

# VINNO X3



Data sheet  
V1.9.60



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# VINNO X3

## Ultrasound System Specifications

Mobile, solid and affordable **VINNO X3** provides excellent value across the full range of general imaging and women healthcare applications. It is also perfect for regional nerve block, musculoskeletal, rheumatology applications by:

- Exceptional image quality including high end 3D/4D capability
- Versatile features and functions
- Amazing superficial imaging for breast and other small parts.
- Up to 22MHz capability provides excellent visualization tools in regional nerve block, musculoskeletal, rheumatology clinical applications
- Easy to use workflow with touch panel and 21.5" monitor



## 1. System Overview

### 1.1 Architecture

- The revolutionary RF platform, The First In The World, allows for more accurate information. This platform transfers all RF data for computing without any information loss. It has a much better advantage in detail imaging than current advanced platforms

- Thanks to the RF platform, it allows the development of many RF-based processing algorithms, which have ultra-premium contrast and resolution imaging
- The 576 000 digital channels platform is capable of processing multiple data streams simultaneously
- Up to 25MHz next generation digital broadband and high resolution acoustic beamforming
- The new low noise, digital circuitry, with up to 280db dynamic range has improved 2D performance and increased Doppler sensitivity
- Next generation adaptive image processing for noise and artifact reduction that improves tissue presentation and edge definition
- Fully independent, triplex multiple mode operation for easy in Doppler procedures



- Multi-processors allow simultaneous mode changes and support for advanced system functionality

## 1.2 Applications

- Abdomen
- Obstetric
- Gynecology
- Cardiology
- Urology
- Vascular
- TCD
- Small Parts
- Pediatrics
- Intra-operative

## 1.3 Imaging features

- 2D grayscale imaging
- Harmonic imaging both in tissue harmonic and pulse inversion harmonic technologies
- VFusion, directional-enhanced information compounding
- VSpeckle, specialized and adaptive imaging processing to remove speckle noise artifacts and enhance tissue edge for clarity and accuracy
- VTissue, the advanced adaptive image processing to compensate for sound and speed variation in different tissue

- Auto imaging optimization
- Easy Comparative Function to compare previous exam
- M-mode
- Color Doppler imaging
- Power Doppler imaging
- Pulse wave Doppler imaging
- Simultaneous 2D and M mode
- Duplex 2D/PW Doppler
- Triplex 2D/Color/PW Doppler
- High PRF pulsed wave Doppler
- Continuous wave Doppler (CW )
- Real Time Pan/Zoom
- Pan/Zoom on Freez mode
- FULL screen imaging to enlarge imaging size
- Dual real time imaging without compromising imaging size
- PView for panoramic imaging (Optional)
- TView for trapezoidal imaging
- Needle Enhancement\*(optional)
- SGC (Scanline gain compensation)
- HSG
- 2D/3D auto follicle\*(optional)
- Tomographic display (MCUT)
- Free Hand 3D \* (optional)
- 3D/4D Live Imaging
- HQ(Optional)
- HQ Silhouette (Optional)
- Inversion mode(Optional)
- Magic Cut (Optional)
- Smart 3D Volume Calculation (Optional) \*
- Multiline-Free View (Optional)



- Volume Contrast Imaging(VCI)
- Niche view(Optional)
- Color M-mode
- Multi Angle M-mode with 360 degree rotation
- Tissue Doppler (TD) mode
- Tissue Velocity Imaging (TVI) mode
- Tissue Velocity M (TVM) mode (optional)\*
- VFlow,adaptive color flow filter to increase the sensitivity of blood flow
- Elastography imaging
- Stress echo\* (optional)
- Strain Imaging\* (optional)

### 1.4 Standard features

- Up to 25Mhz high frequency in system platform. Up to 22MHz' s probes are supported
- RF platform and RF data processing
- Up to 1500 seconds standard cine storage
- 1T HDD
- Integrated DVDRW
- Integrated black/white thermal video printer slot
- Patient information database
- Image archive on hard drive
- Quick store to USB memory stick
- Quick store to hard drive
- Quick print to B/W and color thermal video printer
- Network storage and printing

- Full measurement and analysis package
- Real time auto wave Doppler track and calculations
- Vascular calculations
- Cardiac calculations
- OB calculations and tables
- Gynecological calculations
- Urological calculations
- Renal calculations
- Volume calculations
- Barcode reader for patient information input(optional)
- Wireless networking for easy data sharing, storage and printing (optional)
- Bluetooth for image data transfer(optional)
- Image data transfer directly by E-Mail with network access(optional)
- Up-to-date connectivity and data management solutions, wireless , LAN, Bluetooth, E-Mail, integrated database
- DICOM 3.0 compatibility\*
- Four active probe ports
- 5 USB ports
- 8 TGC slides
- Average 4 multiple adjustable frequency in every probe and mode
- Up to 512 line density
- 1 DVI-D interface
- 1 Audio in interface; 1 Audio out interface
- 1 Speaker interface
- 1 RJ45 interface



## 1.5 Language support

- Software: Chinese, English, German, Greek, Malay, Portuguese, Romanian, Spanish, Swedish, Norwegian, Danish, Finnish, French, Polish, Russian, Uighur, Italian, Czech, Hungarian, Cambodia
- Keyboard input: Chinese, English, German, Greek, Malay, Portuguese, Romanian, Spanish, Swedish, Polish, Norwegian, Danish, Finnish, French, Russian, Italian, Czech, Cambodia
- Control panel overlay: English
- User manual: Chinese, English, German, Russian, Portuguese, Spanish, Italian, French

## 2. Ergonomics

- Unique human oriented design for comfort and convenience
- Fully articulating 21.5-inch high resolution flat panel display
- lifted operation panel 150 mm
- Easy access DVD media drive
- 4 active transducer ports
- 4 transducer holders (removable for easy cleaning)
- Integrated touchable alphabetic keyboard
- Simple, easy and effective cable management structure

## 2.1 Keyboard

- Highly sensitive 10 inch LED technology touch panel
- Resolution: 1280\*800 pixels
- Intuitive, configurable and touchable interactive operation interface
- Ergonomic hard keys for general ultrasound operations
- 8 TGC slides, functionality at any depth
- Backlight keys
- Independent up/down adjustment
  - Down/up range: 150 mm

## 2.2 Image display screen

- 21.5 inch high resolution LED technology, pixel resolution: 1366x768
- Brightness, contrast and color temperature adjustment
- View angle:  $-178^{\circ} \sim 178^{\circ}$
- Number of color: 16.7M
- Adjustable Gamma curve optimization for dedicated applications
- Multifunctional support arm design
- Independent tilt and swivel adjustment
  - Swivel range:  $\pm 180$ degrees
  - Tilt range:  $-20-90$ degrees
  - Up/down with electric lifting arm:



150±80mm

## 2.3 Wheels

- Diameter: 125mm
- Front castor (2 ea): Total lock  
Rear castor (2 ea): Total lock

## 2.4 Touch gestures

- Swipe down/up:  
display/remove projected image on touch screen
- Swipe horizontally: page up/down or review images/cine loops one by one
- Swipe from left edge to right: display hidden menu on projected image.
- Image parameter adjustment
- Measurement on projected image on touch screen
- Zoom in/out the projected Image on touch screen
- Rotate or erase on projected 3D/4D image on touch screen
- User defined gestures using two fingers for more functions, such as freeze, save, print, activate specific imaging modes, measurements, and some other special functions

## 2.5 System boot-up

- Boot-up from shut-down: ≤62 sec

- Shut-down: ≤12 sec

## 2.6 Comments

- Supports text input and arrow
- Support freehand marking on touch screen
- Adjustable text size and arrow size
- Supports home position
- Covers various application
- User customizable

## 2.7 Bodymark

- More than 215 bodymarks for versatile application
- User customizable

## 2.8 Peripherals

- B&W thermal video printer: Sony UP-X898MD(optional)
- Color thermal video printer: Sony UP-D25MD (optional)
- Memory stick (optional)

## 2.9 Dimensions and Weight

- Height: 1260mm
- Width: 605mm
- Depth: 875mm



- Net Weight: 60kg

## 2.10 Electrical Power

- Voltage: 100-240V AC
- Frequency: 50/60Hz
- Power: Max. 600VA for console Only

## 2.11 Operating Environment

- Ambient temperature: 10-40° C
- Relative humidity: 30-75%
- Atmospheric pressure: 700hPa-1060hPa

## 2.12 Storage & Transportation

### Environment

- Ambient temperature: -5-50° C
- Relative humidity: 10%-80% (no condensation)
- Atmospheric pressure: 700hPa-1060hPa

## 3. Transducers

### 3.1 Transducer Technology

- Xcen technology for wideband

frequency

- Pure wave technology for high resolution imaging
- Unique and high technical Xcen probe connector to adapt all different type of VINNO product models

### 3.2 Transducer types

- Convex array
- Linear array
- Phase array
- 4D probe
- Endocavity probe
- Micro-convex array

### 3.3 Transducer selection

- Electronic switching of transducers
- User customizable imaging presets for each transducer and application
- Automatic dynamic receiving focus in all transducers
- Multiple adjustable transmit focal zone, up to 8 focal zone

#### G2-5C Broadband Curved Array

- Field of view: 66 degree
- Convex radius: 50mm
- Application: abdomen, OB/Gyn,



urology, pediatric

- Frequency range: 2.0 -6.0MHz
- Physical Footprint: 68.5mm x 27mm
- Center frequency: 3.2 MHz
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

**F2-5C Broadband Curved Array**

- Field of view: 59 degree
- Convex radius: 60mm
- Application: abdomen, OB/Gyn, urology, pediatric
- Frequency range: 2.0 -6.5MHz
- Center frequency: 3.2 MHz
- Physical footprint: 72mm x 27mm
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

**D3-6C broadband curved array volume probe**

- Field of view: 75 degree
- Convex radius: 40mm
- Application: abdomen, OB/Gyn, urology
- Frequency range: 2.0 – 6.0MHz

- Physical Footprint: 82mm × 53mm
- Center frequency: 4.0 MHz
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic, 3D/4D grayscale and 3D color modes
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

**G4-9M broadband micro convex array**

- Field of view: 138 degree
- Convex radius: 12mm
- Application: pediatric, abdomen, cardiac
- Frequency range: 5.0 – 11.0MHz
- Physical Footprint: 34mm × 29mm
- Center frequency: 7.0MHz
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

**X4-9E broadband micro convex endocavity array (crank and straight handle )**

- Field of view: 180 degree
- Convex radius:8.8 mm
- Application: ob/gyn, urology
- Frequency range:5.0-11.0 MHz
- Physical Footprint: 19.15mm x 17.8mm
- Center frequency: 3.2MHz



- Transducer elements:192
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

**D4-9E broadband micro convex 4D endocavity array**

- Field of view: 146 degree
- Convex radius: 10mm
- Application: Ob/Gyn, urology
- Frequency range: 5.0 - 11.0MHz
- Physical Footprint: 24.7mm x 23.7mm
- Center frequency: 6.5MHz
- Transducer elements:148
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic , 3D/4D grayscale, 3D color
- Multi-imaging frequency setting in 2D, 3D/4D, Harmonic, color Doppler and Wave Doppler modes

**X4-12L broadband linear array**

- Fine pitch, high resolution
- Applications: vascular, small parts
- Aperture size: 38.4mm
- Frequency range: 5.0 -16.0MHz
- Physical Footprint: 50.5mm × 17mm
- Center frequency: 7.8MHz
- Transducer elements:192
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in

2D, Harmonic, color Doppler and Wave Doppler modes

- Reusable biopsy guide available

**X6-16L broadband linear array**

- Fine pitch, high resolution
- Applications: vascular, small parts
- Aperture size: 38.4mm
- Frequency range: 7.3 -18.0MHz
- Physical Footprint:

50.5mm × 20mm

- Center frequency: 10.5MHz
- Transducer elements:192
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

**U5-15LE broadband linear array**

- Fine pitch, high resolution
- Applications: small parts, specially for breast, vascular
- Aperture size: 51.2mm
- Frequency range: 6.0 -14.0Mhz
- Physical Footprint: 65.5mm × 25.5mm
- Center frequency: 7.3MHz
- Transducer elements: 256
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes



### **G1-4P phased array**

- Applications: cardiac, abdomen
- Field of view 90 degree
- Aperture size: 17.92mm
- Frequency range: 2.0-5.0Mhz
- Physical Footprint:  
34.5mm × 28.5mm
- Center frequency: 2.5MHz
- Transducer elements: 64
- Pulsed wave Doppler, continuous wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

### **F4-9E broadband micro convex endocavity array**

- Field of view: 156degree
- Convex radius: 10mm
- Application: Ob/Gyn, urology
- Frequency range: 5.0 - 11.0MHz
- Center frequency: 3.2MHz
- Physical footprint: 21.0mm (lens) x 19.0mm(lens)
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

### **F4-12L broadband linear array**

- Fine pitch, high resolution
- Applications: vascular, small parts
- Aperture size: 38.4mm
- Frequency range: 4.0 -16.0MHz
- Center frequency: 7.5MHz
- Physical footprint: 50mm × 18.5mm
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

### **G3-10PX phased array**

Application: pediatric cardiology, abdomen

Aperture size: 15.36 mm

Field of view: 90 degree

- Frequency range: 3.0-10.0Mhz
- Physical Footprint: 33mmx 33mm
- Center frequency: 4.7MHz
- Transducer elements:96
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

### **X9-22L broadband linear array**

- Fine pitch, high resolution
- Applications: msk,nerve,small parts
- Aperture size: 28.8mm



- Frequency range: 9.0-22.0MHz
- Physical Footprint: 49.5mm x 22mm
- Center frequency: 14.0MHz
- Transducer elements:192
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

### **S2-9C Broadband Curved Array**

- Field of view: 60 degree
- Convex radius: 60mm
- Application: abdomen, ob/gyn, urology, pediatric
- Frequency range: 1.2-5.2MHz
- Physical Footprint: 79mm × 31mm
- Center frequency: 3.5MHz
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

### **X2-6C Broadband Curved Array**

- Field of view: 62 degree
- Convex radius: 60mm
- Application: abdomen, ob/gyn, urology, pediatric
- Frequency range: 2.0-5.5MHz
- Physical Footprint: 78mm × 28mm
- Center frequency: 3.5MHz
- Transducer elements:192

- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

### **G4-9E broadband micro convex endocavity array**

- Field of view: 138 degree
- Convex radius: 11.5mm
- Application: Ob/Gyn, urology
- Frequency range: 5.0 – 11.0MHz
- Physical Footprint: 24.0mm x 18.8mm
- Center frequency: 6.9MHz
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
- Reusable biopsy guide available

### **D3-6CX broadband curved array volume probe**

- Field of view: 75 degree
- Convex radius: 40mm
- Application: abdomen, OB/Gyn, urology
- Frequency range: 1.8 – 7.2MHz
- Center frequency: 3.85 MHz
- Physical footprint: 65mm × 45.2mm
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic , 3D/4D



grayscale, 3D color

- Multi-imaging frequency setting in 2D, 3D/4D, Harmonic, color Doppler and Wave Doppler modes

#### **I4-11T broadband linear array**

- Fine pitch, high resolution
- Frequency range: 6.0-12.0Mhz
- Physical Footprint: 48mm × 15mm
- Center frequency: 7.5MHz
- Transducer elements:128
- Pulsed wave Doppler, color Doppler, power Doppler, harmonic
- Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

### **4. Advanced Imaging controls**

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#### **4.1 VFusion**

- Available on all transducers and for 2D, 3D/4D (except phase array probe)
- Up to 5 levels of directional imaging fusion to enrich information
- Operate in conjunction with VSpeckle, harmonic imaging

#### **4.2 VSpeckle**

- Available on all transducers and for 2D, 3D/4D
- Virtually eliminate speckle noise

artifact and dynamically enhances tissue margins

- Selectable multiple levels of speckle noise reduction and smoothing
- Operates in conjunction with VFusion and harmonic imaging

#### **4.3 VTissue**

- Advanced imaging processing to adapt to the speed of the ultrasound variation in different tissue
- Improved detail resolution and conspicuity of lesions
- Presentable sound and speed in different applications
- One touch operation to ease diagnosis
- Better detection in diffuse lesions of organs

#### **4.4 3D/4D Live Imaging**

##### **4.4.1 Inversion mode**

- This render mode is used to display anechoic structures such as vessels
- It invert the gray values of the rendered image, such as black image information become white and vice versa

##### **4.4.2 Magic Cut**

- Ability to edit images, make



possible to cut away structure obstructing the view in the ROI

- Several cutting methods available
- Have quality index to indicate if there is proper external force

#### **4.4.3 Free View(Optional)**

- Provide any plane view to visualize the internal tissue information
- Improve the contrast resolution to facilitate the detection of diffuse lesions in organs

#### **4.4.4 Volume Contrast Imaging(VCI)**

- Increases the tissues demarcation inside the adjustable slab
- Renders images with improved contrast resolution

#### **4.4.5 Niche view**

- Display 3 orthogonal planes centered on ROI
- Use Depth to translate the selected plane
- Each imaging plane or Niche image can be selected using image reference

### **4.5 Next generation RF-based image processing**

- Available on all imaging transducers in 2D grayscale modes

- Virtually eliminates speckle noise artifact and dynamically enhance tissue edge
- Operates with other real-time processing algorithms

#### **4.6 Tissue Doppler (TD)**

- Present wall motion spectrum by using Doppler principle
- Provide wall motion direction and velocity information

#### **4.7 Tissue Velocity Imaging (TVI)**

- Color codes the velocities in tissue
- Present tissue color imaging by using Doppler principle
- This color image is overlaid onto the 2D image
- Captures low flow but high amplitude signals associated with wall motion

#### **4.8 Stress Echo**

- Stress echo is a non-invasive, dynamic evaluation of myocardial structure and its function under an external stress(exercise or pharmacology)
- 12 Ready to use templates (max 8 stages \* 6 views) Editable





- User definable template
- Re-arrange & Select default template
- 8 View names available
- 9 Stage names are available (can add user defined stage name)
- One Touch Shuffle (Stage / View)
- Touch & Compare any view of stage
- Systole only review

#### 4.9 Strain Imaging

- Auto-ROI (after selecting Mitral Valve Plane)
- Adjust Segment-wise (Longitudinal strain)
- Adjust Segment-wise and Rotate whole ROI (Radial & Circumf. Strain)
- ECG to select heart cycle
- View based Bulls Eye view
- Result type (Peak Strain or Peak Time)Parameter type (L Strain, R Strain& C Strain)

#### 4.10 Tissue Velocity M mode(TVM)

\*

- Color codes the velocities in tissue
- Present wall motion spectrum based on tissue moving
- This color image is overlaid onto the 2D image
- Captures low flow but high

amplitude signals associated with wall motion

#### 4.11 Multi-angle M mode

- Sample on moving tissue from multi-angle
- Present wall motion spectrum based on tissue moving

### 5. Imaging modes

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#### 5.1 2D Imaging

- Pre-defined ATGC (adaptive temporal gain compensation) curves optimized for consistently excellent imaging
- Display format: Single, Dual, Quad
- B/M acoustic output: 0-100%
- Depth: able to adjust from 1 to 40cm
- Select between 1 to 8 transmit focal zones
- Reverse function: on/off
- 2D optimization: on/off
- Centerline: on/off
- L/R flip and U/D flip: on/off
- VFusion :  $\cong$  7steps
- VSpeckle :  $\cong$  13 steps
- Harmonic imaging both tissue harmonic and phase inversion



- Cineloop image review
- Selectable 2D line density
- Dual imaging with independent cineloop
- 256(8 bit) gray level
- Up to 8 focus zone adjustable
- Multiple color maps with chroma imaging
- FULL screen imaging to larger image size
- Multi frequency:  $\cong$  4 levels, probe dependent
- Gray filter:  $\cong$  7 steps
- Persistence:  $\cong$  8steps
- Selectable image angles, probe Dependent
- Gain: 0-100%
- Selectable Dynamic range: 30-280 dB
- VSharpen( enhance edge contrast) :  $\cong$  8steps
- Smooth(improve spatial resolution):  $\cong$  11steps
- EdgeEnhance ( improve detail information and contrast):  $\cong$  6steps
- VNear to enhance SNR of near field, 4steps
- Gray Map:  $\cong$  23types
- Tint Map:  $\cong$  24types
- TGC: 8 slides on control pannel
- SGC: 8 ponds on touch pannel
- TI heat index: TIB, TIS, TIB
- Rotation:  
0° ,90° ,180° ,270°
- Zoom(up to 10×)

## 5.2 Harmonic Imaging

- Supports both tissue harmonic and phase inversion imaging (transducer and frequency dependence)
- Second harmonic processing to reduce artifacts and improve image clarity
- Maximize detail resolution and enhance contrast
- Available on all imaging transducers
- Extends high performance imaging capabilities to all patient body types

## 5.3 M mode

- Selectable sweeping rates,  $\cong$  10steps
- Time marks: 0.025 – 0.5 second
- Selectable display format prospective or retrospective (V2/3, V1/3, V1/2, H1/2, H3/4, full screen)
- Chroma colorization with multiple color maps
- Cineloop review for retrospective analysis of M-mode data
- 256 gray levels
- Acoustic output: 10%-100%
- Gray filter:  $\cong$  7steps
- Dynamic range: 108db-128db,



2db/step

- Vsharpen:  $\cong$  6steps
- Gray Map:  $\cong$  23types
- Tint Map:  $\cong$  24types
- Gain: 0-100%
- Color M mode: available
- MultiAngle: available

### 5.4 Color Doppler mode

- Available on all imaging transducers
- Automatically adapts transmit and receive bandwidth processing based on the color box position
- Cineloop review with full playback control
- Steering on linear array transducers
- Color flow M mode display for tissue motion and flow velocity(optional)
- Reverse function: on/off
- Selectable baseline, line density, flash reduction, persistence, maps, frequency, PRF, wall filter, packet size, color level, sensitivity, focus position, acoustic power, and smooth
- FULL screen imaging to larger image size
- L/R flip and U/D flip: on/off
- Frequency:  $\cong$  4steps, depend on probes
- Baseline: 0-100%
- Acoustic power: 5% -100%
- Line density:  $\cong$  6 steps

- Flash reduction:  $\cong$  6 steps
- Persistence:  $\cong$  20 steps
- Color Map:  $\cong$  33types
- Smooth :  $\cong$  7steps
- Sensitivity:  $\cong$  5 steps
- Transparency:  $\cong$  6steps
- Color level:  $\cong$  14 steps
- Packet size:  $\cong$  7 steps
- Reverse function: on/off
- Color gain: 0-100%
- Adjustable region of interest
- Region of interest
- Baseline invert
- Simultaneous mode during PW mode
- Zoom

### 5.5 Power Doppler mode

- High sensitive mode for small vessel visualization
- Available on all transducers
- Cineloop review
- Display format: Single, Dual, Quad
- Selectable baseline, line density, flash reduction, persistence, maps, frequency, PRF, wall filter, packet size, color level, sensitivity, focus position, acoustic power, and smooth
- Color maps:  $\cong$  24 types
- Color levels:  $\cong$  11 steps
- Sensitivity:  $\cong$  5steps
- Smooth:  $\cong$  7steps



- Persistence:  $\geq 20$  steps
- Individual controls for gain
- Adjustable region of interest

## 5.6 Pulsed Wave (PWD) Doppler

- Ultra high resolution spectral FFT rate
- Angle correction with automatic velocity scale adjustment
- Normal, invert display around horizontal zero line
- Auto optimization: on/off
- Invert: on/off
- Selectable display format prospective or retrospective (V2/3, V1/3, V1/2, H1/2, H3/4, full screen)
- Selectable gray filter, dynamic range, frequency, PRF, wall filter, baseline, angle correct, sample volume
- Gray filter:  $\geq 6$  steps
- Dynamic range: 108db-128db
- Baseline: 5%-95%
- Sample volume: 0.5mm-10mm
- Angle correct:  $-80^\circ \sim 80^\circ$
- Sensitivity:  $\geq 21$  steps
- Audio Volume:  $\geq 21$  steps
- Spectrum Optimize:  $\geq 28$  steps
- Gray map:  $\geq 13$  types
- Tint map:  $\geq 11$  types
- Selectable sweep speeds: 10 steps
- Maximum velocity range: 12m/s

- PW acoustic output: 5%-100%
- Trace direction: above, below, above and below
- Trace type: max, mean, max and mean
- Cardiac cycle: 1-5
- Selectable low frequency signal filtering with adjustable wall filter settings
- Selectable grayscale curve for optimal display
- Selectable chroma colorization maps
- Auto function to optimize spectral Doppler displ.
- Digitally enhanced stereo output
- 256 gray levels
- Post-processing in frozen mode includes map, baseline, invert and chroma
- Simultaneous or duplex mode of operation
- Simultaneous 2D, color Doppler, pulsed Doppler
- High PRF capability in all modes including duplex and triplex

## 5.7 Continuous Wave Doppler (CWD)

- Cardiac sector array transducer only
- User can measure distance and area



- Measurement can be made on individual frames during cine loop review
- Available on linear transducers

### 5.8 Elastography imaging

- Shows the spatial distribution of tissue elasticity properties in a region of interest to estimate the strain before and after tissue distortion caused by external force
- The strain estimation is scaled by color to have smooth distribution display
- Have quality index to indicate if there is proper external force
- WInsize: 0,1,2,3,4
- Overlap: 0,1,2,3,4
- Dynamic range: 0-10
- Sensitivity: 0,1
- Transparency:  $\cong$  13steps
- Smooth:  $\cong$  7steps
- Line density:  $\cong$  7steps
- Persistence:  $\cong$  20steps
- Map: EIO
- Display format: Single, Dual, Quad

### 5.9 Contrast imaging(Optional)

- Support contrast imaging in both 2D and 3D volume

- By contrast agent, imaging is enhanced within vessel which agent flow
- Have one button push to destroy the agent. Useful in the bubble wash-in characteristics of anatomy being scanned

### 5.10 3D/4D Live Imaging

- 3D/4D rotation
  - Grayscale imaging controls
  - Selectable rendering
- Approaches: HQ Surface, HQ Grad, HQ Silhouette, Surf Texture, Surf Smooth, Grad Light, Surf HDR, Trans Max, X-ray, Transp Min, Light
- Unique high quality rendering algorithm
  - Review volume
  - Volume Angle: 15%-75%
  - Quality: low, mid, good, high, best
  - Threshold: 256
  - Transparency: 0.1-2, 0.1/step
  - Category: Face, Spine, Brain, Heart, Hi speed, Lip&plate, Limbs, Custom
  - Display format: single, dual, MRP, Quad
  - Image Reference: A, B, C, 3D
  - Flip: 0°, 90°, 180°, 270°
  - View: Front/Back, Back/Front; Left/Right, Right/Left; Up/Down, Down/Up



- Rotation Direction: X, Y, Z
- 3D Map:  $\cong$  8types
- Tint maps:  $\cong$  24Types
- Gray maps:  $\cong$  23Types
- 2D VSpeckle:  $\cong$  3types
- 3D VSpeckle:  $\cong$  3types
- Render Type: Gray, GrayInv
- Inverse Available

- **MCUT(Optional)**

- Slice Number:  $2 \times 2$ ,  $3 \times 3$ ,  $4 \times 4$ ,  $5 \times 5$
- Max Slice Number: 25
- Gray Map:  $\cong$  23 types
- Tint Map:  $\cong$  24 types
- Cut plane: A,B,C
- Rotation Direction: X, Y, Z
- Volume Angle:  $15^\circ$  -  $75^\circ$
- Interval: 1mm-20mm, 0.5mm/step
- Quality: low,mid,good,high,best

- **Free view(optional)**

- Direction: X, Y, Z
- Route: curve, straight line
- Reference image: A,B,C
- Slice thickness: 0mm-20mm
- Active line: 1,2,3
- Mix: 10-90
- Threshold: 256steps
- Transparency: 0.1-2.0, 0.1/step

- **Magic cut(optional)**

- Erase mode: inside lasso, outside lasso, big circle, small circle

- Erase type: trace, rectangle, ellipse

- Rotation direction: X, Y, Z

- **VOCAL**

- Vocal layers: 8, 12,16,20,24,28,32
- Display format: single, Quad
- Image reference: A, B, C

- **Niche view**

- Model type: upper, lower
- Display format: single, quad
- Rotation direction: X, Y, Z
- Image reference: A, B, C, N

### 5.11 PView (Optional)

- Real time extended field of view composite imaging
- Ability to back up and realign the image during acquisition
- Full zoom, cineloop review and image rotation capabilities

### 5.12 TView

- Expand view of scanning
- Available on linear transducers

### 5.13 Auto

- Intelligent one button automatic optimization in 2D and



## Doppler modes

- Automatically adjust PRF and baseline in Doppler

### 5.14 Tissue Doppler Imaging (TD)

- Present wall motion spectrum by using Doppler principle
- Provide wall motion direction and velocity information
- Available on all sector transducer for cardiac imaging
- Selectable frequency, PRF, Focus position, wall filter
- Gain
- Sweep speed:  $\cong$  10steps
- Baseline: 5%-95%
- Angle correct:  $\pm 80^\circ$
- Sample volume: 0.5mm-10mm, 0.5mm/step
- Spectrum optimize:  $\cong$  20steps
- Acoustic power: 5%-100%
- Dynamic range: 108db-128db
- Trace sensitive:  $\cong$  21steps
- Gray filter:  $\cong$  6steps
- Audio volume:  $\cong$  21steps
- Mode: max, mean, both
- Direction: above, below, both
- Heart cycle: 1-5
- Gray map:  $\cong$  13types
- Tint map:  $\cong$  11types

### 5.15 Tissue Velocity Imaging (TVI)

- Color codes the velocities in tissue
- Present tissue color imaging by using Doppler principle
- This color image is overlaid onto the 2D image
- Captures low flow but high amplitude signals associated with wall motion
- Available on all sector transducer for cardiac imaging
- Tissue velocity M mode display for wall motion(optional)
- Gain
- Velocity
- Color level:  $\cong$  11steps
- Transparency:  $\cong$  12steps
- Smooth:  $\cong$  7steps
- Line density:  $\cong$  3steps
- Persistence:  $\cong$  7steps
- Color map:  $\cong$  10types

### 5.16 Tissue Velocity M mode (TVM)

\*

- Color codes the velocities in tissue
- Present wall motion spectrum based on tissue moving
- This color image is overlaid onto the 2D image
- Captures low flow but high



amplitude signals associated with wall motion

- Selectable frequency, PRF,
- Focus position
- Baseline: 5%-95%
- Color level:  $\cong$  11steps
- Transparency:  $\cong$  13steps
- Packet size: 3,4,5,6
- Acoustic power: 5%-100%
- Display format: Single, Dual, Quad

## 6. Touch Panel Interface

---

### 6.1 2D mode

- New patient
- BodyPattern
- Archive
- Comments
- End exam
- Sys setting
- Probe&App
- Pview
- Tview
- Fullscreen
- L/R
- U/D
- Center line
- VTissue\*
- VSpeckle
- VFusion
- Gray Filter

- Persistence
- Display Format
- Image reference
- Maps
- Frequency
- Focus position
- Focus #
- Dynamic Range
- Line density
- VSharpen
- Biopsy
- Image angle
- Focus width
- Smooth
- Acoustic power
- Contrast imaging
- Elastosonography
- EdgeEnhance
- Vnear
- NeedleEnhance
- SGC

### 6.2 M Mode

- New patient
- BodyPattern
- Archive
- Comments
- End exam
- Sys setting
- Probe&App
- L/R format
- U/D format
- Maps
- Dynamic range





- Acoustic power
- Sweep speed
- Gray filter
- VSharpen
- ECG

- Focus position
- Acoustic power
- Smooth

### 6.3 CF mode

- New patient
- BodyPattern
- Archive
- Comments
- End exam
- Sys setting
- Probe&App
- Invert
- Full Screen
- L/R
- U/D
- Baseline
- Flash Reduction
- Line density
- Persistence
- Display format
- Sync display
- Transparency
- Image reference
- Maps
- Frequency
- PRF
- Wall filter
- Packet size
- Colorlevel
- Sensitivity

### 6.4 PW/CW mode

- New patient
- BodyPattern
- Archive
- Comments
- End exam
- Sys setting
- Probe&App
- Invert
- Triplex
- Display format
- Sweep speed
- Gray filter
- Dynamic range
- Trace sensitive
- Auto trace
- Mode/direction
- Maps
- Frequency
- PRF
- Wall filter
- Baseline
- Steer
- Sample volume
- Volume
- Spectrum optimize
- Acoustic power



## 6.5 3D mode

- Comments
- BodyPattern
- Back to 2D
- Start3D
- Render
- Display format
- Image reference
- View
- Gray map
- VSpeckle
- Quality
- Threshold
- Transparency
- Volume angle
- Auto rotate (after data acquisition)
- Movement step (after data acquisition)
- Slice position(after data acquisition)
- Speed(after data acquisition)
- HQ Grad Light(after data acquisition)
- Rotation angle (after data acquisition)
- Rotation direction (after data acquisition)
- 3DMcut(after data acquisition)
- Magic Cut (after data acquisition)
- Free View(after data acquisition)

- Smart Touch Automatic 3D/4D operation(after data acquisition)

## 6.6 4D mode

- Comments
- Body Pattern
- Back to 2D
- Start 4D
- Auto Cine
- Movement step
- Rotation direction
- Render
- Display format
- Image reference
- View
- Gray map
- VSpeckle
- Quality
- Threshold
- Transparency
- Volume angle
- Slice position(after data acquisition)
- 3DMcut(after data acquisition)
- Smart touch Automatic 3D/4D operation(after data acquisition)

## 7. System Feature

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### 7.1 Display modes

- Simultaneous capability



- 2D/PW/CW
- 2D/CF or PDI
- 2D/M
- Dual, 2D/2D
- Dual, 2D/2D+CF or PDI
- Dual, duplex and triplex
- Duplex and Triplex mode
- Quad display in 3D/4D

application

- 25 slice images display in

3D/4D application

- Time line display
  - Independent dual 2D/PW or

CW

- Timed based sweep update

mode

## 7.2 Display annotation

- Institution/hospital name
- Date: 3 types selectable, Year-Month-Day, Day-Month-Year, Month-Day-Year
- Time: 2 types selectable, 24hours and 12 hours
- Operator identification
- Patient name, first, last
- Patient identification: 30 characters
- Gestational age from LMP/BBT/DOC/IVF/GA/Avg.US
- VINNO image symbol: Ginkgo leaf
- Power output index

- MI: mechanical index
- TIS: thermal index soft

tissue

- TIC: thermal index cranial (Bone)
- TIB: thermal index

bone

- Probe orientation marker: coincide with a probe orientation marking on the probe

- Gray/color bar
- Measurement result window
- Probe type
- Application name
- Image depth
- Imaging parameters by mode

• 2D/M mode: acoustic power output, gain, frequency, frame rate, dynamic range

• Color mode: color acoustic power output, color gain, color flow frequency, PRF, wall filter

• PW/CW mode: Doppler acoustic power output, Doppler gain, Doppler frequency, PRF, wall filter, sample depth

• Scanline Gain Compensation(SGC) with 6 slides adjustment

• Focus zone marker

• Body pattern

• PW and CW scale markers: time/speed

• M scale markers: time/depth, time



- System measurement display
- System message display
- Biopsy guide line
- Heart rate

- The system provides quick save function through USB stick, internal/external HDD, DVD during or after exam
- Configurable saving file format, VRD (VINNO Raw Data), DICOM, PNG,BMP,JPG , MP4 and AVI

### 7.3 Simple User Operation

#### Interface

- Simple user interface and easy workflow, allows one step on probe & application switch, and intuitive user parameter control

#### 7.4 Cineloop

- Acquisition, storage in memory and display of up to 30000 frames, 1500 seconds long of 2D, color and PW/CW images for review
- Available to decide StartFrame and EndFrame
- Frame by frame manual cine loop review or auto playback with variable speed: 400%, 200%, 100%, 60%, 50%,40%, 20%
- Frame compare: displays one cine in dual format and allows frame by frame compare side by side
- Acquisition, storage and replay of Doppler audio

#### 7.5 Quick save feature

#### 7.6 Physio (Optional)

- One 3-lead ECG input
- Gain, sweep rate and display position controls
- Automatic heart rate calculation and display
- Fault condition display

#### 7.7 Archive

- Patient data input which include patient ID, name, birth date, sex, exam physician, quality check, exam operator
- Physical data such as weight, height
- Patient exam management
- Patient exam images storage and management
- Import VRD format data into the system from outside media, such as USB stick, external HDD, DVD
- Export patient data into outside medias



## 7.8 Report

- Automatically pull patient data into the report
- Automatically load measurement worksheet into the report
- Pull related exams' images into the report
- Write comments in the report
- Print report through network or local printer

## 7.9 Connectivity

- Standard connectivity features
  - Local print to on-board or off-board video printers through USB port
    - Page report print
    - Image export to removable media (DVD, external HDD, USB stick)
  - Ethernet Network Connection
    - Cable connection
    - Wireless connection: need wireless routing adaptor
  - Network linkage
    - Image export to network storage servers\*
      - DICOM export and retrieve \*
  - Mobile data transfer solution by

- Blue tooth\*(Optional)
- email\*(Optional)
- Hot point connection
- VCloud \* (Optional)
- Integrated DVDRW
  - Support standard DVD media
    - Data storage formats include VRD, DICOM, JPEG,BMP,PNG, AVI
      - JPEG,BMP,PNG,VRD and DICOM images stored in disc can be recalled on the VINNO system
        - PNG and AVI images can be played on normal computers
  - On-board patient exam storage
  - Direct digital storage of static image or cineloop images to internal hard disk drives
  - Fully integrated user interface

## 7.10 Probes/application

- Selectable multiple applications
- Edit exist application preset
- Edit user defined preset
- Rename preset
- Return to factory preset
- Quick save user defined parameters in related application

## 7.11 Safety Conformance



- Regulatory Notice:  
This device is tested to meet all applicable requirements in relevant. According to 93/42 EEC, it is class IIa medical device.
- Conformity to Standards:
  - IEC 60601-1 : 2012 Medical electrical equipment - Part 1: General requirements for basic safety and essential performance
  - IEC 60601-1-2:2007 Electromagnetic compatibility - Requirements and tests
  - IEC 60601-1-6:2010 Usability
  - IEC 60601-2-37:2007 Medical electrical equipment - Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment
  - IEC 61157:2007 Declaration of acoustic output parameters
  - ISO 10993-1:2009 Biological evaluation of medical devices
  - IEC 62304:2006 Medical device software – Software life cycle processes
  - IEC 62366:2007 Medical devices - Application of usability engineering to medical devices
  - Council Directive 93/42/EEC on Medical Device
  - WEEE according to 2012/19/EU

- RoHS according to 2011/65/EU

## 8. Measurement and Analysis

### 8.1 Measurement in different modes

#### 8.1.1 Generic Measurement in 2D mode

- Depth
- Distance
- Perimeter
  - Length and width method
  - Ellipse method
  - Polygon method
  - Spline method
  - Tracing method
- Area
  - Length and width method
  - Ellipse method
  - Polygon method
  - Spline method
  - Tracing method
- Volume
  - Single line method
  - Dual line method
  - Triple line method
  - Single ellipse method



- Single ellipse and single line method
- Angle
- Stenosis
  - Diameter method
  - Square meter method
- A and B ratio
  - Diameter ratio
  - Square meter ratio

### 8.1.2 Generic Measurement in CFM

#### mode

- CFV
  - point
  - profile

### 8.1.3 Generic Measurement in M

#### mode

- Depth
- Distance
- Time
- Speed
- Heart rate
- Stenosis
- A and B ratio
  - Diameter ratio
  - Time ratio
  - Speed ratio<sup>Generic</sup>

### 8.1.4 Measurement in PW mode

- Speed (include PV (Peak Velocity))
- Time (include AT (Accelerate Time))

- Acceleration
- PS (Peak Speed in systole period)
- ED (The speed in the end of diastole period)
- MD (Minimum speed in diastole period)
- TAMAX (maximum speed in time average)
- TAMEAN (mean speed in time average)
- TAMIN (minmum speed in time average)
- PI (Pulsatility Index)
- RI (Resistance Index)
- PS and ED ratio
- ED and PS ratio
- A and B ratio (A/B ratio)
  - Speed ratio
  - Time ratio
  - Acceleration ratio
- FLOWVOL (Flow Volume)
- MaxPG ( maximum pressure gradient)
- MeanPG (Mean pressure gradient)
- SV ( Stroke Volume)
  - Each volume diameter cardiac
  - Time mean speed in each stroke volume
  - Cardiac output
- Heart rate
- SV(LVOT)/SV(RVOT)



## 8.2 Measurement in different applications

### 8.2.1 Abdominal Measurement

- General abdomen
- Difficult abdomen
- Kidney
- Renal vessel
- Abdominal trauma

### 8.2.2 Small Part Measurement

- Thyroid
- Breast
- Testis
- Musculoskeletal
- Upper and lower extremity joint
- Nerve block

### 8.2.3 Vessel Measurement

- Carotid artery
- Upper artery
- Upper vein
- Lower artery
- Lower vein
- Vessel puncture
- Transcranial Doppler

### 8.2.4 Gynecology Measurement

- Uterus and Plevis
- Follicle

### 8.2.5 Urology Measurement

- Bladder
- Prostate
- Renal
- Kidney and ureter
- Pelvic Floor dysfunction

### 8.2.6 Pediatric Measurement

- Neonatal Head
- Neonatal Abdomen
- Pediatric Abdomen
- Pediatric Hip
- FAST

### 8.2.7 Obstetrics Measurement

- OB Early
- OB Mid
- OB Late
- Fetal Heart

### 8.2.8 Cardiac Measurement

- General
- LV
- MV
- Ao
- AV
- LA
- RV
- TV
- PV
- RA
- System





### **8.2.9 Auto NT (Nuchal Translucency )**

#### **measurement**

- Automatically detect Nuchal Translucency in interest box
- Automatically report thickness result of NT

### **8.2.10 Auto IMT (Intima-Media Thickness) measurement**

- Automatically detect intima media thickness in interest box
- Automatically report the result of IMT
- Available in linear probe

### **8.2.11 Auto Follicle(2D/3D)(Optional)**

- \*
  - Just click on the area of follicle in B mode, the area of this follicle will be reported automatically
  - Report the area of different follicle in the volume data automatically

### **8.2.12 Smart 3D Volume**

#### **Measurement(Optional) \***

- Trace the margin of the irregular circle in different slices of volume data in irregular shape
- Automatically report the volume of the irregular object



## VINNO Technology (Suzhou) Co., Ltd

VINNO is focusing on producing premium diagnostic ultrasound development to provide customer clinical value through Continuous Innovation, Excellent Performance and Accessible Solutions.



**Thanks you for your interest in VINNO.**

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