

## Specifications for S11 Plus Digital Color Doppler Ultrasound System



**SonoScape**

SonoScape Medical Corp

# 1 General Specifications

## 1.1 Applications

- Abdomen
- OB/Gynecology
- Cardiology
- Peripheral vascular
- Small parts
- Musculoskeletal
- Transvaginal
- Transrectal
- Cephalic

## 1.2 Available Probes

- Convex array probe
- Linear array probe
- Phased array probe
- Volume probe

## 1.3 Imaging Modes

- B
- THI/PHI
- M
- Anatomical M
- Color M
- CFM
- PDI/DPDI
- PW
- CW
- TDI
- TDI+PW
- TDI+M

## 1.4 Function and Configuration

- 5-band adjustable frequency in B mode (fundamental wave and harmonic wave)
- $\mu$ -scan
- Compound imaging
- LGC (2 bands)
- Tissue specific index
- Image rotation
- Trapezoid Imaging
- HPRF
- Simultaneous mode (Triplex)
- PW Auto Trace
- Auto IMT
- Auto NT
- Auto EF

- Zoom
- B mode Panoramic Imaging
- Biopsy Guide
- Vis-Needle
- Freehand 3D
- 3D/4D
- ECG

## 1.5 Available Languages

- Software: English, Simplified Chinese, Spanish, Russian, French, Italian, German, Norwegian, Portuguese
- Key panel: English, Simplified Chinese, Spanish, Russian, French, Italian, German, Norwegian, Portuguese
- User manual: English, Simplified Chinese, Spanish, French, German, Portuguese

# 2 Physical Specifications

## 2.1 Size and Weight

- Size: approx. 520 mm (W)  $\times$  1300 mm (H)  $\times$  720 (D) (The height is measured when the upper arm is adjusted to the lowest positions and the monitor is adjusted to the vertical direction)
- Weight: approx. 60kg

## 2.2 Monitor

- Medical high resolution monitor
- Resolution: 1024  $\times$  768
- Viewing angle: 176° (left and right), 176° (up and down)
- Swivel angle:  $\pm 30^\circ$
- Up/down angle:  $-80^\circ$  to  $50^\circ$

## 2.3 Monitor Arm

Upper arm can be swiveled left or right relative to the lower arm; swivel angle:  $\pm 90^\circ$

## 2.4 Control Panel

- User-oriented design
- Backlight design: panel buttons
- Multiple defined-keys
- TGC: 8 segment sliders
- Trackball sensitivity: adjustable
- With key panel on control panel

## 2.5 Speaker

Hi-Fi Speaker

## 2.6 Casters

- Diameter: 5 inches
- Four casters can all be independently locked

## 2.7 Probe Port and Probe Holder

- Probe port: 4 (activated and interchangeable)
- Probe holder: 5
- Coupling gel holder: 1
- Cable hanger: 2
- Probe cable hanger

## 2.8 Power

- Power supply: 100 - 240 V~, 2.7-1.1A
- Frequency: 50/60 Hz

## 2.9 Working Environment

- Temperature: 10°C to +40°C
- Relative humidity: 30% - 75% RH (no condensation)
- Atmospheric pressure: 700 hPa - 1060 hPa
- System noise: ≤ 55 dB

## 2.10 Storage and Transportation

### Environment

- Temperature: -20°C to +55°C
- Relative humidity: 20% - 90% RH (no condensation)
- Atmospheric pressure: 700 hPa - 1060 hPa

## 3 Annotation and Body Mark

- All exams application included
- Annotation: text annotation and arrow annotation
- Annotation can be selected, edited and moved
- User-defined annotation
- Front size of text annotation: adjustable
- Body marks: ≥ 114
- Body marks classified by specific exam types, and position adjustable

## 4 Monitor Information

- Manufacturer logo
- Hospital name
- System date and time
- Probe and exam item
- MI and TIS
- Operator
- Probe icon
- Patient ID, name and date of birth

- Exam type icon
- Tissue temperature display (specified probe)
- Depth scale and focus position
- Image parameter
- Thumbnail
- Clipboard
- Screen saver

## 5 Image Parameter

### 5.1 Description

- System boot up: approx. ≤ 80s
- System shut down: approx. ≤ 15s
- Frame rate: ≥ 820 fps (e.g. L741 probe)
- Gray map: 256 levels
- Transducer element: up to 256
- Quad beams
- Audio: 0 - 100, 101 levels

### 5.2 B mode

- Gain: 1 - 255 adjustable
- Scan depth: ≥ 40 cm
- Compound imaging: Off, 1, 2, 3 levels
- Frequency: 5 bands adjustable (fundamental wave and harmonic wave)
- Chroma: 1 - 13, 13 levels
- Adaptive image fusion: 0 - 15, 16 levels
- μ-Scan: off, 2, 3, 7, 11, 5 levels
- Line density: Low, Med, High, 3 levels
- Persist: 0 - 95 (e.g. L741 probe)
- Focus number: 12 (e.g. L741 probe)
- Focus span: adjustable
- Dynamic range: 20 - 280 (e.g. L741 probe)
- Gray map: 1 - 7, 7 types selectable
- Power%: 1 - 100 adjustable, 100 levels
- Tissue acoustic characteristics: 1400 - 1700, 31 levels
- TGC: 8 segment sliders
- LGC: gain compensation for left or right part of image
- Image reverse: left/right, up/down, rotation
- Scan range and image position: adjustable
- B steer: 3 levels adjustable (linear array probe)
- Trapezoid Imaging: off, 1, 2 (linear array probe)
- Auto optimization

### 5.3 M Mode

- Gain: 1 - 255 adjustable

- Chroma: 1 - 5, 5 levels
- Display format: H1/2, H1/4, V1/3, V1/2, V2/3, O1/4
- Scan speed: Min, Slow, Med, Fast, Max, 5 levels (e.g. cardiology probe)
- Video invert: On/Off
- M process: Ave, Peak
- Power%: 30 - 100, 8 levels
- Color M: CFM, TDI

## 5.4 Anatomical M-mode

- Display 3 sample lines simultaneously
- Angle and position of sample lines adjustable

## 5.5 CFM Mode

- Frame rate:  $\geq 110$  fps
- Gain: 0 - 255 adjustable
- Power%: 0 - 100, 11 levels
- B reject: 0 - 255, 256 levels
- Size and position of color ROI: adjustable
- Image reverse: up/down, left/ right
- Invert: On/Off
- Frequency: 5 levels
- Wall filter: 25 - 750 adjustable (e.g. 2P1 probe)
- PRF: 0.5 - 8 kHz adjustable (e.g. L741 probe)
- Line density: Low, High, 2 levels
- Color map: 1 - 10, 10 levels
- Baseline:  $\pm 15$ , 31 levels
- Persist: 30 - 80
- ROI steer: 5 levels adjustable (linear array probe)
- ROI color: adjustable
- Auto optimization

## 5.6 PDI/DPDI Mode

- Power%: 0 - 100, 11 levels
- B reject: 0 - 255, 256 levels
- Persist: 0 - 60, 5 levels (e.g. L741 probe)
- Color map: 1 - 7, 7 levels
- Image reverse: up/down, left/right
- Wall filter: 35 - 750 adjustable (e.g. 2P1 probe)

## 5.7 PW Mode

- Gain: 0 - 255 adjustable
- Display format: H1/2, H1/4, V1/3, V1/2, V2/3, O1/4, 6 levels
- Simultaneous mode (Triplex)
- PW sample volume: 0.7 - 21 mm (L741 probe)

- PW sample position: adjustable
- Invert: On/Off
- Quick angle correction:  $0^\circ$ ,  $60^\circ$ ,  $-60^\circ$
- Angle correction range:  $0^\circ$  to  $72^\circ$
- Sample line steer: 5 levels adjustable (linear array probe)
- Auto trace: achievable in real-time mode and frozen mode
- Baseline: -8 to 8, 17 levels
- Frequency: 5 levels
- Wall filter: 25 - 750 adjustable
- PRF: 1 - 16 KHz (2P1 probe)
- HPRF
- Max. velocity range: 0 - 11 m/s (2P1, PRF=16 KHz,  $\theta=60^\circ$ , the lowest baseline)
- Scan speed: Min, Slow, Med, Fast, Max, 5 levels
- Chroma: 1 - 5, 5 levels
- Dynamic range: 1 - 10, 10 levels
- Auto optimization

## 5.8 CW Mode

- Gain: 0 - 255 adjustable
- Display format: H1/2, H1/4, V1/3, V1/2, V2/3, O1/4, 6 levels
- CW sample position: adjustable
- Invert: On/Off
- Angle correction range:  $0^\circ$  to  $72^\circ$
- Auto trace: achievable in real-time mode and frozen mode
- Baseline: -8 to 8, 17 levels
- Wall filter: 25 - 750 adjustable (2P1 probe)
- PRF: 1 - 48 KHz (2P1 probe)
- Max. velocity range: 0 - 38 m/s (2P1, PRF=48 KHz,  $\theta=60^\circ$ , the lowest baseline, SVD=0.1 cm, FRQ=1.8 MHz)
- Scan speed: Slow, Fast, Max, 3 levels
- Chroma: 1 - 5, 5 levels
- Dynamic range: 1 - 5, 5 levels

## 5.9 TDI Mode

- Tissue speed imaging
- Power%: 0 - 100, 11 levels
- B reject: 0 - 255, 256 levels
- Persist: 0 - 50, 5 levels (2P1 probe)
- Color map: 1 - 4, 4 levels
- Image reverse: up/down, left/right
- Invert: On/Off

- Wall filter: 25 - 750 (2P1 probe)

## 5.10 TDI+PW Mode

- PRF: 1-16 kHz (2P1 probe)
- Max. velocity range: 0 - 11 m/s (2P1, PRF=16 KHz,  $\theta=60^\circ$ , the lowest baseline, SVD=0.1 cm, FRQ=2 MHz)

## 5.11 TDI+M Mode

- Gain: 1 - 255 adjustable
- Chroma: 1 - 5, 5 levels
- Display format: H1/2, H1/4, V1/3, V1/2, V2/3, O1/4
- Scan speed: Min, Slow, Med, 3 levels
- M process: Ave, Peak
- Power%: 30 - 100, 8 levels

## 5.12 Freehand 3D

- Acquire method: linear scan, sector scan
- Display mode: dual-split screen display, quad-split screen display, 3D full display
- Storage type: image, volume
- Retrieve type: stored volume and image
- Rotate X: rotate  $4^\circ$  along X axis, Rotate Y: rotate  $4^\circ$  along Y axis, Rotate Z: rotate  $4^\circ$  along Z axis
- Up/Down: move the image up/down; Left/Right: move the image left/right
- View: Top, Bottom, Left, Right, Front, Back
- 3D viewing angle:  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$
- Free rotation: On/Off
- Select slice: A, B, C, 3D
- Reset: default settings, swivel angle, view angle
- Render mode: Surface, Skeleton, X-Ray
- Contrast: 0 - 100, 1 each step
- Transparency: 0 - 100, 1 each step
- Brightness: 0 - 100, 1 each step
- Smoothness: 0 - 30, 1 each step
- B Chroma: 1 - 13, 1 each step
- 3D Chroma: max. 0 - 14 adjustable, 1 each step (render mode dependent)
- Zoom: 0.5 - 3.0, 0.1 each step
- Methods for cropping reviews
  - By trace (crop inner or outer image)
  - By box (crop inner or outer image)
  - By eraser (big or small eraser)
- M-Slice display:  $1 \times 2$ ,  $2 \times 2$ ,  $3 \times 3$ ,  $3 \times 4$ ,  $4 \times 4$ ,  $5 \times 5$
- Slice spacing: 0.5 - 10.0, 0.5 each step

- Slice number: 3 - 29, 2 each step

## 5.13 3D/4D

- Available for volume probe
  - Display mode: dual-split screen display, quad-split screen display, 3D full display
  - Rotate X: rotate  $4^\circ$  along X axis, Rotate Y: rotate  $4^\circ$  along Y axis, Rotate Z: rotate  $4^\circ$  along Z axis
  - Up/Down: move the image up/down; Left/Right: move the image left/right
  - View: Top, Bottom, Left, Right, Front, Back
  - 3D viewing angle:  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$
  - Reset: default settings, swivel angle, view angle
  - Render mode: Surface, Skeleton, X-Ray
  - Free rotation:  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ ,  $360^\circ$
  - Image quality: High, Medium, Low
  - Scan angle:  $5^\circ$  to  $75^\circ$ ,  $5^\circ$  each step
  - Stability: On/Off
  - VolPre: user can return to pre-activate mode from activate mode
  - Cine playback: 0 - 499 (volume value dependent)
  - Trackball (free rotation switch highlighted): free rotation, Z-axis rotation
  - Contrast: 0 - 100, 1 each step
  - Transparency: 0 - 255, 1 each step
  - Brightness: 0 - 100, 1 each step
  - Smoothness: 0 - 30, 1 each step
  - 3D Chroma: max. 0 - 14 adjustable, 1 each step (render mode dependent)
  - B Chroma: 1 - 13, 1 each step
  - Methods for cropping reviews
    - By trace (crop inner or outer image)
    - By box (crop inner or outer image)
    - By eraser (big or small eraser)
  - C-Plane display: AB, AC, BC, ABC
  - M-Slice display:  $1 \times 2$ ,  $2 \times 2$ ,  $3 \times 3$ ,  $3 \times 4$ ,  $4 \times 4$ ,  $5 \times 5$
  - Slice spacing: 0.5 - 10.0, 0.5 each step
  - Slice number: 3 - 29, 2 each step
- ## 5.14 Panoramic Imaging
- B Mode Panoramic Imaging
  - Color Panoramic Imaging: CFM/PDI
  - Probe type: linear, convex
  - Rotation:  $0^\circ$  to  $360^\circ$ ,  $5^\circ$  each step
  - Zoom: 2.0 times

## 5.15 Biopsy Guide

- Biopsy line angle: adjustable
- Biopsy line angle calibration
- Biopsy line offset calibration
- User-defined biopsy line angle

## 5.16 Vis-Needle

- Available probes: L741, 10I2
- Steer angle: 20°, 30°, 40°, 50°, 4 levels
- Biopsy depth: adjustable
- Dual live

## 5.17 Wide Scan

Trapezoid Imaging: Off, 1, 2 (linear array probe)

## 5.18 Zoom

- Zoom ratio: 0.8 - 10.0
- One-key full screen display

## 5.19 Preset Exam

- Preset optimal exam mode and parameter for different probes and exam types
- Preset order: adjustable
- Import or export preset

## 6 Measurement/Analysis and Report

### 6.1 Measurement Settings

- BSA setting: Eastern, Western
- Cross cursor size: Large, Medium, Small
- Measure line size: Large, Medium, Small
- Distance dash line display: On, Off
- Velocity cross line display: On, Off
- Ellipse cross line display: On, Off
- Line ID display: On, Off
- Keep result window: On, Off
- Result font size: Large, Medium, Small
- Result position: Right Top, Right Bottom, Left Top, Left Bottom adjustable in 2D, dual+quad-split screen display or M+D mode

### 6.2 Basic Measurement Package

- Obstetrics measurement package
- Small parts measurement package
- Gynecology measurement package
- Vascular measurement package

- Abdominal measurement package
- Cardiac measurement package
- Urology measurement package
- Pediatrics measurement package

## 6.3 Report

- Application-specific measurement report
  - ✓ Fetal growth curves
  - ✓ Fetus anatomy structure
  - ✓ Fetus compare (four fetuses)
- Measurement values: editable
- Image: adjustable
- Report logo (170 × 60 Pixel, bmp): changeable
- Font size and color: selectable
- Background color: selectable
- Display items: selectable
- Export format: PDF, TXT

## 6.4 Auto Measurement

- Auto IMT
- Auto NT
- Auto EF

## 7 Storage and Data Management

### 7.1 Storage

- Total storage: 500 G; free: ≥ 466 G
- Max. number of frames for cine: 100 - 2000 frames
- Storage of 4D cine: ≥ 77 frames (probe and parameter dependent)
- Directly store to USB drive

### 7.2 Data Management

- Image share service (Samba)
- Export data to USB drive or DVD
- Export format:
  - ✓ System format
  - ✓ PC format
    - ♦ Image format: BMP, JPG, TIF
    - ♦ Cine format: AVI, WMV
    - ♦ Report format: PDF, TXT
  - ✓ DICOMDIR
- Clipboard: thumbnail display, delete, export
- Create exam, delete exam, resume suspended exam
- Query/Retrieve service
- Review current exam and history exam

- Post-processing and post-measurement
- Show gallery

## 8 Cine Review

- Cine review: frame by frame manual play and auto play with adjustable speed
- Skip from first frame to last frame
- Auto playback with trackball

## 9 System Input and Output

### 9.1 I/O port

- USB port:
  - ✓ 4 USB 2.0 ports
- Video output port: 3
  - ✓ VGA
  - ✓ VIDEO OUT
  - ✓ S-VIDEO OUT
- AUDIO OUT port: 1
- Foot switch input: 1
- Ethernet port: 1
- Video print port: 1

### 9.2 Video Output Settings

- TV-NTSC
- TV-PAL
- VGA (4:3)
- VGA (16:9)
- DVI (4:3)
- DVI (16:9)

### 9.3 Network Connection

- Local network
- Wireless network (the same function with local network)

## 10 DICOM 3.0

- DICOM storage
- DICOM structured report
  - ✓ Gynecology structured report
  - ✓ Obstetrics structured report
  - ✓ Cardiology structured report
  - ✓ Vascular structured report
- DICOM storage commitment
- DICOM Worklist
- DICOM MPPS
- DICOM print
- DICOM Q/R list

## 11 Probe

### 11.1 Convex Array Probe

- C344
    - ✓ Application: Abdomen, Gynecology, Obstetrics
    - ✓ Frequency range: 2.0 - 7.0 MHz
    - ✓ Field of view: 72°
    - ✓ Depth:  $\geq 24$  cm
    - ✓ Acoustic lens: 57 mm  $\times$  18 mm
    - ✓ Biopsy bracket: NGBC344, 21°, sterilizable
  - C322
    - ✓ Application: Abdomen
    - ✓ Frequency range: 2.0 - 7.0 MHz
    - ✓ Field of view: 68°
    - ✓ Depth:  $\geq 32$  cm
    - ✓ Acoustic lens: 32 mm  $\times$  11 mm
    - ✓ Biopsy bracket: NGBC322, 5°/25°, sterilizable
  - 6V1
    - ✓ Application: Gynecology, Urology
    - ✓ Frequency range: 3.0 - 15.0 MHz
    - ✓ Field of view: 135°
    - ✓ Depth:  $\geq 16$  cm
    - ✓ Acoustic lens: 32 mm  $\times$  10 mm
    - ✓ Biopsy bracket: NGB6V1, 3°, sterilizable
    - ✓ Temperature monitor
  - C613
    - ✓ Application: Cardiology, Abdomen
    - ✓ Frequency range: 4.0 - 13.0 MHz
    - ✓ Field of view: 90°
    - ✓ Depth:  $\geq 15$  cm
    - ✓ Acoustic lens: 30 mm  $\times$  10 mm
    - ✓ Biopsy bracket: NGBC613, 12°/18°/30°, sterilizable
  - EC9-5
    - ✓ Application: Urology
    - ✓ Frequency range: 3.0 - 15.0 MHz
    - ✓ Field of view: 147°
    - ✓ Depth:  $\geq 16$  cm
    - ✓ Acoustic lens: 27 mm  $\times$  10 mm
    - ✓ Biopsy bracket: NGBEC9-5, 1.5°, sterilizable
    - ✓ Temperature monitor
  - BCC9-5
    - ✓ Application: Urology
    - ✓ Frequency range: 3.0 - 15.0 MHz
    - ✓ Field of view: 140°
    - ✓ Depth:  $\geq 16$  cm
    - ✓ Acoustic lens: 26 mm  $\times$  10 mm
    - ✓ Biopsy bracket: NGBBCC9-5, 0°, sterilizable
- ### 11.2 Linear Array Probe
- L741
    - ✓ Application: Vascular, Small parts, Musculoskeletal, Neurology
    - ✓ Frequency range: 4.0 - 16.0 MHz

- ✓ Width of view: 46 mm
- ✓ Depth:  $\geq 10$  cm
- ✓ B steer:  $0^\circ/\pm 6^\circ$
- ✓ ROI/sample line steer:  $0^\circ/\pm 12^\circ/\pm 16^\circ$ , 5 levels
- ✓ Trapezoid Imaging:  $6^\circ/20^\circ$
- ✓ Acoustic lens: 49 mm  $\times$  10 mm
- ✓ Biopsy bracket: NGBL741,  $45^\circ$ , sterilizable
- 10I2
  - ✓ Application: Vascular, Small parts, Musculoskeletal, Neurology
  - ✓ Frequency range: 4.0 - 16.0 MHz
  - ✓ Width of view: 25 mm
  - ✓ Depth:  $\geq 10$  cm
  - ✓ B steer:  $0^\circ/\pm 6^\circ$  (for some modes:  $0^\circ/\pm 8^\circ$ )
  - ✓ ROI/sample line steer:  $0^\circ/\pm 12^\circ/\pm 16^\circ$
  - ✓ Trapezoid Imaging:  $6^\circ/20^\circ$  (for some modes:  $8^\circ/20^\circ$ )
  - ✓ Acoustic lens: 28 mm  $\times$  10 mm

### 11.3 Phased Array Probe

- 2P1
  - ✓ Application: Cardiology, Abdomen
  - ✓ Frequency range: 2.0 - 4.0 MHz
  - ✓ Field of view:  $90^\circ$
  - ✓ Depth:  $\geq 32$  cm
  - ✓ Acoustic lens: 24 mm  $\times$  16 mm
  - ✓ Biopsy bracket: NGB2P1,  $19^\circ$ , sterilizable
- 5P1
  - ✓ Application: Pediatric Cardiology
  - ✓ Frequency range: 2.0 - 9.0 MHz
  - ✓ Field of view:  $90^\circ$
  - ✓ Depth:  $\geq 18$  cm
  - ✓ Acoustic lens: 15 mm  $\times$  13 mm

### 11.4 Volume Probe

VC6-2

- ✓ Application: Abdomen, Obstetrics
- ✓ Frequency range: 2.0 - 7.0 MHz
- ✓ Field of view:  $68^\circ$
- ✓ Depth:  $\geq 24$  cm
- ✓ Acoustic window: 150 mm  $\times$  86 mm

## 12 Accessories

### 12.1 Printer

- Printer types
  - ✓ Color ink jet printer
  - ✓ B/W video printer
  - ✓ Color video printer
- Print type
  - ✓ Video print
  - ✓ Network print
  - ✓ USB print
  - ✓ Windows print
- Video invert
- Add printer

### 12.2 External Wi-Fi

### 12.3 Foot Switch

2 pedals

### 12.4 DVD R/W Drive

### 12.5 Built-in Battery

Battery running time: 90 minutes

### 12.6 1T Hard Disk

### 12.7 ECG Cable

## 13 Safety and Certification

- Comply with:
  - ✓ IEC 60601-1, Class I BF
  - ✓ IEC 60601-1-2, Group 1, Class B
  - ✓ IEC 60601-2-37



**NOTE:**

- The specifications of this system may change without any prior notification.
- Some products or features may not be available in some countries.
- Please contact your local SonoScape sales representative for more information.

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