Instruction of SS-2000 Color Doppler Ultrasound System

——Excellent imaging technology——

Real-time dynamical focusing

It adopts continuous dynamical receiving aperture (CDA) and continuous dynamical receiving focusing (CDF).The Focus of real-time changed when receiving. That's to say, it can far field gradually according to the depth, so that the ultrasonic beam can be delicate in both short resolution will be greatly improved, so the frame rate will not be lower as the increasing of focuses.

Smoothing processing technology of image
An advanced 2D image automatic filtering device is inserted to the system to realize smoothing processing and improve the clarity of fine structures of the tissues being checked up.

Filtering technique
The filtering device used in this system can filter the noise signal of static and slowly-moving tissues or low-speed blood stream. It's hard to detect the noise, but this system can improve SNR and improve the quality of image effectively.

——Extraordinary application range——

Endocavity ultrasound
It's a part of intervention ultrasound, which is mainly composed of vagina, esophagus, recta and gastro scope ultrasound. It can prevent the air and skeleton from affecting ultrasonic examination, and at the same time, it uses high-frequency probe., therefore a clear image can be received.

Intervention ultrasound
It's branch of modern ultrasonic medicine. Ultrasound puncture technology not only can be used in cytologic examination, histology biopsy, intravenous radiography, and percutaneous puncture intravenous radiography, but also can be used in therapeutic examination including percutaneous puncture drainage technology, medicament injection and so on. It's simple and convenient, and is characterized by the advantages like high positive rate, safety, sensitivity, and clear image.

3D imaging
The computer can process and rebuild the ultrasonic echo collected according to the required image, and display the three-dimensional image. It's helpful to locate space, improve spatial resolution, and can make precise quantitative analysis (such as the measurement of volume), so as to provide all-round ultrasound patterns for clinic.

Color Doppler Energy-gram (CDF)
It's totally new ultrasound pattern processing model. It's a color blood stream displaying method with Doppler shift strength (amplitude) as the information source, which can get rid of the dependence on detection angle in routine CFM display: meanwhile it won't generate Alias spurious image, so it can display the minor blood vessels and low speed blood stream clearly.

Color Doppler Direction Energy-gram (DCDE)
It's a directive Doppler energy-gram, which is the combination of energy Doppler and color Doppler. This technology can combine the advantages of these two. It can display the speed and direction of blood stream, and can display the low speed and low-flow blood stream with Doppler energy-gram as well.

Excellent 2D imagine technology (2D)
It adopts super high density and ultra-wideband probe as well as high-efficiency matching layer and strongly absorbing materials to eliminate near field disturbance for the convenience of observing the shallow tissues. The unique digital signal processing technique can reduce energy loss and increase

penetrability to allow the high-frequency probe to detect deep tissues. Besides, it adopts optimization control to physical sign image(PSI) so that patients with different signs can enjoy the same treatment.

Color Doppler Technology (CDT)
It mainly has the ability to provide hemodynamics information, which is called noninvasive angiography clinically. It's shown as follows:
- It can visually display the distribution and direction of blood stream so as to distinguish the arteries and veins clearly.
- It can help to understand the time phase and velocity of blood stream.
- It can help to find out splitting flow and back-streaming reliably.
- It can conduct quantitative analysis to the origin, width, length and area of blood stream.

Broadband multi-frequency probe technology
Dynamic frequency scanning, a broadband probe technology based on a certain frequency, can realize the simultaneous transmission of multi-frequency and receive high frequency at the near field and low frequency at the far field optionally , thereby to meet the different requirements of clinic. In this way, it can avoid the difficulty and limitation in using high frequency probe(which can lessen greatly in the body) independently in diagnosing the deep organs or foci .

Ultrasound workstation
This system can be connected with DICOM3.O work station directly in windows operating environment. The modular workstation can process image in real time, conduct comp???? digital acquisition , storage, playback and transmission of ultrasound examination, and finis the management of analysis and report,
Application functions of the workstation include:
- Acquisition, storage, playback and transmission of static & dynamic images as well as the management of patient data;
- Perfect integral DICOM3.0 network connection functions, realizing the information-sharing with other section or department office;
- Enhanced measurement and calculation functions;
- Support 3D imaging

Specifications of SS-2000 Color Doppler Ultrasound System

1 System definition

1.1 System technology character:
・All digital ultrasonic system, based on PC platform, WINDOWS operating system
・Monitor: 15 or 17 inch medical color LCD, progressive line scan, high-differentiating rate
・Four transducer connector (156ZIFF plug)
・Supported transducer types: convex , micro-convex, linear, convex array cavity
・48 channels all digital dynamic focusing ultrasonic beam composing
・Multi-frequency emission
・Second harmonic imaging
・Real time three synchronization ability, two dimension image/spectrum doppler/three simultaneous display of color flow imaging
・Color Doppler, including velocity variance display (Velocity Variance), the energy display (Color Energy), speed display (Velocity), the variance shows (Variance), the direction of Energy
・Launch of physical channels 48, 48 receiving, the probe array elements :96-128 (invite public bidding description or display problems, discuss other treatment)
・Digital beam forming device: continuous dynamic focusing, variable aperture and trace the dynamic changes, the total adjustment range $\geq$ 100dB gain
・Emission beam focus: the focus up to 4 segment
・Emission maximum depth of 32 cm or less
・Emission sound power output regulation

1.2 Ultrasound scan mode
• Two-dimensional mode (B)
• Two-rate two-dimensional image display mode (B + B)
• M model
• Color flow imaging (CFM)
• Color Doppler energy (CDE)
• The direction of Energy (DPDI)
• Color variances
• Two-rate real-time two-dimensional image display (B + CFM)
• pulse wave Doppler (PW) (including HPRF)
• Second harmonic imaging (NTHI)

•Two-dimensional images, color flow imaging and spectral display real-time synchronization

• B scan lines: ≤ 256

1.3 Configurable broadband probe:

	Frequency range （MHz）	Array elements	Scan angle (degrees)	Scanning radius （mm）
Broadband convex array probe	2.5-5.0	128	72	50 或 60
Broadband linear array probe	5.0-10	128	-	-
Vaginal probe	4.0-9.0	128	150	10
Micro-Convex probe	2.0-4.0	80	103	20

1.4 System Interface and peripherals:

• 100 MB Ethernet interface

• RS232 serial interface, parallel port, USB Interface

• Video Output: Composite video and VGA output

• Dual-channel stereo output

• CD / DVD drive to read and write

• Video printer, USB printer

1.5 Mechanical and physical parameters

• Input voltage: 110V ~ 240V Universal

• Operating temperature range :15-32 C

• Operating humidity: 30% - 85%

2 Application

2.1 Check the default

• Check for different organs, pre-check the condition of the best images to reduce the operations required for the regulation and the common combination of regulation and external regulation

• Default set: abdominal, urology, gynecology, obstetrics, superficial tissue, peripheral vascular, small parts, pediatric applications, the heart

• Customize set: doctors can modify the default pre-scan parameters and save

• Do not support the user add and remove the set

2.2 The two-dimensional image parameters

• Full View of the biggest frame rate: ≧ 30fps

• Maximum scanning depth: 32 cm

• Two-dimensional image Frequency: 5 file conversion (including the second harmonic)

- TGC slider: 8 adjustment
- Depth adjustment: 2 cm ~ 32cm
- Focus position adjustment, multi-move and adjust the focus
- Image Zoom
- Two-rate real-time display
- The image upside down, turn around
- Image view (FOV) (100% / 90% / 75% / 50%)
- Scan line density (high, medium, low)
- Dynamic range (10dB ~ 100dB, 5dB one file)
- Time-domain filtering (0,1,2,3,4, can be multi-file configuration)
- Edge enhancement (1,2,3)
- Contrast adjustment (CONTRAST)
- Image Denoising (B REJECT): 0 ~ 14 files can be adjusted
- Support for two-dimensional image playback: 300 frame

2.3 Color Flow (CFM) parameters

- Color maximum frame rate: ≧ 15fps
- Maximum scanning depth: 32 cm
- color frequency conversion function (default 2 files, can be configured up to 4 files)
- Scan Mode: Color flow imaging (CFM), color Doppler energy (CDE), the direction of Energy (DPDI), color variances
- the location and size of the color sample box regulation
- Speed range adjustment (PRF): ≦ 5000Hz, not support HPRF
- Zero position adjustment (Baseline)
- blood flow velocity inversion (Invert)
- Scan angle: ROI yaw angle (linear array), +15 ° / 0/-15 °
- Wall Filter: Multiple file adjustment 0-5
- Color Map: Configuring multi-color flow color
- Line Density: configure different color line density scan
- Time-domain filtering: Multiple file adjustment 0-14
- Support for color flow image playback: 300 frame

2.4 M image parameters

- Scan speed regulation: fourth gear
- M Image playback is not supported

2.5 Doppler (PW) parameters

- Doppler emission frequency ≥ 2 and a maximum of 4
- Maximum measurement speed: ≥ 1.5m / s
- Minimum measurement speed: ≤ 1mm / s
- Speed range (PRF): ≦ 5000Hz, high PRF energy need to be tested
- zero movement (Baseline): ≥ 6 step
- Sampling width :0.5-20mm, grade 0.5 mm adjustable
- Angle sampling: 0-90-degree
- Deflection angle (linear array): +15 ° / 0/-15 °
- Spectrum rolling speed adjustable: 1s, 2s, 4s, 8s
- Wall Filter: high-pass filtering, and selection
- Speed upside down

• Display area: the spectrum display area height adjustable

• Adjustable volume spectrum

• Does not support movie playback

2.6 Measurement application software package

2.6.1 Basic measurement

• B mode: distance, depth, area and circumference (ellipse method and the monitor method), angle,vol

• M mode: speed, time, heart rate Mode

• D: speed, average velocity of flow, time, resistance index, pulsate index, heart rate

• Frozen image doppler automatic tracing

• Others: narrow ratio, the ratio

2.6.2 Maternity measurement

• Pregnant age assessment of fetal weight

• Growth curve display

• Measurement of fetal heart

2.6.3 Measurement specialist

• Heart Survey

• Measurement of peripheral vascular

• Measurement of thyroid

• Measurement of urinary system

• Measurement of Pediatrics

2.7 Image annotation

• Text annotation: free mobile location, easy content changes

• Arrow mark: trackball control mobile positions and angles

• Mark the location of the probe: Support for different applications in different parts of   the body marked

2.8 case management, image storage and printing

• Image Playback: ≥ 300 frame(B image and color flow image); not support playback of PW and M; trackball control image playback (easy operation).

• Check the patient information input and modify

• Massive hard drive storage: ≥ 500G mass storage

• Still images and movie store

• History of still images and movie playback

• DICOM Store and DICOM Print

• Color video printer

• Support for image recording functions

2.9 System configuration information

• Hospital name and department name

• Multi-language support configuration (in English and Chinese)