons
Built-in accessory	Integrated stereo speakers

Control panel

Height adjustment	N/A
Keyboard	QWERTY keyboard
Special keys	• 8 TGC (Time Gain Compensation) slides • 5 soft keys • 2 user-define keys • 14 Power preset keys • Online help key
Light	Integrated stereo speakers

System component

- 3 active Transducer ports (3rd port is optional)

- Integrated HDD (Capacity: 500GB)
- Integrated DVD-R/W Drive
- On-board Storage for Peripherals
  > B/W Printer, Color Printer, DVD recorder
  > External printer connection (Inkjet, Digital)
- 3 Transducer holders, detachable for cleaning and washing
- Front Handle
- Wheel-lock Mechanism
  > Front -wheel: Bi- Brake system (Direction lock &Total lock)
  > Back-wheel: Total Lock
- 6 USB ports: Front side (2 ea), Back side (4 ea)
- Thumbnail images on-screen

Peripheral and accessory

Basic accessory

Basic accessory
User manual CD (ENG & Multilanguage)
Quick guide (ENG & Multilanguage hard copy)
Sono gel

Optional accessory

Accessory type	Description	
Footswitch	Tri-pedal footswitch	
Disinfectant	Cidex OPA Cidex Plus Gigasept FF Virkon Wavicide-01 Aidal Plus	Cetylcide-G Transepetic Sani-cloth plus Sporicidin Aquasonic 100
Biopsy kit	SC1-6 Biopsy Starter Kit (for SC1-6H, SC1-4H, SC1-6, C1-6, C1-6T, C1-6i) L3-12 Biopsy Starter Kit (for L3-12H, L3-12, L3-8, L3-12T, L3-12i, L3-8i) E3-10 Disposable Needle Guide (for E3-10H, E3-10) E3-10 Reusable Needle Guide (for E3-10H, E3-10)	

	EN3-10 Disposable Needle Guide (EC3-10H, EV3-10H, EN3-10, EC3-10, EV3-10, EC3-10T, EV3-10T) EN3-10 Reusable Needle Guide (EC3-10H, EV3-10H, EN3-10, EC3-10, EV3-10,, EC3-10T, EV3-10T)
Software	SRI Full SRI Xpeed(One button optimization) Spatial Compounding Imaging(SCI) Frequency Compounding Imaging(FCI) Filtered Tissue Harmonic(FTHI) DICOM 3.0 Connectivity DICOM SR (OB) Cardiology M&R Panoramic Imaging Auto IMT Measurement Anatomical-M Mode CW Mode ECG Compact 3D/4D Stress Echo Cube View

Optional peripheral

Peripheral type	Description
Color printer	Sony Digital UP-D25MD, Sony Analog UP-25MD
B/W printer	Sony Digital UP-D897 Sony Analog UP-897MD Mitsubishi P95DE
DVR	Sony Digital DVO-1000MD
DVD-RW	Samsung Digital SE-T084

SYSTEM FEATURE

Application

- Abdomen
- Obstetrics
- Gynecology
- Cardiac
- Vascular
- Urology
- Small Parts (Superficial)
- Pediatrics (Neonatal)
- Transcranial
- Emergency Medicine (EM)

Imaging mode

- 2D mode
- M mode
- Color flow (CF) mode
- Color M mode(CMM)
- Power doppler(PD) mode
- Pulsed wave doppler (PWD) mode
- Continuous wave Doppler (CWD) mode
- 3D/4D (Volume) mode

Image feature

- Xpeed
- SRI
- Full SRI
- THI (PI/FTHI)
- Beam steering
- Panoramic B/F
- Spatial compounding

- Frequency compounding
- Virtual convex

Annotation

Display component

Component	Description
Institution/Hospital Name	Up to 25 Characters
Date	3 types (YYYY/MM/DD, MM/DD/YYYY, DD/MM/YYYY)
Time	2 types (24 hour, 12 hour)
Operator ID	
Patient Name	First, last, middle name
Patient Identification	Up to 64 Characters
Gestational Age	LMP/EDC/GA
MI	Mechanical Index
TIS	Thermal Index Soft Tissue > TIC (Thermal Index Cranial (Bone)) > TIB (Thermal Index Bone)
System Status	Real-time or frozen
Transducer marker	Marker for indicating the current direction of the transducer
Image Preview	Thumbnails
Gray/Color Bar	The current settings for Gray map/Colorize
CINE Gauge	Show the CINE gauage
Summary Window	Show the measurement summary
Results Window	Show the measurement result (presettable display location)
Transducer Type	Show the current transducer that is being operated
Application Name	Show the current application that you are in
Imaging Parameter	Show the available imaging parameters in the current imaging mode (current mode highlighted)

Body pattern

- Arrow
  > Arrow size: S, M, L, XL
  > Rotate Arrow
- Body pattern
  > Pattern size: S, M, L

- Text
  > Font Color: Green, Yellow, White, Orange
  > Text size: S, M, L

IMAGING MODE

Each imaging mode provides a table of available imaging parameters that you can use.

2D mode

Imaging parameter	Value
Gain	0-100 dB (1dB increment)
Transmit Frequency	3 selectable frequencies (THI is included)
Multi Focus	Max 8
Line Density	5 steps
Dynamic Range	Max 192 dB
Persist	4 steps
Reject	10 steps
Gray Map	14(0-13)
Colorize	21(0-20)
SRI	On/Off
FullSRI	5 steps
Spatial Compounding	3 steps
Frequency Compounding	On/Off
Transmit Power:	100% (2% steps)

M mode

Imaging parameter	Value
Sweep Speed	5 steps
Gray map	14(0-13)
Colorize	19(0-18)
Power Output	1-100%(2% increment)
Transmit Power	100% (2% steps
Dynamic Range	30-150 Db (3dB)
Reject	10 steps
Anatomical M-mode	On/Off

PD mode

Imaging parameter	Value
Transmit Power:	100% (2% steps)
Wall Filter	7steps
PRF	300Hz-20,100Hz (Transducer dependent)
Persist	10 steps
Scale	kHz, cm/s, m/s
Base Line	40 steps
Ensemble	6-16
Line Density	2 steps
Colorize	10 steps
Threshold	0-100 %
Angle Steer	7 steps (-15°~+15°)
Smooth	10 steps

CF mode

Imaging parameter	Value
Transmit Power	100% (2% steps)
Wall Filter	7 steps
PRF	300Hz-20,100Hz (Transducer dependent)
Invert	On/Off
Scale	kHz, cm/s, m/s
Base Line	40 steps
Ensemble	6-16
Line Density	2 steps
Colorize	10 steps
Angle Steer	7 steps (-15°~+15°)
Smooth	10 steps

PW mode

Imaging parameter	Value
Transmit Power	100% (2% steps)
Frequency	3 selectable frequencies
SV Gate Width	13 Steps (0.7,1,2,3,4,5,6,7,8,9,10 and 15mm)
Sweep Speed	5 steps
Invert	On/Off
Angle Correct	±89°, (1° step)
Base Line	16 steps
Wall Filter	9 steps
Velocity Scales	Max: 52m/sec (Angle/Transducer dependent) Min: 10cm/sec
Scale	kHz, m/s, cm/s
PRF	300Hz-20,100Hz (Transducer dependent)
Angle Steer	6 steps
Dynamic Range	30-120dB (2dB steps)
gray maps	14(0-13
Colorize	19(0-18)
Reject	10 steps
Time Resolution	7 steps
Update	Frozen, Live, 2, 3, 4, 8 and 16 sec

Auto Calculation	ON/OFF
Method	Mean, Max, Both
Direction	Below, Above, Both
Sensitivity	20 steps

CW mode

Imaging parameter	Value
Transmit Power	100% (2% steps)
Frequency	2 selectable frequencies
Sweep Speed	5 steps
Invert	On/Off
Full Screen CW mode	On/Off
Angle Correct	±89°, (1° step)
Base Line	16 steps
Wall Filter	9 steps
Velocity Scales	Max: 270m/sec (Angle/Transducer dependent) Min: 10cm/sec
Scale	kHz, m/s, cm/s
PRF	500Hz-78,100Hz
Dynamic Range	30-120dB (2dB steps)
Gray map	14(0-13)
Colorize	19(0-18)
Reject	10 steps
Time Resolution	7 steps
Auto Calculation	On/Off
Method	Mean, Max, Both
Direction	Below, Above, Both
Sensitivity	20 steps

Simultaneous mode

Duplex mode

Duplex mode type	Description
2D/PW	PW doppler mode
2D /CW	CW doppler mode
2D /CFM	Color flow mode
2D / PDI	Power doppler mode
2D/M	Motion mode

Triplex mode

CF doppler mode (2D/CF/D)

Color M mode (2D/CF/M)

3D/4D mode

Imaging parameter	Value
Rendering mode	> Surface (Gradient/Texture) > Light mode > MIN IP (Intensity Projection) > MAX IP (Intensity Projection) > X-Ray
Viewing volume data	3D/4D (Live and Review)
MPR + VR	
CUBE CT	
Multi Slices	
Standard	
Editing volume	Inside Contour/Box
Annotation	> Comment > Arrow
Navigation	
CINE	> 3D Rotation > 4D CINE Loop
SRI	On/Off
Gain	0-100 (1dB increment)
Dynamic Range	30-192 dB (2dB steps)

IMAGING FUNCTION

Display mode

- Maximum display depth: 30 cm (dependent on the transducer type)
- Zoom: Write/ Read/Pan (Write zoom up to 8x)
- Dual Screen Display
  - Vertical (Left/Right): 1:1, 1:2, 2:1
  - Horizontal (Top/Bottom): 1:1, 1:2, 2:1
- Quad Screen Display

CINE

- CINE frame: 3,000 frames
- Playback speed: 200%, 100%, 50%, 25% (4 types)
- CINE gauge and CINE image number display
- CINE review: Frame by frame/Loop
- Start and End Frame Selections for Loop Playback
- Measurement and calculation capability

Image archive

- Preview: displays thumbnail images of the acquired data for the current exam
- E-View: An enlarged preview of the image
- Recalling Images from the Preview
- Image Management
  > Select All/Unselect All
  > Permanent Store
- Hard disk drive Image Storage: Min 300GB
- Ethernet Network Connection (100MBPS)
- Archiving Format:
  > DICOM with ultrasound raw data
  > Standard DICOM
  > Secondary Capture
- 6 USB ports
- DVD/CD RW

- USB, USB HDD
- Export Image Format: *BMP, *JPEG, *DICOM, *WMV, *AVI

Connectivity

- DICOM 3.0 Connectivity
- DICOM Structured Report
- DICOM Verification
- DICOM Storage
- DICOM Storage Commitment
- Modality Work list
- Network Storage

MEASUREMENT AND CALCULATION

Basic measurement

Imaging mode	Measurement menu
2D	• Distance • Ellipse • Trace • % Stenosis • Volume • Ratio • Angle • Histogram
M	• Distance • HR (Heart Rate) • Slope • % Stenosis • Time • Ratio (% Distance)
PW	• Velocity

	• PI (Pulsatility Index) • RI (Resistance Index) • S/D Ratio (Systole/Diastole Ratio) • A/B Ratio • PG Mean (Pressure Gradient Mean) • PG Max (Pressure Gradient Max.) • Acceleration • HR (Heart Rate) • Time (Velocity Time)
2D/PW	Auto & Manual Trace • PS (Peak Systole) • ED (End Diastole) • MD (Minimum Diastole) • PS/ED (Peak Systole/End Diastole) • ED/PS (End Diastole/ Peak Systole) • PI (Pulsatility Index) • RI (Resistance Index) • TAmax (Time avg. max. Velocity) • TAmean (Time avg. mean. Velocity) • VTI (Velocity Time Integral) • HR (Heart Rate)

Labeled measurement

Cardiology measurement

Imaging mode	Measurement menu
2D	• AV/LA (Aortic Valve/Left Atrium): RV, LA & Ao Dm • PA (Pulmonary artery): PA Dm • Vena Cava: IVC & SVC Dm • RV (Right Ventricle): RV Diameter, RV length • Simpson BP (Simpson Bi-plane): EDV & ESV • Simpson SP (Simpson Single-plane): EDV&ESV • Modified Simpson • Area Length: LVLd, LVLs, LVAd, LVAs • Teichholz (Left Ventricular Dimensions by Teichholz method):RVAWd, RVDd, Diastole, Systole • LV Mass (Left Ventricle Mass): Truncated Ellipse & Area-Length method • LA Vol A-L (Left Atrium Volume by Area-Length method) • LA Vol /Simp BP (Left Atrium Volume by Simpson method /Biplane) • RA Vol /A-L (Right Atrium Volume by Area-Length method) • RA Vol /Simp (Right Atrium Volume by Simpson method /Single) • MV (Mitral Valve): EPSS, LVOT Dm, MV Area, MV Dm • AV (Aortic Valve): LVOT Dm, AVA Area • MR (Mitral Valve - Regurgitant Flow): MR VC Dm, Jet Area • AR (Aortic Valve - Regurgitant Flow): AR VC Dm, Jet Area • TR (Tricuspid Valve - Regurgitant Flow): TR VC Dm, RAP • PV (Pulmonary Valve): PV Dm • PVe (Pulmonary Vein): PVed Dm, PVes Dm • PISA AR (Proximal Isovelocity Surface Area of Aortic Regurgitation): Radius, Aliasing Vel • PISA MR (Proximal Isovelocity Surface Area of Mitral Regurgitation): Radius, Aliasing Vel
M	• Teichholz (Left Ventricular Dimensions by Teichholz method): RVAWd, RVDd, Diastole, Systole, LVET, HR • AV/LA (Aortic Valve/Left Atrium): RV, LA & Ao Dm LVET, LVPEP • MV (Mitral Valve): CA/CE amp, DE amp/slope, EPSS, EF slope,

	• RV (Right Ventricle): RV Dm, RVOT Dm • PVe (Pulmonary Vein): PVe Dm
Doppler	• MV (Mitral Valve): E Dur, A Dur, IVRT, MV E pt, MV A pt, MVA (PHT,VTI,Area), CO, LVIMP, HR • AV (Aortic Valve): AV VTI, LVOT VTI, AVA (Vmax, Area) • PV (Pulmonary Valve): PV Vmax, CO • TV (Tricuspid Valve): TV VTI, TV Vmax, TV E pt, TV A pt, RVIMP • PVe (Pulmonary Vein): PVs, PVd, PVa • AR (Aortic Valve - Regurgitant Flow): AI Decel slope, AI PHT, AR VTI • TR (Tricuspid Valve - Regurgitant Flow): TR VTI, TR VC Dm, RAP • PR (Pulmonary Valve - Regurgitant Flow): PR VTI, PR V ed • MR (Mitral Valve - Regurgitant Flow): MR Vmax, dp/dt, MR VC Dm • PISA AR (Proximal Isovelocity Surface Area of Aortic Regurgitation): AR VTI, Aliasing Vel • PISA MR (Proximal Isovelocity Surface Area of Mitral Regurgitation): MR VTI, Aliasing Vel • TDI (Tissue Doppler Imaging)): MV E pt, Ea, Aa, Sa

OB measurement

- Abdominal Circumference (AC)
- Anterior Posterior Thoracic Diameter (APTD)
- Binocular Distance (BOD)
- Biparietal Diameter (BPD)
- Clavicle (CLAV)
- Crown Rump Length (CRL)
- Estimated Fetal Weight (EFW)
- Fibula (FIB)
- Femur Length (FL)
- Fetal Trunk Area (FTA)
- Gestational Sac (GS)
- Head Circumference (HC)
- Humerus
- Middle Abdomen Diameter (MAD)
- Occipital Frontal Diameter (OFD)
- Radius
- Spinal Length (SL)
- Transverse Abdominal Diameter (TAD)

- Transverse Cerebella Diameter (TCD)
- Tibia
- Transverse Thoracic Diameter (TTD)
- Ulna Length (ULNA)
- Multi-Gestational Calculation
  > Up to 4-fetuse comparison of multiple fetuses data on a graph and a worksheet
- OB Worksheet
- Patient Information
  > Fetus Number
  > CUA/AUA Selection
  > Fetus Position

Report package

• Abdomen	• Pediatrics
• Obstetrics	• Small Parts
• Gynecology	• Breast
• Cardiology	• MSK
• Vascular	• Emergency Medicine (EM)
• Urology	

TRANSDUCER

Transducer naming rule

- **Convex** array transducer: This array transducer is usually designated by the first character "C."
- **Linear** array transducer: This array transducer is usually designated by the first character "L."
- **Phased** array transducer: This array transducer is usually designated by character "P."
- **Endo-cavity** transducer: This transducer is usually designated by the first characters "EC."
- **Endo-vaginal** transducer: This transducer is usually designated by the first character "E" or "EV."
- **High-resolution** transducer: If a transducer supports high resolution technology, "H" is added after the transducer name. This transducer has 192 elements except for SC1-4HS.
- If a transducer is manufactured with Single Crystal base technology, "S" is added as the first character.
- **Mechanical 4D** transducer: This array is usually designated by the character "V." If it is a 4D convex array, "C" is added.
- **WD** means wide foot print transducer.

Transducer list

Type	Transducer name
Convex array	SC1-6 C1-6 C5-8 C5-8N
Linear array	L3-12H L3-12H^{wd} L3-12 L3-8 L8-17 IO3-12
Phased array	SP1-5 SP3-8
Endo-vaginal	EN3-10 E3-10 EC3-10 EV3-10
Volume	VC1-6
Pencil	CW2.0, CW5.0

Transducer information

SC1-6

Application	Abdomen, Renal, OB, Fetal Echo, GYN, Emergency Medicine
Type	Convex array
Frequency	1.0 - 6.0 MHz
Convex Radius	60 mm
FOV	60°
Element	128
Biopsy kit	Available

C1-6

Application	Abdomen, Renal, OB, Fetal Echo, GYN, Emergency Medicine
Type	Convex array
Frequency	1.0 - 6.0 MHz
Convex Radius	60 mm
FOV	60°
Element	128
Biopsy kit	Available

C5-8

Application	Abdomen, Cardiac, Emergency Medicine
Type	Micro Convex array
Frequency	5.0 - 8.0 MHz
Convex Radius	14 mm
FOV	92°
Element	128
Biopsy kit	N/A

C5-8N

Application	Small animal, Abdomen, Cardiology
Type	Micro Convex array
Frequency	5.0 - 8.0 MHz
Convex Radius	15 mm
FOV	94°

Element	128
Biopsy kit	N/A

L3-12H

Application	Carotid, Peripheral Vascular, Thyroid, Testicle, MSK, Superficial, Breast, Emergency Medicine
Type	Linear array
Frequency	3.0 - 12.0 MHz
Aperture length	45 mm
FOV	N/A
Element	192
Biopsy kit	Available

L3-12H^{WD}

Application	Carotid, Peripheral Vascular, Thyroid, Testicle, MSK, Superficial, Breast, Emergency Medicine
Type	Linear array
Frequency	3.0 - 12.0 MHz
Aperture length	64 mm
FOV	N/A
Element	192
Biopsy kit	N/A

L3-12

Application	Carotid, Peripheral Vascular, Thyroid, Testicle, MSK, Superficial, Breast, Emergency Medicine
Type	Linear array
Frequency	3.0 - 12.0 MHz
Aperture length	45 mm
FOV	N/A
Element	128
Biopsy kit	Available

L3-8

Application	Carotid, Peripheral Vascular, Thyroid, Testicle, MSK, Superficial,

	Breast, Emergency Medicine
Type	Linear array
Frequency	3.0 – 8.0 MHz
Aperture length	45 mm
FOV	N/A
Element	128
Biopsy kit	Available

L8-17

Application	Carotid, Peripheral Vascular, Thyroid, Testicle, MSK, Superficial, Breast, Emergency Medicine
Type	Linear array
Frequency	8.0 – 17.0 MHz
Aperture length	32.8 mm
FOV	N/A
Element	128
Biopsy kit	Available

SP1-5

Application	Abdomen, Renal, Cardiac, Emergency Medicine, TCD
Type	Phased array
Frequency	1.0 - 5.0 MHz
Foot print	25mm x 18mm
FOV	90°
Element	64
Biopsy kit	N/A

SP3-8

Application	Abdomen, Cardiac, Emergency Medicine
Type	Phased array
Frequency	3.0 – 8.0 MHz
Foot print	16mm x 13mm
FOV	90°
Element	64
Biopsy kit	N/A

EN3-10

Application	GYN, Fetal Echo, Urology, Emergency Medicine
Type	Endo-vaginal
Frequency	3.0 - 10.0 MHz
Convex radius	10 mm
FOV	145°
Element	128
Biopsy kit	Available

E3-10

Application	GYN, Fetal Echo, Urology, Emergency Medicine
Type	Endo-vaginal
Frequency	3.0 - 10.0 MHz
Convex radius	10 mm
FOV	145°
Element	128
Biopsy kit	Available

EC3-10

Application	GYN, Fetal Echo, Urology, Emergency Medicine
Type	Endo-vaginal
Frequency	3.0 - 10.0 MHz
Convex radius	10 mm
FOV	142°
Element	128
Biopsy kit	Available

EV3-10

Application	GYN, Fetal Echo, Urology, Emergency Medicine
Type	Endo-vaginal
Frequency	3.0 - 10.0 MHz
Convex radius	10 mm
FOV	142°
Element	128
Biopsy kit	Available

VC1-6

Application	Abdomen, Renal, OB, Fetal Echo, GYN, Emergency Medicine
Type	Volume Convex array
Frequency	1.0 - 6.0 MHz
Convex Radius	40 mm
FOV	79°
Element	128
Biopsy kit	N/A

IO3-12

Application	Salivary gland, Parotid gland, Sub maxillary gland
Type	Linear
Frequency	3.0 - 12.0 MHz
Aperture length	16 mm
FOV	N/A
Element	80
Biopsy kit	N/A

CW2.0

Application	Cardiac
Type	Pencil Type
Frequency	2.0MHz
Diameter	17.2 mm

CW5.0

Application	Cardiac
Type	Pencil Type
Frequency	5.0MHz
Diameter	17.2 mm