EDANUSA

U50

Diagnostic Ultrasound System

Version 1.2

$C\,E\,_{0123}$

About this Manual

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Statement

This manual will help you understand the operation and maintenance of the product better. It is reminded that the product shall be used strictly complying with this manual. User's operation failing to comply with this manual may result in malfunction or accident for which Edan Instruments, Inc. (hereinafter called EDAN) can not be held liable.

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EDAN holds the rights to modify, update, and ultimately explain this manual.

Responsibility of the Manufacturer

EDAN only considers itself responsible for any effects on safety, reliability and performance of the equipment if:

Assembly operations, extensions, re-adjustments, modifications or repairs are carried out by persons authorized by EDAN, and

The electrical installation of the relevant room complies with international standards, and

The equipment is used in accordance with the instructions for use.

Upon request, EDAN may provide, with compensation, necessary circuit diagrams, and other information to help qualified technician to maintain and repair some parts, which EDAN may define as user serviceable.

Terms Used in this Manual

This guide is designed to give key concepts on safety precautions.

WARNING

A **WARNING** label advises against certain actions or situations that could result in personal injury or death.

CAUTION

A **CAUTION** label advises against actions or situations that could damage equipment, produce inaccurate data, or invalidate a procedure.

NOTE

A NOTE provides useful information regarding a function or a procedure.

Table of Contents

Chapter 1 Safety Guidance

1.1. Warnings and cautions

In order to use the equipment safely and effectively, and avoid possible dangers caused by improper operation, please read through the user manual and be sure to be familiar with all functions of the equipment and proper operation procedures before use. Always keep this manual with the equipment.

Please pay more attention to the following warning and caution information.

1.1.1. Safety Warnings

NOTE:

The reliability of the device and the safety of operators and patients are considered during product design and production. The following safety and preventive measures should be carried out:

WARNING

1.   This equipment is not intended for treatment.

2.   This equipment is not intended for home use.

3.   The diagnosis and examination function of the ultrasonic imaging management system should be integrated with clinical situation of patients, and the diagnostic results are only for physician's reference.

4.   EXPLOSION HAZARD-Equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

5.   The device should be operated by qualified operators or under their instructions.

6.   The device should be operated appropriately to avoid mechanical damage to the transducer.

7.   The device is not waterproof. Do not use it in locations where water or any liquid leakage may occur.

8.   Do not use any fluid onto the system surface, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.

9.   Do not spray cleansers on the system, as this may force cleaning fluid into the system and damage electronic components. It is also possible for the solvent fumes to build up and form flammable gases or damage internal components.

WARNING

10. The parameters of the device are not recommended to be altered at will. If it is necessary, please consult EDAN or authorized representatives for service.

11. The device has already been adjusted to its optimum performance. The presetting controls or switches are not recommended to be adjusted, unless it is listed in this manual.

12. If the device breaks down, please shut down the machine immediately and contact EDAN or authorized representatives.

13. Only accessories supplied or recommended by EDAN can be used, the battery and probes of EDAN can be only used on EDAN's systems. Otherwise, the performance and electric shock protection can not be guaranteed. If electrical or mechanical equipment from other companies need to be connected to the device, please contact EDAN or authorized representatives before connection.

14. The equipment should be installed by a qualified service engineer. Do not try to access the interior of the main unit. Only authorized service personnel could remove the unit cover.

15. The AC power connector plug for the ultrasound system is a three-prong grounded plug and should never be adapted to any two-prong (non-grounded) outlet, either by modifying the plug or by using an adapter.

16. To ensure grounding reliability, only connect the system to a hospital-grade power receptacle.

17. To ensure grounding reliability, connect the system only to an equivalent outlet.

18. To avoid electrical shock, inspect whether the grounding wire is connected prior to powering on the system. And disconnect the grounding wire after powering off the system.

19. If you have any questions about the grounding connection, use the battery but not the AC power supply. Prior to using AC power supply, inspection of grounding connection is recommended. If it is necessary, consult EDAN or authorized representatives for service.

20. Equipment connected to the U50 and located in the patient zone must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can cause your system to exceed leakage current limits. Enclosure leakage current created by an accessory or device connected to a non-isolated outlet may add to the enclosure leakage current of the imaging system.

WARNING

21. When more than one medical device is connected to the patient, leakage current of the devices is summed together. Take caution.

22. SHOCK HAZARD-Do not attempt to connect or disconnect a power cord with wet hands. Make certain that your hands are clean and dry before touching a power cord.

23. SHOCK HAZARD - Don't connect non-medical electrical equipment, which has been supplied as a part of the system, directly to the wall outlet when the non-medical equipment is intended to be supplied by a multiple portable socket-outlet with an isolation transformer.

24. Use an extension cord or multi-socket outlet setup to provide power to the ultrasound system or to the system's peripheral devices, may compromise the system grounding and cause your system to exceed leakage current limits.

25. Multiple portable socket-outlet is not intended for the device, anybody, who connects it to the signal input or output connector to configure a medical system, must make sure that it complies with the 57.2.201 requirements of the valid version of the system standard IEC/EN 60601-1-1, or the multi-socket is with an isolation transformer.

26. SHOCK HAZARD - Don't connect electrical equipment, which has not been supplied as a part of the system, to the multiple portable socket-outlets supplying the system.

27. Multiple portable socket-outlets shall not be placed on the floor.

28. Do not exceed the maximum permitted load when using multiple portable socket-outlets to supply the system.

29. Do not use the additional multiple portable socket-outlet or extension cord in the medical electrical system, unless it's specified as part of the system by manufacturer. And the multiple portable socket-outlets provided with the system shall only be used for supplying power to equipment which is intended to form part of the system.

30. Do not touch accessible parts of non-medical electrical equipment and the patient simultaneously.

31. A damaged probe can also increase the risk of electric shock if conductive liquids come in contact with internal live parts. Inspect probes often for cracks or openings in the enclosure and holes in and around the acoustic window or other damage that could allow liquid entry.

32. To avoid electrical shock, never modify the ultrasound system's AC power circuits.

33. To avoid electrical shock and damage to the system, turn off and disconnect the device from the AC power source before cleaning and disinfecting.

34. Don't touch the signal input or output connector and the patient simultaneously.

WARNING

35. To avoid the possibility of electrostatic shock and damage to the system, avoid using aerosol spray cleansers on the monitor screens.

36. Any non-medical equipment (such as the external printer) is not allowed to be used within the patient vicinity (1.5m/6ft.).

37. Periodically have the integrity of the system ground checked by a qualified service engineer.

38. This device is not suitable for intracardiac use or direct cardiac contact.

39. EDAN makes every effort to manufacture safe and effective probes. You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. These precautions should be considered in the use of any application that may indicate the need for such care, and during endocavity scanning.

40. If the liquid crystal material leaks from the panel, it should be kept away from the eye or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

41. **EMI Limitations**

    Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air of wiring. Ultrasound machines also generate EMI. The U50 complies with limits as stated on the EMC label. However, there is no guarantee that interference will not occur in a particular installation.

    Possible EMI sources should be identified before the unit is installed.

    Electrical and electronic equipment may produce EMI unintentionally due to one of the following defects: High frequency electrotome, Transformer, Defibrillator, Wireless LAN equipment, Medical lasers, Scanners, Cauterizing guns, Computers, Monitors, Fans, Gel warmers, Microwave ovens, Light dimmers, Portable phones

    The presence of a broadcast station or broadcast van may also cause interference.

    If you find strong interference shows on the screen, please check the sources.

WARNING

42. Ultrasound may be harmful to human body. This device should be used for valid reasons, for the shortest period of time, and at the lowest mechanical and thermal indices necessary to produce clinically acceptable images. According to the ALARA (As Low As Reasonably Achievable) principles, acoustic output should be set to the lowest level required to satisfactorily perform the examination. Long time exposure should be avoided. For the parameters of sound output, please refer to appendix II. The U50 complies with the requirements of applicable International Electrotechnical Commission (IEC) standards in terms of safety and acoustic output levels.

43. Contact with natural rubber latex may lead to a severe anaphylactic reaction in persons sensitive to the natural latex protein, Sensitive users and patients must avoid contact with these items. EDAN strongly recommends that health-care professionals identify their latex-sensitive patients, and refer to the FDA's March 29, 1991 Medical Alert on Latex products. Be prepared to treat allergic reactions immediately.

44. If a sterile probe cover becomes compromised during an intraoperative application involving a patient with transmissible spongiform encephalopathy, such as Creutzfeldt-Jakob disease, follow the guidelines of the U.S. Disease Control Center and this document from the World Health Organization: WHO/CDS/APH/2000/3, WHO Infection Control Guidelines for Transmissible Spongiform Encephalopathies. The probes for your system cannot be decontaminated using a heat process.

NOTE:

The probe stops transmission after freezing, disconnecting, falling off, or entering sleeping mode. Main control software checks the probe connection all the time, once probe disconnects from the probe socket, the system stops transmission.

Electromagnetic Compatibility (EMC)

Operating the U50 in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

1.1.2. Battery Safety

To prevent the battery from igniting, emitting fumes, bursting, injuring personal, damaging equipment, pay attention to the following precautions.

WARNING
1   Improper operation may cause the internal li-ion battery (hereinafter called battery) to be hot, ignited or exploded, and it may lead to the decrease of the battery capacity. It is necessary to read the user manual carefully and pay more attention to warning messages.
2   Only qualified service engineers authorized by the manufacturer can open the battery compartment and replace the battery, and batteries of the same model and specification should be used.
3   **DANGER OF EXPLOSION** -- Do not reverse the anode and the cathode when installing the battery.
4   If the ambient temperature is over 40°C, ensure the device is in power-off or non-operation status prior to recharging the battery.
5   Do not use the battery near heat sources or when the ambient temperature is over 40°C. Do not heat or splash the battery or throw it into fire or water.
6   Do not destroy the battery; do not pierce battery with a sharp object such as a needle; do not hit with a hammer, step on or throw or drop to cause strong shock; do not disassemble or modify the battery. Otherwise, it may be hot, smoking, distorted or ignited and result in injury.
7   When leakage or foul smell is found, stop using the battery immediately. If your skin or cloth comes into contact with the leakage liquid, cleanse it with clean water at once. If the leakage liquid splashes into your eyes, do not wipe them. Irrigate them with clean water first and go to see a doctor immediately.
8   When the battery reaches the end of its service life, or foul smell, deformation, discoloration, or distortion is found, stop using the battery immediately, replace it with a new one, and properly dispose of or recycle the depleted battery according to local regulations.
9   Only when the device is off can the battery be installed or removed.
10   Remove the battery from the device when the device is not used for a long time.
11   If the battery is stored alone and not used for a long time, we recommend that the battery should be charged at least once every 6 months to prevent overdischarge.

When the battery capacity is too low, the system displays a prompt shown as below, please follow the prompt, recharge the battery or shut down the system.
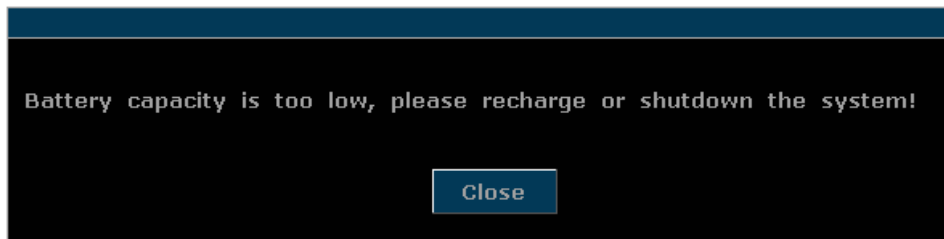
1.1.3. General Cautions

CAUTION

1. Before use, you must make sure that there is no visible evidence of damage on the equipment, cables and probes, which may affect patient safety or diagnostic capability. The recommended inspection interval is once per week or less. If damage is evident, replacement is recommended before use.

2. If the power cord of the system is missing, damaged or not provided, please purchase the power cord meeting the specification requirements for the original one and complying with the local regulations.

3. It is necessary to take the probe out of the probe bracket during moving and transporting; otherwise, the probe or probe bracket may be broken.

4. The normal ultrasonic examination is recognized as being safe. To avoid burns, do not scan in the same area for a long period of time. Always minimize the exposure time while acquiring necessary clinical information

5. To ensure proper grounding and leakage current levels, it is the policy of EDAN to have an authorized EDAN representative or an EDAN approved third party to perform all on-board connections of documentation and storage devices to the U50.

6. The device and accessories are to be disposed of according to local regulations after their useful lives. Alternatively, they can be returned to the dealer or the manufacturer for recycling or proper disposal. Batteries are hazardous waste. Do not dispose them together with house-hold garbage. At the end of their life hand the batteries over to the applicable collection points for the recycling of waste batteries. For more detailed information about recycling of this product or battery, please contact your local Civic Office, or the shop where you purchased the product.

7. Please use the standard power cord as the input line of the network power supply for the adapter to reduce risk.

8. Federal (U.S.) law restricts this device to sale by or on the order of a physician.

9. To avoid misdiagnosis from inaccurate measurement values, ensure that the target area of interest and image are correct, and the measurement area is valid.
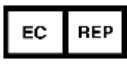
NOTE:

To avoid damaging the system, DO NOT use it in environment as below:

1. Locations exposed to direct sunlight.
2. Locations subject to sudden changes in ambient temperature.
3. Dusty locations.
4. Locations subject to vibration.
5. Locations near heat sources.
6. Locations with high humidity.

1.2. Labeling Symbols

Descriptions of symbols of the device are shown in _Table 1-1_.

No.	Symbol	Definition
1	**SN**	Serial Number
2	**P/N**	Part Number
3		Date of Manufacture
4		Manufacturer
5		Consult Instructions for Use
6		Symbol for "Caution"
7		Equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
8		It indicates that the equipment should be sent to special agencies according to local regulations for separate collection after its useful life.
9		General Symbol for Recovery / Recyclable
10	Rx only (U.S.)	Federal (U.S.) law restricts this device to sale by or on the order of a physician.
11	EC REP	Authorized Representative in the European Community
12	CE 0123	The symbol indicates that the device complies with the European Council Directive 93/42/EEC concerning medical devices.
13		Type BF, Applied Part
14		Alternating Current (a.c.)
15		ON (AC power supply)
16		OFF (AC power supply)
17		Equipotentiality
18	VGA	VGA output, External Monitor

19		S-Video/ Video Output port
20		Fuse
21		Probe socket
22		Network port
23		Footswitch To identify a footswitch or the connection for a footswitch.
24		Protective earth (ground)
25		Recording on an information carrier
26	EDAN	Trademark
27		USB (Universal Serial Bus) Connection
28		Dangerous voltage
29		Variability, for rotating movement Rotate clockwise to increase the value, and counterclockwise to decrease.
30		Variability Adjust right to increase the value, and left to decrease.
31		Running indicator
32		Battery check
33	IPX7	Degree of protection provided by enclosures (IP Code): temporary immersion. For the probe but not including the probe connector.
34		Power off/on the system
35		Brightness
36		Sound muting
37		Loudspeaker To adjust volume in PW mode

Table 1-1 Descriptions of Symbols

Chapter 2 Introduction

2.1. Overview

The U50 is a portable Diagnostic Ultrasound System, which applies advanced technologies such as Phased Inversion Harmonic Compound Imaging (eHCI), Multi-Beam-Forming (mBeam), Speckle Resistance Imaging (eSRI), and Spatial Compounding Imaging, etc. Various image parameter adjustments, 12.1 inch LCD and diverse probes are configured to provide clear and stable images.

2.2. Features

◆ **Multi-language displays**

◆ **256 gray scale**

◆ **Two probe sockets**

◆ **Display modes**:

   B, B+B, 4B, B+M, M, B+PW, B+Color, B+Color+PW, B+PDI/DPDI, B+PDI/DPDI +PW.

◆ **Generic Measurements and Calculations:**

   a). B/Color Mode: Distance, Cir/Area (Ellipse/Trace), Volume, Ratio (2-Axis/3-Axis), % Stenosis, Angle, and Histogram.

   b). M Mode: Distance, Time, Slope and Hear Rate (two cycles).

   c). PW Mode: Velocity, Heart Rate, Time, Acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto (auto trace)

2.3. Intended Use

The diagnostic ultrasound system (U50) is applicable for adults, pregnant women, pediatric patients' ultrasound evaluation in hospitals and clinics. It is intended for use in abdominal, obstetric, gynecology, pediatric, small parts, urology, peripheral vascular, musculoskeletal (conventional and superficial), transvaginal and cardiac clinical applications, by or on the order of a physician or similarly qualified health care professional.

2.4. Model

U50

2.5. Contraindications

◆ The equipment is not applicable to the diagnosis of the pneumatic organs that contain gas such as lung, stomach, intestines, etc.

◆ It is recommended not to examine the parts with wounds or acute inflammation to avoid cross infection.

◆ The equipment is not intended for ophthalmic use or any use causing the acoustic beam to pass the eye.

Chapter 3 System Overview

3.1. Appearance

3.1.1. Front View
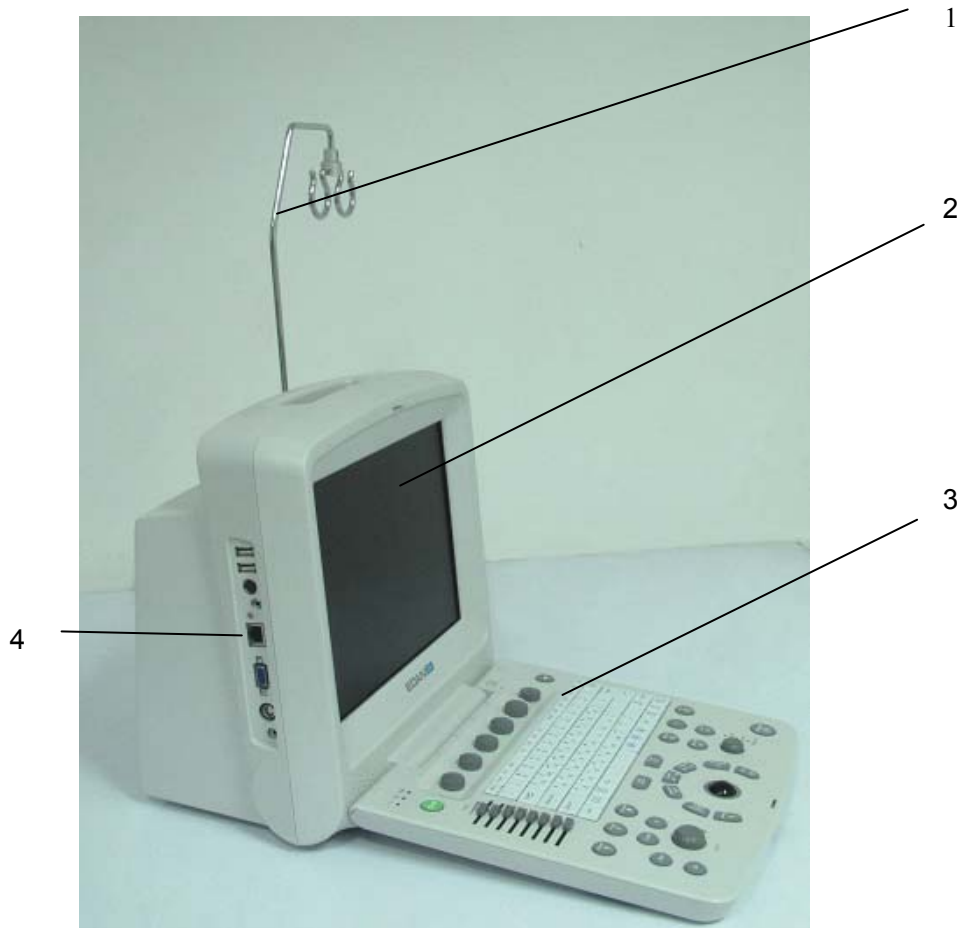
Figure 3-1 Front View

1. Cable holder

2. Display screen

3. Control panel

4. I/O ports

NOTE:

1. Please check details of I/O ports on *Figure 4-7 I/O Ports on the Left Panel*

2. The pictures and interfaces in this manual are for reference only.

3.1.2.Rear View

Figure 3-2 Rear View

1   Probe sockets

2   Heat dissipation orifice

3   AC power switch

4   Appliance inlet

5   Fuse-box

6   Equipotential terminal

7   Handle

8   Probe holder

9   Coupling gel trough

10   Battery compartment door

CAUTION

1. To have good aeration performance and be able to operate normally, please don't cover or plug the air fan or heat dissipation orifice partly or wholly by using any object.

2. For easy control, please don't cover or block the AC power switch using any object.

3.2. Configuration

3.2.1. Standard Configuration

◆ 1 U50 main unit

◆ 1 convex array probe: C352UB

◆ 1 power cord

◆ 1 potential equalization conductor

◆ 2 pieces of fuse, φ5×20, T3.15AH/250V

◆ 1 bottle of coupling gel, 250 mL

◆ 1 user manual

◆ 2 packing lists

◆ Puncture

3.2.2. Options

The Diagnostic Ultrasound System supports the following options:

◆ Flat linear array probe: L1042UB/ L742UB/ L552UB

◆ Endocavity probe: E612UB

◆ Micro convex probe: C612UB/ C6152UB/ C422UB

◆ Rechargeable lithium-Ion battery

◆ Printers are as shown below.

Printer type	Recommended Models
Black /white Video Printer	SONY UP-897MD, MITSUBISHI P93W_Z, SONY UP-D897
Color Video Printer	SONY UP-20, MITSUBISHI CP910E, MITSUBISHI CP30W, SONY UP-D25MD
Graph/text Printer	Color Inkjet printer: HP2010, Color laserjet printer: HP CP1525n

Table 3-1 Printers

The video printer output:

Color: Paper size: 100mm*94mm;

Print area: 96mm*72mm

B/W: Paper size(general display:only one page): 110mm*100mm；

Print area 99mm*74mm

The USB printer output: A4 paper, 210 mm× 297 mm

◆ Needle Guide Bracket Kit

Model	Name	Description
BGK-R50UB	R50UB Needle Guide Bracket Kit	For the probe C352UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-L40UB	L40UB Needle Guide Bracket Kit	For the probe L742UB/L1042UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-CR10UA	CR10UA Needle Guide Bracket Kit	For the probe E612UB, 1 vessels: 16G
BGK-R10UB	R10UB Needle Guide Bracket Kit	For the probe C612UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-R15UB	R15UB Needle Guide Bracket Kit	For the probe C6152UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-R20UB	R20UB Needle Guide Bracket Kit	For the probe C422UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-L50UB	L50UB Needle Guide Bracket Kit	For the probe L552UB, 4 vessels: 16G, 18G, 20G, 22G

Table 3-2 Needle Guide Bracket Kits

◆ DICOM 3.0

◆ Freeze footswitch

◆ Mobile trolley MT-805

◆ Hand carried bag

◆ Cable holder

◆ Dustproof cloth

◆ U disk

◆ Portable hard disk

◆ USB mouse is supported. After connecting the mouse to the U50 via the USB port, you can operate the system by using the mouse. The left button responnds to the **Set** key while the right button responds to the **Back** key.

Chapter 4 Installation Instructions

4.1. Environmental Requirements

Keep the device away from equipment with strong electric field, strong magnetic and high voltage field, and protect the display screen from direct exposure to strong sunlight. Keep good ventilation.

4.2. Unpacking Inspection

Visually examine the package prior to unpacking. If any signs of mishandling or damage are detected, contact the carrier to claim for damage. After unpacking the device, you should follow the packing list to check the product carefully and to make sure that no damage has occurred during transportation. Then, install the device according to the installation requirements and methods.

WARNING
1. Do not use the device if it is found to be damaged or defective.
2. Do not drop or collide with the probe. Otherwise you shall give up using it.

4.3. Connecting Procedure

1. Take the main unit and accessories out from the package.

2. Connect the cable holder and battery (if it is configured) to the main unit correctly.

3. Connect the probes to the main unit correctly.

4. Connect the printer and load the recording paper.

5. Connect the power cable

    1) Connect the main unit and the common earth terminal firmly via a potential equalization conductor.

    2) Plug one end of the power cable to the power socket of the main unit, and the other end to the special power output socket of the hospital.

6. Switch on the main unit.

    Press power switch on the rear side of the main unit, and press the power on/off key on the top left of the control panel. You can operate the main unit after the main interface appears.

4.3.1. Installing and Uninstalling a Cable Holder

To install the cable holder:

1. Take out the cable holder, three screws (M3×12) and packing foam from the package.
2. To avoid scraping the main unit, put one piece of packing foam on a flat ground.
3. Carefully turn the main unit upside down and put it on the packing foam and assemble the screws to the main unit with a cross-head screw driver as shown in *Figure 4-1.*
4. Carefully turn the main unit with a cable holder to the normal state as shown in *Figure 4-2*.

M3×12 (3×)
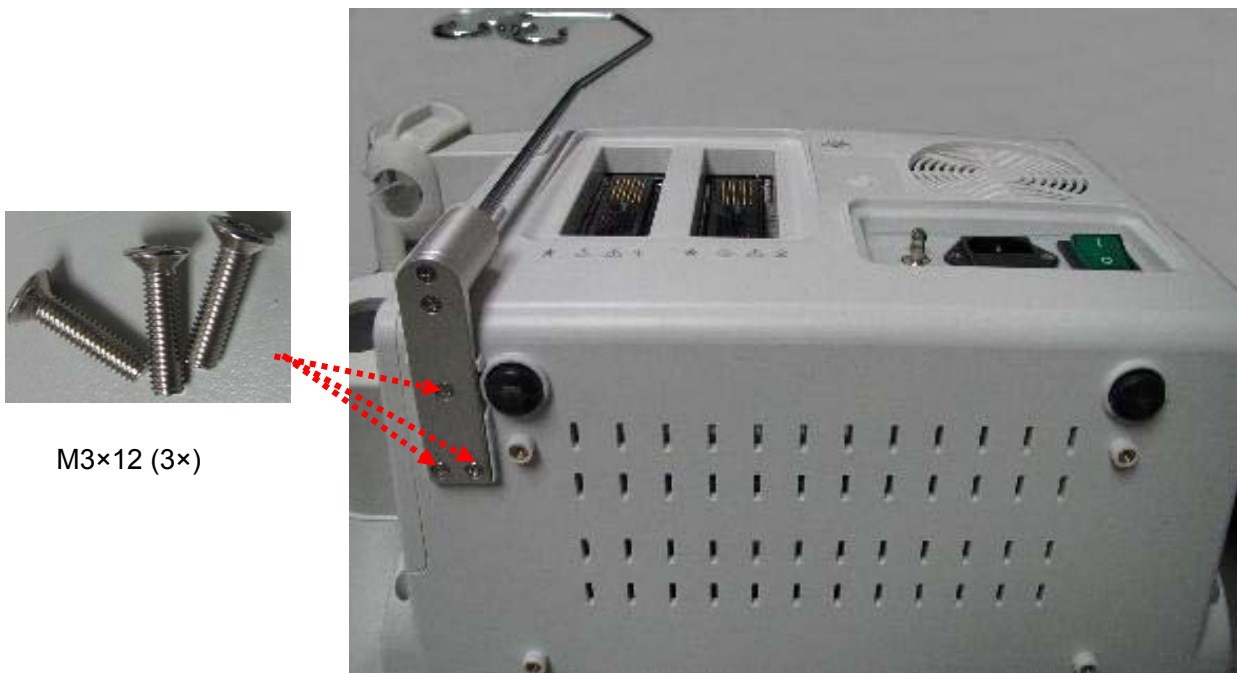
Figure 4-1 Assembling Cable Holder to Main Unit

Figure 4-2 Main Unit with Cable Holder

To uninstall the cable holder:

Uninstall the cable holder in a reverse procedure.

4.3.2. Installing and Uninstalling a Battery

To install a battery (if necessary):

1. Turn off the device, and take out the battery from the package.
2. Press the button on the battery compartment door and pull the door out.
3. Turn the lever counterclockwise to hide it and push the battery into place.
4. Turn the lever clockwise to keep the battery in place.
5. Replace the battery compartment door.

① Press the button   ② Pull the battery compartment door out
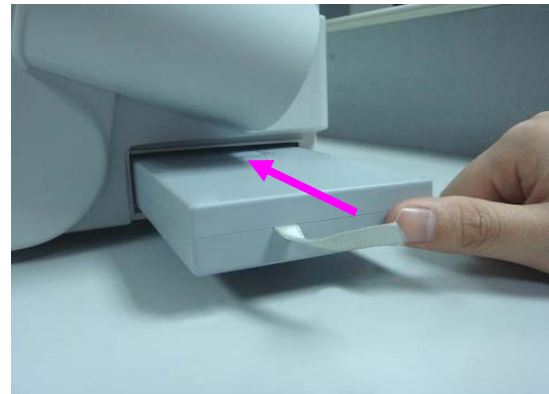
③Turn the lever counter-clockwise to hide it   ④Push the battery into place

⑤Turn the lever clockwise to keep the   ⑥Replace the battery compartment door
   battery in place

Figure 4-3 Installing Battery to Main Unit

To uninstall a battery:

1. Turn off the device, and press the button on the battery compartment door and pull the door out.

2. Pull the lever counterclockwise to hide it.

3. Pull the battery out.

4. Replace the battery compartment door.

① Press the button

② Pull the battery compartment door out

③Turn the lever counter-clockwise to hide it
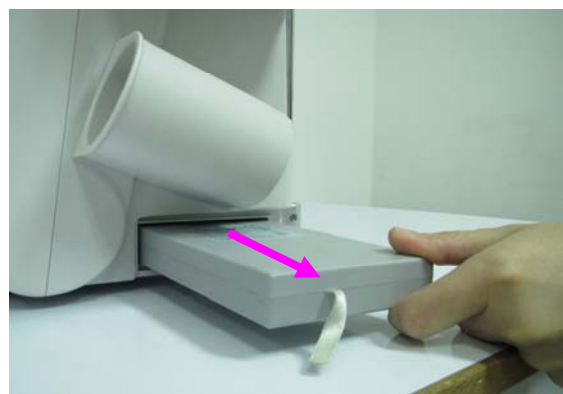
④ Pull the battery out
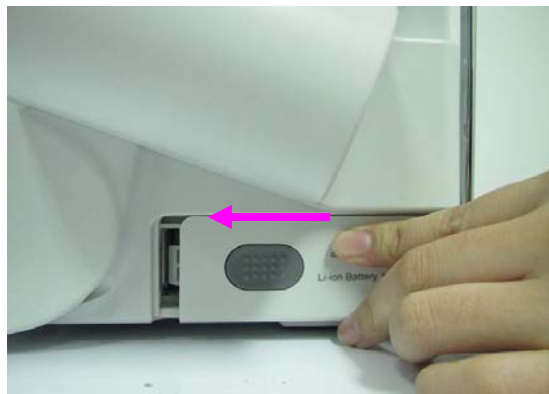
⑤Replace the battery compartment door

Figure 4-4 Uninstalling Battery from Main Unit

4.3.3. Connecting and Disconnecting Probes

NOTE:

Ensure that the system is shut down, or the image is frozen, before connecting and disconnecting probes.

Flip images horizontally to change the scan direction or vertically to change the image orientation. The scan direction mark located at the side of probe indicates the beginning direction of scanning. The scan direction mark is shown below.

Scan Direction Mark
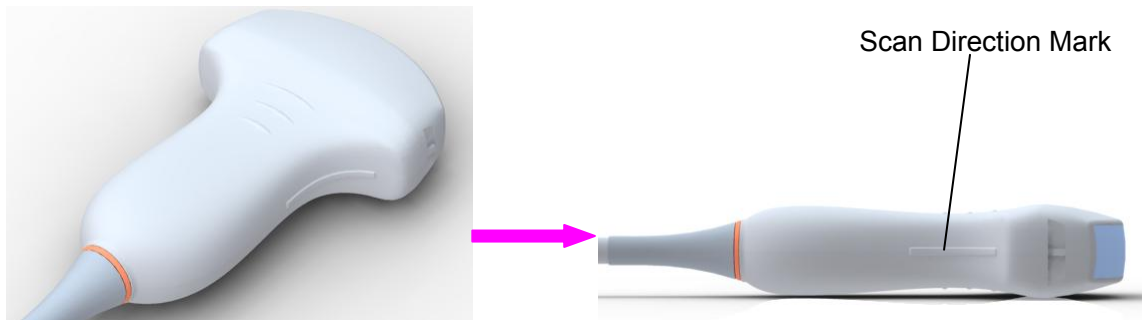
Figure 4-5 Probe Scan Direction Mark Schematic Diagram

There is information about Model and SN on the probe connector.

To connect a probe:

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cable.
3. Do not allow the probe head to hang free. Impact to the probe head could result in irreparable damage.
4. Turn the connector locking handle counterclockwise to the horizontal position.
5. Align the connector with the probe port and carefully push into place.
6. Turn the locking handle on the transducer connector clockwise to the vertical position. This ensures the connector in position and ensures the best possible contact.
7. Place the probe in the probe holder.

To disconnect a probe:

1. Turn the locking handle on the connector housing counterclockwise to the horizontal position.
2. Firmly grasp the probe connector and carefully remove it from the system port.
3. Store each probe in its protective carrying case.
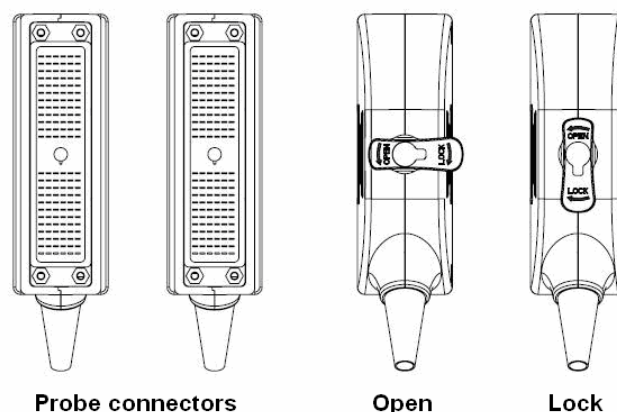
Figure 4-6 Lock and Open Marks on Probe Connectors

WARNING

Do not touch the pin of probe connector.

CAUTION

Do not plug in or pull out the connector when the device is activated. This is to avoid uncontrollable damage to the probe and the main unit.

NOTE:

Once the probe is connected to the main unit, please do not reinstall it frequently. This is to avoid poor contact between the probe and the main unit.

4.3.4. Peripheral Connections

Video connections are located on the left panel of the U50.

WARNING

1. Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC/EN standards (e.g. IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment). Furthermore, all configuration shall comply with the valid version of the standard IEC/EN 60601-1-1. Therefore, anybody, who connects additional equipment to the signal input or output connector to configure a medical system, must make sure that it complies with the requirements of the valid version of the system standard IEC/EN 60601-1-1. If in doubt, consult our technical service department or your local distributor.

2. Parts and accessories used must meet the requirements of the applicable IEC/EN 60601 series safety standards, and/or the system configuration must meet the requirements of the IEC/EN 60601-1-1 medical electrical systems standard.

3. Connecting any accessory (such as external printer) or other device (such as the computer) to this equipment makes a medical system. In that case, additional safety measures should be taken during installation of the system, and the system shall provide:

   a) Within the patient environment, a level of safety comparable to that provided by medical electrical equipment complying with IEC/EN 60601-1;

   b) Outside the patient environment, the level of safety appropriate for non-medical electrical equipment complying with other IEC or ISO safety standards.

4. Parts and accessories must be connected to the I/O ports designated in *Figure 4-7.* For example, only the supplied or recommended USB device can be connected to the USB ports; DO NOT connect telephone line to the network port; DO NOT connect earphone to the footswitch port or remote port.

CAUTION

To ensure proper grounding and leakage current levels, it is the policy of EDAN to have an authorized EDAN representative or EDAN approved third party perform all on-board connections of documentation and storage devices to the U50.
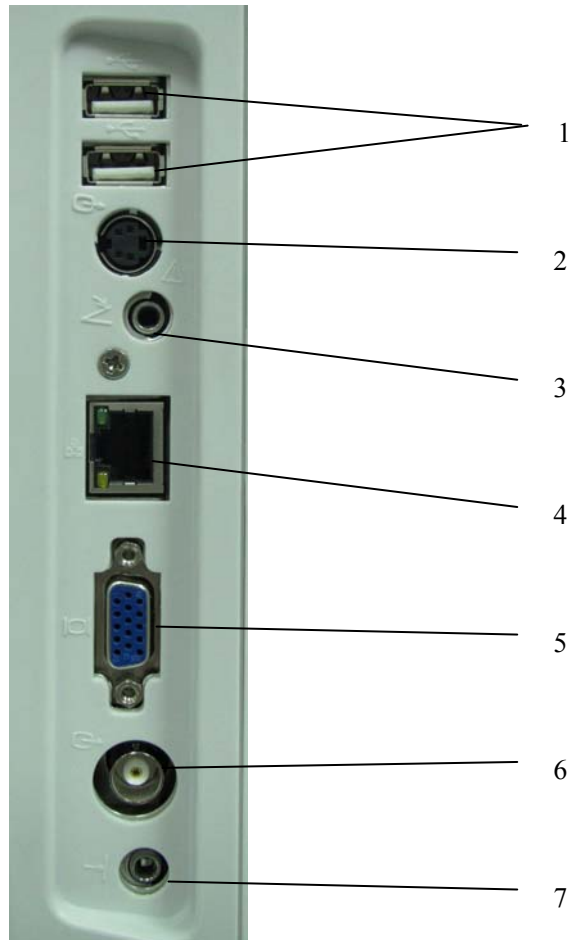
Figure 4-7 I/O Ports on the Left Panel

Peripheral ports:

1	USB ports	5	VGA output port (15 pin)
2	S-Video output port	6	Video output port
3	Footswitch port	7	Remote port
4	Network port (DICOM 3.0)		

4.3.5. Equipotential Bonding
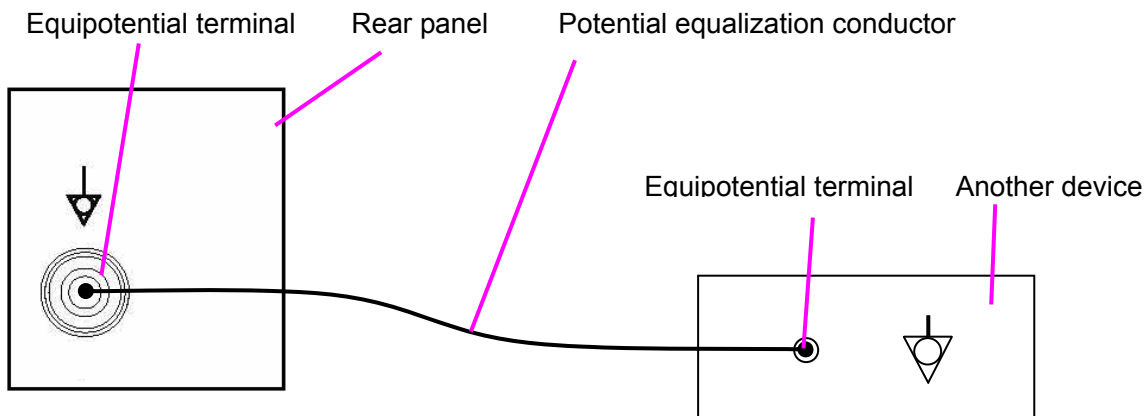
Figure 4-8 Equipotential Bonding

Any use of other devices with the system is at the user's risk and may void the system warranty. In order to fulfill IEC/EN 60601-1-1 requirements, connections of peripheral equipment to the U50 must adhere to one of the following conditions:

◆ The peripheral equipment itself is a medical device approved according to IEC/EN 60601-1.

◆ Non-medical peripheral equipment approved according to any other EN or IEC standard must use the following setup for connection:

➢ Connect the equipotential connector of U50 to an independent protective earth terminal with a potential equalization conductor.

➢ The peripheral equipment is located at least 1.5 meters (1.8 meters in Canada and the U.S.A) outside the patient environment. A patient environment is defined as the area in which medical examination, monitoring, or treatment of the patient takes place.

➢ The peripheral equipment is connected to a main outlet outside the patient environment but still within the same room as the ultrasound system.

WARNING

1. Equipotential bonding: when the device is running with other instruments jointly, consideration should be given to equipotentiality.

2. Doctors and patients might be exposed to the hazardous and uncontrollable effects of compensating current caused by unbalanced equipotentiality between indoor medical device and touchable conducting parts. The safest solution is to build a unified equipotential network, to which the medical device is connected, using an angular plug.

4.3.6. Printer Installation

This system supports video printers and USB printers.

To install a video printer:

1. Power off the main unit and the printer.

2. The system supports both S-Video output and Video output, you can connect the VIDEO IN (video input) of the video printer with the S-Video output or Video output of the main unit.

3. Connect the REMOTE of the video printer with the REMOTE of the main unit.

Reference   *Figure 4-7 I/O Ports on the Left Panel*

4. Power on the main unit and run the printer.

NOTE:
The video printers are used in patient vicinity.

To install an USB printer:

1. Power off the main unit and the printer.
2. Connect the printer with the main unit by using a USB cable.
3. Power on the main unit and run the printer.

NOTE:

1. Chromatic aberration, unfriendly brightness, contrast or overall appearance may occur if you print images with default presetting of video printer. To obtain good printings, please adjust video printer parameters according to the images.

2. Please check the printer user manual for details about printer installation. If the printer does not work normally, check the Report printer presetting through **System preset**>**Application preset**, see Section *5.7.3 System Preset*.

3. To obtain good printings, EDAN recommends you to connect the color printer with the S-Video output, and connect the monochrome printer with Video output.

4. Multiple portable socket-outlet is not intended for the device, anybody, who connects it to the signal input or output connector to configure a medical system, must make sure that it complies with the requirements of the valid version of the system standard IEC/EN 60601-1-1. If in doubt, consult our technical service department or your local distributor.

5. If you want to use a multiple portable socket-outlet to supply power to the whole U50 system, you are suggested to calculate the system power consumption when building a U50 system so as to match the system power consumption with the power sustained by a multiple portable socket-outlet.

6. The system identifies the printers it supports automatically; you can use the printer promptly after connecting to the main unit, with no need to switch the printer driver.

Chapter 5 System Control

5.1. Powering On/Off Device

◆　To power on the device

Before powering on this device, check as below:

1. Check the potential equalization conductor and make sure it is connected properly.

2. Check all the cables and make sure there is no scrape or crack.

3. Check the control panel and the monitor and make sure there is no crack.

4. Check the probe and the connection and make sure there is no scrape or crack.

5. Check the power socket and the switch and make sure there is no damage.

To power on:

1. Connect the device to a standard three-pin power supply socket via the power cable, switch on the AC power switch on the rear panel; Or

    Use the battery as the power supply.

2. Press the power on/off key on the top left of control panel, and a startup interface appears.

◆　To shut down the device

1. Press the power on/off key on the top left of control panel and the system displays a confirm dialog box.

2. Select **Yes** to power off the system.

Or,

If the system breaks down, long press the power on/off key on the top left of control panel to shut down the system directly.

NOTE:
Please unplug the AC power cord from the power socket and disconnect the battery if the device is to remain idle for a long time.

CAUTION

1. You are forbidden to unplug or plug the power cord before switching off the system.

2. Wait approximately five seconds between powering the system off and then on again. This allows the system to complete its shutdown process.

Standby mode

To place the system in standby mode:

Press **Stndby** on PC keyboard once ("Stndby" is the abbreviation of "Standby"), the system goes into the maximum power saving state: Standby Mode. But the archived patient information, measurement and images will be kept.

To wake up the system from standby mode:

Press **Stndby** on PC keyboard once to come out of Standby Mode, the system resumes working immediately.

◆   To restart the device

If there is any trouble described as below, please press the power on/off key to switch off the device and then press it again to restart the device.

➢ The device displays wrong information and it lasts a long time.

➢ The device displays abnormally.

➢ The device can not execute an operation.

5.2. Examining

Apply an appropriate amount of coupling gel (medical ultrasound coupling agent) to the body area to be examined, and then contact the area with the acoustic window of the probe firmly. A cross-sectional image of tissues will be displayed on the screen. Adjust **brightness**, **gain**, **TGC**, **focus combination**, etc properly. Adjusting the monitor's contrast and brightness is one of the most important factors for best image quality. If theses controls are set incorrectly, the **gain**, **TGC**, **and focus combination** may have to be changed more often than necessary to compensate. Meanwhile, properly move the probe to obtain an optimal image of the target area. Or if necessary, adjust **sweep speed** to get satisfying images in the M mode, and adjust **D gain**, **sample line**, **Sample Volume**, **Base Line**, **Correction Angle**, **D WallFilter**, **PRF** (Pulse Repetition Frequency), etc in the PW mode.

CAUTION
1. Please be gentle when contacting the target area with a probe. This is to avoid making the probe damage or the patient disturbed.
2. Please choose a proper probe for the target area with an appropriate frequency to begin the diagnostic operation.
3. Adjust the gain knob slowly.

5.3. Screen Layout

Figure 5-1 Monitor Display

① **Information Field：**

Manufacturer logo, Institution/Hospital name, Patient name, Patient ID, Current examination type, Probe model, Probe frequency, "Freeze" icon, MI, TI, System date and time, etc.

② **Image Field:**

Ultrasound image (B/Color/PDI/PW/M mode), Gray map bar, Color map bar, Depth scale, Focus mark, Sample line of PW/M mode, Sample volume of PW mode, Scan area window of Color mode (also referred to as the region of interest, or ROI), Puncture line, Probe scan direction mark, Comments (texts or arrows), Body marks, Measurement caliper, TGC curve, etc.

③ **Menu Field:**

Image control menus /control program menus. The content of menus depends on system status.

④ **Measurement Results Field:**

The field displays the measurement and calculation items and results in different rows.

⑤ **Parameter Field:**

It displays the principal image parameters of each mode. Parameters of the current active mode are marked with " * " symbols. Parameters of B mode: Freq, Gain, Depth, and Frame Rate; Parameters of Color /PW mode: Freq, Gain, and PRF.

⑥ **CINE Review Progress Bar**

⑦ **Menu Controls Field:**

Image parameters adjustment/ program menus control, the items correspond to system menus in different modes or status.

⑧ **Status Prompt Field:**

The lower left side of the field displays operation prompt, examination type;

The lower right side of the field shows the state of USB, the state of power supply, input method, brightness or volume adjusting information (the icon is displayed only during adjustment)

NOTE:

: AC power supply, with battery connected;

: AC power supply, without battery connected.

: Battery power supply.

5.4. Control Panel

Figure 5-2 Control Panel

① Power/running indicators ② Power on/off key ③ TGC sliders

④ Function controls ⑤ PC keyboard ⑥ Menu Controls

5.4.1.Trackball

The trackball operation is easy and convenient. It can achieve the following functions:

◆ Move the measurement cursor during measurement.

◆ Move to select menu items in menu-based operations.

◆ Move the comment cursor in the comment status.

◆ Move the M Mark in the B/M mode.

◆ Move the scan area of Color mode, increase or decrease the size of scan area of Color mode.

◆ Move the sample line in the PW mode.

◆ Realize single frame playback in the frame-by-frame playback status.

◆ Move the zoomed window in the zoom status.

NOTE:

1. Please be gentle when running the trackball.

2. Please keep the surface of trackball clean.

5.4.2."0~9" Numeric Keys

Numbers are used for time calibrating, data setting, age notating, and comment adding etc.
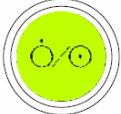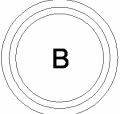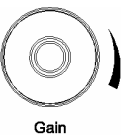
5.4.3.Alphabetic Keys
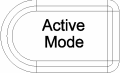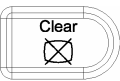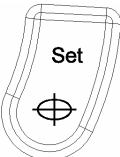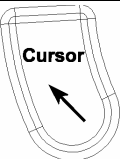
The system supports some language-specific characters through the use of SHIFT with a combination of keys on the keyboard. Press any of these keys in the annotation mode and the comment mode to display the character on the cursor position.
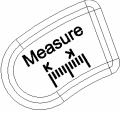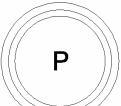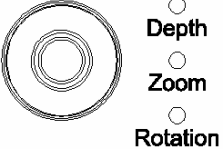
<table>
<tr><td colspan="2">**German Characters**</td></tr>
<tr><td>**Symbol**</td><td>**Key Combination**</td></tr>
<tr><td>**ä**</td><td>SHIFT-A</td></tr>
<tr><td>**ö**</td><td>SHIFT-S</td></tr>
<tr><td>**ü**</td><td>SHIFT-D</td></tr>
<tr><td>**β**</td><td>SHIFT-F</td></tr>
<tr><td>**ñ**</td><td>SHIFT-G</td></tr>
<tr><td>**ø**</td><td>SHIFT-H</td></tr>
</table>

<table>
<tr><td colspan="2">**French Characters**</td></tr>
<tr><td>**Symbol**</td><td>**Key Combination**</td></tr>
<tr><td>**è**</td><td>SHIFT-Z</td></tr>
<tr><td>**à**</td><td>SHIFT-X</td></tr>
<tr><td>**ó**</td><td>SHIFT-C</td></tr>
<tr><td>**é**</td><td>SHIFT-V</td></tr>
<tr><td>**ç**</td><td>SHIFT-B</td></tr>
<tr><td>**å**</td><td>SHIFT-N</td></tr>
</table>
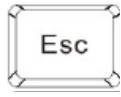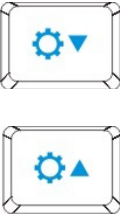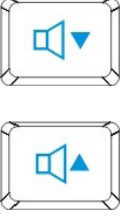
Table 5-1 German and French Characters

5.4.4.Function Controls

No.	Key	Name	Description
(1).		Power on/off	Press to power on the system or display the shut down interface.
(2).		/	Press to turn to next page of Menu Controls field. It will return to the first page if the current page is the last one.
(3).	1-6	Menu Controls	The 6 combination rotary dials/push buttons corresponds to the items displayed in the menu controls field，and also to the items of system menu in different modes or status.
(4).	TGC	TGC	Glide the slide controls to adjust the TGC, glide the upper segments to adjust the near field gain, and the lower segments to adjust the far field gain; glide rightward to increase TGC, and glide leftward to decrease.
(5).	Patient	Patient Info	Patient information annotation key Press to view, edit or input the patient data.
(6).	Probe	Probe	Press to display an onscreen menu for connected probe and exam type selections.
(7).	End Exam	End Exam	Press to erase cache memory of the last exam (including comments, measurements, calculations and reports except for archived Images) before the exam ends, begins a new exam.
(8).	B	B Mode	Press to enter B Mode.
(9).	Color	Color Mode	press to enter or exit Color Mode
(10).	PW	PW Mode	In B mode, press to display the sample line, and press this key again to enter B+PW mode; in B+PW mode, press this key to exit PW mode and enter B mode.
(11).	M	M Mode	Press to enter M Mode.
(12).	Gain	Gain	Rotate the control to increase or decrease the overall gain of the current mode.

(13).	Active Mode	Active Mode	1. Press to toggle between current image modes in duplex or triplex. 2. After the image is frozen, the system enters Cine Review status by default. Press **Active Mode** to switch between different frozen imaging modes and Cine Review status. When switching between different frozen imaging modes, the currently available parameters are highlighted, you can use the menu controls to adjust options. (Such as Pseudo Color, and Gray Map). **NOTE**: In measurement status, the **Active Mode** key is inactive.
(14).	Clear	Clear	Press to clear all the measurements, calculations, comments, and body marks displayed in the current image.
(15).		Trackball	A multifunction trackball used for various system activities (increase or decrease size of ROI, position Color ROI, position Calipers, position annotations etc.)
(16).	Set	Set	Set key 1. Press to confirm the selection of a specific function or command. 2. Use this key to anchor calipers, select a menu item or image graphic. 3. Press to move the scan area of Color mode, increase or decrease size of scan area of color mode with the trackball. (In color mode, it enters ROI position adjusting status firstly, you can press trackball to move the ROI; after you press **Set,** it enters ROI size adjusting status, you can move the trackball to increase or decrease the size of ROI; if you press **Set** once again, it returns to ROI position adjusting status.) 4. Press to move the zoomed window in the zoom status together with the trackball.
(17).	Cursor	Cursor	Press to hide or display the cursor
(18).	BodyMark	BodyMark	Body Mark Key Press to activate or exit the body mark function. It is to indicate the examine position and the scan direction.

(19).		Generic Measurement	Generic Measurement key Press to activate or exit the generic measurement function.
(20).		Update	1. In annotation status, press to display the comment library. 2. In measuring status, you can press **Update** once to change the settled point and the active point 3. In unsynchronized Mode, such as B+M, B+PW, B+Color, B+PDI, B+PDI+PW or B+Color+PW mode, press to active real time image window.
(21).		Application Measurement	Application Measurement key Press to activate or exit the application measurement function.
(22).		Comment	Comment key Press to activate or exit annotation function.
(23).		Report	Press to activate or exit current patient report.
(24).		Save Image	Press to save the current image to Flash, U disk or portable hard disk, according to the present saving path and image format.
(25).		Cine	Cine key Press to enter or exit the frame-by-frame cine mode.
(26).		P	Reserved key
(27).		Print	Print key Press to do the video printing.
(28).		Multi-function knob	◆ In real time mode, rotate to adjust depth. ◆ Press to activate or exit zoom function. ◆ When an arrow is added, rotate this button to adjust the arrow direction. ◆ When a body mark is added, rotate this button to adjust the scanning direction.

(29).	Freeze	Freeze	Freeze key Press this key to switch between the frozen and real-time states. When an image is frozen, the system inserts " ❄ " next to the system time clock and the clock pauses. When unfreezing the system, all the measurements, calculations, body marks, and comments will be erased.
PC Keyboard			
(30).	Esc	ESC	To escape
(31).	Preset	Preset	Preset key Press this to activate or to deactivate the preset function. Reference Section *5.7 Presetting*
(32).	File	File	File management key Press this key to enter or to exit the file management system. Reference Section *6.11 File Management*
(33).	Menu	Menu	Press this to display or to hide the menu.
(34).	Stndby	Standby	Press to enter to come out of standby mode.
(35).	☼▼ ☼▲	/	Brightness adjustment keys Press these two keys to adjust brightness. And the brightness symbol will be displayed at the bottom of the screen
(36).	◁▼ ◁▲	/	Volume adjustment keys Press these two keys to adjust volume in the PW mode. And the volume symbol will be displayed at the bottom of the screen
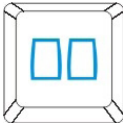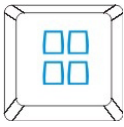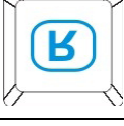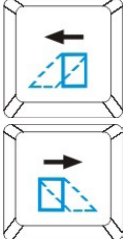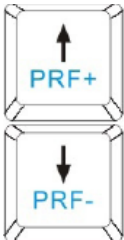
(37).	🔇	/	Sound muting key Press this to close the loudspeaker in the PW mode. And the mute symbol will be displayed at the bottom of the screen
(38).	Back	Back	Back key In the measurement status, press to delete to the previous measurement. In comment mode, press the key to delete the entered text one by one.
(39).	⬜⬜	/	Dual Press to select Dual and switch between a live or frozen, single or multi-mode A/B split screen display.
(40).	⬜⬜⬜⬜	/	Quad Press to select Quad and cycle through a live or frozen A/B/C/D single or multi-mode split screen display.
(41).	PDI	PDI	Press to enter or exit Power Doppler Imaging Mode (PDI)
(42).	⬦	/	Press to display or hide the M/D cursor. In B/C mode, press it to display the sample line, after positioning the sample line, press M or PW to enter M mode or PW mode.
(43).	Я	/	Image left/right Flip key Press this key to flip the image horizontally.
(44).	Я	/	Image up/down Flip key Press this key to flip the image vertically.
(45).	← / →	/	Steering angle adjusting key(only applicable to linear probes) : In PW mode, press to adjust the Doppler sample volume steering angle. In Color mode, press to adjust the ROI steering angle
(46).	↑PRF+ / ↓PRF-	/	PRF adjusting keys Press these two keys to adjust the PRF (Pulsed Repetition Frequency) in the PW mode.
(47).	F1-F4	F1-F4	Reserved keys/ User defined keys

Table 5-2 Function Controls

The 6 menu controls on the control panel are corresponding to the items displayed in the menu controls field, and also to the items of system menu in different modes or status, such as the preset menu, file menu, needle guide menu, Cine Review menu, measurement menu, etc. The currently available menu control items are highlighted, and the currently unavailable items are in gray color.

Operation of menu controls:

● To activate function: Press the menu control to active a function.

  For example, in File menu, press **File** menu control to display the **File Manager** dialog box directly.

● To switch/Adjust options:

  (1) If the parameter has only two options, press the menu control to activate the function and select the options.

  For example, in Color mode, press the **Dual Live** menu control to activate "**Dual Live On/Off**".

  (2) If the parameter has several options/values, rotate the menu control to switch/adjust options.

  (In the PW-generic measurement menu, press the **Trace Sensitivity+/ Trace Sensitivity-** menu control to increase/decrease the sensitivity)

  For example, in File menu, rotate the **FileType** menu control to switch the image format before saving; in B mode, rotate the **Dyn Rng** menu control to increase or decrease the value of dynamic range.

● To enter the secondary menu:

  If the menu item has a secondary menu, rotate the menu control to enter the secondary menu and select options, and then press the menu control to activate the option.

  For example, in B-generic measurement menu, rotate **Volume** menu control to enter the secondary menu, select 2-Axis/3-Axis/3-Axis (LWH), and then press the menu control to activate the option.

● Page down: You can press ⊙ on menu controls panel to flip through pages of menu controls field. Press the key again, it returns to the first page circularly if the current page is the last one.

5.4.5. Imaging Functions
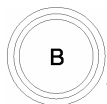
Ⓑ **B mode Imaging Control**

Press this key to enter the B mode. The system displays a single real-time B mode image.

B indicates brightness, or two-dimensional (2D) gray scale imaging.

NOTE:

To return to a real-time B mode image from any imaging mode, press B control. This also deletes all measurements, calculations, comments, or body marks that are displayed on the screen.
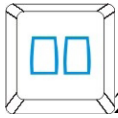
2B mode Imaging Control

This key has two functions:

◆ Press this key to enter the 2B mode.

◆ Press this key to activate one of the dual images. The probe direction of the activated image is brighter than that of the frozen image.
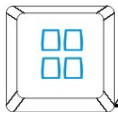
4B mode Imaging Control

Press this key to enter the 4B mode. The system divides the image area into four quadrants: the first quadrant is on the top left, the second on the top right, the third on the bottom left, and the fourth on the bottom right.

Press it repeatedly to active one of the four images. The probe direction of the activated image is brighter than the direction of the frozen images. The four images are obtained separately and only one image at a time is displayed in real time.

Color mode Imaging Control

Follow the same procedure as described under B Mode to locate the anatomical area of interest. After optimizing the B mode image, press **Color**, move the scan area of interest as close to the center of the image as possible; Or after entering Color mode, press **PW** to display the sample line, and press **PW** again to enter triplex mode (B+Color+PW). Optimize the Color mode image parameters.
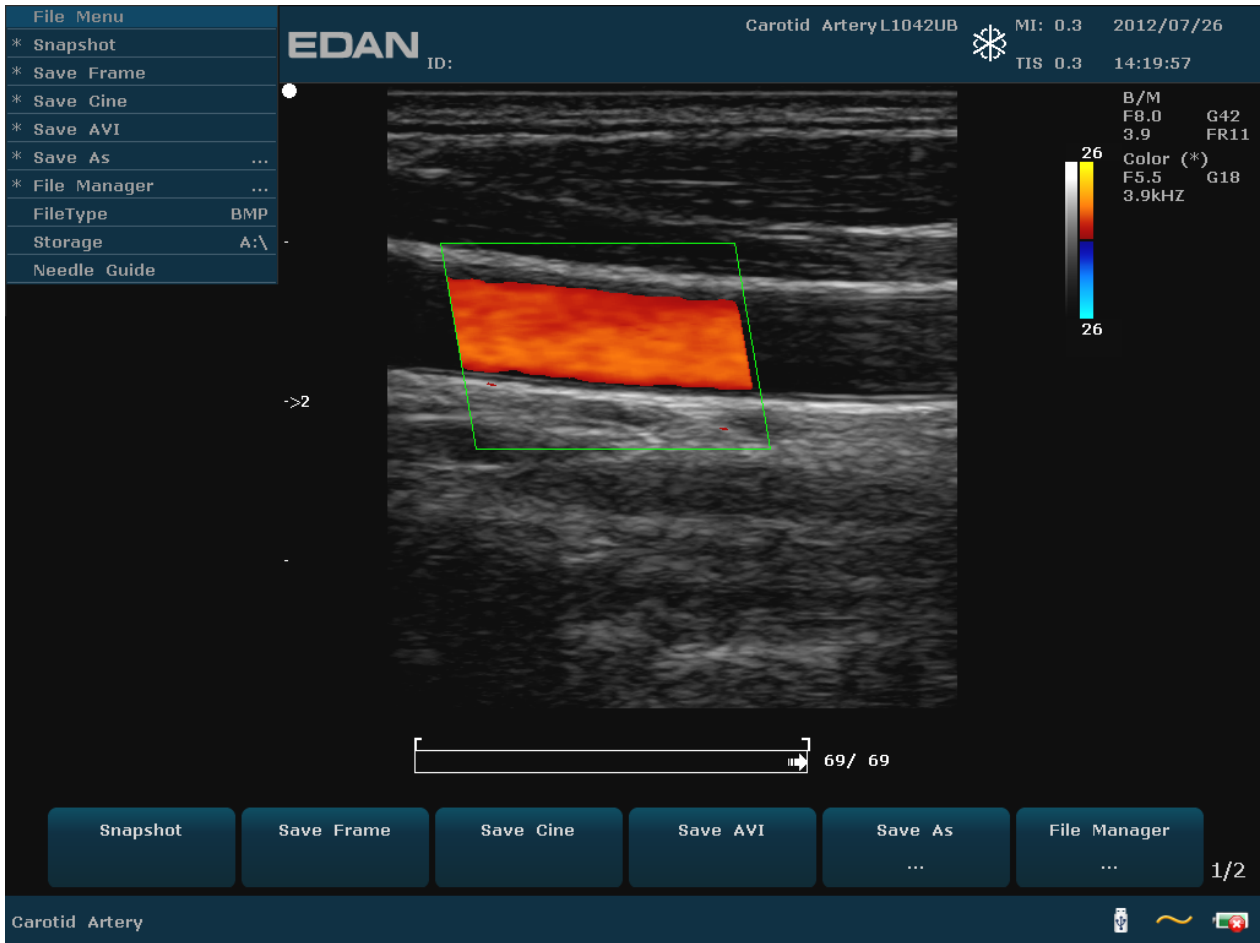
Figure 5-3 Example of B+Color Scan

PDI mode Imaging Control

Follow the same procedure as described under B Mode to locate the anatomical area of interest. After optimizing the B mode image, press **PDI**, move the scan area of interest as close to the center of the image as possible; Or after entering PDI mode, press **PW** to display the sample line, and press **PW** again to enter triplex mode (B+PDI+PW). Optimize the PDI mode image parameters; In PDI mode, rotate the **Map** menu control until the value is among 8-11, the system enters **Directional Power Doppler Imaging mode** (DPDI).

Dual-split mode of B+Color/PDI:

✓ In dual-split mode of 2B, press **Color/PDI,** and then press [   ] to enter dual-split mode of B+Color/PDI, the two windows are in B+Color/PDI mode.

✓ In single B+Color/PDI mode, press [   ] to enter dual-split mode of B+Color/PDI, the two windows are in B+Color/PDI mode.

✓ In dual-split mode of B+Color/PDI, press **Color/PDI,** the currently active window exits color mode and enters 2B mode.

PW

Pulsed-Wave Doppler mode Display Control

In B mode, press this key to display the sample line, and press this key again to enter B+PW mode; in B+PW mode, press this key to exit PW mode and enter B mode.

A pulsed-wave Doppler (PW) scan produces a series of pulses used to study the motion of blood flow in a small region along a desired scan line, called the sample volume.

The X-axis of the graph represents time, and the Y-axis represents Doppler frequency shift. The shift in frequency between successive ultrasound pulses, caused mainly by moving red blood cells, can be converted into velocity and flow if an appropriate angle between the insonating beam and blood flow is known.

Shades of gray in the spectral display represent the strength of the signal. The thickness of the spectral signal is indicative of laminar or turbulent flow (laminar flow typically shows a narrow band of blood flow information).

Pulsed-Wave Doppler mode and B mode are shown together in a mixed mode display. This combination lets you monitor the exact location of the sample volume on the B image in the B Image Display window, while acquiring Pulsed-Wave Doppler data in the Time Series window.

Operation:

In the B scan, the long line lets you adjust the sample line position, the two parallel lines (that look like =) let you adjust the sample volume (SV) size and depth, and the line that crosses them lets you adjust the correction angle (PW angle).
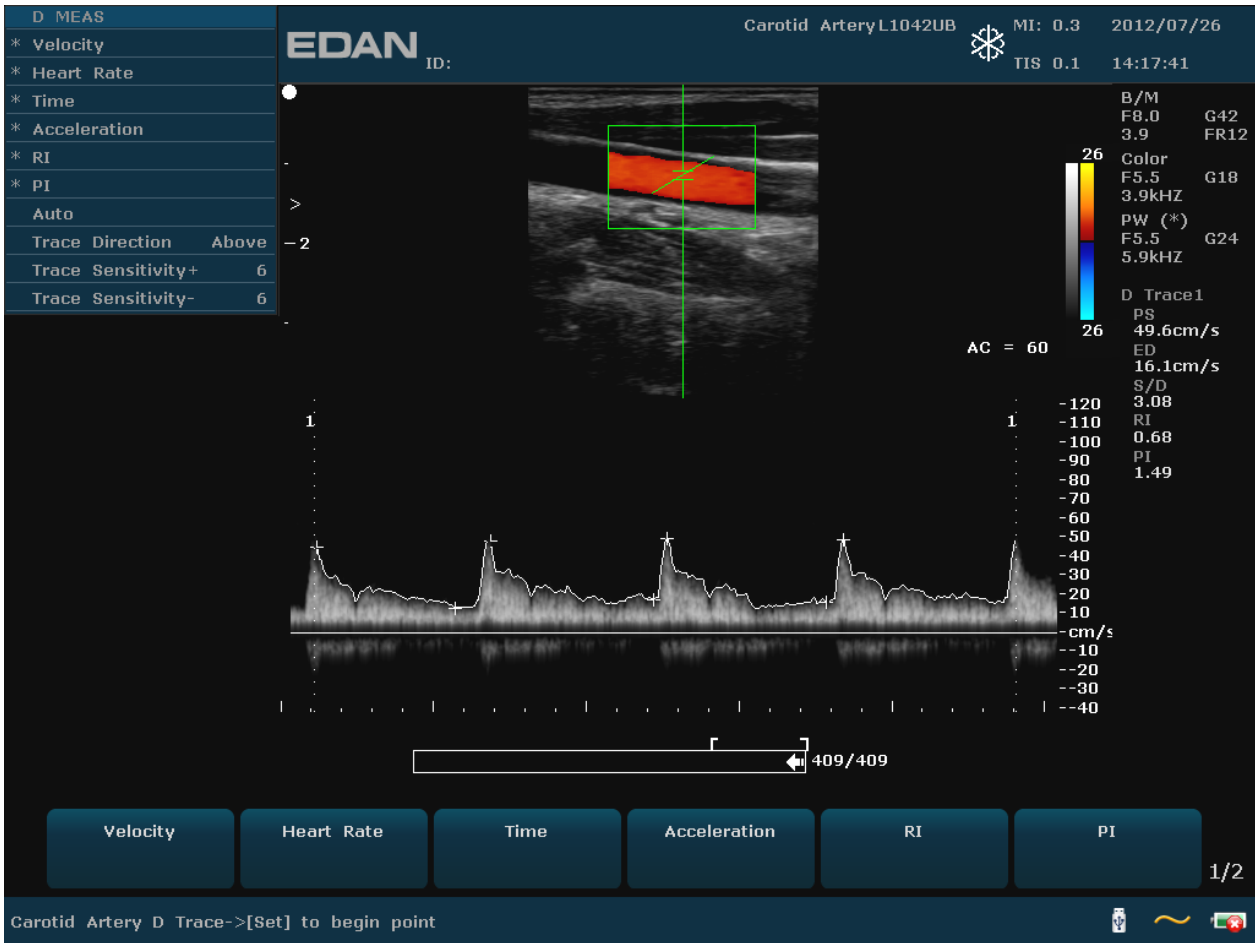
Figure 5-4 Example of B+Color+PW Scan

In B+PW mode, you can choose scanning in synchronized or unsynchronized mode by pressing **Synchro** menu control: in unsynchronized mode, the active mode is PW; while, in synchronized mode, the B and PW mode are both active. When you are scanning in unsynchronized mode either the B or the time series window receives data. This lets you independently change the PW PRF. When scanning in simultaneous mode, both the 2D and the time series window receive data. This feature lets you define which method is used, based on the exam type.

The sample volume indicator allows you to start a scan in a B scan mode, set the sample volume, and switch to Doppler mode. The sample volume locks in position.

Switch between the frozen PW and real-time PW images

✓ After entering B+PW, or B+Color/PDI+PW mode, the B or B+Color/PDI image is frozen by default, and PW image is active.

✓ After entering B+PW, or B+Color/PDI+PW mode, in unsynchronized mode, press **Update** to switch between the frozen and real-time PW images. When PW image is frozen, move the trackball to adjust the sample line, rotate the menu controls to adjust the sample volume, and the correction angle, etc. Then press **Update** to switch to real-time PW images.

✓   After entering B+PW, or B+Color/PDI+PW mode, roll the trackball to move the sample line and sample area, the B or B+Color/PDI image is active, and PW image is frozen; when the trackball stops moving, the B or B+Color/PDI image is frozen, and PW image is active.

To enter PW mode:

1. Press **B** to enter B mode and adjust all image control settings appropriate for the current exam.

2. Place the cursor inside the vessel of interest.

3. Press **PW** to display sample line, move the trackball to adjust the sample line, rotate the menu controls to adjust the sample volume, and the correction angle, etc.

4. Press **PW** again to enter B+PW mode. The system locks the sample volume indicator and adds the Time Series window.

Or, you can scan in PW mode as follows:

1. Press **B** to enter B mode, after optimizing the B mode image, press on PC keyboard to display the sample line;

2. Move the trackball to adjust the sample line, place the sample gate inside the vessel of interest. Rotate the menu controls to adjust the sample volume, and the correction angle, etc.

3. Press **PW** to enter B+PW mode.
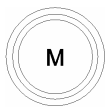
   M mode Display Control

Press it to enter the B+M mode, the B mode and the M mode images are displayed on the screen at the same time (Abbreviated as B/M or B+M). A line called M Mark is displayed on B mode image. Roll the trackball to move the M Mark. Press **Set** to locate the M Mark.

Press this key again to enter the single M mode. It displays an M mode sweep. The slope of this mode has four levels.

5.5. Menu

Menus are displayed on the left of the screen. Only one menu can be activated at a time. The types are shown as follows:

System status menu

In B mode, B+ PW mode, B+Color mode, B+Color+PW mode, B+PDI/DPDI mode, B+PDI/DPDI +PW mode or M mode, the system status menu provides information about the current imaging mode. In 2B and 4B modes, it indicates the status and parameters of the active image. In B/M mode, it indicates the status and parameters of M sweep. In the PW mode, it

indicates the status and parameters of Doppler wave and 2D image. The following are the system status menus of B mode, Color Mode, PW mode, and B/M mode respectively.

B Mode Menu	
* eSRI	3
* Spatial Comp	On
* Dyn Rng	98
* Focus Pos	3
* F.Number	1
* B Freq	1
Pseudo Color	0
Frame Persist	3
ScanMode	HiDen
Gray Map	5
Rejection	0
ScanAngle	3

Color Mode Menu	
* Map	7
* Invert	Off
* Dual Live	Off
* C WallFilter	2
* Persist	2
* C PRF	3
Base Line	3
Packet Size	12
Smooth filter	2
Threshold	15
C Freq	0

D Mode Menu	
* Base Line	3
* Correction Angle	-30
* Quick Angle	
* Invert	Off
* Sample Volume	0.5
* D PRF	11
Pseudo Color	0
D Dyn Rng	56
Synchro	Off
D WallFilter	1
Sweep Speed	2
D Freq	0

M Mode Menu	
* Sweep Speed	2
* Display Layout	U/D
* Rejection	0
* Dyn Rng	98
* Focus Pos	3
* B Freq	1
Pseudo Color	0
Line Average	0
Gray Map	5

Figure 5-5 System Status Menu

Measurement and calculation menu

Perform an operation. For instance, begin a distance measurement, and then the measurement cursor is displayed.

After entering B mode, press **Caliper** to display the menu below.

B MEAS	
* Distance	
* Cir/Area	▶
* Volume	▶
* Ratio	
* % Stenosis	▶
* Angle	
Histogram	

Figure 5-6 B Mode Generic Measurement and Calculation Menu

To enter application measurement menu, press **Probe** to select a desired probe model and the

exam mode, select B/Color/PDI/PW/M imaging mode, and then press **Measure**. For example, after the exam type **Obstetric** of relevant probe is selected, press **OK,** or double click on the exam type, press **B** to enter B mode, and then press **Measure**, the system displays the **B-Obstetric** application measurement and calculation menu, as shown below:

Figure 5-7 Obstetric Measurement and Calculation Menu in B mode

Secondary menu

The symbol "►" indicates that there is a secondary menu associated with the menu option. Roll the trackball to highlight the menu option with "►", the system displays a secondary menu for the selected option.

Example: The secondary menu of **Cir/Area** contains **Ellipse** and **Trace**, shown as below.

After entering B mode, press **Measure** to display the menu below, and highlight the option **Cir/Area**, the system will display the secondary menu **Ellipse** and **Trace**.
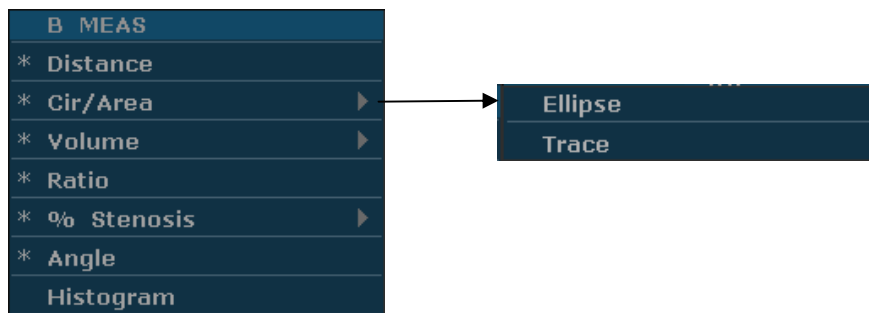
Figure 5-8 Secondary Menu
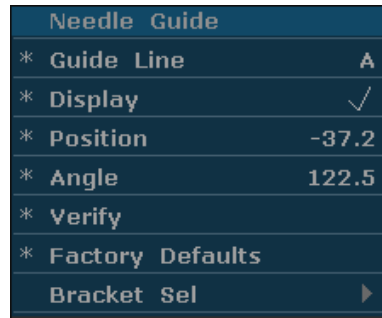
Figure 5-9 File Menu   Figure 5-10 Needle Guide Menu

5.6. Dialog Box Operation

The dialog box may have a few tabs, as shown below. You can select one tab at a time with trackball and **Set**. Also, you can modify the parameter following the prompt instruction, and then highlight **OK** and press **Set** to save the modified parameters and close the dialog box; or highlight **Cancel** to give up the modification and close the dialog box directly.
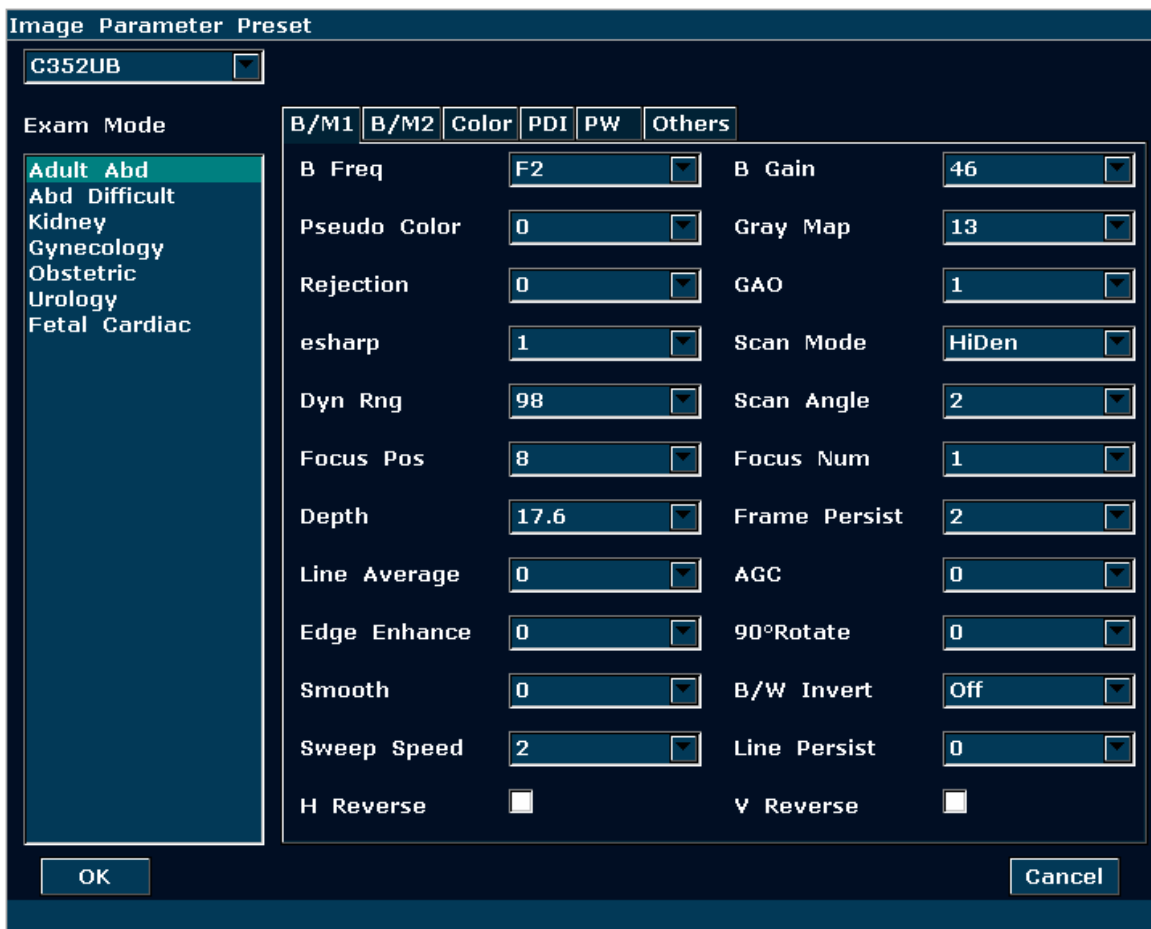
Figure 5-11 Image Parameter Preset Dialog Box

5.7. Presetting

5.7.1. Entering Presetting

Press **Preset**, and the system displays the preset menu, as shown below.
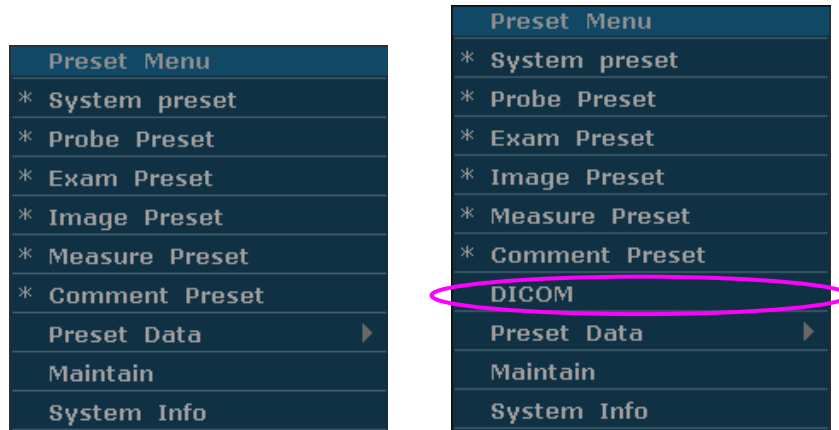
Figure 5-12 Preset Menu (the left—with no DICOM installed, and the right—with DICOM installed)

5.7.2. Displaying / Modifying Presetting Parameters

Select a type of preset and press **Set** to display the relevant dialog box, and you can modify the parameter following the prompt instruction.

Reference   Section *5.6 Dialog Box Operation*

5.7.3. System Preset

1. In preset menu, move the cursor to highlight **System preset** and press **Set** to display **System preset** dialog box, as shown below.

2. Roll the trackball to highlight an item and then press **Set**. Then use the keyboard to enter text.
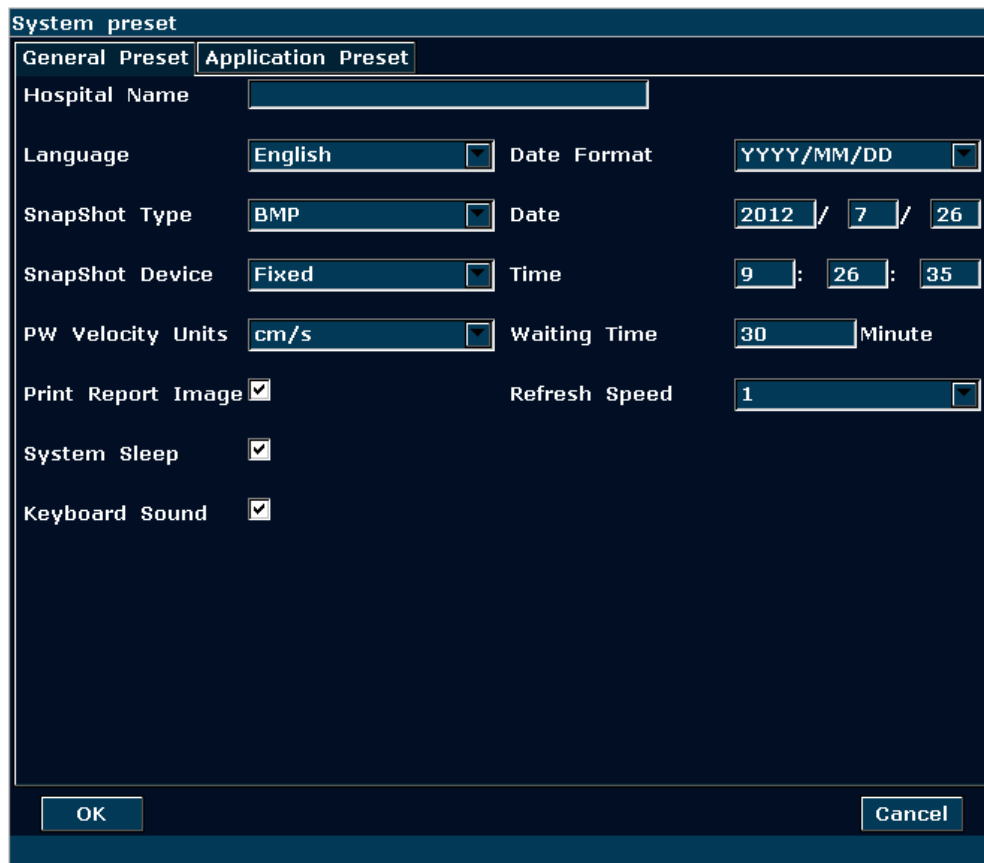
Figure 5-13 System Preset Dialog Box

Preset items	Options	Functions
Hospital Name	Input freely	Set hospital name displayed on the top left of the screen and diagnosis report.
Language	Chinese, English, etc.（The language options vary with language software installed.）	Set the system language
SnapShot Type	BMP/JPG/FRM/DCM (if DICOM is installed)	Set the storage file format type of snap shot.
SnapShot Device	Fixed, USB disk, or portable hard disk （A:\, B:\, C:\）	Set the storage device of snap shot.
PW Velocity Units	cm/s, kHz	Set the velocity units of PW spectrum
Print Report Image	√/ Null	Select whether to print image in report when using USB printer.
System Sleep	√/ Null	Select whether the device enters sleep mode when no operation is performed for certain minutes.
Keyboard Sound	√/ Null	Turn on or off the keyboard sound.
Date Format	Set freely	YYYY/MM/DD, MM/DD/YYY or DD/MM/YYYY.
Date	Set freely	Set the system date.
Time	Set freely	Set the system time, format: H/M/S.

| Waiting time | 5-60 min | Set the system waiting time to enter sleep mode (5-60 min), the default waiting time is 30 min, then screensaver is displayed and acoustic output is disabled. |
| Refresh Speed | 1-10 | Set the grade of refresh speed during system dormancy. |

Table 5-3 General Preset Information

Preset items	Options	Functions
Comment Active	Green/ Yellow/ White/ Red/ Orange	Set the color of the comment in active status.
Comment Inactive	Green/ Yellow/ White/ Red/ Orange	Set the color of the comment in inactive status.
Guide Line	Green/ Yellow/ White/ Red/ Orange	Set the color of the guide line.
TI	TIS,TIB,TIC	Select the application tissue of thermal index.
Brightness	0-14	Set the brightness of monitor
Color Temp	0-3	Set the tones of monitor color
Video Printer	MIT_CP910E, MIT_CP30W SONY_UP_20, SONY_UP_897MD MIT_P93W_Z	Select the video printer type, or set the default video printer model.
Video Color Type	Colorized/ Monochrome	Set the video color
Video Mode	PAL/NTSC	Set the video mode
Video Paper	Small/Large	Set the video printer paper size.
Report Printer	DJ3600, DJ4100, DJD2600, DJGeneric VIP, ColorLaser	Preset the default printer type, see table *Table 3-1* for the printer model.
Button F1/F2/F3/F4/P	None, Save Frame, Save Cine, Save AVI, File Manager, B/W invert and 90° Rotate, Send DCM Image (If DICOM function is purchased), Send Cine Images, Save Preset Data (F1 by default).	Define the F1/F2/F3/F4/P key, select one of the pull-down options.

Table 5-4 Application Preset Information

You must restart the system to validate the change, including **Language**, **Keyboard Sound**, and **Report Printer**. After you perform those presetting, and press **OK**, the system displays a confirm dialog box to prompt you whether to restart the system.

5.7.4. Probe Preset

In preset menu, move the cursor to highlight **Probe Preset** and press **Set** to display **Probe preset** dialog box, as shown below.
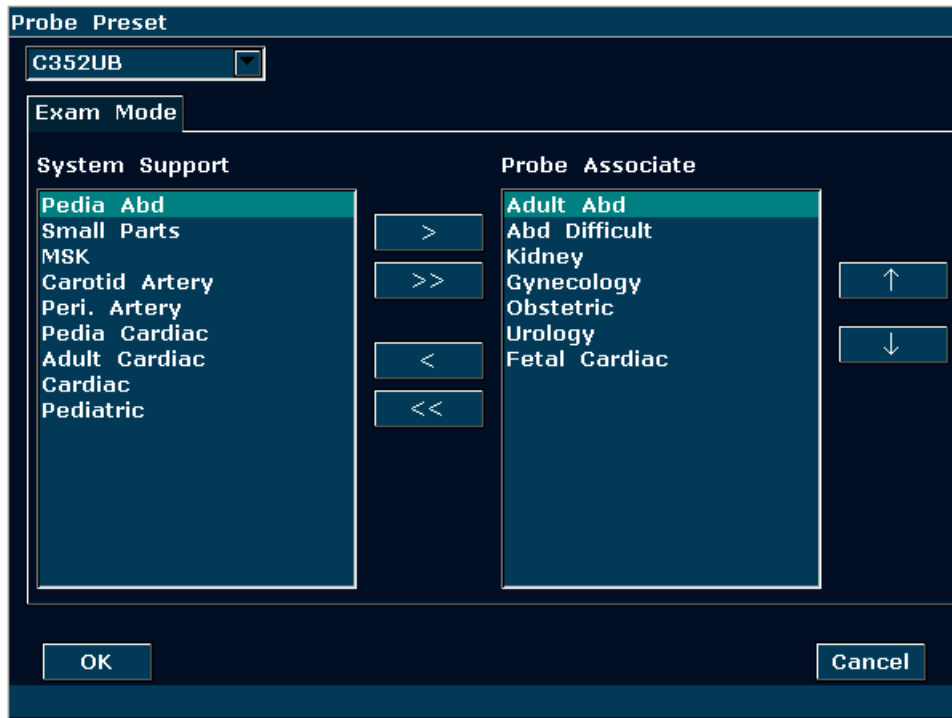
Figure 5-14 Probe Preset Dialog Box

The **Probe preset** dialog box displays probe selection and Exam mode selection. This page is used to assign an exam type to a specific probe.

Operation:

1. Select a desired probe: move the cursor onto the column "C352UB", and select the probe model you need through the pull-down menu.

2. Select exam mode for the probe: on the left side of the dialog box, you can view "System Support" box with all the exam modes supported by the system. On the right side of the dialog box, you can view "Probe Associate" box with the exam modes supported by the current probe. To add an exam for the current probe, select the exam from the "System Support" box and click on ⟩ to add it to the "Probe Associate" box. Click on ⟩⟩ to add all of the different exams from the left side to the right. To delete an exam associated with the current probe, select the exam first, and then click on ⟨ to delete it. To delete all of the exams associated with the current probe, click on ⟨⟨ to clear all.

3. Arrange the order of the associated exams: after the exams associated with the probe are set, you can select an exam, and click on ↑ or ↓ to adjust the order of it gradually.

4. Click on [OK] to confirm the modification, or click on [Cancel] to exit.

5.7.5. Exam Preset

Exam Preset is used to add exam mode, and set the application associated with the probe. Application types include abdomen, obstetric, gynecology, pediatric, small parts, urology, peripheral vascular, musculoskeletal, and cardiac.
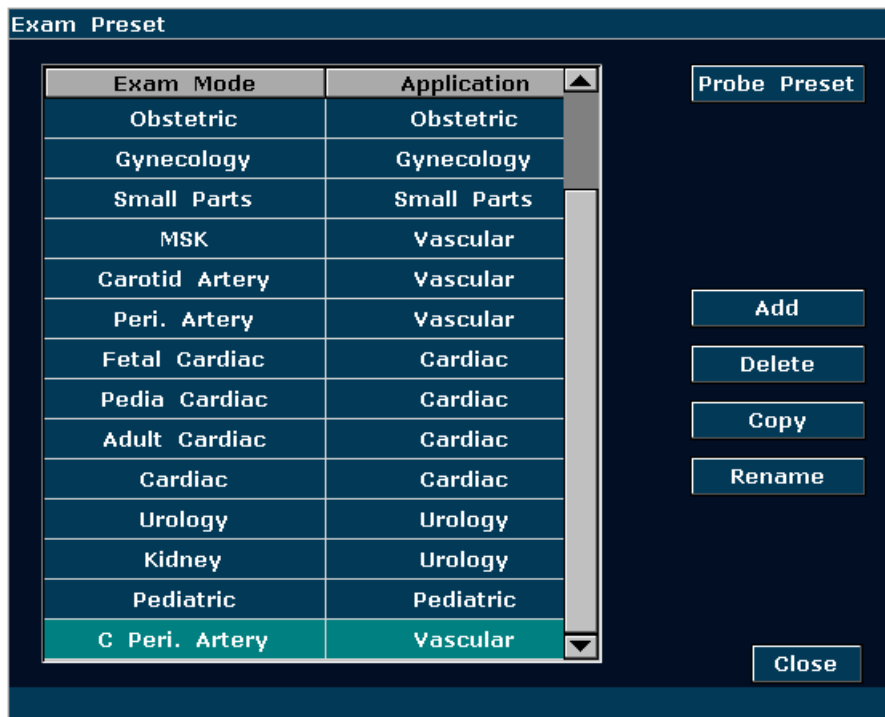
Figure 5-15 Exam Preset Dialog Box

Operation:

➢ Select a desired exam mode, and click on **Copy** to get a copy of the exam, then you can define applications associated with this new exam. For example, after the exam "**Peri. Artery**" is selected, press **Copy**, you will get "**C Peri. Artery**", a copy of the exam "**Peri. Artery**'. To rename the "**C Peri. Artery**", click on **Rename.** To set a probe model for this exam, press **Probe Preset.**

➢ Select a desired exam mode, click on **Delete**, the system displays a confirm dialog box to prompt you whether to delete the exam, Click on **Yes** to delete the exam, or click on **No** to exit.

➢ Press **Add** to display the **Add new Exam Mode** dialog box, as shown below. Input an exam name in the "Exam name" blank, select an application you need, and press **OK** to close the dialog box, then a new exam mode will be displayed in the **Exam Preset** dialog box,
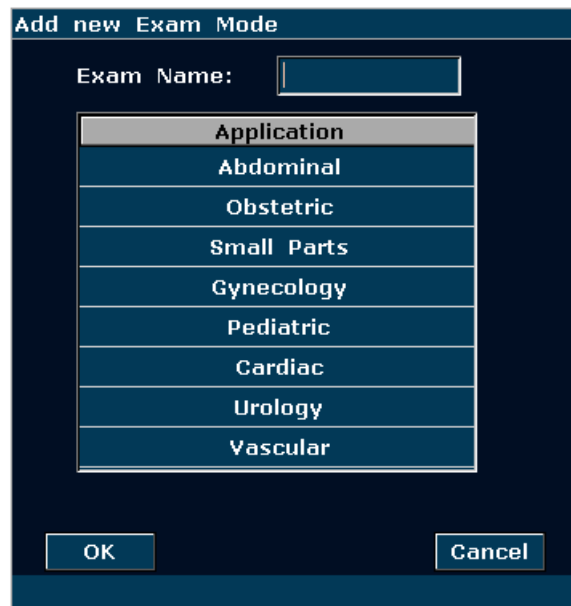
Figure 5-16 Add new Exam Mode Dialog Box

NOTE：

The default exam modes can not be deleted or renamed.

➢ To configure relevant parameters for the newly added exam mode, such as probes, or image parameters, press **Probe Preset** or **Image Preset** on preset menu.

5.7.6. Image Parameter Preset

Image parameter preset is used to set image parameters for a specific probe in a specific exam mode. Parameters for each image mode are different, but the setting ways are similar. See the example of image parameter preset shown as below, for the probe C352UB in Color Mode, Adult Abd exam:
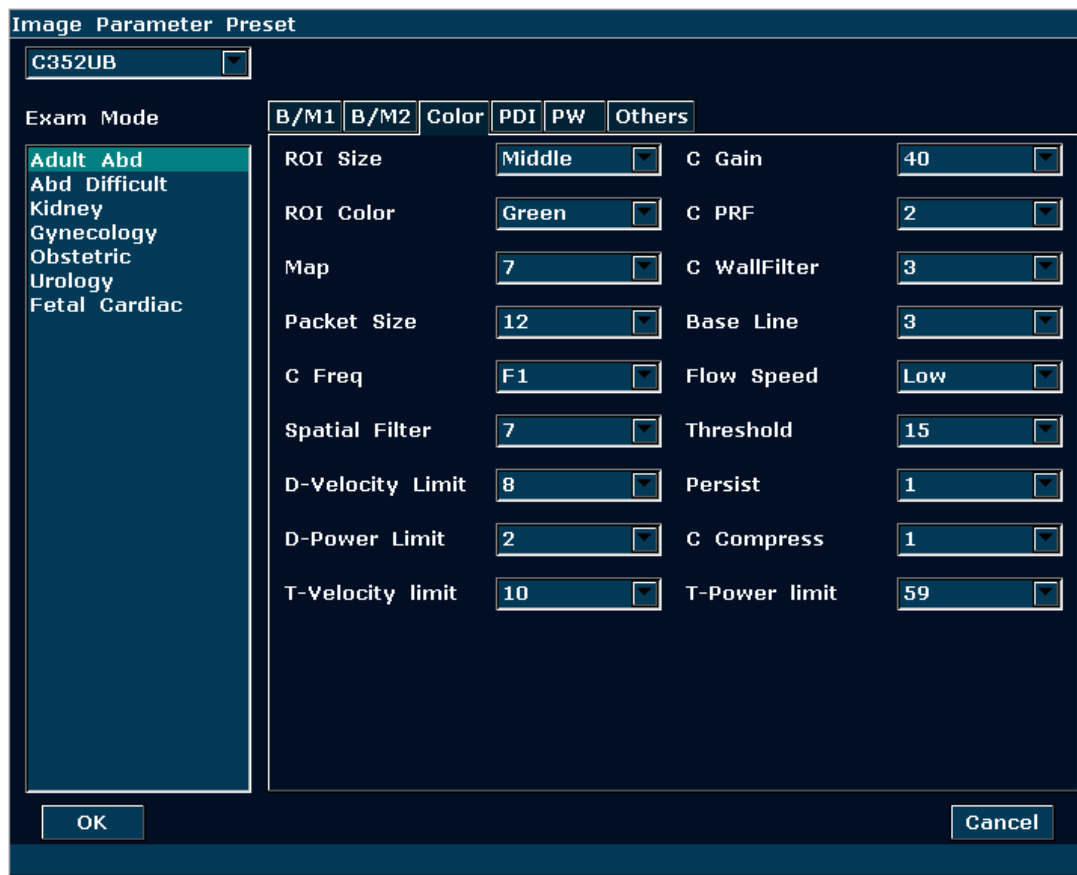
Figure 5-17 Image Parameter Preset Dialog Box
(For probe C352UB in Adult Abd exam, Color Mode)

In the preset menu, move the cursor to highlight **Image Preset** and press **Set** to display **Image Parameter Preset** dialog box. The Exam Mode field on the left side of the dialog box displays all exam modes supported by the probe. While the right side of the dialog box displays all parameter settings for the probe in different image modes.

Select probe C352UB from the probe pull-down menu firstly. Move the trackball to highlight **Adult Abd** in the Exam Mode Column and press **Set,** roll the trackball onto the **Color** tab to enter Color Mode image parameter presetting page for the probe C352UB, Adult Abd exam. You can set the parameters by selecting an option from the pull-down menu, or ticking on the option.

The following are part of the parameters:

Preset Items	Options	Functions
Depth	1.9 cm-32.4 cm（C352UB）	Set examine depth.
Focus Num	1/2/3/4	Set the number of focuses.
Scan Mode	HiDen/HiFPS	Set scanning density.
Scan Angle	0-3	Set the sector angle for curve probes, and the scan width for linear probes, providing a larger field of view in the far field.

Line Persist	0-7	Set image line correlation.
B Freq	F1/F2/F3/TH1/TH2 (5 levels of frequency)	Set the frequency of probe
Gray Map	0-14	Selects the post-processing gray curve map
Sweep Speed	0/1/2/3	Set the M mode sweeping speed.
B Gain	0-130	Set the gain of B image, in 2 increments.
GAO	0-3	Set the Gray scale Automatic optimization
H Reverse	√ / Null	Set the attribute of Horizontal reversal.
V Reverse	√ / Null	Set the attribute of Vertical reversal.
esharp	0-7	Eliminate from the B mode image of low level echoes resulting from speckle noise. Thin image granules, enhance the image boundary layers, and reserve more details of the image.
B/M Display	U/D, L/R	Set the display layout of dual-split mode B+M: Up/Down, Left/Right.
GAC	0-7	Enhance penetrability of images, and reduce noises. This function is more useful especially for liquid areas.

Table 5-5 B/M Mode Image Parameter Preset Information

Preset Items	Options	Functions
ROI Size	Small/Middle/Large	Set the size of ROI of Color Mode
ROI Color	Yellow/Green	Set the frame boundary color of ROI
Flow Speed	Low/High	Set the CFlow Speed
Base Line	0-6	Adjust the velocity range of forward flow /reverse flow to minimize aliasing by displaying a faster forward flow or reverse flow.
Persist	0-7	Eliminate the low level echoes caused by noise to make the Color flow imaging more stable.
C Gain	1-80, in increments of 1	Set Color gain in the Color mode
C WallFilter	0-7	Filter out low flow velocity signals in order to hide unusable motion. It helps to get rid of motion artifacts resulted from breathing and other patient motion

| Map | In Color mode:0-7
In PDI mode:
0-7 (PDI)
8-11 (DPDI) | For Color Doppler mode, you can choose whether Color Doppler data is shown in the standard Rainbow color map, or a Red-Blue color map |

Table 5-6 Color/PDI Mode Image Parameter Preset Information

Preset Items	Options	Functions
D Gain	1-80, in increments of 1	Set the gain of PW image
Sample Volume	0.5-20.0	Set the size of the sample volume.
D PRF	0-15，0.9kHz-14.7KHz	Set the level of PRF.
D WallFilter	0-3	Set the level of wall filter.
Steer	0-2	Set the position of the sample line (for linear probes).
Invert	√/ Null	Vertically inverts the spectral trace without affecting the baseline（above/ below the base line））
Base Line	0-6	Change the Doppler spectrum baseline to accommodate higher velocity blood flow. Minimize aliasing by displaying a greater range of forward flow with respect to reverse flow, or vice versa.
Pseudo Color	0-6	Set the colorization colors.
Correction Angle	-90°-90°	Set the correction angle.
Sound Volume	0~7	Set the volume of Doppler.

Table 5-7 PW Mode Image Parameter Preset Information

To set a default exam mode for a probe:

1. After a probe model and exam mode is selected, roll the trackball onto "**Others**" tab and press **Set**.

2. The system displays Default Image Mode page, as shown below, then select one default exam mode you need from the pull-down menu.

3. Click on **OK** to confirm the setting, or click on **Cancel** to exit.
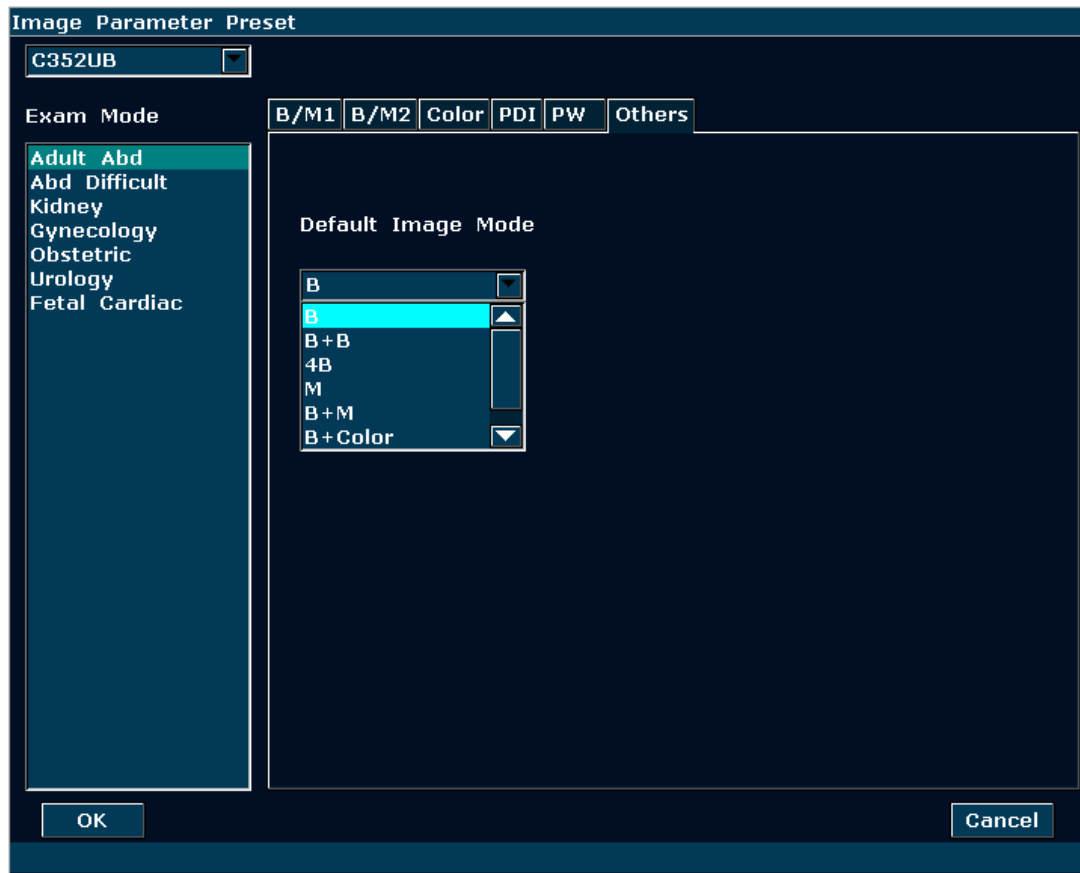
Figure 5-18 Default Image Mode Preset Dialog Box

5.7.7. Measurement Preset

In the preset menu, move the cursor to highlight **Measure Preset** and press **Set** to display **Measure Preset** dialog box, as shown below:

Figure 5-19 Measure Preset Dialog Box

Parameter	References	Parameter	References
GS	Tokyo Hellman Rempen China	CRL	Tokyo Hadlock Hansmann China Robinson
BPD	Tokyo Hadlock Merz Rempen Osaka China	EFW	Tokyo Hadlock1 Hadlock2 Hadlock3 Hadlock4 Shepard Campbell Merz1 Merz2 Hansmann Osaka
AC	Hadlock Merz	FL	Tokyo Hadlock China Jeanty Merz Osaka
HC	Hadlock, Merz	HUM	Jeanty
FTA	Osaka	CER	Goldstein
THD	Hansmann	BSA	Oriental, Occidental

Table 5-8 Measurement Preset Information

5.7.8. Comment Preset

There are eight tabs of comment library: generic, abdomen 1, abdomen 2, obstetric, cardiac, small parts, lesion 1 and lesion 2. Each tab has a few sets of comments defined at factory, and you can create up to 6 user-defined comments for each tab. Creating a comment library for a patient report saves your time, especially for recurring examinations. You can quickly add a comment by using the **Add** button.

Operation procedure:

1. Press **Preset** on the keyboard to activate the presetting function.

2. Roll the trackball to highlight **Comment Preset** and then press **Set**. Then the **Comment Preset** dialog box is displayed, as shown below:
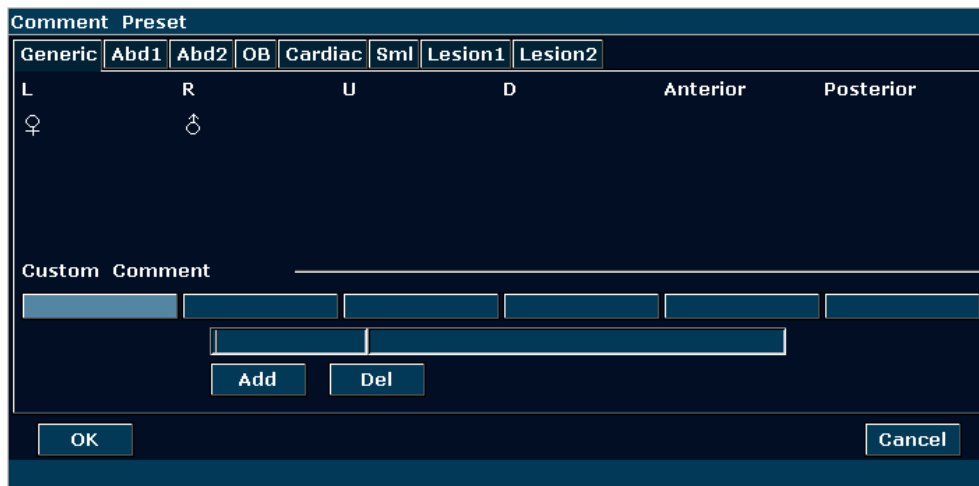
Figure 5-20 Comment Preset Dialog Box

To create text for text list:

Take **Generic** for instance:

1. Press **Generic** to open the **Generic comment library**.

2. Roll the trackball to highlight one of the custom comments, and press **Set**.

3. Roll the trackball to highlight the left side frame of Custom Comment, and press **Set**. Then the cursor turns to "I", as shown below. You can enter comment with the keyboard.

Figure 5-21 Custom Comment Library

4. Roll the trackball to highlight the right side frame of Custom Comment, and press **Set**. Then the cursor turns to "I", as shown below. You can enter some detailed help information about the new created comment with the keyboard.

Figure 5-22 Custom Detailed Information of Comment Library

5. Roll the trackball to highlight **Add** to add the new created comment to Generic.

6. Press **OK** to save the modification, or press **Cancel** to give up and close the dialog box.

To delete text from text list:

1. Press **Generic** to open the **Generic comment library**.

2. Roll the trackball to highlight the created comment, and press **Set**.

3. Press **Del** to delete the created comment.

4. Press **OK** to save the modification, or press **Cancel** to give up and close the dialog box.

5.7.9. Presetting Data

Press **Preset**, roll the trackball to highlight **Preset Data**, and press **Set**. You can view three options in Preset Data submenu: **Save As, Load** and **Factory Default.**

To save preset preferences, select **Save As;** to load existing preset preferences, select **Load;** to restore factory default presetting, select **Factory Default.**

➢ To Save Preset Data

This function is used to save all user preset data to a designated disk for back-up. The format of the data file is .DAT.

Steps:

1. Roll the trackball to highlight **Save As** and press **Set**. The system displays the **Preset Data Save As** dialog box, as shown below.
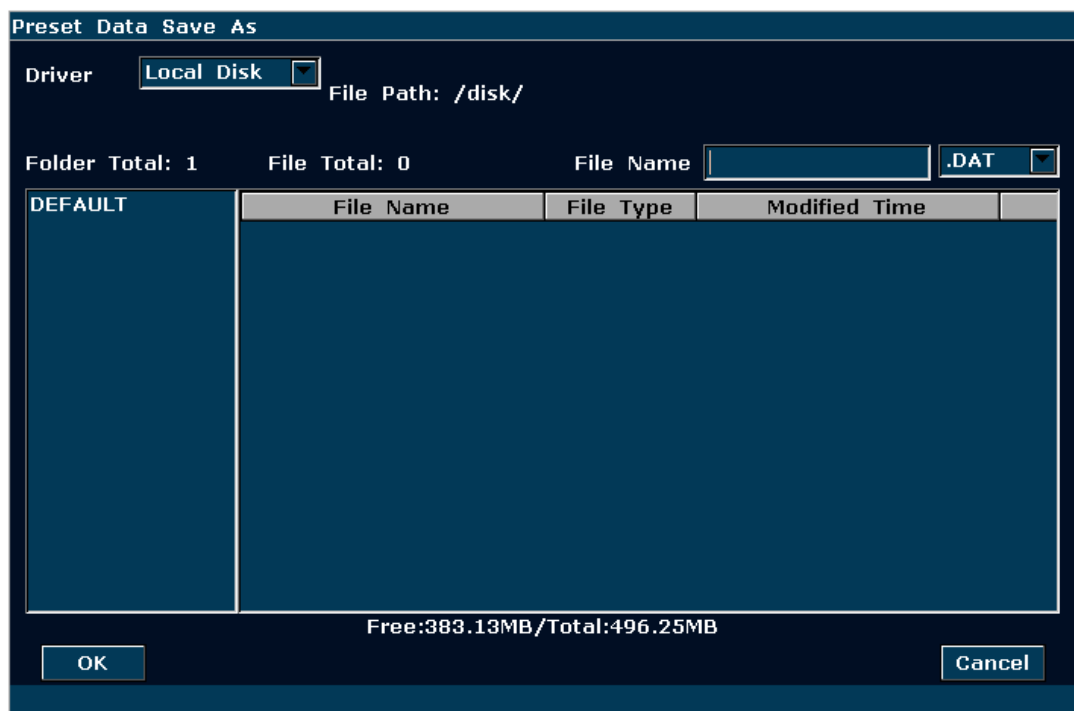
Figure 5-23 Preset Data Save As Dialog Box

2. Select the destination driver and input the file name.

3. Click on **OK** to close the dialog box, then the preset data will be saved to the designated disk and file.

➢ To Load existing Preset Data

This function is used to load the existing preset data to the preset data memory of the system. The system will be reset and operate according to the newly loaded preset data.

Steps:

1. Roll the trackball to highlight **Load** and press **Set**. The system displays the **Preset Data Load** dialog box, as shown below.
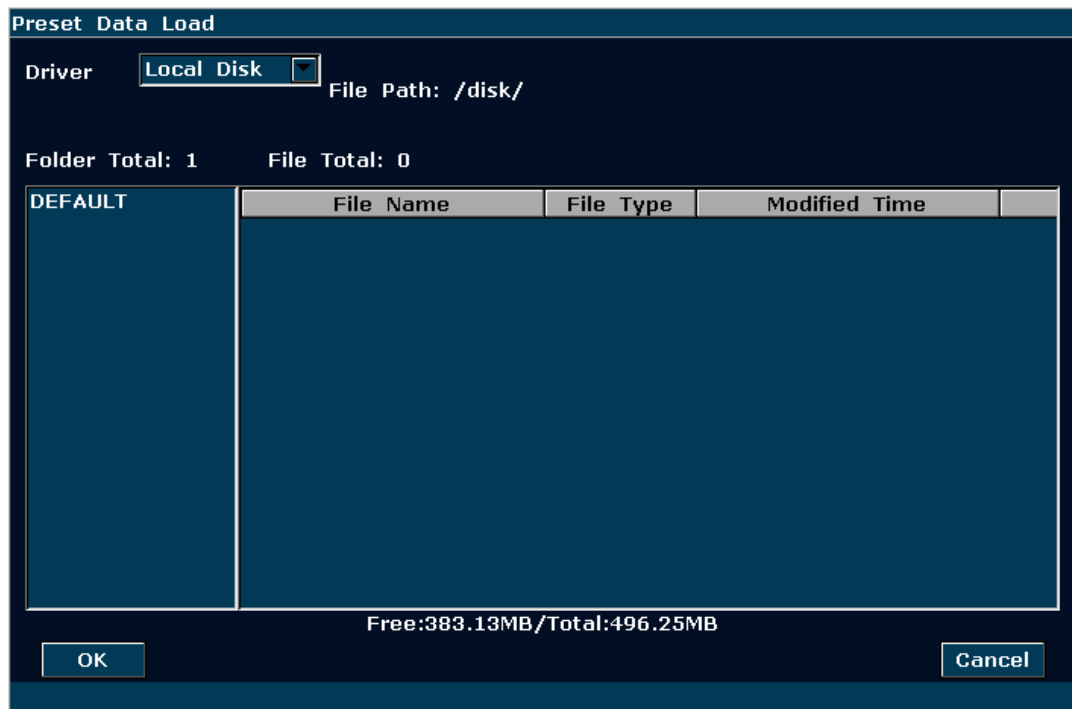
Figure 5-24 Preset Data Load Dialog Box

2. Select the preset data file and click on **OK**.

3. The system will be reset and operate according to the newly loaded preset data

WARNING

Be careful, if you confirm to load existing preset data, all of the previous preset will be cleared, and the system will operate according to the newly loaded preset data.

➢ To Restore Factory Default Presetting

Roll the trackball to highlight **Factory Default** and press **Set**. The system will restore the factory presetting.

WARNING

Be careful, if you confirm to restore factory default presetting, all of the previous preset will be cleared, and the system will restore preset data at factory.

5.7.10. Presetting DICOM

If you have installed the DICOM software, perform the DICOM presetting as shown below.

Figure 5-25 DICOM Preset

Item	Description	
System AE Title	The same as the title set in the **AE Title** of **Local**	
Institution Name	Set the name of the institution	
Local	AE Title	Set the local AE title
	Host Name	Set the local host name
	IP Address	Set the local IP address
	Port	Set the local port
	Alias	Set the alias of the local system
	Package Size	Set the PDU transmission package size, from 4K to 64K, and the default value is **16K**.
Server 1/2	AE Title	Set the server AE title, the same as the **System AE Title** displays
	Host Name	Set the server host name
	IP Address	Set the server IP address
	Port	Set the server port
	Alias	Set the alias of the server
	Package Size	Set the PDU receiving package size, from 4K to 64K, and the default value is **16K**.
Verify	After presetting the server information, press **Verify** to verify the server's connection.	
Current Server	To choose the current server that is connected to the system.	

Table 5-9 DICOM Presetting Information

Press **OK** to save the presetting and exit, or **Cancel** to exit without saving the presetting.

NOTE:

1.   Do not set a same IP Address for the local system and the server.

2.   Ensure that you have turned on the server before verifying it.

5.7.11. Maintenance

The maintenance can be only done by EDAN authorized personnel.

5.7.12. System Information

In the preset menu, move the cursor to highlight **System Info** and press **Set** to display System information interface, as shown below:

Figure 5-26 System Information Interface

5.8. Printing

To connect a video printer:

1.   Connect **VIDEO IN** (video input) of the video printer to **S-Video Output** or **Video Output** of the main unit.

2.   Connect **REMOTE** of the video printer to **REMOTE** of the main unit.

3.   Check the printer, referring to the printer user manual.

4.   Make sure the **Report Printer** and **Print Report Image** options in the **General Preset** window are set correctly.

5.   Run the printer.

Video printing:

Press **Print** on the keyboard to print the image currently displayed.

To connect a USB printer:

1.   Connect the USB printer via the USB port.

2.   Check the printer, referring to the printer user manual.

3.   Check the **Report Printer** and **Print Report Image** in **System Preset**.

4.   Enter the desired worksheet to edit the examination and diagnosis information.

5.   Run the printer.

USB printing:

Press **Print** of the worksheet dialog box. Printer begins to print.

Print area:

The print area includes: information field, image field, parameter field, and measurement results field.

NOTE:

1.   When using a monochrome printer, preset the video color to "monochrome" through **System Preset>Application Preset**; When using a color printer, EDAN recommends you to preset the video color to "Colorized", but "monochrome" is also workable.

2.   Before printing, make sure there is enough paper for printing.

3.   Before printing, make sure the presetting printer type is correct.

4.   Before printing, make sure the printer power cord and the USB cable are connected well.

5.   Do not cut off the printer power supply or the USB cable during printing.

6.   If the printer can not work normally, please restart the printer and the U50.

7.   Do not connect two USB printers to the U50, otherwise, abnormal printing may occur.

Chapter 6 Operation

6.1. Entering or Editing Patient Information
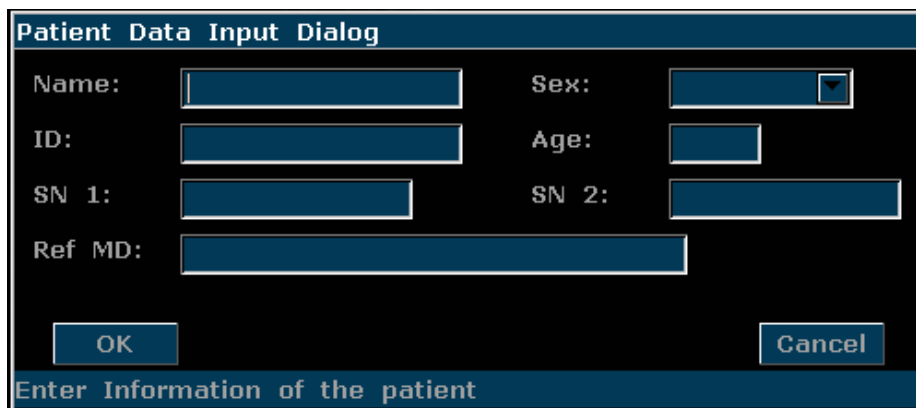
NOTE:

Before a patient exam, **EndExam** should be pressed. Pressing **EndExam** will automatically erase all cache memory (Including patient data, comments, measurements, calculations and reports of the last exam，except for archived Images.)

<u>**CAUTION**</u>

To avoid patient information errors, always check the information with the patient. Make sure the correct patient information appears on all the screens and reports.

Press **Patient** to activate the patient data annotation function, and then enter or edit the patient data, as shown below:

Figure 6-1 Patient Data Input Dialog Box

To switch the input text box: press **Enter**;

To enter the patient information, use the keyboard;

To exit: select **OK** or **Cancel**, and then press **Enter** or **Set**.

6.2. Selecting a Probe and an Examination Type

Connect a probe to the system, and press **Probe** to open a dialog box as shown in the figure below. Roll the trackball to select a desired exam type corresponding to the probe. such as abdominal, obstetric, gynecology, pediatric, small parts, urology, peripheral vascular, musculoskeletal (conventional and superficial), and cardiac exams. Press **OK,** or double click on the exam type to confirm.
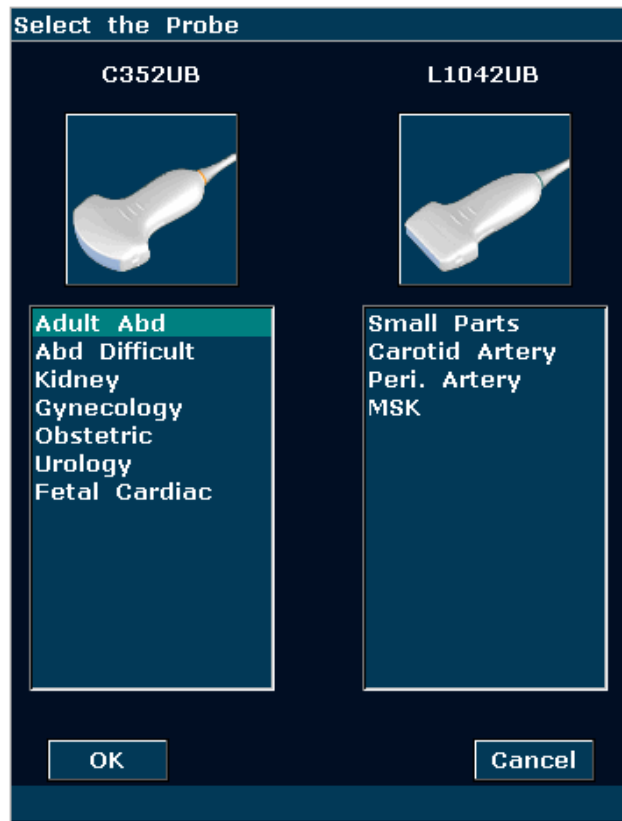
Figure 6-2 Probe and Examination Selection Menu

While multiple probes are connected to the ultrasound system, only one can be activated at a time. The model of the activated probe is displayed in the top right corner of the screen.

Press **Freeze** to activate or deactivate a probe. In frozen status, the "Freeze" icon ❄ is displayed on the upper right part of the screen.

WARNING

DO NOT activate intra-corporeal transducers outside the patient's body (such as E612UB). Otherwise, EMC requirements will not be met and harmful interference to other devices in the environment may be caused.

NOTE:

You can preset examination types for each probe in **Probe Preset**, see section *5.7.4 Probe Preset.*

The system limits patient contact temperature to 43℃, and the acoustic output below the FDA maximum acoustic output limits for track 3. A power-protection circuit is used to prevent over-current conditions. If the power monitor protection circuit detects an over-current condition, then the drive current to the probe is cut off promptly, preventing overheating of the probe surface and limiting acoustic output. Validation of the power protection circuit is performed during normal operation.

6.3. Selecting an Imaging Mode

The system will display the default mode after it is powered on. You can select an imaging mode

by pressing (B), (Color), (PW), (M), [□□], [▦], or [PDI] and then begin an examination.

📖 Reference   Section *5.4.5 Imaging Functions* and section *5.2Examining*

6.4. Image Adjustments

The U50 also provides the following additional control functions, which are available through status menus and Menu Controls panel.

Control Functions	Description	Parameter Range	Operations
B Gain	Increases or decreases the amount of echo information. It may brighten or darken the B mode image.	0-130, in increments of 2	Gain Knob
eSRI (Speckle Resistance Imaging)	Eliminates from the B mode image of low level echoes resulting from speckle noise. Thin image granules, enhance the image boundary layers, and reserve more details of the image.	0-7	Menu Controls
Spatial Comp (Spatial Compounding Imaging)	This function is used to increase target signals, weaken the speckle noises, enhance image contrast of the target area, and decrease influences of sound shadow, ultrasound loss and the occurrence of reverberation.	On/Off	
Dyn Rng (Dynamic Range)	Adjust the gray display range of B image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30db-150db	
Focus Pos (Focus Position)	Adjust the position of focuses.	0-15	
F. Number	Set the number of focuses.	1-4	
B Freq	Set the frequency of probe.	5 levels	
Pseudo Color	Set the colorization of a conventional B/PW mode image to enhance the visibility so as to distinguish B, M and PW mode intensity.	6 types	

Frame Persist	Remove the bright spot noise that appears randomly in B mode image. The bigger the value the stronger the effect, but the frame rate will not be affected.	0-7	Menu Controls
ScanMode	Selects the scan mode. In same conditions, the frame rate in High FPS mode is twice as much as that in High density mode.	High density or High FPS (frame rate, in frames per second)	
Gray Map	Adjust the gray scale distribution to obtain the optimum images.	0-14	
Rejection	Eliminates from the B mode image of low level echoes resulting from flicker noise. 0 represents no Rejection. The bigger the value, the stronger the effect.	0-7	
ScanAngle (sector angle/ scan width)	Adjusts the sector angle for curve probes, and the scan width for linear probes, providing a larger field of view in the far field. The larger angle, the faster frame rate, and vice versa.	0-3	
90° Rotate	Rotate the image by 90 degrees (in B mode).	90°,180°,270°	User-defined keys （F1/F2/F3/F4/P） Or Image Parameter Preset
Line Average	Adjust to smooth the image horizontally so as to smooth the tissue display.	0-7	
AGC	Adjust to balance the image, in order that the density of echoes is the same throughout the image.	0-3	
B/W Invert	Set the color to black or white.	On/Off	
H Reverse	Set the attribute of Horizontal reversal.	/	Press ⊞ on PC keyboard
V Reverse	Set the attribute of Vertical reversal.	/	Press ⊞ on PC keyboard
M/D Sample Line	Set the position of sample before entering PW mode. Press to display or hide the sample line.	/	Press ⊞ on PC keyboard
Dual	Press to select Dual, and press it again to switch between a live or frozen, single or multi-mode A/B split screen display.	/	Press ⊞ on PC keyboard
Quad	Press to select Quad, and press it again to cycle through a live or frozen A/B/C/D single or multi-mode split screen display.	/	Press ⊞ on PC keyboard

Table 6-1 B Mode image parameters

Control Functions		Description	Parameter Range	Operations
Color Gain		CFM: Increase the overall strength of color flow echoes, but the color map will not be affected. PDI: Power Doppler Imaging. The larger the gain the more number of reflectors and the brighter of the PDI map.	1-80, in increments of 1	Gain knob
Scan area of Color Mode (ROI)	Size	/	The maximum height of ROI is only 1/2 of the physical height of the image field.	Trackball. By default, roll the trackball to position the ROI, and press **Set** to switch to ROI size adjusting status.
	Position	/	Within B Mode imaging area	
	Color	/	Yellow/Green	Image Parameter Preset
Map		Each map displays velocity/power according to colors. In PDI mode, 12 kinds of maps are provided: 0-7 belong to Power Doppler Imaging (PDI) Mode maps. While, 8-11 belong to Directional Power Doppler Imaging (DPDI) Mode maps.	In Color mode:0-7 In PDI mode: 0-7 (PDI) 8-11 (DPDI)	Menu controls
Invert		Reverse the color of blood flow. False: Red toward (positive velocities) and Blue away（negative velocities） True: opposite to the above.	On/Off	
Dual Live		On: the window will be automatically switched to the dual real-time status (the left one is B image, and the right one is B+Color/PDI image). Off: non-dual-live status.	On/Off	
C WallFilter		Filter out low velocity flow signals in order to hide unusable motion. It helps to get rid of motion artifacts caused from breathing and other patient motion. The bigger the value, the more signals of low velocity will be filtered out.	0-7	
Persist		The bigger the value, the more persistence among frames, and the more continuity of color maps.	0-7	
C PRF		Adjust to raise or lower the flow velocity range. The bigger the value, the higher the maximum velocity will be detected. Frame rate will be affected by excessive lower PRF. Aliasing may occur if low velocity range is set for high velocity flow.	0-15	

Base Line	Adjust the velocity range of forward flow /reverse flow. Minimize aliasing by displaying a greater range of forward flow or reverse flow.	7 levels	Menu Controls
Packet Size	The bigger the value, the stabler the flow signals, but the frame rate will be decreased. Adjust properly according to practical applications.	4 levels: 8,10,12,14	
Smooth filter	Adjust to smooth out the color image. Similar to spatial smooth. The bigger the value, the stronger the effect.	0-7	
Threshold	Set the gray scale level at which strong echoes inside vessel walls will be rejected. The smaller the value, the lower the gray scale level, and the more gray scales will be recognized as echoes inside vessel walls, and the information will be rejected.	0-15	
C Freq	The lower the frequency, the better the force of penetration; the higher the frequency, the better spatial resolution.	2 levels	
Angle Steer	Adjust the ROI steering angle of the Color Flow linear image to get more information without moving the probe. The Angle steer function only applies to linear probes.	-10°,0°,10°	Press or on PC keyboard

Table 6-2 Color/PDI Mode image parameters

Control Functions	Description	Parameter Range	Operations
PW Gain	Increases or decreases the amount of echo information. It may brighten or darken the PW mode image.	1-80, in increments of 1	Gain knob
Position of sample volume	The sample volume can be positioned anywhere within B images; In B+ Color/PDI+PW mode, the sample box moves with sample volume.	/	Trackball
Base Line	Adjust the baseline position. It helps to increase positive/negative spectral range for evaluation.	7 levels	Menu controls
Correction Angle	The correction line should be set parallel to the sample vessel. Correct the PW velocity caliper to obtain accurate measurement of velocity.	-90°-90°	

Quick Angle	Adjust the correction angle faster in increments of 30°.	-90°-90°	Menu controls
Invert	Vertically inverts the spectral trace without affecting the baseline. False: Above the baseline (towards the probe, positive velocities) and below the baseline（away from the probe,. negative velocities） True: opposite to the above.	On/Off	
Sample Volume	The echoes information in the sample volume is used to evaluate spectral. Adjust the sample volume properly and keep it within the sample area.	0.5-20.0, 16 levels	
D PRF	Adjust to raise or lower the flow velocity range. The bigger the value, the higher the maximum velocity will be detected. Frame rate will be affected by excessive lower PRF. Aliasing may occur if low velocity range is set for high velocity flow.	0-15	
Pseudo Color	Set the colorization of a conventional B/PW mode image to enhance the visibility so as to distinguish B, M and PW mode intensity.	6 types	
D Dyn Rng (Dynamic Range)	Adjust the gray display range of B image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30-90db in increments of 2	
Synchro (Synchronization)	Set whether B (B+Color) and PW images are displayed synchronously.	On/Off	
D WallFilter	Insulate the Doppler signal from excessive noise caused from vessel movement The bigger the value, the more low velocity signals will be filtered out.	0-3	
Sweep Speed	Adjust the scanning speed level of the PW mode image.	0-5	
D Freq	The lower the frequency, the better the force of penetration; the higher the frequency, the better spatial resolution.	2 levels	

Volume of PW mode	Decrease/ increase the volume of Doppler; Or mute the sound.	7 levels	Press one of the three keys on PC keyboard
Angle steer	Adjust the steering angle of the sample line. The angle steer function only applies to linear probe.	-10°,0°,10°	Press one of the two keys on PC keyboard
M/D Sample Line	Set the position of sample before entering PW mode.	Display/hide	Press on PC keyboard

Table 6-3 PW Mode image parameters

Control Functions	Description	Parameter Range	Operations
M Gain	Increases or decreases the amount of echo information. It may brighten or darken the M mode image.	0-130, in increments of 2	Gain knob
M-Mark	Position the sample line.	Within B Mode image area	Trackball
Sweep Speed	Adjust the scanning speed level of the M mode image.	0-3	Menu controls
Display Layout	Set the display layout of dual-split mode of B+M: Up/Down, Left/Right.	U/D, L/R	
Rejection	Eliminates from the B mode image of low level echoes resulting from flicker noise. 0 represents no Rejection. The bigger the value, the stronger the effect.	0-7	
Dyn Rng (Dynamic Range)	Adjust the gray display range of B image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30-150db	
Focus Pos (Focus Position)	Adjust the position of focuses.	0-15	
B Freq	Set the frequency of probe.	5 levels	
Pseudo Color	Set the colorization of a conventional B/PW mode image to enhance the visibility so as to distinguish B, M and PW mode intensity.	6 types	
Line Average	Set image line softening attribute.	0-7	
Gray Map	Adjust the gray scale distribution to obtain the optimum images.	0-14	

Table 6-4 M Mode image parameters

eSRI	Spatial Comp	Dyn Rng	Focus Pos	F.Number	B Freq
3	On	98	3	1	1

B Mode（Page 1）

Pseudo Color	Frame Persist	ScanMode	Gray Map	Rejection	ScanAngle
0	3	HiDen	5	0	3

B Mode（Page 2）

Map	Invert	Dual Live	C WallFilter	Persist	C PRF
7	Off	Off	2	2	3

Color Mode（Page 1）

Base Line	Packet Size	Smooth filter	Threshold	C Freq
3	12	2	15	0

Color Mode（Page 2）

Base Line	Correction Angle	Quick Angle	Invert	Sample Volume	D PRF
3	-30		Off	0.5	11

PW Mode（Page 1）

Pseudo Color	D Dyn Rng	Synchro	D WallFilter	Sweep Speed	D Freq
0	56	Off	1	2	0

PW Mode（Page 2）

Sweep Speed	Display Layout	Rejection	Dyn Rng	Focus Pos	B Freq
2	U/D	0	98	3	1

M Mode（Page 1）

Pseudo Color	Line Average	Gray Map
0	0	5

M Mode（Page 2）

Figure 6-3 Menu Controls Field of Image Parameter Adjustment

After the image adjustments, press **Save Preset Data** (user defined key F1/F2/F3/F4/P) to save the image parameter presetting to the user-defined exam mode. The system prompts you to enter a new exam name if the current exam mode is a default one; if the current exam mode is already a user defined one, the image preset data will be saved to the current exam mode.

6.5. Generic Measurements and Calculations

Measurement and calculation functions are contained in each examination type and imaging mode. All of the measurements and calculations can be processed in real-time, frozen status, zoomed status or cine review status.

The general Measurements of B/Color Mode include: Distance, Cir/Area (Ellipse/Trace), Volume, Ratio (2-Axis/3-Axis), % Stenosis, Angle, and Histogram.

The general Measurements of M Mode include: Distance, Time, Slope and Hear Rate (two cycles).

The general Measurements of PW Mode include: Velocity, Heart Rate, Time, Acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto (auto trace).

Distance and circumference will be presented in mm; area, in mm^2, cm^2, or dm^2; volume, in mm^3, cm^3, dm^3, mL or L; time in ms or s, and heart rate in bpm, etc.

After entering B/Color/PDI/PW/M mode, press **Caliper** to activate the B/Color/PDI/PW/M mode generic measurement function, and the light will be on.

There is one type of mark in B mode measurement: "+".

There are three types of marks in M mode measurement: "+", big "+", and a line.

The measurement results will be displayed in real-time. After measurement, the outcome is displayed in measurement result window with a serial number. You can measure one to four groups of data. If you continue to measure, the earliest group will be automatically covered by the newest one.

NOTE:

1. When you exit measurement status, or press **EndExam**/**Clear,** all the measurements will be cleared.

2. During general measurement, press **Back** to delete the previous operation.

3. After a complete general measurement, press **Back** to erase a measurement at a time.

The generic measurements and calculations include four sets of measurement calipers, four sets of ellipses, four sets of measurement results at most.

6.5.1. Generic Measurements in B Mode

The default measurement of B mode is distance measurement. B mode measurement menus are shown as follows:
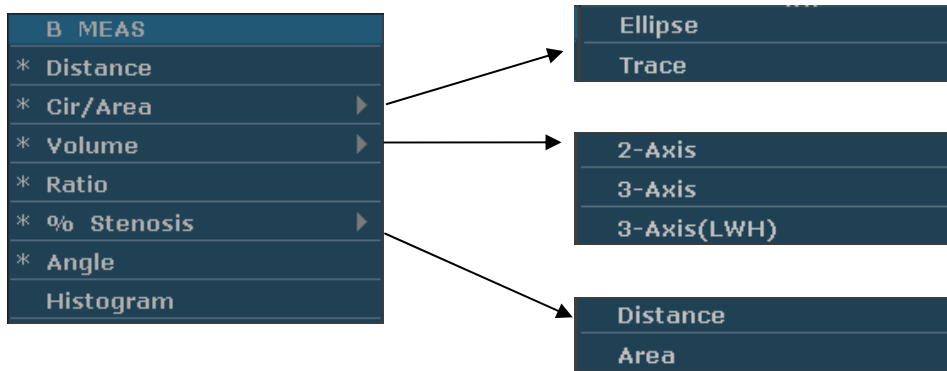
Figure 6-4 B Mode Generic Measurement and Calculation Menu

Distance

To measure distance:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **Distance**, press **Set** to activate a measurement cursor "+" on the screen.

3. Roll the trackball and press **Set** to anchor the start point.

4. Roll the trackball and press **Set** to anchor the end point.

5. Roll the trackball and press **Set** to begin a new distance measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.

6. Press **Caliper** to finish and exit.
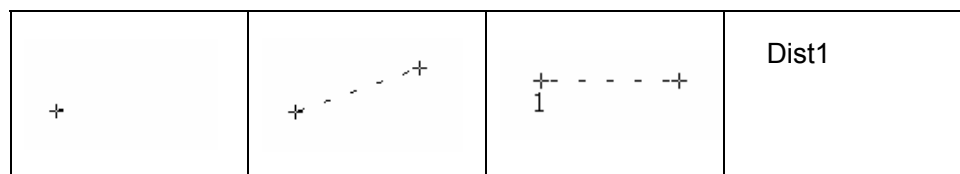
Figure 6-5 Distance Measurement and the Results

Circumference/Area   ● **Ellipse Method**

To measure Circumference / Area:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **Cir/Area**. Then select **Ellipse**, and press **Set** to activate a measurement cursor "+" on the screen.

3. Roll the trackball and press **Set** to anchor the start point of fixed axis of ellipse.

4. Roll the trackball and press **Set** to anchor the end point of fixed

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axis of ellipse.

5. Roll the trackball, and press **Set** to define the size of the ellipse.

6. Roll the trackball and press **Set** to begin a new circumference/area measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.

7. Press **Caliper** to finish and exit.
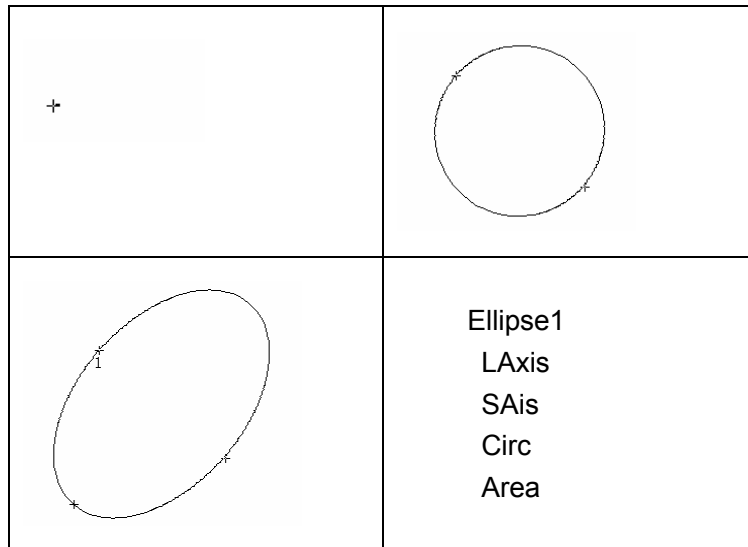
Figure 6-6 Ellipse Circumference/Area Method and the Results

● **Trace Method**

To measure Circumference / Area:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **Cir/Area**. Then select **Trace**, and press **Set** to activate a measurement cursor on the screen.

3. Roll the trackball and press **Set** to anchor the start point.

4. Roll the trackball to outline the region of interest. As you move the trackball, the system displays dots to outline the structure. To correct an error in the trace, press **Back** to move in reverse along the traced outline. Roll the trackball to move forward again. The system automatically closes the loop when the last measurement marker is moved very near to the start point. Or press **Set** to close the loop. The system draws a line from the position of the active measurement marker to the beginning of the loop.

5. Roll the trackball and press **Set** to begin a new circumference/area measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as

shown below.

6.   Press **Caliper** to finish and exit.
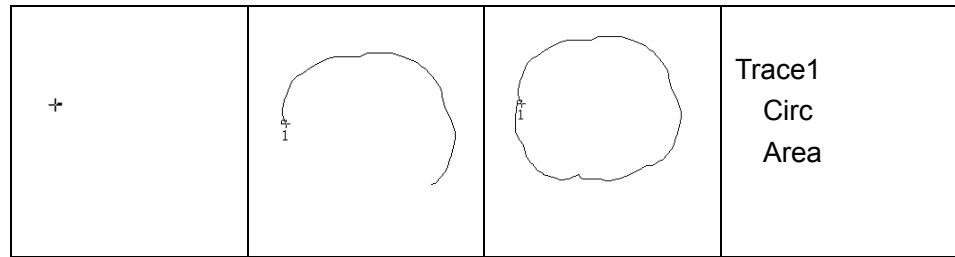
Figure 6-7 Trace Circumference/Area Method and the Results

Volume

● **2-Axis volume method**

V= (π/6) × A × B², (A: the length of major axis. B: the length of minor axis)

Two-axis volume method can be used to perform volume measurement by calculating only one set of measured data.

Operating Method:

The two-axis volume method is similar to the generic B mode Cir/Area measurement ellipse method. You can measure a maximum of four groups of data.

● **3-Axis method**

V= (π/6) × A × B × M,

(A: the length of major axis. B: the length of minor axis. M: the length of the third axis.)

Three-axis method can be used to perform volume measurement by calculating two sets of measured data, EA and the length of the third axis. To complete volume measurement, first measure EA by ellipse method, and then measure the length of the third axis with the distance measurement method, and the value of volume will be displayed automatically.

To measure volume:

In the **B mode**

1.   Obtain a cross-section image and freeze the system.

2.   Measure the lengths of the major axis and the minor axis of the cross section with the ellipse method.

3.   Unfreeze the system to acquire a new image (vertical-section image), and then freeze it.

4. Measure the length of the third axis in the vertical section image with the distance measurement method. You can measure a maximum of one group of data. The outcome will be displayed in the measurement result window.

In the **2B mode** or **4B mode**

To measure volume:

1. Obtain the cross-section image and the vertical-section image.

2. Measure the length of the major axis and the minor axis of the cross section with the ellipse method.

3. Roll the trackball to the next image, vertical section image, measure the length of the third axis with the distance measurement method. The outcome will be displayed in the measurement result window, as shown below.

4. Press **Caliper** to finish and exit.
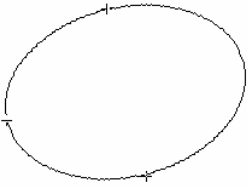
	LAxis
	SAxis
	3rdAxis
	Volume

Figure 6-8 3-Axis Volume Method and the Results

- **3-Axis (LWH) method**

$V = (\pi/6) \times L \times W \times H,$

(L: the length. W: the width. H: the height.)

Three-axis (LWH) method can be used to perform volume measurement by calculating 3 sets of distance data, L, W, and H. Measure the three pieces of data by the method of B mode generic distance measurement, and then the value of volume will be displayed automatically.

To measure volume:

In the **B mode**

1. Obtain a cross-section image and freeze the system.

2. Measure the length and the width.

3. Unfreeze the system to acquire a new image (vertical-section image), and then freeze it.

4. Measure the height. You can measure a maximum of one group of data. The outcome will be displayed in the measurement result window.

In the **2B mode** or **4B mode**

1. Obtain the cross-section image and the vertical-section image.

2. Measure the length and the width.

3. Roll the trackball to the next image, vertical section image, measure the height. The outcome will be displayed in the measurement result window, as shown below.

4. Press **Caliper** to finish and exit.
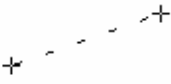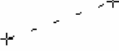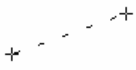
Figure 6-9 3-Axis (LWH) Volume Method and the Results

Ratio

To determine the ratio, take two measurements: A and B. The system calculates the ratio: A/B or B/A.

To measure ratio:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **Ratio**, press **Set** to activate a measurement cursor on the screen.

3. Measure the first distance A with the distance measurement method.

4. Measure the second distance B, move the cursor and press **Set** to anchor the start point, and the mark "+" appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.

5. During measurement, you can press **Update** once to change the settled point and the active point; if you press **Update** a second time,

the system interchanges the numerator and denominator.

6. Roll the trackball and press **Set** to complete the measurement, and the calculation result will be displayed in the measurement result window.

7. Roll the trackball and press **Set** to begin a new ratio measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.

8. Press **Caliper** to finish and exit.

Figure 6-10 Ratio Measurement and the Results

% Stenosis   ● **Distance stenosis**

To determine the distance stenosis, take two distance measurements: A and B. The system calculates the stenosis: (A-B)/A * 100%.

To measure distance stenosis:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **% Stenosis**, and select **Distance**, and then press **Set** to activate a measurement cursor on the screen.

3. Measure the first distance with the distance measurement method.

4. Measure the second distance, move the cursor and press **Set** to anchor the start point, and the mark "+" appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.

5. During measurement, you can press **Update** to change the start point and the end point; if you press **Update** again, the system interchanges the numerator and denominator.

6. Roll the trackball and press **Set** to complete the measurement, and the calculation result will be displayed in the measurement result window.

7. Roll the trackball and press **Set** to begin a new stenosis measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.

8. Press **Caliper** to finish and exit.

Figure 6-11 Distance Stenosis Measurement and the Results

● **Area stenosis**

To determine the area stenosis, take two area measurements: A and B. The system calculates the stenosis: (A-B)/A * 100%.

To measure area stenosis:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **% Stenosis**, and select **Area**, and then press **Set** to activate a measurement cursor on the screen.

3. Measure the first area with the ellipse method.

4. Measure the second area, move the cursor and press **Set** to anchor the start point, and the mark "+" appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.

5. During measurement, you can press **Update** to change the start point and the end point.

6. Roll the trackball and press **Set** to complete the measurement. You can measure a maximum of one group of data. The outcome will be displayed in the measurement result window.

7. Press **Caliper** to finish and exit.

+	(ellipse)
(ellipse)	A1 A2 ASR %
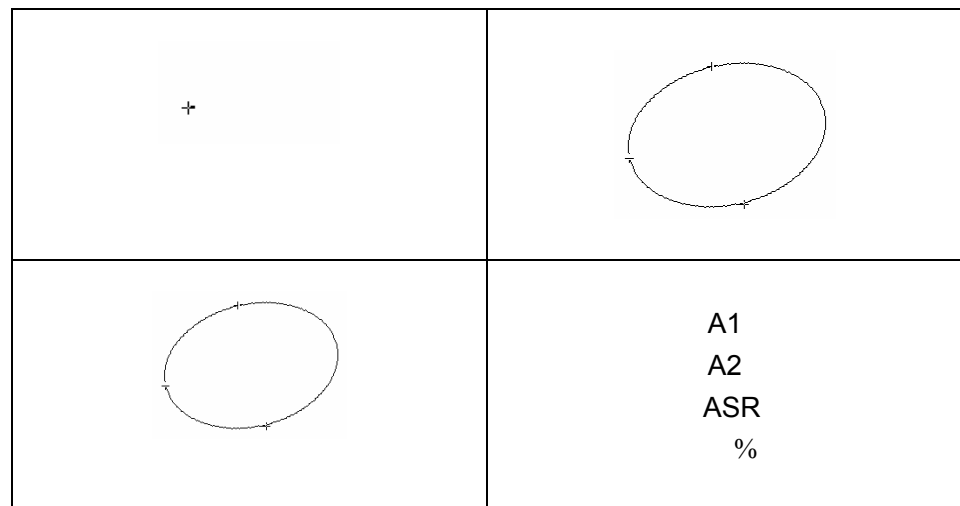
Figure 6-12 Area Stenosis Measurement and the Results

Angle   To determine an angle, draw two lines: A and B. The system calculates the angle.

To measure angle:

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight **Angle**, and then press **Set** to activate a measurement cursor on the screen.

3. Draw the first line A with the distance measurement method.

4. Draw the second line B, move the cursor and press **Set** to anchor the start point, and the mark "+" appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.

5. During measurement, you can press **Update** to change the start point and the end point; if you press **Update** again, the system interchanges line A and line B.

6. Roll the trackball and press **Set** to complete this measurement.

7. Roll the trackball and press **Set** again to begin a new angle measurement. You can measure a maximum of four groups of data. The angles formed by the two lines are displayed in measurement result window, in units of degrees. The outcome will be displayed in the measurement result window.

8. Press **Caliper** to finish and exit.
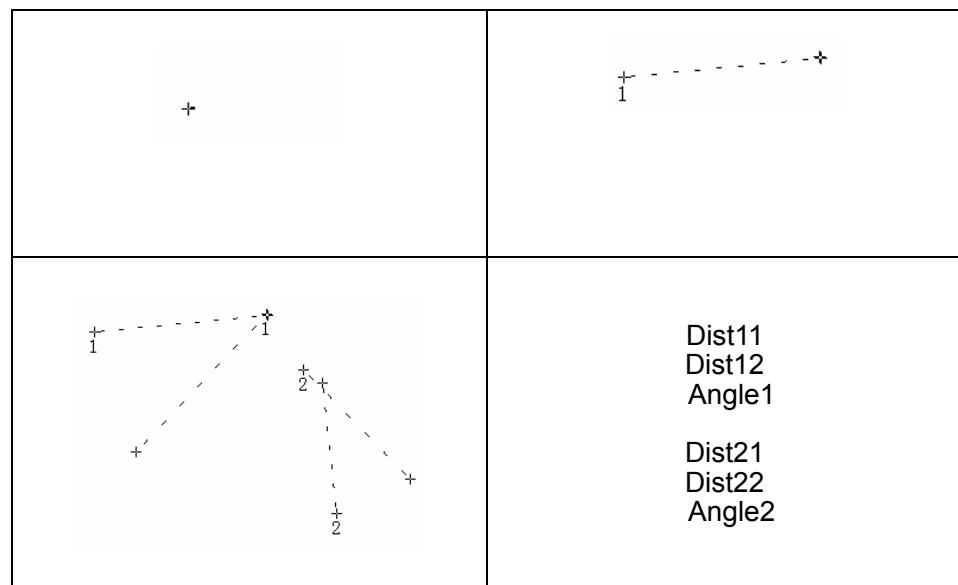
Figure 6-13 Angle measurement

Histogram   The image will be frozen automatically after entering histogram measurement.

1. Press **Caliper** to activate generic measurement function.

2. Roll the trackball to highlight menu **Histogram**, and then press **Set** to activate a measurement cursor on the screen.

3. Roll the trackball, press **Set** to anchor the start point.

4. Roll the trackball, adjust the position and size of the histogram, and then press **Set** to anchor the end point.

5.   During measurement, you can press **Update** to change the start point and the end point.

6.   Roll the trackball and press **Set** again to begin a new histogram measurement. You can measure a maximum of four groups of data. The outcome is displayed in Measured Results.

7.   Press **Caliper** to finish and exit.

6.5.2. Generic Measurements in M Mode

M mode measurements and calculations include distance, time, slope and heart rate (2 cycles). These are for B/M and M display modes only. The default measurement of B/M and M mode is heart rate measurement. M mode measurement menus are shown as follows:

Figure 6-14 M Mode Generic Measurement and Calculation Menu

Distance   To measure distance:

1.   Press **Caliper** to activate a measurement cursor "+".

2.   Roll the trackball to highlight **Distance** and press **Set**.

3.   Roll the trackball and press **Set** to anchor the start point, and a big "+" is displayed.

4.   Roll the trackball and press **Set** to anchor the end point.

5.   Roll the trackball and press **Set** to begin a new distance measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.

6.   Press **Caliper** to finish and exit.

Figure 6-15 Distance Measurement and the Results

Time   To measure time:

1. Press **Caliper** to activate a measurement cursor "+".

2. Roll the trackball to highlight **Time** and press **Set**.

3. Roll the trackball to move the first measurement cursor at the beginning of the time interval and then press **Set**, and the measurement mark turns to a vertical line.

4. Roll the trackball to move the first measurement cursor at the end of the time interval and then press **Set**.

5. Roll the trackball and press **Set** to begin a new time measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.

6. Press **Caliper** to finish and exit.
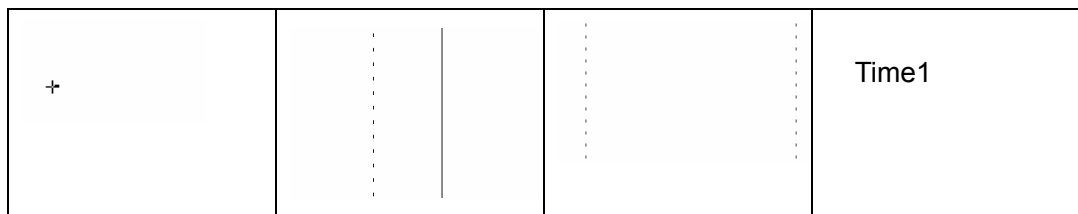
Figure 6-16 Time Measurement

Slope   To measure slope:

1. Press **Caliper** to activate a measurement cursor "+".

2. Roll the trackball to highlight **Slope** and press **Set** and a big "+" is displayed.

3. Roll the trackball and press **Set** to anchor the start point, and displays a big "+".

4. Roll the trackball and press **Set** to anchor the end point.

5. Roll the trackball and press **Set** to begin a new slope measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.

6. Press **Caliper** to finish and exit.
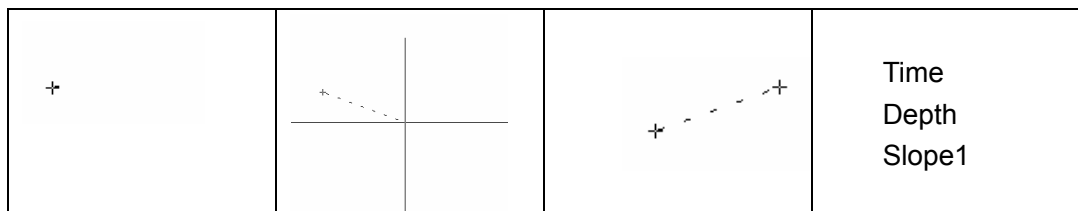
Figure 6-17 Slope Measurement and the Results

Heart Rate   To measure heart rate:

1.   In the **B/M mode**, roll the trackball to change the position of the M Mark and press **Set** to obtain a satisfying electrocardiogram, and then freeze it.

2.   In the **M mode**, freeze the desired image.

Measure the distance between two peaks of cardiac cycles with the time measurement method.

1.   Press **Caliper** to activate a measurement cursor "+".

2.   Roll the trackball to highlight **Heart Rate** and press **Set** and a "+" is displayed.

3.   Roll the trackball to move the first measurement maker on the first peak systole and then press **Set** to anchor start position, and the measurement mark turns to a vertical line.

4.   Roll the trackball to move the second measurement maker on the peak systole following two complete cycles and then press **Set** to anchor end position.

5.   Roll the trackball and press **Set** to begin a new heart rate measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.

6.   Press **Caliper** to finish and exit.
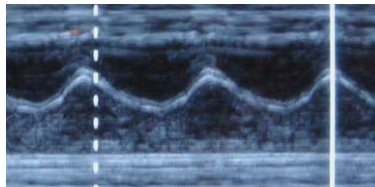
Figure 6-18 Heart Rate Measurement

NOTE:

In **B/M mode**, you should define the M Mark position, and then begin the measurement.

6.5.3. Generic Measurements in Color/PDI Mode

The generic measurements in Color /PDI mode are the same as those in B Mode

6.5.4. Generic Measurements in PW Mode

PW mode measurements and calculations include velocity, heart rate, time, acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto (auto trace). The default measurement is velocity measurement. The measurement menu is shown below.

Figure 6-19 PW Mode Generic Measurement and Calculation Menu

NOTE:

Heart rate and time measurement methods are the same as those in the M mode.

Reference Section *6.5.2 Generic Measurements in M Mode*

Velocity   To measure velocity of a point on the Doppler wave:

1. Press **Caliper** to activate a measurement cursor "+".

2. Roll the trackball to highlight **Velocity** and press **Set** and a "+" is displayed.

3. Roll the trackball and press **Set** to anchor the point, measuring velocity.

4. Roll the trackball and press **Set** to begin a new velocity measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.

5. Press **Caliper** to finish and exit.

Acceleration   To measure velocities of two points on the Doppler wave, and calculate the acceleration:

Acceleration = (Vel1－Vel2) / Interval

1. Press **Caliper** to activate a measurement cursor "+".

2. Roll the trackball to highlight **Acceleration** and press **Set** and a "+" is displayed.

3. Roll the trackball and press **Set** to anchor the first point, measuring **Vel1**.

4. Roll the trackball and press **Set** to anchor the second point, measuring **Vel2** and **Interval**, and calculating **Acceleration**.

5. Roll the trackball and press **Set** to begin a new acceleration measurement. You can measure a maximum of four groups of data. The outcome will be

displayed in the measurement result window, as shown below.

6. Press **Caliper** to finish and exit.

RI

(Resistance Index)

To measure velocities of two peak points on the Doppler wave, and calculate RI and S/D:

RI = (Vel1－Vel2)/Vel1

1. Press **Caliper** to activate a measurement cursor "+".

2. Roll the trackball to highlight **RI** and press **Set** and a "+" is displayed.

3. Roll the trackball and press **Set** to anchor the first peak point, measuring **Vel1**.

4. Roll the trackball and press **Set** to anchor the second peak point, measuring **Vel2**, calculating **RI**.

5. Roll the trackball and press **Set** to begin a new RI measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.

6. Press **Caliper** to finish and exit.

PI (Pulsatility Index)

To measure velocities and pressure difference of two peak points on the Doppler wave, and calculate Pulsatility Index(PI):

PI(no unit) ＝ ｜(PS－ED) / TAMAX｜

1. Press **Caliper** to activate a measurement cursor "+".

2. Roll the trackball to highlight **PI** and press **Set** and a "+" is displayed.

3. Roll the trackball and press **Set** to anchor the start point. Roll the trackball to trace along the Doppler wave forward, or press **Back** to erase the trace backwards.

4. Press **Set** to anchor the end point, the system displays the results of PS, ED, RI, etc. in measurement result window.

5. Roll the trackball and press **Set** to begin a new PI measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.

6. Press **Caliper** to finish and exit.

Auto
(Auto trace)

The trace in PW mode is shown below:
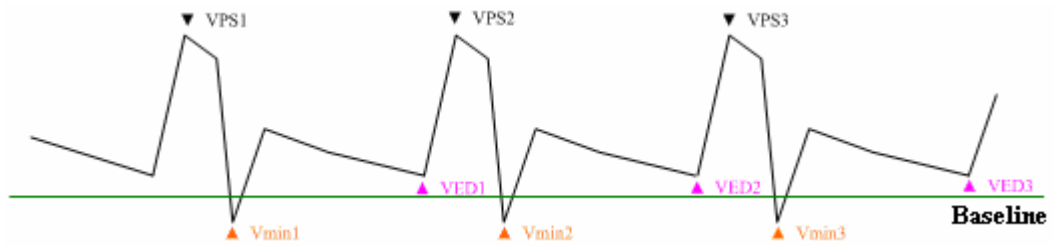
Figure 6-20 Trace Diagram

Where,

➢ VPS is the maximum velocity in the cycle;

➢ VED is the minimum velocity in the cycle;

➢ V $_{min}$ is the minimum absolute value.

NOTE:

Freeze the system before performing the tracing function.

● **To perform Auto Trace function (automatic tracing)**

1. Press **Caliper** to activate a measurement cursor "+". Before tracing, press **Trace Direction** menu control, select **Above** to trace spectrum only above the baseline, or select **Below** to trace spectrum only below the baseline.

2. Roll the trackball to highlight **Auto** and press **Set**.

3. A big "+" is displayed, roll the trackball and press **Set** to anchor the start point.

4. Roll the trackball press **Set** to anchor the end point, the system displays the results of PS, ED, RI, etc. in measurement result window.

5. After a trace measurement, press **Trace Sensitivity+** menu control to increase the identification sensitivity to the spectrum, the bigger the value the higher the sensitivity, and the less spectrum information to be removed, and the higher degree of overlapping between trace line and spectrum. Or press **Trace Sensitivity-** to decrease the sensitivity.

6. Roll the trackball and press **Set** to begin a new tracing measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.

7. Press **Caliper** to finish and exit.

6.6. Application Measurements and Calculations

To enter application measurements and calculations menu, select a probe and the examination type and press **Measure**, then you can choose the measurement item you need. Please find more information about application measurements and calculations in *Chapter 7~Chapter 14*.

The measurement & calculation items and results for each examination are shown in *Table 6-5*.

Examination	Application measurement & calculation items	Result
Abdomen	Liver, Portal V.Diam, CBD, Gallbladder, GB wall, Pancreatic, and Spleen.	Abdominal worksheet
Obstetric	B mode: GS, CRL, NT, BPD, HC, AC, FL, AFI, TAD, APAD, CER, FTA, HUM, OFD, THD, FBP, EDC and EFW PW mode: Umb A, MCA, Fetal AO, Desc.AO, Placent A, Ductus V and FHR M mode:FHR	Fetus growth analysis curve and standard obstetric worksheet
Cardiology	LV, RV, Mitral, Aorta, etc.	Cardiac worksheet
Gynecology	B mode: UT, UT-V, Endo, OV-Vol, FO, CX-L, UT-L/CX-L PW mode: L UT A, R UT A, L OV A, R OV A	Gynecologic worksheet
Small parts	L.THY-V, R.THY-V, Isthmus	Small Parts worksheet
Urology	BLV, RUV, Prostate Vol, ADR, KID, COR,	Urologic worksheet
Peripheral Vascular	PW mode: CCA, ICA, ECA, Vert A	Vascular worksheet
Pediatrics	B mode: HIP	HIP Worksheet

Table 6-5 Application measurement & calculation Items and Results

The system-defined examinations are abbreviated as follows:

Abd: Abdominal; OB: Obstetric; Sml: Small Parts; Gyn: Gynecology; PED: Pediatrics

Urol: Urology; Vas: Vascular

After entering the application measurement, the first item of the measurement menu is activated by default. When you have measured the first item, and pressed **Set**, the cursor moves to the next item automatically, you can press **Set** to enter the measurement, or roll the trackball to select other items to measure.

In the application measurement menu, " √ " is displayed before the item that has been measured.

6.7. Comment Function

The comment library is for positions and anatomical structures.

NOTE:

1. The entered text is in upper case by default.

2. The comments are in different colors under active/inactive status. To preset the comment colors, press **Preset>Application Preset**.

To add a comment:

➢ **To add a comment by using the keyboard:**

1. Press **Comment**, and there is a cursor "l" displayed in the image area for annotating;

2. Enter text by using the keyboard;

3. Press **Set** to complete the comment.

➢ **To add a comment by using the comment library:**

1. Press **Comment**, and there is a cursor "l" displayed in the image area for annotating;

2. Press **Update** to display the comment library;

3. Highlight a comment in the comment library, and press **Set** to confirm the choice and complete the comment.

➢ **To add an arrow:**

1. Press **Comment**, and there is a cursor "l" displayed in the image area for annotating;

2. Press **Cursor** to display an arrow;

3. Move the trackball to move the position of the arrow; and the rotation function of Multi-function knob is automatically activated and the rotation light is on. You can rotate this knob to adjust the arrow direction;

4. Press **Set** to set the position of the arrow.

To move a comment:

1. Move the cursor to a comment that needs to be moved, and there is a pane around the comment;

2. Press **Set** and move the cursor to a new position;

3. Press **Set** to confirm the new position.

To delete a comment:

During commenting, you can use **DEL** or **Bksp** to cancel the undesired text word by word, or you can use **Clear** to cancel all of the comments at one time.

The comment library is shown below:

L	R	U	D	Anterior
Posterior	♀	♂		

Generic

L	LL	RL	CL	LTH
VL	PV	HV	RHV	MHV
LHV	HA	HD	GB	CBD
Sp	SpA	SpV	P	PH
PB	PT	PD	K	AG
RA	RV	RP	RC	Pr
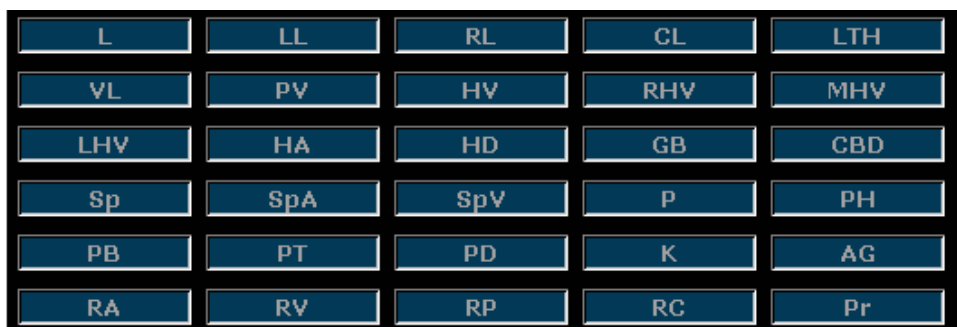
Abd 1

RCo	Ur	Bl	Pro	SV
Sto	Ca	E	Bo	Du
Co	Ap	SMA	SMV	Ao
IVC				

Abd 2

Ut	Ov	Cx	V	En
IUD	GS	Embryo	YS	Am
Pl	UC	AF	F	FH
F_Sp	F_Sto	FK	F_Lb	

OB

LV	RV	LA	RA	AAO
PA	MV	TV	AV	PV
IVS	IAS	LVPW	CT	PM
CS	CA	PVOT	RVAW	

Cardiac

Thy	MG	Eye	Ts	Ep
LyN	CCA	IJV	ICA	ECA
VA	IIA	IIV	EIA	EIV
FA	FV	GSV		

Sml

M	T	Sc	St	Cy
Abs	Hma	Eff	Asc	Nec
Sed	Met	Cal	Hcc	Ang
Polyp	As	FB	Tb	Fe
Th	Plaque	Myo	HM	Any
Hyd	SB	VSD	ASD	PDA

Lesion 1

MS	MR	MVP	MVV	LAM
Pe	AAn	ASA	AS	PS

Lesion 2

Figure 6-21 System-defined Comment Library

6.8. Body Mark Function

To add a body mark:

1. Press **Body Mark**, to display the **Body Mark** dialog box.

2. Highlight a body mark in the **Body Mark** dialog box, and press **Set** to confirm the choice to add the body mark. The selected body marks are displayed in the bottom left corner of the screen.

Reference   *Figure 5-1 Monitor Display*

3. After adding a body mark, use the trackball to move the position of the probe; and the rotation function of Multi-function knob is automatically activated and the rotation light is on, you can rotate this knob to adjust the probe scanning direction.

4. Press **Set** to complete adding the body mark.

NOTE:

In dual or quad split mode, you can add a body mark to the currently active window; if you press ⬚⬚ or ⬚⬚.to switch to another window, you can also add a body mark to the window.

To move a body mark:

1. Move the cursor to a body mark that needs to be moved, and there is a pane around the body mark;

2. Press **Set** and move the cursor to a new position;

3. Press **Set** to confirm the new position.

There are more than 130 types of body marks, as shown below:

Abdomen
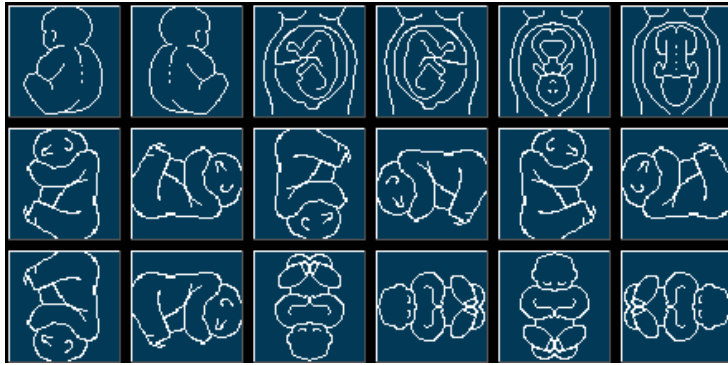
Obstetric 1

Obstetric 2

Twins
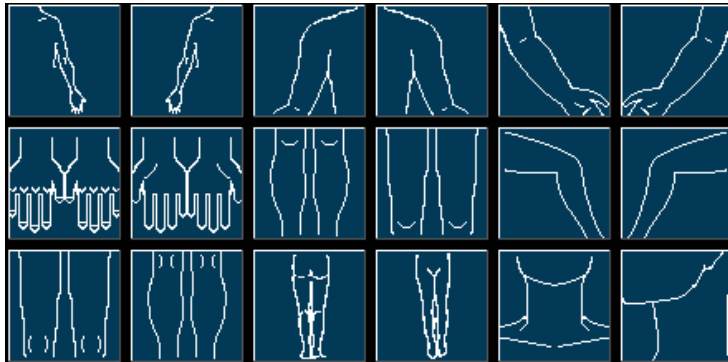
Small parts 1
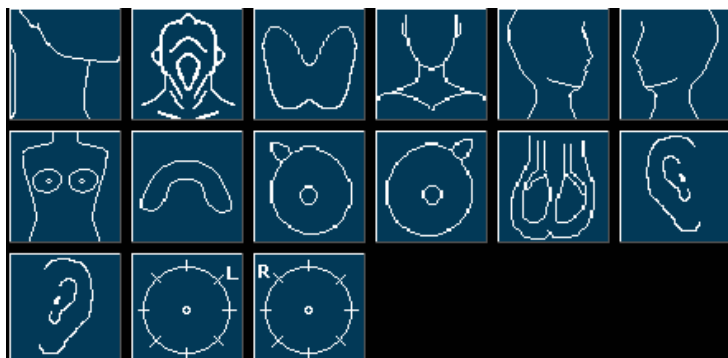
Small parts 2
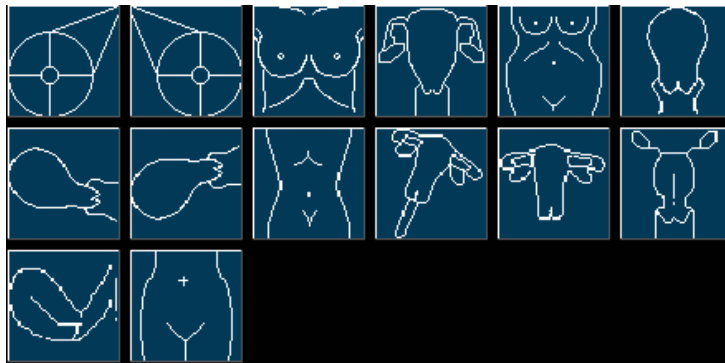
Gynecology

Pediatrics

Cardiology

Urology

Figure 6-22 Body Marks

6.9. Zoom

Zoom is used to magnify images for better viewing.

◆ To zoom in real-time/frozen B mode:

In real-time or frozen B mode, press **Multi-function knob** till the zooming light is on, and the system displays a zooming window in the middle of the image; roll the trackball to move the zoom window to the desired area, press **Set** to enter Zoom state, and rotate the zooming adjustment knob to adjust magnification of the zoom window. Press **Set** to display the zoomed

image, and then roll the trackball to move the zoomed image. If you press **Set** once again to anchor the image, you can still rotate the zooming adjustment knob to adjust magnification factor of the zoom window. Press **Multi-function knob** again to exit Zoom.

◆   To zoom in real-time 2B mode: Similar to zooming in B mode.

◆   To zoom in real-time B+Color/PDI mode:

After the position of ROI window (region of interest) is set, press **Multi-function knob** to magnify the ROI area; in zoom status, you can rotate the zooming adjustment knob to adjust magnification factor, or roll the trackball to move and adjust the ROI window. Press **Multi-function knob** again to exit Zoom; press **Color** or **PDI** again to exit zoom status and color imaging mode.

◆   The Zoom range is 1.14-4.0 (7 levels)

NOTE:

To zoom an image in each mode, press Multi-function knob till the zooming light is on. Otherwise, the zoom function will not be activated.

6.10. CINE Review

The system provides a storage capacity of 409 frames(Color)/1227frames（Black & White） for CINE Review playback.

Activate the device and enter the real-time B, B/B, 4B, B/M, or PW scanning mode. Enable the system to collect images before CINE Review playback. The cine function includes frame-by-frame playback (manual playback) and motion playback (automatic playback). The cine review symbol is displayed on the bottom of the screen, as shown below:
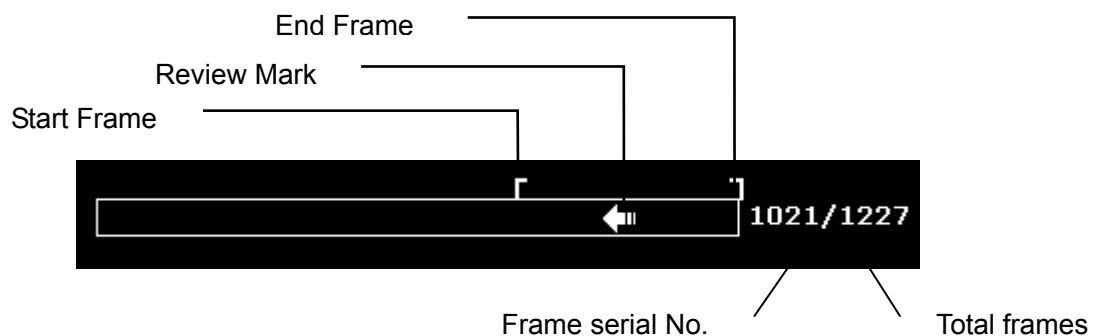
Figure 6-23 CINE Review Progress Bar

To perform the manual playback:

1.   Press **Freeze** to freeze the image, and the system displays the cine menu, as shown below:

Figure 6-24 Cine Review Menu

2. Roll the trackball to start playing back frame by frame. Roll the trackball to the right to advance the cine data one frame at a time, or to the left to move the data in reverse. The arrow on the CINE Review Symbol indicates the direction toward which the data is moving. The loop of data wraps around when either end is reached. As the trackball moves, the current cine number is displayed on the right of the CINE Review Symbol.

3. Press **Cine** to exit manual playback mode, or press **Freeze** to exit the CINE Review playback and enter the real-time scanning status.

To perform the automatic playback:

1. Press **Freeze** to freeze the image, and the system displays the cine menu.

2. Set the start frame: in manual playback status, roll the trackball to review frame by frame until the frame that you want to set as the start point, press **Start Frame** menu control to set it as the start frame, or rotate the **Start Frame** menu control to select a frame as the start frame.

3. Set the end frame: in manual playback status, roll the trackball to review frame by frame until the frame that you want to set as the end point, press **End Frame** menu control to set it as the end frame, or rotate the **End Frame** menu control to select a frame as the end frame.

4. Rotate the **FPS** menu control to adjust the review speed, and press **Play/Stop** menu control to start the automatic playback within the set region (Start frame-end frame).

5. In automatic playback status, press **Play/Stop** to stop.

6. Press **Cine** to go back to the manual playback status. Or, press **Freeze** to exit the CINE Review playback and enter real-time scanning status.

In dual or quad split screen status, freeze the image, and press [⊡] or [⊞] to toggle between the two or four windows, the CINE Review progress bar corresponds to the currently active image, you can perform manual/auto CINE Review for the currently active image.

In dual live mode of B and B+ (Color/PDI), freeze the image, then you can perform CINE Review and Save Cine for both images.

The default setting is to load images by serial numbers forward. When the number reaches the last, it will return to 1.

During playing back, press **Save As** to save the file in BMP, JPG, RFM, DCM, CIN or AVI format. You can save files to the local disk, U disk or portable hard disk. Or, press **File**>**Save Cine** to save the cine images of the set region. For details about operation method, please refer to *6.11.1 Saving Files*

NOTE:

1. Cine review can't be performed at the beginning of scanning or probe switching. You should wait until 30 seconds later.

2. The FPS (frames per second) is adjustable, from 5 to 50, in increments of 5.

3. After opening a cine file, you can perform measurements, add comments and the body mark on the image and print them in the report. See section *6.7 Comment Function* and section *6.8 Body Mark Function* for detailed operation information.

6.11. File Management

Press **File** to display the file menu, shown as below.
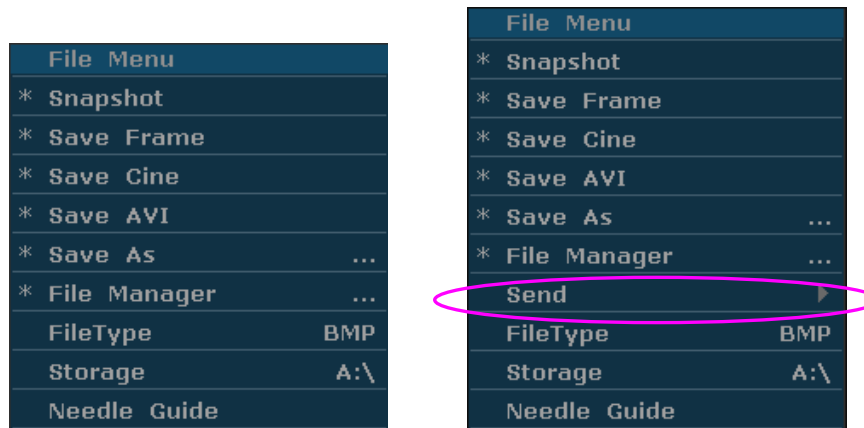
Figure 6-25 File Menu (the left—with no DICOM installed, the right—with DICOM installed)

6.11.1. Saving Files

File types:

The file types include BMP, JPG, DCM (if DICOM is installed), CIN, FRM, and AVI.

To choose a storage disk:

The storage disk can be set to **Fixed**, **USB-Disk or portable hard disk** by the **Storage** option in the file menu. You can set the default storage disk by using **General Preset.**

To choose a storage disk: highlight **Storage** in the file menu and press **Set** repeatedly to cycle between **Fixed, USB-Disk and portable hard disk**.

NOTE:

After connecting a removable disk, the interface displays a USB symbol on the bottom left corner.

To set a file type:

The **File Type** in the file menu means the file type for the quick saved images.

To choose a file type for the quick saved images: highlight **File Type** in the file menu and press **Set** repeatedly to cycle between **JPG**, **BMP**, **FRM and DCM** (if DICOM is installed).

To save a file:

The system provides two ways to save images:

◆ Press **SaveImg** on the keyboard;

Press **SaveImg** on the keyboard to save the current displaying image in BMP, JPG, FRM or DCM (if DICOM is installed) format (set by **File Type** in the file menu, as shown above).

◆ Use **Snapshot**, **Save Cine**, **Save As**, **Save Frame** or **Save AVI** of the file menu to save files.

➢ **Snapshot**

Highlight **Snapshot** in the file menu and press **Set** to save the current displaying image in BMP, JPG, FRM or DCM (if DICOM is installed) format (set by **File Type** in the file menu, as shown above).

➢ **Save Frame**

1. Press **Freeze** to freeze the system;

2. Play back and find the desired image;

3. Press **File** to open the file menu;

4. Highlight **Save Frame** in the file menu, and press **Set** to save the current displaying image.

➢ **Save Cine**

1. Press **Freeze** to freeze the system;

2. Press **File** to open the file menu;

3. Highlight **Save Cine** in the file menu, and press **Set**.

➢ **Save AVI**

1. Press **Freeze** to freeze the system;

2. Press **File** to open the file menu;

3. Highlight **Save AVI** in the file menu, and press **Set**.

NOTE:

The AVI files can not be viewed on this system, please use a U disk or portable hard disk to copy the AVI files to a PC, and view them by using video players.

➢ **Save As**

When obtaining a satisfying image:

1. Press **File** and select **Save As…** in the file menu to display the **File Save As** dialog box.

2. Choose the driver and the file type.

3. Press **Set** on the field next to **File Name**, and use the keyboard to enter a file name with a maximum of ten characters.

4. Press **OK** to save.
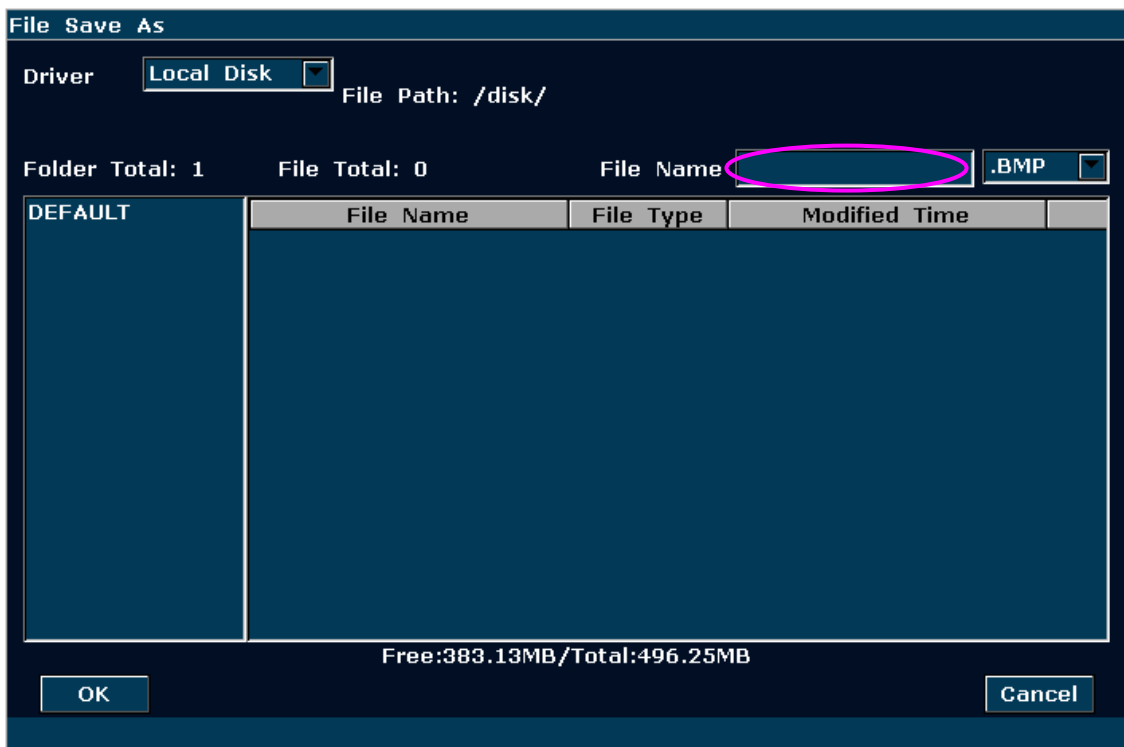
Figure 6-26 File Saving Dialog Box

NOTE:

If you do not enter the name for the file, the system will automatically number the file in sequence. For instance, if the latest number comes to YYMM0020 ("Y" stands for "year", and "M" stands for "month"), and if you save a file the next time, the file is numbered as YYMM0021.

When saving a file, the saving information is automatically displayed in the middle of image area.

6.11.2. Opening Files

Press **File** in the real-time or freezing mode, and the system displays the file menu. Then select **File Manager** and press **Set** to display an **File Manager** dialog box, as shown below.
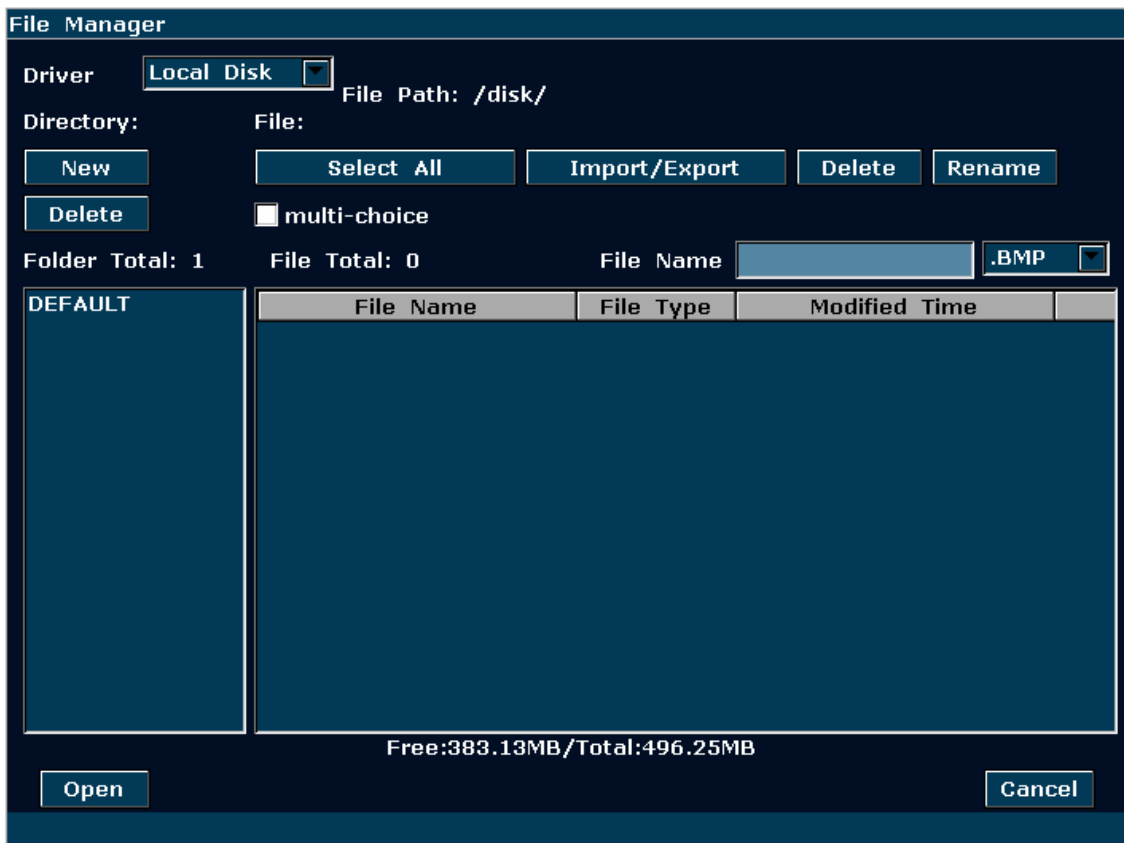
Figure 6-27 File Manager Dialog Box

The default driver is the local disk, and the default file type is **.BMP**. The driver types include local disk, U disk and portable hard disk. The file types include BMP, JPG, FRM, DCM, AVI and CIN. Pressing the symbol "▼" to display the driver or the file type, and then roll the trackball to choose one.

Select a desired file name and press **Open**, or double-click on a file name, the system begins to load the image. A prompt instruction *Loading file…* is displayed in the middle of the screen. Then the prompt instruction disappears and the system displays the designated image.

NOTE:

1. Images that have not yet been saved in the saving zone can not be loaded.

2. When saving or loading an image is still in process (prompt instruction *Saving file…* or *Loading file…*), please do not perform any other operation. This is to avoid damaging the device.

3. You should freeze the system before opening Cine images.

4. You can process measurements, add comments / body marks and print them out in reports after opening an FRM file. See section *6.7 Comment Function* and section *6.8 Body Mark Function* for detailed operation information.

6.11.3. Browsing Images

After you open an image, press [<<] on the bottom of the screen to open the previous image, and [>>] to open the next image; press [Play] to perform automatic browsing, and press [Stop] to stop automatic browsing; press [Exit] or **Esc** to exit.
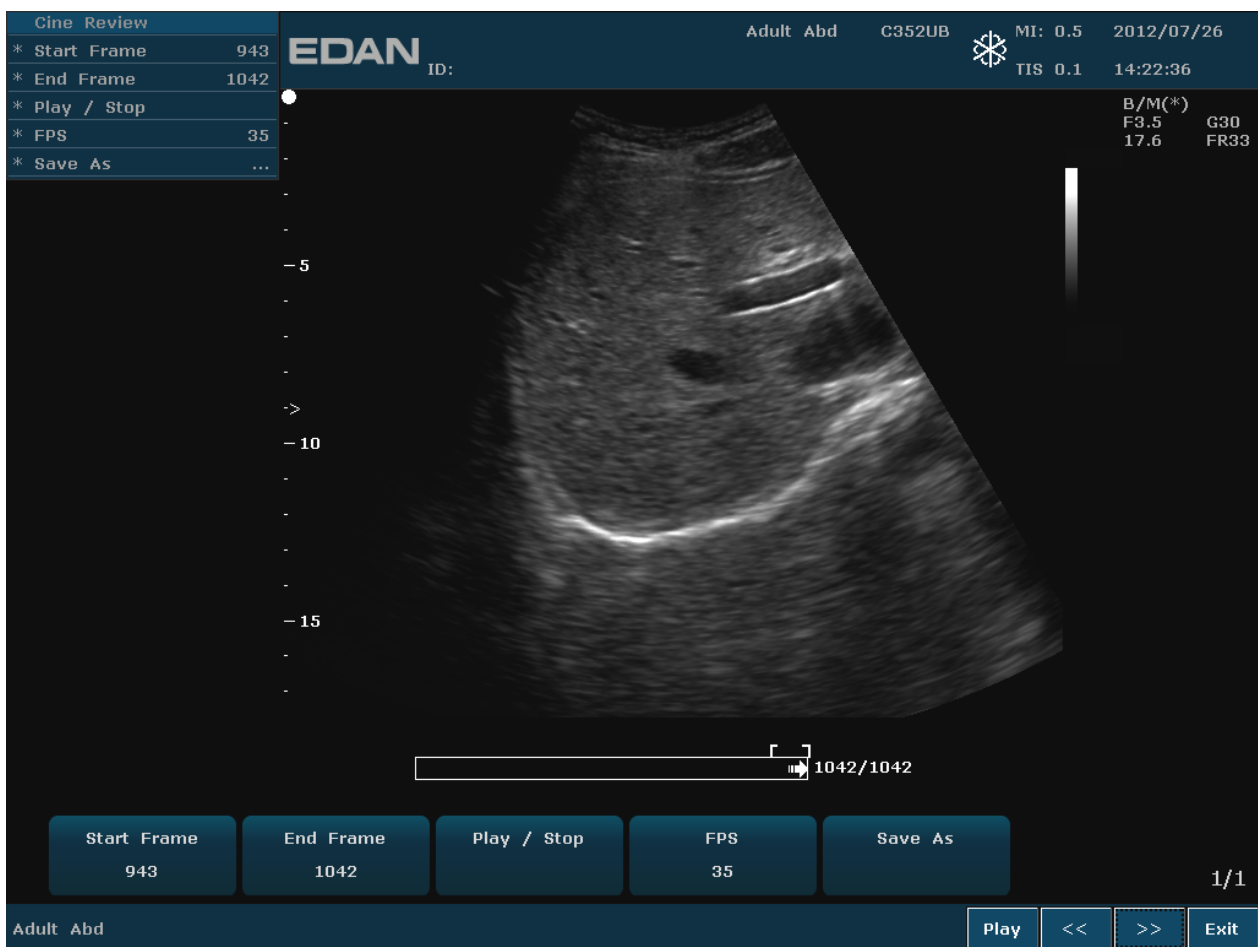
Figure 6-28 Image Browsing Dialog Box

NOTE:
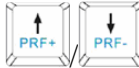
The JPG, BMP, and DCM (if DICOM is installed) images are available to the browsing function.

6.11.4. File Manager

In real-time or frozen status, press **File** to display file menu**,** and select **File Manager,** the **File Manager** dialog box pops up, as shown in *Figure 6-27* .

You can use the file manager to perform the file management. After you open an image, you can perform the image viewing as shown in section *6.11.3*

Basic operations:

◆ Tick the **multi-choice** box or press **Ctrl** on the PC keyboard, click on the files you need, and then you can **Import/Export**, or **Delete** many files at one time.

◆ Press **Select All**, and then you can **Import/Export**, or **Delete** all files at one time.

◆ In non multi-choice status, click on a file and then press [PRF+]/[PRF-] on the PC keyboard to select files upwards or downwards.

◆ Select the file format from the pull-down menu File Name [____] .BMP ▼ , such as BMP/JPG/DCM/FRM/CIN/AVI/DAT, or select *.* to display all files.

◆ Click on the headings of the file list: **File Name**, **File Type** or **Modified Time**, to rearrange the file order according to the file name, file type or modified time (in ascending/descending order).

NOTE:

1. When you are importing/exporting, deleting or renaming a file, do not connect or disconnect the U disk or portable hard disk.

2. USB disk or portable hard disk must be in FAT32 format.

3. Do not use the U disk or portable hard disk for other uses, but only for this device. Otherwise the storage and the transmission function may not be stable.

4. We suggest that you use the U disk or portable hard disk supplied or recommended by EDAN.

To create a file folder

1. Roll the trackball to select the driver and then press **Set**.
2. Press **New** and a dialog box pops up. Enter the file folder name.
3. Press **OK** to create a file folder, or **Cancel** to give up the creating operation.

To delete a file folder

1. Roll the trackball to select the driver and then press **Set**.

2. Roll the trackball to select the file folder to be deleted, and then press **Set**.

3. Press **Delete**, and a confirmation dialog box is displayed to ask you whether to delete the file folder.

4. Press **Yes** to delete the designated file folder, or **No** to give up the deleting operation

To delete a file

1. Roll the trackball to select the driver and the type of file, and then press **Set**.

2. Roll the trackball and then press **Set** to select the file you want to delete.

3. Press **Delete**, and a confirmation dialog box is displayed to ask you whether to delete the file.

4. Press **Yes** to delete the designated file, or **No** to give up the deleting operation.

To rename a file

1. Roll the trackball to select the driver and the type of file, and then press **Set**

2. Roll the trackball and press **Set** to select the file you want to rename.

3. Press **Rename** to open the dialog box to enter the new name of the file using the keyboard, with a maximum of eight characters.

4. Press **OK** to rename the designated file, or **Cancel** to give up the renaming operation.

To import/export Files

1. Connect a U disk or portable hard disk to the system, and press **File;**

2. Roll the trackball to highlight **File Manager** and press **Set** to display the **File Manager** dialog box; select location of your folder or file from the **Driver** pull-down menu;

3. Select a desired folder or file, press **Set**, and then press **Import/Export** to display the **File Import/Export** dialog box ;

4. Select the destination driver and press **OK** to import/export the selected folder or file to the target driver.

6.11.5. Sending Files

If you have installed the DICOM software, and the DICOM presetting has been performed correctly, you can send images / files.
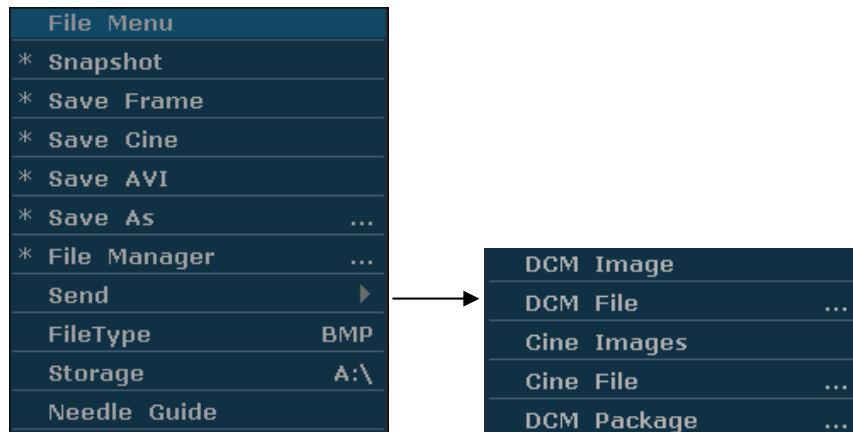
Figure 6-29 File Menu (with DICOM Function)

To send a DCM Image

1. Highlight the secondary menu **DCM Image**, and then press **Set**.

2. If the server is running normally, the current image will be sent to the server.

3. The system displays a prompt indicating the successful transmission.

To send a DCM file

1. Highlight the secondary menu **DCM File**, and then press **Set**.

2. The system displays the **File Opening** Dialog Box for selecting a DCM file to be transmitted.

3. If the server is running normally, the selected file will be sent to the server.

4. The system displays a prompt indicating the successful transmission.

To send a DCM package

1. Highlight the secondary menu **DCM package**, and then press **Set**.

2. The system displays the **File Opening** Dialog Box for selecting the driver: local disk, U disk or portable hard disk.

3. If the server is running normally, all the DCM files of the selected driver will be sent to the server.

4. The progress bar disappears after successful transmission.

To send Cine Images

1. Freeze the system.

2. Press **File** to enter the file menu.

3. Highlight the secondary menu **Cine Images**, and then press **Set**.

4. If the server is running normally, the current Cine images will be sent to the server.

5. The progress bar disappears after successful transmission.

To send a Cine File

1. Highlight the secondary menu **Cine File**, and then press **Set**.

2. The system displays the **File Opening** Dialog Box for selecting a cine file to be transmitted.

3. If the server is running normally, the selected file will be sent to the server.

4. The progress bar disappears after successful transmission.

6.12. Puncture Function

NOTE: Use proper disinfection technique at all times to perform a biopsy.

Always follow these basic precautions:

WARNING
1. Disinfect the needle guide before the first use and after each subsequent use.
2. Always handle transducers and needle guide adaptors with care. Do not use a transducer or an adaptor if it has been dropped or struck against a hard surface until it is inspected by an EDAN customer engineer.
3. The displayed needle guide pathway on the EDAN video monitor is intended for reference during biopsy procedures. A variety of factors outside EDAN's control, such as changing tissue density, bending of the needle, off-axis pressure by the person holding the transducer, may cause deflection of a needle outside of the displayed video pathway even when the transducer, needle guide, and the system software are all performing as intended and within manufacturing specification. The specialist performing a biopsy procedure must be aware of potential external factors when executing an invasive procedure.
4. The caliper must be placed along the needle path. If not, the displayed measurements may be incorrect.
5. EDAN needle guides are designed and manufactured to attach firmly to designated transducers and should not require excessive force to assemble or disassemble. If it appears that excessive force or manipulation is required to assemble or disassemble needle guide components, please contact your EDAN customer engineer before using it.

6.12.1. Activating Puncture Function

To enable the puncture function:

1.   In the real-time B mode imaging, press **File** on the keyboard, highlight **Needle Guide** and then press the **Set** to activate Needle Guide function.

2.   Prompt information "**Please calibrate the needle guide line before each puncture!**" is displayed on the screen. Press **OK** and enter the puncture function and a needle guide menu

is displayed, as shown below.

Figure 6-30 Needle Guide Menu

WARNING

DO NOT freeze the system when doing puncture.

NOTE:

◆ There are no more than 3 needle guide lines for each puncture frame.

◆ If image depth ≤ 8 cm, the distance between the two nods of the needle guide line indicates 0.5 cm.

◆ If image depth > 8 cm, the distance between the two nods of the needle guide line indicates 1 cm.

6.12.2. To Select the Angle of Needle Guide Line

If the puncture frame has several kinds of angle, you can highlight **Guide Line** in the needle guide menu and press the **Set** to make a choice, and the system displays the angle.

6.12.3. To Display or To Hide the Needle Guide Line

Highlight **Display** in the needle guide menu, and press the **Set** key repeatedly to display or to hide the needle guide line.

6.12.4. To Adjust the Needle Guide Line

Needle guide line has been verified when the device is produced. The value is saved in Factory data. But after a period of use, the needle guide line needs to be adjusted since the real value may be changed.

WARNING

1. Prior to each puncture, calibrate the needle guide line.

2. If the needle position is not the same as the needle guide line position, do not do the puncture.

To calibrate the guide line (performing phantom cal):

1. Put the assembled puncture kit, put the probe in to water phantom, and perform the water scan;

2. Adjust the position and angle of needle to comply with the guide line as shown below;

3. Select **Verify** to save the verified value.

◆   To verify the needle guide line:

   Move the needle guide line horizontally

   Highlight **Position**, and press the **Set** key to increase the value, or rotate the **Position** menu control to increase or decrease the value, and the value is displayed in the menu option.

◆   To adjust the angel of needle guide line:

   Enter **Angle** option to adjust the angle. Operation procedure is the same as that of the **Position**.

◆   To save the verified value:

   After verifying the position and the angle, highlight **Verify** and press the **Set** key, and the system saves the verified value. After restarting the system, the verified value is activated.

◆   To save the factory data:

   Highlight **Factory Defaults** and press the **Set** key to load the factory data.

◆   To select the bracket:

   If the probe has different brackets, you can use **Bracket Sel** option to select the bracket.

6.12.5. Performing Puncture Function

To perform puncture:

1. The needle guide line is displayed on the image of the ultrasound system, and the numbers on the right of the menu stand for the situation of puncture;

2. Align the needle guide line with the target;

3. Get the sample of the target;

4. Move the probe away from the patient carefully.

Chapter 7 Abdominal Measurements & Calculations

7.1. Measurements and Calculations

The abdominal examination is usually in the B mode.

1. Press **Probe**, select a desired probe model and the exam mode **Pedia. Abd/ Adult Abd/ Abd Difficult**, and then press **OK,** or double click on the exam type.

2. Press **B** to enter the B mode.

3. Press **Measure** to activate the application measurement function. The measurement menu is displayed.
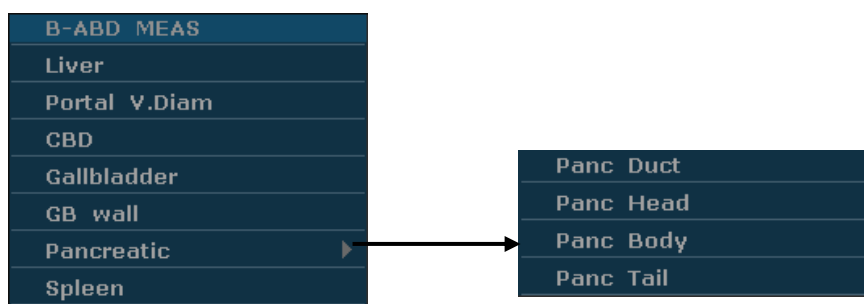
Figure 7-1 Abdominal Measurement and Calculation Menu

Items of Measurement and Calculation

Liver, Portal V. Diam, CBD, Gallbladder, GB wall, Pancreatic, Spleen

7.1.1. Liver

1. In the abdominal measurement menu, roll the trackball to highlight **Liver/Portal V. Diam**, press **Set**.

2. Measure three pieces of data: LIVER-L, LIVER-W, LIVER-H, or portal V. Diam by the method of distance measurement.

 Reference　Section *6.5.1Generic Measurements in B Mode*

3. After the measurement, the result of Liver will be displayed in the measurement result window.

7.1.2. Gallbladder

1. In the abdominal measurement menu, roll the trackball to highlight **CBD/ Gallbladder/ GB wall**, press **Set**.

2. Measure CBD, or GB-L, GB-W and GB-H, or GB wall by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the measurement, the result of gallbladder will be displayed in the measurement result window.

7.1.3. Pancreatic

1. In the abdominal measurement menu, roll the trackball to highlight **Pancreatic**, select **Panc Duct/ Panc Head/ Panc Body/ Panc Tail** from the secondary menu**,** and then press **Set**.

2. Measure Panc Duct/Panc Head/Panc Body/Panc Tail, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the measurement, the result of pancreatic will be displayed in the measurement result window.

7.1.4. Spleen

1. In the abdominal measurement menu, roll the trackball to highlight **Spleen**, press **Set**.

2. Measure three pieces of data: SPLEEN-L, SPLEEN-W, and SPLEEN-H, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of spleen will be displayed in the measurement result window.

7.2. Abdominal Report

After the abdominal examination, the system generates an abdominal worksheet.

1. Select a desired probe model and the exam mode **Pedia. Abd/ Adult Abd/ Abd Difficult**.

2. In B mode, after application measurements press **Report** to open **Abdominal Worksheet**, as shown below:

Figure 7-2 Abdominal Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the Abdominal Worksheet.

Printing reference   Section *5.8 Printing*

Chapter 8 Obstetric Measurements and Calculations

The obstetric examination is usually in the B mode, PW mode, and M mode.

8.1. Obstetric Measurements and Calculations in B Mode

To enter B mode obstetric examination:

1. Press **Probe**, select a desired probe model and the exam mode **Obstetric**, and then press **OK,** or double click on the exam type.
2. Press **B** to enter B mode.
3. Press **Measure** to activate the application measurement function. The system displays the measurement menu as shown in *Figure 8-1.*

Items of Measurement and Calculation:

B-OB MEAS: GS, CRL, NT, BPD, HC, AC, FL, AFI, EFW, TAD, APAD, HUM, CER, FTA, OFD, THD and FBP.
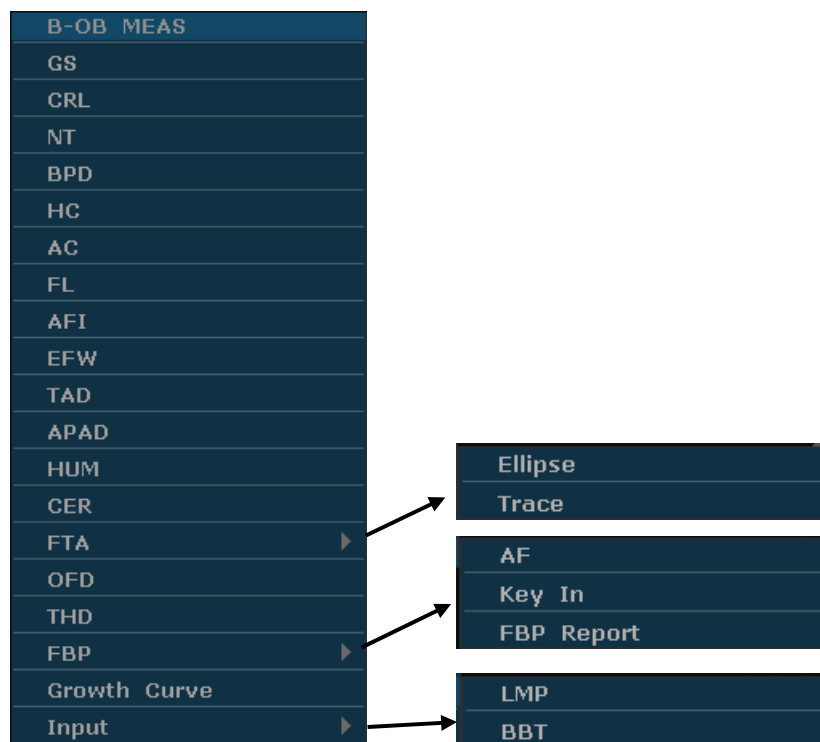
Figure 8-1 Obstetric Measurement and Calculation Menu in B mode

Items of input: LMP and BBT

Fetus growth is usually measurement by the following parameters.

Abbreviations:

◆   EDC: Estimated Date of Confinement

◆   MA: Menstrual Age

◆   LMP: Last Menstrual Period

◆ BBT: Basal Body Temperature

◆ EFW: Estimated Fetal Weight

B-OB MEAS 1:

Label	Description	Channel	Method	Results display
GS	Gestational Sac Diameter	1	Distance (mm)	The measurement results will be displayed in the result window.
CRL	Crown Rump Length	1		
NT	Nuchal Translucency	1		
BPD	Biparietal Diameter	1		
HC	Head Circumference	1	Ellipse (mm)	
AC	Abdominal Circumference	1		
FL	Femur Length	1	Distance (mm)	
AFI	Amniotic Fluid Index	1	Calculating AFI requires 4 sets of distance measurement data, AF1, AF2, AF3, and AF4.	
EFW	Estimated Fetal Weight	1	According to the selected formula, described as follows. (g or kg)	

Table 8-1 Obstetric Measurements 1 in B Mode

B-OB MEAS 2:

Label	Description	Channel	Method	Results display
TAD	Transverse Abdominal Diameter	1	Distance (mm)	The measurement results will be displayed in the result window.
APAD	Antero Posterior Diameter of the Abdomen	1		
CER	Cerebellum Diameter	1		
FTA	Fetus Trunk cross section Area	1	Ellipse or Trace Area $(mm^2$ or $dm^2)$	
HUM	Humerus Length	1	Distance (mm)	
OFD	Occipital Frontal Diameter	1		
THD	Thorax Diameter	1		
FBP	Fetal Biophysical Profile	1		

Table 8-2 Obstetric Measurements 2 in B Mode

The system will calculate MA and AVE EDC automatically after measuring each parameter.

8.1.1. GS

To measure GS (use the Maximum diameter method):

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **GS**, press **Set**, and move the cursor to image and display "+".

2. Measure GS, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new GS measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.2. CRL

To measure CRL:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **CRL**, press **Set**, and move the cursor to image and display "+".

2. Measure CRL, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new CRL measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.3. NT

To measure NT:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **NT**, press **Set**, and move the cursor to image and display "+".

2. Measure NT, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new NT measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.4. BPD

To measure BPD:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **BPD**, press **Set**, and move the cursor to image and display "+".

2. Measure BPD, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new BPD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.5. HC

To measure HC:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **HC**, press **Set**, and move the cursor to image and display "+".

2. Measure HC, by the method of ellipse circumference/area measurement.

 Reference   Section *6.5.1 Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new HC measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.6. AC

To measure AC:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **AC**, press **Set**, and move the cursor to image and display "+".

2. Measure AC, by the method of ellipse circumference/area measurement.

 Reference   Section *6.5.1 Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new AC measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.7. FL

To measure FL:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **FL**, press **Set**, and move the cursor to image and display "+".

2. Measure FL, by the method of distance measurement.

 Reference   Section *6.5.1 Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new FL measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.8. AFI

To measure AFI:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **AFI**, press **Set**, and move the cursor to image and display "+".

2. Measure four groups of AF, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results, AF1, AF2, AF3, AF4, and AFI are displayed in measurement result window.

4. To begin a new AFI measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.9. TAD

To measure TAD:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **TAD**, press **Set**, and move the cursor to image and display "+".

2. Measure TAD, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new TAD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.10. APAD

To measure APAD:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **APAD**, press **Set**, and move the cursor to image and display "+".

2. Measure APAD, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new APAD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.11. HUM

To measure HUM:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **HUM**, press **Set**, and move the cursor to image and display "+".

2. Measure HUM, by the method of distance measurement.

Reference   Section *6.5.1 Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new HUM measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.12. CER

To measure CER:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **CER**, press **Set**, and move the cursor to image and display "+".

2. Measure CER, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new CER measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.13. FTA

To measure FTA:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **FTA**, press **Set**, and move the cursor to image and display "+".

2. Measure FTA, by the method of ellipse or trace area measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new FTA measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.14. OFD

To measure OFD:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **OFD**, press **Set**, and move the cursor to image and display "+".

2. Measure OFD, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new OFD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.15. THD

To measure THD:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **THD**, press

Set, and move the cursor to image and display "+".

2. Measure THD, by the method of distance measurement.

    Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in measurement result window.

4. To begin a new THD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.1.16. FBP

To measure AF:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **FBP**, select **AF** and press **Set**.

2. Measure AF, by the method of distance measurement.

    Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results are displayed in Measured Results window.

4. To begin a new AF measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

Fetal Biophysical Profile

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **FBP**, select **Key In** and press **Set**.

2. The Fetal Biophysical Profile window displays as the following figure shows. Select the parameters from the pull-down menu of FHR, FM, FBM, FT and PL, and then press **OK** to confirm, the biophysical evaluation result will be displayed in the FBP Report.

FBP Report

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **FBP**, select **FBP Report** and press **Set** to get the FBP report window.

```
FBP Report

FHR      2    Normal
FM       2    Normal
FBM      2    Normal
FT       2    Normal
AF       1    Slight Abnormal
PL       2    Normal

              Total  11
Diagnosis:    Normal, Chronic asphyxia risk low

       OK                    Cancel
```

2. Press **Cancel** to exit.

NOTE: To get the Total result in the FBP report, you have to measure the AF and input the fetal biophysical profile and save them.

8.1.17. EDC Calculation

EDC Calculation by LMP

To calculate EDC according to LMP:

1. In the B-Obstetric measurement menu, roll the trackball to highlight the menu **Input**, and it will display secondary menu automatically, as shown below:

```
LMP
BBT
```

Figure 8-2 Obstetric Input Items

2. Select LMP and press Set, and the **LMP input** dialog box will be displayed on the screen.

```
date input


LMP input:  [          ]
                (YYYYMMDD)


      OK              Cancel
```

Figure 8-3 LMP Input Dialog Box

3. Enter the LMP in YYYYMMDD ("Y" stands for "year", "M" stands for "month", and "D" stands for "day") format with the keyboard.

4. Select **OK** and press **Set** to perform the calculation automatically, or **Cancel** to give up the calculation.

EDC Calculation by BBT

To calculate EDC according to BBT:

1. In the B-Obstetric measurement menu, roll the trackball to highlight **Input**, and the system will display the secondary menu automatically.

2. Select **BBT** in the list of input items and press **Set**, and the **BBT input** dialog box will be displayed.
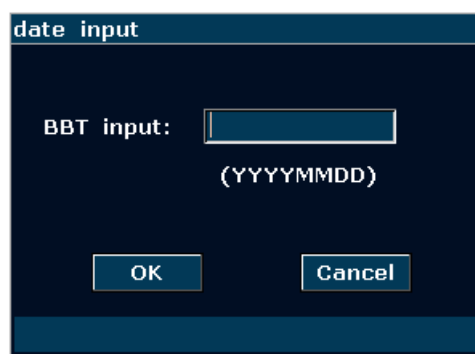
Figure 8-4 BBT Input Dialog Box

3. Enter the BBT in YYYYMMDD ("Y" stands for "year", "M" stands for "month", and "D" stands for "day") format with the keyboard.

4. Select **OK** and press **Set** to do the calculation automatically, or **Cancel** to give up the calculation.

NOTE:

1. For EDC calculation, make sure that the system date is correct. The default standard pregnancy period in the system is 40 weeks. For the LMP method calculation, if the interval between the input date and the current system date exceeds 40 weeks, the system will not accept it. For the BBT method calculation, if the interval between the input date and the current system date exceeds 266 days, system will not accept it.

2. The date format of EDC here accords with what you have set in General Preset window.

8.1.18. EFW Calculation

This system can calculate EFW according to the measured data corresponding to different formulas.

Select a Formula in Preset

This system provides eleven types of EFW formula, as shown below.

Options	Formula	
Tokyo	EFW = 1.07* (BPD^3)+3.42*APTD*TTD*FL EFW: g; Others: cm	
Osaka	EFW = 1.25674* (BPD^3)+3.50665*FTA*FL+6.3 EFW: Kg; FTA: cm^2; Others: cm	
HADLOCK1	EFW = 10^{1.304+ (0.05281*AC)+ (0.1938*FL)- (0.004*FL*AC)}	EFW: Kg; Others: cm
HADLOCK2	EFW = 10^{1.335- (0.0034*AC*FL)+ (0.0316*BPD)+ (0.0457*AC) + (0.1623*FL) }	EFW: g; Others: cm
HADLOCK3	EFW = 10^{1.326- (0.00326*AC*FL)+ (0.0107*HC)+ (0.0438*AC) + (0.158*FL) }	EFW: Kg; Others: cm
HADLOCK4	EFW = 10^{1.3596- (0.00386*AC*FL)+ (0.0064*HC)+ (0.00061*BPD*AC) + (0.0424*AC)+ (0.174*FL) }	
Shepard	EFW = 10^{-1.7492+ (0.166*BPD)+ (0.046*AC) - (2.646*AC*BPD/1000)} EFW: kg; Others: cm	
Merz1	EFW = (-3200.40479+ (157.07186*AC)+{15.90391* (BPD^2)}	EFW: Kg; Others: cm
Merz2	EFW = 0.1* (AC^3)}	EFW: g; Others: cm
Hansmann	EFW = (-1.05775*BPD+0.0930707* (BPD^2) + {0.649145*THD) - 0.020562* (THD^2) +0.515263	EFW: kg; Others: cm
Campbell	EFW = EXP{-4.564+ (0.282*AC)-[0.00331* (AC^2)]}	

Table 8-3 Obstetric Calculation Formula

Measurement

Measurement items vary with formulas. So you should perform the measurement items according to the preset formula.

Take Osaka formula for instance, to calculate EFW:

EFW = 1.25674* (**BPD**^{3}) + 3.50665***FTA***FL**+6.3

1. In the obstetric menu, roll the trackball to highlight **EFW**, and then press **Set**.

2. Use the distance measurement method to measure **BPD**.

3. Use the ellipse method to measure **FTA**.

4. Use the distance measurement method to measure **FL**, and the result of EFW will be displayed in the measurement result window.

8.2. Obstetric Measurements and Calculations in PW mode

1   Press **Probe**, select a desired probe model and the exam mode **Obstetric**, and then press **OK,** or double click on the exam type.

2   Press **PW** to display the sample line, and press this key again to enter the PW mode.

3   Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.

Items of Measurement and Calculation

FHR, Umb A, MCA, Fetal AO, Desc.AO, Placent A, and Ductus V.
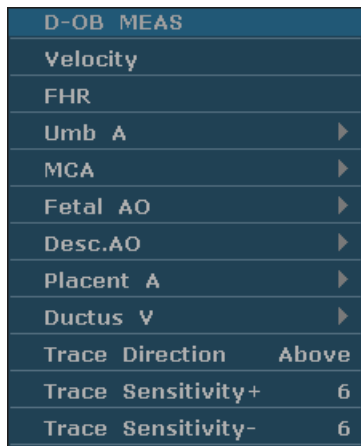
Secondary menu of the obstetric measurement items in the PW mode:

Figure 8-5 Obstetric Measurement and Calculation Menu in PW mode

Label	Description	Channel	Method
FHR	Fetal Heart Rate	1	
Umb A	Umbilical Artery	1	
MCA	Middle Cerebral Artery	1	
Fetal AO	Fetal Aorta	1	D trace
Desc.AO	Descending Aorta	1	
Placent A	Placent Aorta	1	
Ductus V:	Ductus Venosus	1	

Table 8-4 Obstetric Measurements in PW Mode

8.2.1. FHR

To measure FHR:

1. In the PW-Obstetric measurement menu, select **FHR**.

2. Measure **FHR**, by the method of heart rate measurement.

 Reference   Section *6.5.2 Generic Measurements in M Mode*

3. The results are displayed in measurement result window.

4. To begin a new **FHR** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.2.2. Umb A

To measure Umb A:

1. In the PW-Obstetric measurement menu, select **Umb A**.

2. Measure **Umb A**, by the method of D trace measurement.

 Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **Umb A** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.2.3. MCA

To measure MCA :

1. In the PW-Obstetric measurement menu, select **MCA**.

2. Measure **MCA**, by the method of D trace measurement.

 Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **MCA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.2.4. Fetal AO

To measure Fetal AO:

1. In the PW-Obstetric measurement menu, select **Fetal AO**.

2. Measure **Fetal AO**, by the method of D trace measurement.

 Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **Fetal AO** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.2.5. Desc.AO

To measure Desc. AO:

1. In the PW-Obstetric measurement menu, select **Desc. AO**.

2. Measure **Desc. AO**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **Desc. AO** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.2.6. Placent A

To measure Placent A:

1. In the PW-Obstetric measurement menu, select **Placent A**.

2. Measure **Placent A**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **Placent A** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.2.7. Ductus V

To measure Ductus V:

1. In the PW-Obstetric measurement menu, select **Ductus V**.

2. Measure **Ductus V**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **Ductus V** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.3. Obstetric Measurements and Calculations in M mode

1   Press **Probe**, select a desired probe model and the exam mode **Obstetric**, and then press **OK,** or double click on the exam type.

2   Press **M** to enter B+M mode**,** or press **M** again to enter single M mode.

3   Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.
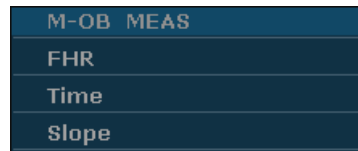
Figure 8-6 Obstetric Measurement and Calculation Menu in M mode

Items of Measurement and Calculation: FHR

To measure FHR:

1. In the M-Obstetric measurement menu, select **FHR**.

2. Measure **FHR**, by the method of heart rate measurement.

 Reference   Section *6.5.2 Generic Measurements in M Mode*

3. The results are displayed in measurement result window.

4. To begin a new **FHR** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

8.4. Results

Obstetric results include **Growth Curve** and **OB Worksheet**.

8.4.1. Growth Curve

You can define the fetus growth by comparing the measured parameter value with the fetus growth curve.

Operation procedure:

1. Measure one or more fetus growth parameter (GS, CRL, BPD, FL, AC, HC, APAD, TAD, CER, FTA, HUM, OFD, or THD).

2. Enter LMP or BBT.

3. In the B-obstetric menu, roll the trackball to highlight **Growth Curve** and press **Set**, and the **fetal growth analysis** dialog box will be displayed in the middle of the screen.

4. The default tab is GS and the formula of the current growth curve. Move the cursor to another formula in the pull-down menu, and press **Set** to display the normal growth curve based on the selected formula, which can define how the fetus grows.

5. Move the cursor to another tab in the pull-down menu, and press **Set** to display the growth curve of another measurement item and the phase of the growth corresponding to the measured data.

The signification of the growth curves is shown below and the x-coordinate shows the phase of the growth corresponding to the entered LMP or BBT, and the y-coordinate shows the measured data.

Move the cursor to **Close**, and press **Set** to exit.
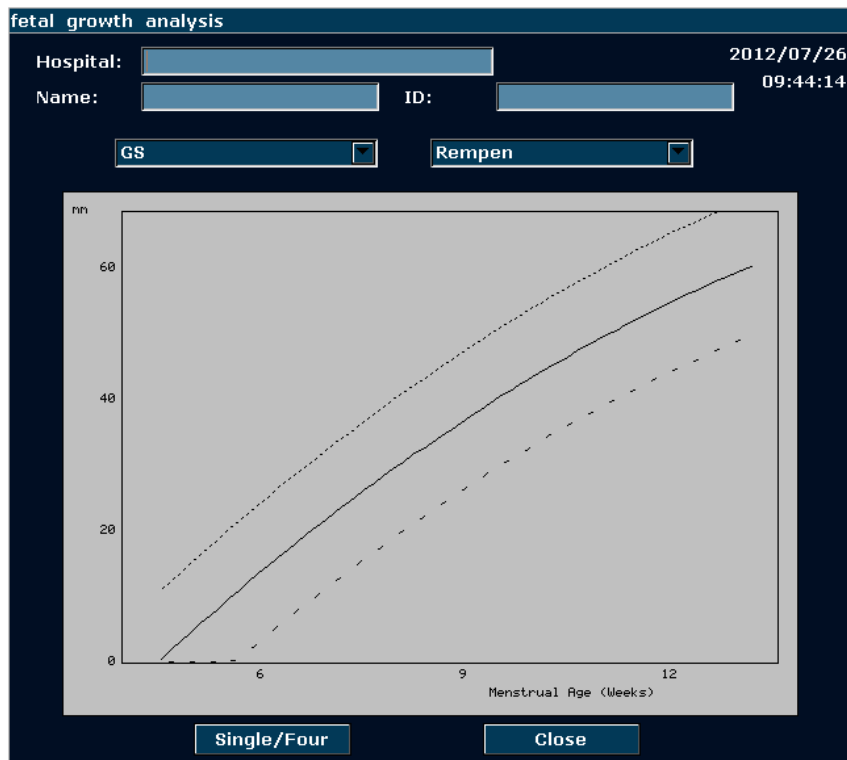
Figure 8-7 Fetal Growth Curve (Single)
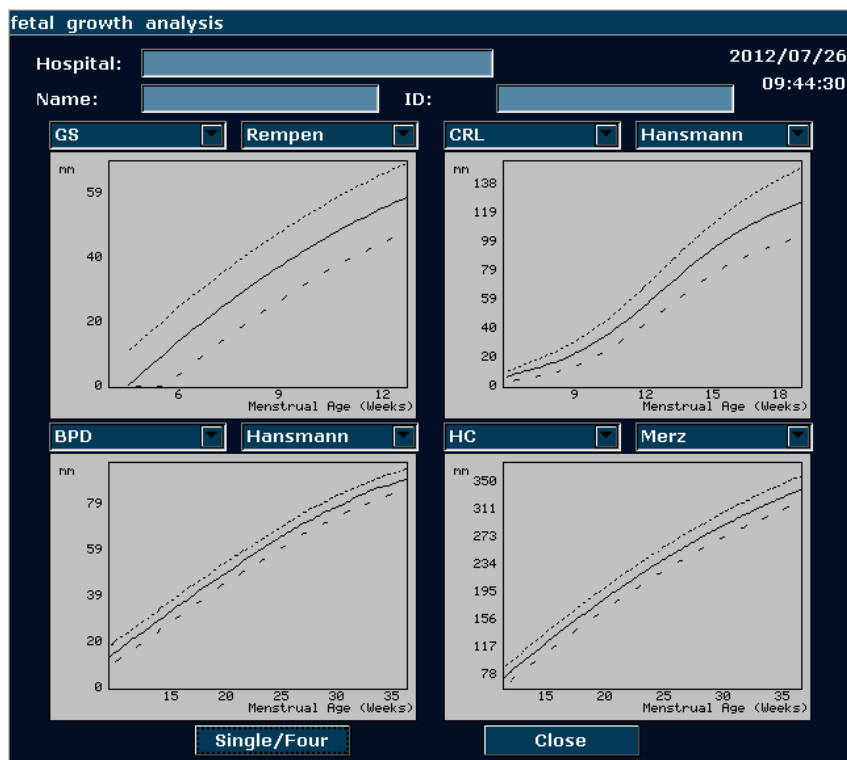
Figure 8-8 Fetal Growth Curve (Four)

NOTE:

Press **Single/Four** to display single growth graphics or four growth graphics.

8.4.2. Obstetric Report

After obstetric examination, the system will generate an obstetrical diagnosis worksheet automatically.

1. Select a desired probe model and the exam mode **Obstetric**.
2. In B/PW/M mode, after application measurements press **Report** to open **Obstetric Worksheet**.

Figure 8-9 Obstetric Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

NOTE:

1. The system will display the completed measurements and calculations, the uncompleted measurements and calculations will not be displayed.
2. You can check the measured items by opening the **Obstetric worksheet** dialog box whenever you want, during measurement or after that. Then press **OK** or **Cancel** to close the dialog box, and continue to measure.

To print the report:

Press **Print** in the Obstetric Worksheet.

Printing reference   Section *5.8 Printing.*

Chapter 9 Cardiology Measurements and Calculations

The cardiology examination is usually in the B mode, the B/M mode or the M mode.

Press **Probe**, select a desired probe model and the exam mode **Cardiac**, and then press **OK**, or double click on the exam type.

The result of ventricle volume measurement is more exact in two-dimension. You can get the two-dimension heart image of end diastolic and end systolic exactly and conveniently in the B/M mode. So we suggest that you do the cardiac measurement and calculation in the B/M mode.

9.1. Cardiac Measurements and Calculations in M Mode

Press **M** to enter B+M mode**,** or press **M** again to enter single M mode. Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.
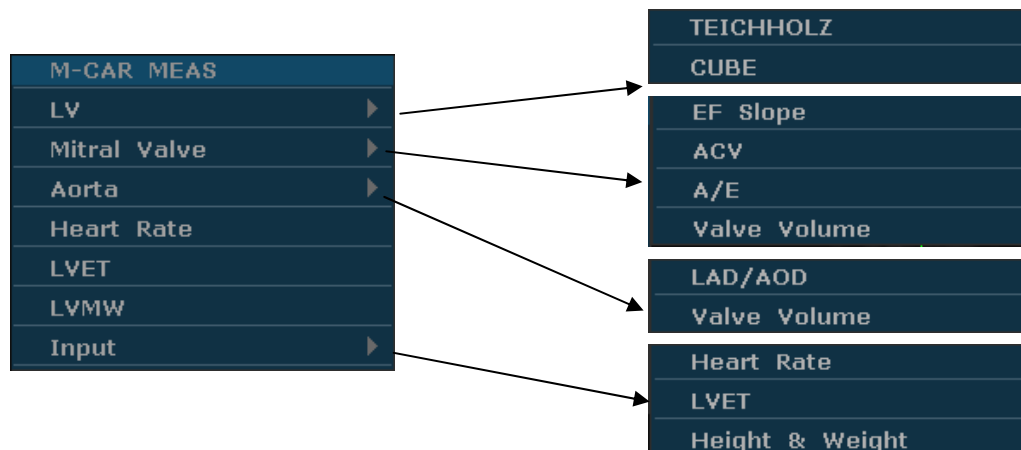
Figure 9-1 M Mode Cardiac Measurement and Calculation Menu

1. Items of Measurement and Calculation

   M-CARDIAC MEAS: LV, Mitral, Heart Rate, LVET, and LVMW.

2. Items of input

   Heart Rate, LVET, and Height &Weight.

   The formulas of B/M mode and M mode cardiac LV measurement include TEICHHOLZ and CUBE, as shown below, and the default formula is TEICHHOLZ.

1. CUBE formula:

NOTE: d: end diastolic; s: end systolic

Label	Description	Method
LVIDd	Left Ventricle Internal Diameter	Distance (mm)
LVIDs	Left Ventricle Internal Diameter	
ET	Ejection Time	Time (ms or s)
HR	Heart Rate	M mode heart rate measurement or key in (bpm)
EDV	End Diastolic Volume	EDV (mL) = $LVIDd^3$ (mm^3)/1000
ESV	End Systolic Volume	ESV (mL) = $LVIDs^3$ (mm^3)/1000
SV	Stroke volume	SV (mL) = EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min) = SV (mL) x HR (bpm)/1000
EF	Ejection fraction (M mode)	EF (No unit) = SV (mL)/ EDV (mL) x 100%
FS	Fractional Shortening	FS (No unit) = [{ LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm)]x 100%
SI	Stroke Index	SI (No unit) = SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit) = CO (L/min)/ BSA (m^2)
MVCF	Mean Velocity Circumferential Fiber Shortening	MVCF (No unit) = { LVIDd (mm)- LVIDs (mm)}/ {LVIDd (mm) x ET (ms)/1000}
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 9-1 Measurement and Calculation Items with CUBE formula

The formulas of BSA calculation:

Oriental: BSA=$Weight^{0.425}$*$Height^{0.725}$*73.58/10000

Occidental: BSA=$Weight^{0.425}$*$Height^{0.725}$*71.84/10000

Height: height   cm.

Weight: weight   kg.

BSA: body surface area m^2.

2. TEICHHOLZ formula:

NOTE: d: end diastolic; s: end systolic

Label	Description	Method
LVIDd	Left Ventricle Internal Diameter	Distance (mm)
LVIDs	Left Ventricle Internal Diameter	Distance (mm)
ET	Ejection Time	Time (ms or s)
HR	Heart Rate	M mode heart rate measurement or key in (bpm)
EDV	End Diastolic Volume	EDV (mL) = $\{7 \times \text{LVIDd}^3 \, (\text{cm})^3\}/\{2.4 + \text{LVIDd (cm)}\}$
ESV	End Systolic Volume	ESV (mL) = $\{7 \times \text{LVIDs}^3 \, (\text{cm})^3\}/\{2.4 + \text{LVIDs (cm)}\}$
SV	Stroke volume	SV (mL) = EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min) = SV (mL) × HR (bpm)/1000
EF	Ejection fraction (M mode)	EF (No unit) = SV (mL)/ EDV (mL) ×100%
FS	Fractional Shortening	FS (No unit) = [{ LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm)] ×100%
SI	Stroke Index	SI (No unit) = SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit) = CO (L/min)/ BSA (m^2)
MVCF	Mean Velocity Circumferential Fiber Shortening	MVCF (No unit) = {LVIDd (mm)- LVIDs (mm)}/ {LVIDd (mm) x ET (ms)/1000}
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 9-2 Measurement and Calculation Items with TEICHHOLZ formula

3. Other measurement items:

Label	Description	Method
AOD	Aortic root Diameter	Distance (mm)
LAD	Left Atrium Diameter	
CA	Cardiac cycle apex A	
CE	Cardiac cycle apex E	
EF SLP	Ejection Fraction Slope	Slope (mm/s)
ACV	AC Decreasing Velocity	
DEV	Deceleration Velocity	
DCT	Deceleration Time	Time (ms or s)

MAVO1	Aortic Valve Volume Opened, beginning	Distance (mm)
MAVO2	Aortic Valve Volume Opened, ending	
AA	Aortic Amplitude	
LVMW	Left Ventricular Muscle Weight	LVMW (g) =1.04* ({IVSTd (cm)+LVIDd (cm)+LVPWd (cm)}^{3}-LVIDd^3 (cm)^3)-13.6
LVMWI	Left Ventricular Muscle Weight Index	LVMWI (No unit) = LVMW/BSA
A/E	The ratio of CA to CE	A/E (No unit) = CA (mm)/CE (mm)
LAD/AOD	Left Atrium Diameter / Aortic root Diameter	LAD/AOD (No unit) = LAD (mm) / AOD (mm)
AVSV	Aortic Valve Stoma Valve flow	AVSV (mL) = MAVO1 (cm)+MAVO2 (cm)* ET (s)*50+AA (cm)
QMV	Mitral Valve Flow	QMV (mL) = 4*DEV (cm/s)*DCT (s)

Table 9-3 Other Measurement Items

4. Calculation items:

Label	Description	Method
EDV	End Diastolic Volume	EDV (mL) = LVIDd^3 (mm^3)/1000 CUBE formula
ESV	End Systolic Volume	ESV (mL) = LVIDs^3 (mm^3)/1000 CUBE formula
SV	Stroke volume	SV (mL) = EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min) = SV (mL) × HR (bpm)/1000
EF	Ejection fraction (M mode)	EF (No unit) = SV (mL)/ EDV (mL) × 100%
FS	Fractional Shortening	FS (No unit) =[{LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm)]x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
MVCF	Mean Velocity Circumferential Fiber Shortening	MVCF (No unit)= { LVIDd (mm)- LVIDs (mm)}/ {LVIDd (mm) × ET (ms)/1000}

BSA	Body Surface Area (m^2)	Calculate by to the selected formula
LVMW	Left Ventricular Muscle Weight	LVMW (g)=1.04*[{IVSTDd (cm)+LVIDd (cm) + $LVPWd^3$ (cm)}^{3}-$LVIDd^3$ $(cm)^3$]-13.6
LVMWI	Left Ventricular Muscle Weight Index	LVMWI (No unit)=LVMW/BSA
A/E	The ratio of CA to CE	A/E (No unit)= CA (mm)/CE (mm)
LAD/AOD	Left Atrium Diameter / Aortic root Diameter	LAD/AOD (No unit)= LAD (mm)/AOD (mm)
AVSV	Aortic Valve Stoma Valve flow	AVSV (mL)=MAVO1 (cm)+MAVO2 (cm)* ET (s)*50+AA (cm)
QMV	Mitral Valve Flow	QMV (mL)=4*DEV (cm/s)*DCT (s)

Table 9-4 Calculation Items

9.1.1. LV

The B/M mode and M mode measurements of LV are based on ESV and EDV measurements, which are calculated by LVIDs and LVIDd measurements.

After measuring LVIDs and LVIDd and entering Heart Rate, LVET, and Height & Weight, the system calculates some physiological parameters, such as ESV, EDV, SV, EF, FS, CO, MVCF, SI, and CI.

There are two calculation formulas for heart antrum volume in the B/M mode and the M mode, as shown below.

Item	Formula
TEICHHOLZ	EDV (mL)= 7 x $LVIDd^3$ (cm^3)/{2.4 + LVIDd (cm)} ESV (mL)= 7 x $LVIDs^3$ (cm^3)/{2.4 + LVIDs (cm)}
CUBE	EDV (mL) = $LVIDd^3$ $(mm)^3$ / 1000 ESV (mL) = $LVIDs^3$ $(mm)^3$ / 1000

Table 9-5 TEICHHOLZ and CUBE Formula

NOTE:

Ensure that the value of LVIDd is bigger than that of LVIDs, or the system can not display the calculation items.

SV and EF calculation is as below.

Measurement items:

LVIDs and LVIDd

To measure LV:

1.   In the M-cardiac measurement menu, roll the trackball to highlight **LV**, and the secondary menu will be displayed. Select TEICHHOLZ or CUBE and press **Set**. Then move the cursor to the image area and a "+" is displayed.

2.   Move the cursor to the end systolic of left ventricle, and measure LVIDs. The method is similar to generic M mode distance measurement. LVIDs and ESV will be displayed in the measurement result window.

3.   Move the cursor to the end diastolic of the left ventricle, and then measure LVIDd. The method is the same as the generic M mode distance measurement method. LVIDd, EDV, SV, EF, and FS will be displayed in the measurement result window.

To enter HR

1.   In the M-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the secondary menu **Heart Rate** and press **Set** to display an **HR input** dialog box, as shown below.
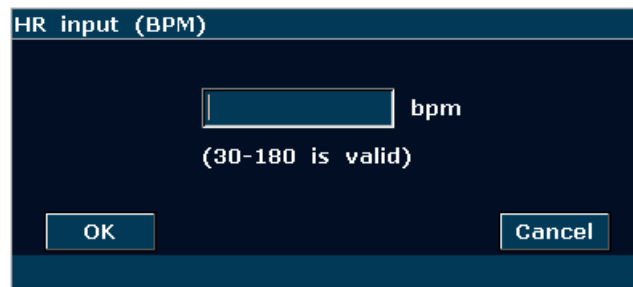
Figure 9-2 HR Input Dialog Box

2.   Input a suitable value in the HR (bpm) box.

3.   Roll the trackball to highlight **OK** and press **Set**, and after measuring LV, the result of CO will be displayed in the measurement result window.

To enter LVET

1.   In the M-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the secondary menu **LVET** and press **Set** to display an **ET input** dialog box, as shown below.
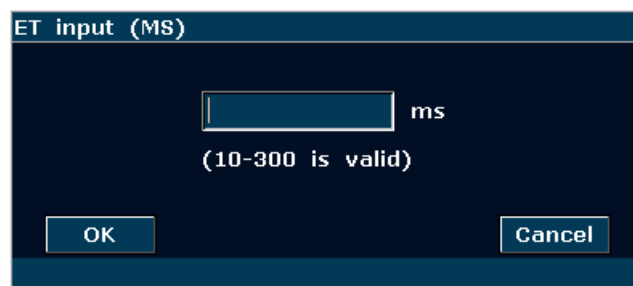
Figure 9-3 ET Input Dialog Box

2.   Input a suitable value in the LVET (ms) box.

3.   Roll the trackball to highlight **OK** and press **Set**.

To enter Height and Weight

1.   In the M-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the secondary menu **Height & Weight** and press **Set** to display a **Height and Weight** entering dialog box, as shown below.
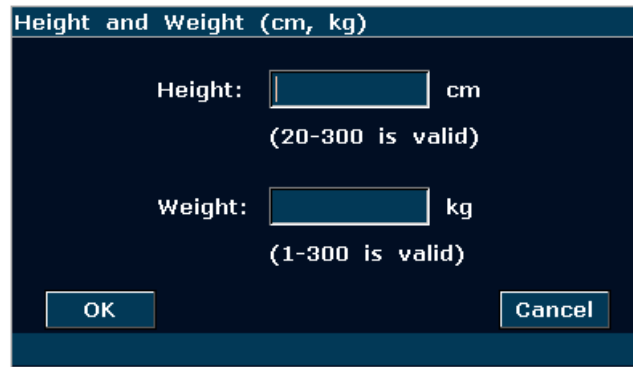
Figure 9-4 Height and Weight Input Dialog Box

2.   Input suitable values in the Height and Weight boxes.

3.   Roll the trackball to highlight **OK** and press **Set**.

The measurements and calculations of all the LV parameters are as below.

Measurement or input items:

Input or measurement items: HR, LVET, and Height & Weight;

Measurement items: LVIDs and LVIDd

To calculate all the LV parameters:

1. Input or measure HR, LVET, and Height & Weight.

2. Measure LVIDs and LVIDd following the prompt instruction.

3. All the LV parameters, ESV, EDV, SV, FS, EF, CO, MVCF, SI and CI will be displayed in the measurement result window.

9.1.2. Mitral Valve

Measurement items of mitral valve include EF slope, ACV, A/E, DEV, and DCT.

To measure EF slope, ACV, and A/E

1.   In the M-cardiac measurement menu, roll the trackball to highlight **Mitral Valve** to display the secondary menu.

2.   Roll the trackball to highlight **EF Slope**, **ACV**, or **A/E**, and press **Set**.

   a)   To measure **EF Slope** and **ACV**, by the method of generic M mode slope measurement;

   b)   To measure **A/E**, measure the breadth from apex A to point C and the breadth from apex

E to point C respectively, by the method of generic M mode distance measurement.

3.   After the measurements, the results of EF SLP, ACV and A/E will be displayed in the measurement result window.

To measure Valve Volume (QMV)

Calculation formula:

QMV (mL) = 4*DEV (cm/s)*DCT (s)

Measurement operation procedure:

1.   In the M-cardiac measurement menu, roll the trackball to highlight **Mitral** to display the secondary menu.

2.   Roll the trackball to highlight **Valve Volume**, and press **Set**.

3.   Measure DEV, by the method of generic M mode slope measurement.

4.   Measure DCT, by the method of generic M mode time measurement.

5.   After the measurement, the result of QMV will be displayed in the measurement result window.

9.1.3. Aortia

Aortia calculation is as below.

●   Measurement items:

LAD/ AOD and Valve Volume

●   Aortia calculation

In the M-cardiac measurement menu, roll the trackball to highlight **Aortia** to display the secondary menu.

✧   **LAD/AOD measurement**

     1. Roll the trackball to highlight **LAD/AOD** and press **Set**.

     2. Measure LAD and AOD respectively, by the method of generic M mode distance measurement.

     3. The results will be displayed in the measurement result window.

✧   **AVSV measurement**

The calculation formula:

AVSV (mL) = MAVO1 (cm)+MAVO2 (cm)*ET (s)*50+AA (cm)

The measurement operation procedure:

1. Roll the trackball to highlight **Valve Volume** and press **Set**.

2. Measure MAVO1, by the method of generic M mode distance measurement.

3. Measure MAVO2, by the method of generic M mode distance measurement.

4. Measure AA, by the method of M mode distance measurement.

5. Measure LVET, by the method of generic M mode time measurement.

6. After the measurements, the result of AVSV will be displayed in the measurement result window.

9.1.4. LVMW, LVMWI

LVMW and LVMWI calculations are as below.

● Measurement items:

LVPWd, IVSTd and LVIDd

● The calculation formula

LVMW (g) = 1.04*[{IVSTd (cm) +LVIDd (cm) +LVPWd (cm)}^{3}-LVIDd^3 (cm)^3]-13.6

LVMWI = LVMW (g)/BSA (m)^2

● To calculate LVMW, LVMWI

1. In the M-cardiac measurement menu, roll the trackball to highlight **LVMW**, and press **Set**.

2. Measure LVPWd, IVSTd and LVIDd respectively following the prompt instruction.

3. After the measurements, the result of LVMW will be displayed in the measurement result window. The system will display LVWMI if you have keyed in Height and Weight before the measurement. If you had measured LV before, it will renovate the LV results.

9.2. Cardiac Measurements and Calculations in B Mode

1. Press **Probe**, select a desired probe model and the exam mode **Cardiac**, and then press **OK**, or double click on the exam type.

2. In B mode, press **Measure**, the system enters B mode cardiac measurement. The B mode cardiac measurement menus are shown as follows:
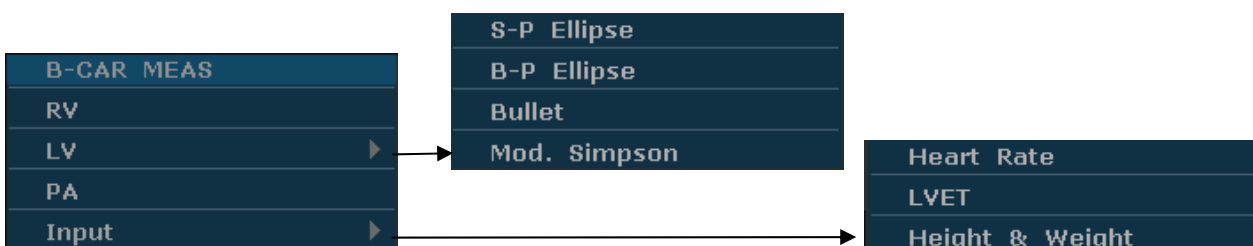
Figure 9-5 B Mode Cardiac Measurement and Calculation Menu

1. Items of Measurement and Calculation

   B-CARDIAC MEAS: RV, LV, and PA.

2. Items of input

   Heart Rate, LVET, and Height & Weight

   The default measurements are LVLs, LVALs, LVLd, and LVALd measurements, by the method of single-plane ellipse (S-P Ellipse) measurement.

   The formulas of B mode cardiac LV measurement include Single plane ellipse (S-P Ellipse), Dual plane ellipse (B-P Ellipse), Bullet, and Modified Simpson (Mod. Simpson), shown as follows:

1. Single plane ellipse formula:

NOTE: d: end diastolic; s: end systolic

Label	Description	Method
LVLd	Left Ventricle Long-axle Diameter	Distance (mm)
LVALd	Left Ventricle Area of Long-axle	Ellipse Area (mm^2, cm^2, or dm^2)
LVLs	Left Ventricle Long-axle Diameter	Distance (mm)
LVALs	Left Ventricle Area of Long-axle	Ellipse Area (mm^2, cm^2, or dm^2)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV (mL)= $(8/3\pi) \times \{LVALd\ (mm^2)\}^2 / LVLd$ (mm) /1000
ESV	End Systolic Volume	ESV (mL)= $(8/3\pi) \times \{LVALs\ (mm^2)\}^2 / LVLs$ (mm) /1000
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) × HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 9-6 Measurement and Calculation Items with Single Plane Ellipse Formula

2. Dual plane ellipse formula:

NOTE: d: end diastolic; s: end systolic

Label	Description	Method
LVALd	Left Ventricle Area of Long-axle	Ellipse Area (mm^2, cm^2, or dm^2)
LVAMd	Left Ventricular Fractional Area of Mitral Valve	
LVIDd	Left Ventricle Internal Diameter	Distance (mm)
LVALs	Left Ventricle Area of Long-axle	Ellipse Area (mm^2, cm^2, or dm^2)
LVAMs	Left Ventricular Fractional Area of Mitral Valve	
LVIDs	Left Ventricle Internal Diameter	Distance (mm)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV(mL)=(8/3π)×LVALd(mm^2)×LVAMd(mm^2)/LVIDd(mm) /1000
ESV	End Systolic Volume	ESV(mL)=(8/3π)×LVALs(mm^2)×LVAMs(mm^2)/LVIDs(mm) /1000
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) × HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 9-7 Measurement and Calculation Items with Dual Plane Ellipse Formula

3. Bullet volume formula:

NOTE: d: end diastolic; s: end systolic

Label	Description	Method
LVAMd	Left Ventricular Fractional Area of Mitral Valve	Ellipse Area (mm^2, cm^2, or dm^2)
LVLd	Left Ventricular Length	Distance (mm)
LVAMs	Left Ventricular Fractional Area of Mitral Valve	Ellipse Area (mm^2, cm^2, or dm^2)
LVLs	Left Ventricular Length	Distance (mm)
HR	Heart Rate	Key in (bpm)

EDV	End Diastolic Volume	EDV (mL)= (5/6)×LVLd (mm)×LVAMd (mm^2) /1000
ESV	End Systolic Volume	ESV (mL)= (5/6)×LVLs (mm)× LVAMs (mm^2) /1000
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) × HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 9-8 Measurement and Calculation Items with Bullet Formula

4. Modified SIMPSON formula:

NOTE: d: end diastolic; s: end systolic

Label	Description	Method
LVAMd	Left Ventricular Fractional Area of Mitral Valve	Ellipse Area (mm^2, cm^2, or dm^2)
LVLd	Left Ventricular Length	Distance (mm)
LVAPd	Left Ventricular Fractional Area of Papillary Muscles	Ellipse Area (mm^2, cm^2, or dm^2)
LVAMs	Left Ventricular Anterior Wall	
LVLs	Left Ventricular Length	Distance (mm)
LVAPs	Left Ventricular Fractional Area of Papillary Muscles	Ellipse Area (mm^2, cm^2, or dm^2)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	*1
ESV	End Systolic Volume	
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) x HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)

BSA	Body Surface Area	Calculate by to the selected formula (m^2)

Table 9-9 Measurement and Calculation Items with Modified SIMPSON Formula

*1

$$EDV(mL) = LVLd(mm)/9 \times \left\{ 4 \times LVAMd(mm^2) + 2 \times LVAPd(mm^2) + \sqrt{LVAMd(mm^2) \times LVAPd(mm^2)} \right\}/1000$$

$$ESV(mL) = LVLs(mm)/9 \times \left\{ 4 \times LVAMs(mm^2) + 2 \times LVAPs(mm^2) + \sqrt{LVAMs(mm^2) \times LVAPs(mm^2)} \right\}/1000$$

5. Other measurement and calculation items:

Label	Description	Method
LVET	Left Ventricular Ejection Time	Time (ms)
FS	Fractional Shortening	FS (No unit)={ LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm) x 100%
MVCF	Mean Velocity Circumferential Fiber Shortening	MVCF (No unit)= { LVIDd (mm)- LVIDs (mm)}/ {LVIDd (mm) x ET (ms)/1000}

Table 9-10 Other Measurement and Calculation Items

9.2.1. LV

LV measurement is as below.

Single plane ellipse (**S-P Ellipse**)

- Measurement items:

  LVLs, LVALs, LVLd, and LVALd

- To measure LV:

1. In the B-cardiac measurement menu, roll the trackball to highlight **LV**. Then select **S-P Ellipse** and press **Set**.

2. During end systolic, measure LVLs and LVALs respectively. The system calculates and displays the result of ESV.

3. During end diastolic, measure LVLd and LVALd respectively, by the method of generic B mode distance measurement and generic B mode ellipse area measurement respectively. The system calculates and displays the results of EDV, SV, and EF.

Dual plane ellipse (B-P Ellipse), Bullet, and Modified Simpson (Mod. Simpson)

The operations in these methods are similar to those in the single plane ellipse method. Please refer to the relevant B mode generic measure method for details, and refer to the prompt instruction to help you.

CO calculation is as below.

- Measurement and input items:

  Measure LV;

  Key in: HR

- To calculate CO:

  1. In the B-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the secondary menu **Heart Rate** and press **Set** to display an **HR input** dialog box, as shown below.
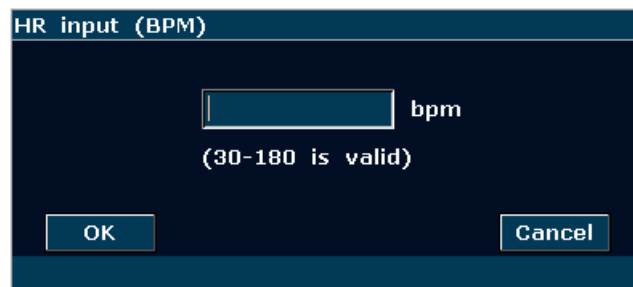
Figure 9-6 HR Input Dialog Box

  2. Input a suitable value in the HR (bpm) box.

  3. Roll the trackball to highlight **OK** and press **Set**. After measuring LV, CO will be displayed in the measurement result window.

MVCF calculation is as below.

- Measurement and input items:

  Measure: LV;

  Key in: LVET

- To calculate MVCF:

  1. Move the cursor to **Input**. Then select the secondary menu **LVET** and press **Set** to display an **ET input** dialog box, as shown below.
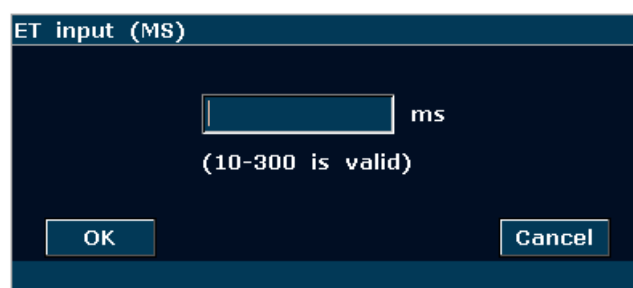
Figure 9-7 ET Input Dialog Box

  2. Input a suitable value in the LVET (ms) box.

  3. Roll the trackball to highlight **OK** and press **Set**. After measuring LV, MVCF will be displayed in the measurement result window.

CI and SI calculations are as below.

● Measurement and input items:

Measure: LV and HR;

Key in: Height and Weight

● To calculate CI and SI:

1. In the B-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the secondary menu **Height & Weight** and press **Set** to display a **Height and Weight** entering dialog box, as shown below.
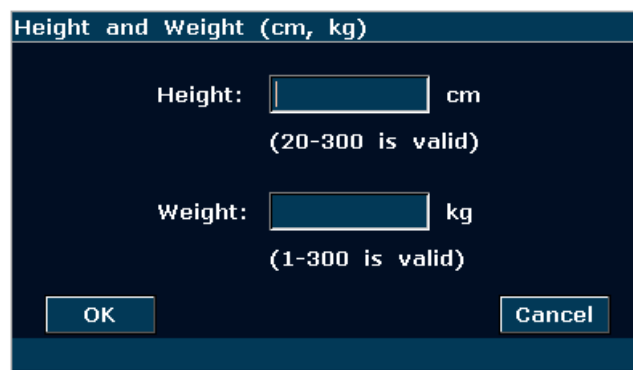
Figure 9-8 Height and Weight Input Dialog Box

2. Input suitable values in the Height (cm) and Weight (Kg) boxes.

3. Roll the trackball to highlight **OK** and press **Set**. BSA will be displayed in the measurement result window. After measuring LV and HR, SI and CI will also be displayed in measurement result window.

9.2.2. RV (Right Ventricle Internal Diameter)

1. In the B-cardiac measurement menu, roll the trackball to highlight **RV**.

2. Measure RV by the method of distance.

3. The result will be displayed in the measurement result window.

9.2.3. PA (Pulmonary Artery)

1. In the B-cardiac measurement menu, roll the trackball to highlight **PA**, and press **Set** to display a "+" in the image area.

2. Measure **PA** by the method of distance measurement.

3. The result will be displayed in the measurement result window.

Other parameters:

If you want to perform other cardiac parameter measurements, please enter B/M mode or M

mode cardiac measurement.

9.3. Cardiac Report

After the cardiac examination, the system generates a cardiology examination and diagnosis worksheet.

1. Select a desired probe model and the exam mode **Cardiac**.

2. In M/B mode, after application measurements press **Report** to open **Cardiac Worksheet**, as shown in *Figure 9-9*.

Figure 9-9 Cardiac Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the Cardiac Worksheet.

Printing reference   Section *5.8 Printing.*

Chapter 10 Gynecology Measurements & Calculations

The gynecology examination is usually in the B mode and the PW mode.

10.1. Measurements and Calculations in B Mode

1. Press **Probe**, select a desired probe model and the exam mode **Gynecology**, and then press **OK**, or double click on the exam type.

2. Press **B** to enter the B mode.

3. Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.
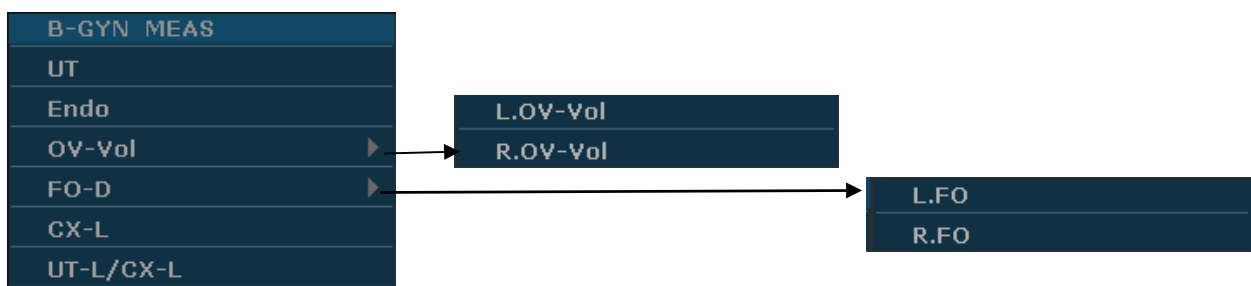
Figure 10-1 Gynecology Measurement and Calculation Menu in B Mode

To determine the volume of right ovary or left ovary, take three measurements: length, width, and height. The system calculates the volume.

The gynecology measurement & calculation items of the B mode are as follows.

Label	Description	Method
UT	Uterus	UT (mm) = UT-L (mm)+UT-W (mm)+UT-H (mm)
UT-L UT-W UT-H	Uterus Length Uterus width Uterus Height	Distance (mm)
UT-V	Uterus Volume	UT-V(mm^3) = 0.523×L(mm)×W(mm)×H(mm)
Endo	Uterus Endo- membrane Thickness	Distance (mm)
L. OV-Vol	Left Ovary Volume	L. OV-V (mL) = 0.523 x L. OV-L (mm) x L. OV-W (mm) x L. OV-H (mm)/1000
L. OV-L L. OV-W L. OV-H	Left Ovary Length Left Ovary Width Left Ovary Height	Distance (mm)
R. OV-Vol	Right Ovary Volume	R. OV-V (mL) = 0.523 x R. OV-L (mm) x R. OV-W (mm) x R. OV-H (mm)/1000
R. OV-L R. OV-W R. OV-H	Right Ovary Length Right Ovary Width Right Ovary Height	Distance (mm)

L. FO-L	Left Follicle Length	
L. FO-W	Left Follicle Width	
R. FO-L	Right Follicle Length	
R. FO-W	Right Follicle Width	
CX-L	Cervix Length	
UT-L/CX-L	The ratio of Uterus Length and Cervix Length	UT-L/CX-L Ratio

Table 10-1 Gynecology Measurement and Calculation Items in B Mode

10.1.1. UT

To measure UT:

1. In the B-gynecology measurement menu, roll the trackball to highlight **UT** and press **Set**.

2. Take three measurements, UT-L, UT-W and UT-H, by the method of distance measurement.

Reference   Section *6.5.1 Generic Measurements in B Mode*

3. After the three measurements are taken, the system calculates UT-V automatically, and the result of UT and UT-V will be displayed in the measurement result window. You can measure a maximum of one group of data.

10.1.2. Endo

To measure endometrium:

1. In the B-gynecology measurement menu, roll the trackball to highlight **Endo** and press **Set**.

2. Measure Endo, by the method of distance measurement.

Reference   Section *6.5.1 Generic Measurements in B Mode*

3. The result of Endo will be displayed in the measurement result window. You can measure a maximum of one group of data.

10.1.3. OV-Vol

The measurement of OV-Vol includes L.OV-Vol and R.OV-Vol.

To measure L.OV-Vol:

1. In the B-gynecology measurement menu, roll the trackball to highlight **OV-Vol**, and then highlight the secondary menu **L.OV-Vol**, press **Set**.
2. Take three measurements, L.OV-L, L.OV-W and L.OV-H, by the method of distance measurement.

Reference　Section *6.5.1 Generic Measurements in B Mode*

3. After the three measurements are taken, the result of L.OV-Vol will be displayed in the measurement result window.

To measuree R.OV-Vol:

1. In the B-gynecology measurement menu, roll the trackball to highlight **OV-Vol**, and then highlight the secondary menu **R.OV-Vol**, press **Set**.
2. Take three measurements, R.OV-L, R.OV-W and R.OV-H, by the method of distance measurement.

Reference　Section *6.5.1 Generic Measurements in B Mode*

3. After the three measurements are taken, the result of R.OV-Vol will be displayed in the measurement result window.

10.1.4. FO-D

The measurement of FO-D includes L. FO and R. FO.

To measure L. FO:

1. In the B-gynecology measurement menu, roll the trackball to highlight **FO-D**, and then highlight the secondary menu **L. FO**, press **Set**.

2. Take two measurements, L. FO-L and L. FO-W, by the method of distance measurement.

Reference　Section *6.5.1 Generic Measurements in B Mode*

3. After the two measurements are taken, the result of **L. FO** will be displayed in the measurement result window.

To measure R. FO:

1. In the B-gynecology measurement menu, roll the trackball to highlight **FO-D**, and then highlight the secondary menu **R. FO**, press **Set**.

2. Take two measurements, R. FO-L and R. FO-W, by the method of distance measurement.

Reference　Section *6.5.1 Generic Measurements in B Mode*

3. After the two measurements are taken, the result of **R. FO** will be displayed in the measurement result window.

10.1.5. CX-L

To measure CX-L:

1. In the B-gynecology measurement menu, roll the trackball to **CX-L**, and press **Set**.

2. Measure **CX-L** with distance method.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The result will be displayed in the measurement result window, if you have already measured UT-L, the UT-L/CX-L will also be displayed.

10.1.6. UT-L/CX-L

To measure UT-L/CX-L:

1. In the B-gynecology measurement menu, roll the trackball to highlight **UT-L/CX-L**, and press **Set**.

2. Measure UT-L and CX-L, by the method of distance measurement.

 Reference   Section *6.5.1Generic Measurements in B Mode*

3. The results will be displayed in the measurement result window.

NOTE:

During measurement, if you have already measured any one of the items, UT-L or CX-L, when you finished the other one, the UT-L/CX-L will be displayed automatically.

10.2. Measurements and Calculations in PW Mode

1. Press **Probe**, select a desired probe model and the exam mode **Gynecology**, and then press **OK**, or double click on the exam type.

2. Press **PW** to display the sample line, and press this key again to enter the PW mode.

3. Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.

Items of Measurement and Calculation

L UT A, R UT A, L OV A, and R OV A.

Secondary menu of the gynecology measurement items in the PW mode:

Figure 10-2 Gynecology Measurement and Calculation Menu in PW Mode

Label	Description	Channel	Method
L UT A	Left Uterus Aorta	1	D trace
R UT A	Right Uterus Aorta	1	
L OV A	Left Ovary Aorta	1	
R OV A	Right Ovary Aorta	1	

Table 10-2 Gynecology Measurement and Calculation Items in PW Mode

10.2.1. L UT A

1. In the PW-gynecology measurement menu, select **L UT A**.

2. Measure **L UT A**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. You can measure a maximum of one group of data. To begin a new **L UT A** measurement, repeat steps 1 through 3.

10.2.2. R UT A

1. In the PW-gynecology measurement menu, select **R UT A**.

2. Measure **R UT A**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. You can measure a maximum of one group of data. To begin a new **R UT A** measurement, repeat steps 1 through 3.

10.2.3. L OV A

1.   In the PW-gynecology measurement menu, select **L OV A**.

2.   Measure **L OV A**, by the method of D trace measurement.

 Reference   Section *6.5.4 Generic Measurements in PW Mode*

3.   The results are displayed in measurement result window.

4.   You can measure a maximum of one group of data. To begin a new **L OV A** measurement, repeat steps 1 through 3.

10.2.4. R OV A

1.   In the PW-gynecology measurement menu, select **R OV A**.

2.   Measure **R OV A**, by the method of D trace measurement.

 Reference   Section *6.5.4 Generic Measurements in PW Mode*

3.   The results are displayed in measurement result window.

4.   You can measure a maximum of one group of data. To begin a new **R OV A** measurement, repeat steps 1 through 3.

10.3. Gynecologic Report

After the gynecologic examination, the system generates a gynecologic worksheet.

1.   Select a desired probe model and the exam mode **Gynecology**.

2.   In B/PW mode, after application measurements press **Report** to open **Gynecologic Worksheet**.

Gynecologic worksheet has three tabs, uterus, ovary, and follicle, as shown in *Figure 10-3*.

Figure 10-3 Gynecologic Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the Gynecologic Worksheet.

Printing reference   *Section 5.8 Printing*

Chapter 11　Small Parts Measurements & Calculations

11.1.Measurements and Calculations

The small parts examination is usually in the B mode.

1. Press **Probe**, select a desired probe model and the exam mode **Small Parts**, and then press **OK**, or double click on the exam type.

2. Press **B** to enter the B mode.

3. Press **Measure** to activate the application measurement function. The measurement menu is displayed.
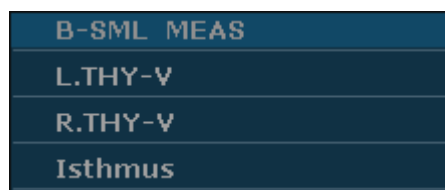
Figure 11-1 Small Parts Measurement and Calculation Menu

To determine the right thyroid volume or left thyroid volume, take three measurements: length, width, and height. The system calculates the volume.

The measurement & calculation items of small parts of B mode are as follows.

Label	Description	Method
THY	Thyroid	/
L. THY-V	Left Thyroid Volume	L. THY-V (mm^3) = 0.497 × L. THY-L (mm) × L. THY-W (mm) × L. THY-H (mm)
L. THY-L L. THY-W L. THY-H	Left Thyroid Length Left Thyroid Width Left Thyroid Height	Distance (mm)
R. THY-V	Right Thyroid Volume	R. THY-V (mm^3) = 0.497 x R. THY-L (mm) × R. THY-W (mm) × R. THY-H (mm)
R. THY-L R. THY-W R. THY-H	Right Thyroid Length Right Thyroid Width Right Thyroid Height	Distance (mm)
Isthmus	Thyroid Isthmus	Distance (mm)

Table 11-1 Small Parts Measurement and Calculation Items

The measurements of THY include L.THY-V and R.THY-V.

To measure L.THY-V:

1. In the small parts measurement menu, roll the trackball to highlight **L.THY-V**, press **Set**.

2. Measure three pieces of data: L.THY-L, L.THY-W and L.THY-H, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of L.THY-V will be displayed in the measurement result window.

To measure R. THY-V:

1. In the small parts measurement menu, roll the trackball to highlight **R.THY-V**, press **Set**.

2. Measure three pieces of data: R.THY-L, R.THY-W and R.THY-H, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of R.THY-V will be displayed in the measurement result window.

To measure Isthmus:

1. In the small parts measurement menu, roll the trackball to highlight **Isthmus**, press **Set**.

2. Measure Isthmus, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the measurement, the result of Isthmus will be displayed in the measurement result window.

11.2.Small Parts Report

After the small parts examination, the system generates a Small Parts worksheet.

1. Select a desired probe model and the exam mode **Small Parts**.

2. In B mode, after application measurements press **Report** to open **Small Parts Worksheet**, as shown below:

Figure 11-2 Small Parts Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the Small Parts Worksheet.

Printing reference   Section *5.8 Printing*

Chapter 12 Urology Measurements and Calculations

12.1.Measurement and Calculation

The urology examination is usually in the B mode.

1. Press **Probe**, select a desired probe model and the exam mode **Urology**, and then press **OK**, or double click on the exam type.

2. Press **B** to enter the B mode.

3. Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.
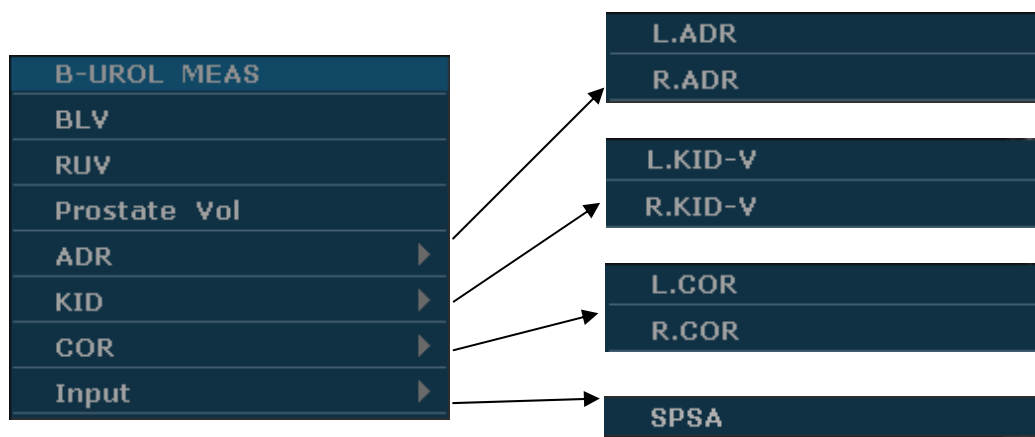
Figure 12-1 Urology Measurement and Calculation Menu

Label	Description	Method
RUV	Residual Urine Volume (ml or mm^3)	RUV (mm^3) = 0.7x RUV-L (mm) × RUV-W (mm) × RUV-H (mm)
RUV-L RUV-W RUV-H	Residual Urine Length Residual Urine Width Residual Urine Height	Distance (mm)
PV	Prostate Volume (mm^3, cm^3, or dm^3)	PV (mm^3) = 0.52 x PV-L (mm) × PV-W (mm) × PV-H (mm) /1000
PV-L PV-W PV-H	Prostate Length Prostate Width Prostate Height	Distance (mm)
PPSA	Predicted Prostate Specific Antigen Density	PPSA (ng/mL) = 0.12 × PV
SPSA	Serum of Prostate Specific Antigen	Key in SPSA (ng)
PSAD	Prostate Specific Antigen Density	PSAD (ng/mL) = SPSA (ng)/ PV (mL), (0.01ng ≤SPSA≤100ng)
BLV	Bladder Volume	BLV(ml) = π/6×L(mm)×W(mm)×H(mm) /1000

BLV-L BLV-W BLV-H	Bladder Length Bladder Width Bladder Height	Distance (mm)
ADR(L/R)	Adrenal (Left/Right)	/
ADR-L ADR-W ADR-H	Adrenal Length Adrenal Width Adrenal Height	Distance (mm)
KID-V(L/R)	Kidney Volume (Left/Right)	$KID-V(cm^3) = \pi/6 \times L(mm) \times W(mm) \times H(mm) /1000$
KID-L KID-W KID-H	Kidney Length Kidney Width Kidney Height	Distance (mm)
COR(L/R)	Cortex Thickness of Kidney(Left/Right)	Distance (mm)

Table 12-1 Urology Measurement and Calculation Items

To determine the residual urine volume or prostate volume, take three measurements: length, width, and height. The system calculates the volume.

To measure BLV:

1. In the urology measurement menu, roll the trackball to highlight **BLV**, and then press **Set**.

2. Measure three pieces of data: BLV-L, BLV-W and BLV-H, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of BLV will be displayed in the measurement result window.

To measure RUV:

1. In the urology measurement menu, roll the trackball to highlight **RUV**, and then press **Set**.

2. Measure three pieces of data: RUV-L, RUV-W and RUV-H, by the method of distance measurement.

Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of RUV will be displayed in the measurement result window.

To measure Prostate Vol:

1. In the urology measurement menu, roll the trackball to highlight **Prostate Vol**, and then press **Set**.

2. Measure three pieces of data: PV-L, PV-W and PV-H, by the method of distance measurement.

![info icon] Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the results of Prostate Vol and PPSA will be displayed in the measurement result window.

To measure ADR:

1. In the urology measurement menu, roll the trackball to highlight **ADR**, select **L.ADR** or **R.ADR** from the secondary menu, and then press **Set**.

2. Measure three pieces of data: ADR-L, ADR-W and ADR-H, by the method of distance measurement.

![info icon] Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of ADR will be displayed in the measurement result window.

To measure KID:

1. In the urology measurement menu, roll the trackball to highlight **KID**, select **L.KID-V** or **R. KID-V** from the secondary menu, and then press **Set**.

2. Measure three pieces of data: KID-L, KID-W and KID-H, by the method of distance measurement.

![info icon] Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the three measurements, the result of KID will be displayed in the measurement result window.

To measure COR:

1. In the urology measurement menu, roll the trackball to highlight **COR**, select **L.COR** or **R. COR** from the secondary menu, and then press **Set**.

2. Measure COR by the method of distance measurement.
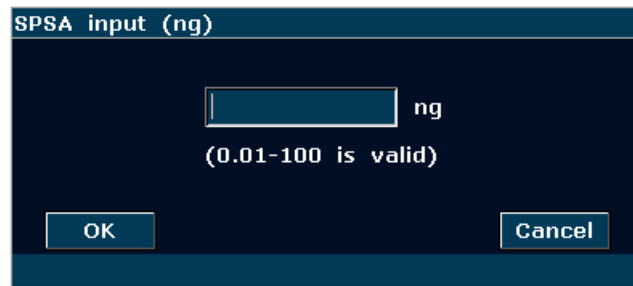
![info icon] Reference   Section *6.5.1Generic Measurements in B Mode*

3. After the measurement, the result of COR will be displayed in the measurement result window.

To measure PSAD:

Measure PV and input SPSA. The **SPSA input** dialog box is as shown below. Input the SPSA

with the keyboard.
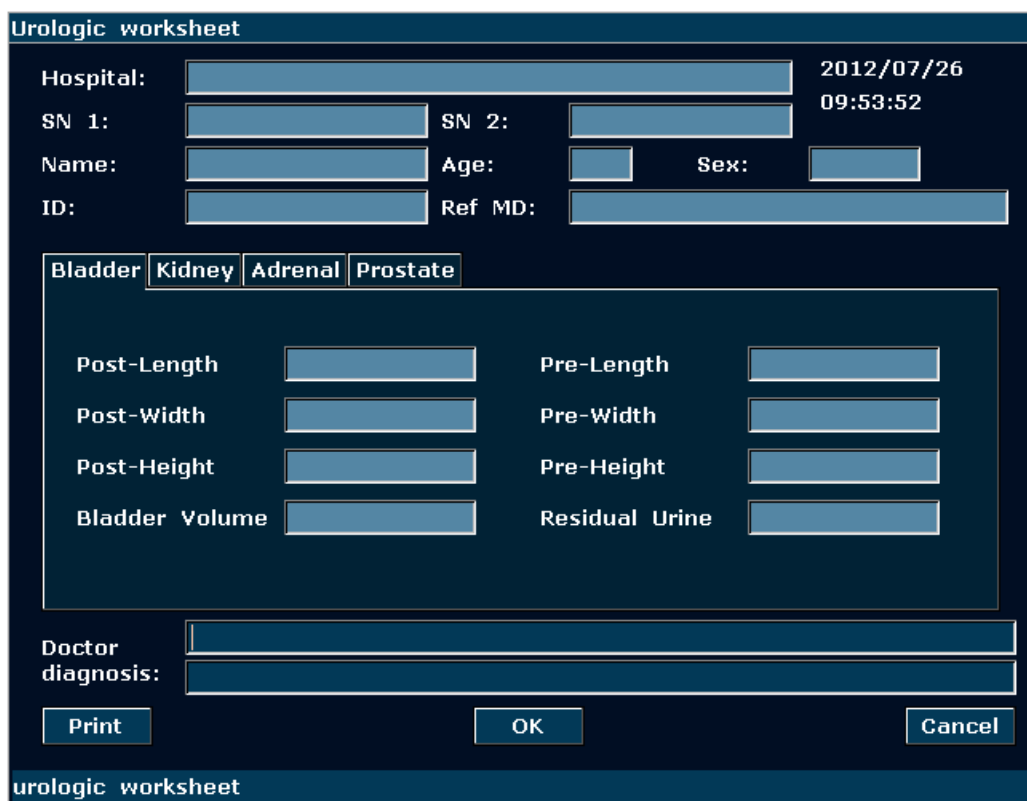
Figure 12-2 SPSA Input Dialog Box

12.2. Urologic Report

After the urologic examination, the system generates a urologic worksheet.

1. Select a desired probe model and the exam mode **Urology**.

2. In B mode, after application measurements press **Report** to open **Urologic Worksheet**, as shown below:

Figure 12-3 Urology Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the Urologic Worksheet.

Printing reference   Section *5.8 Printing*

Chapter 13 Peripheral Vascular Measurements & Calculations

Usually the vascular examination is in the PW mode.

13.1. Measurements and Calculations in PW Mode

1   Press **Probe**, select a desired probe model and the exam mode **Peri. Artery/Carotid Artery**, and then press **OK**,   or double click on the exam type.

2   Press **PW** to display the sample line, and press this key again to enter the PW mode.

3   Press **Measure** to activate the application measurement function. The system displays the measurement menu as shown below.

Items of Measurement and Calculation

Velocity, CCA, ICA, ECA, Vert A, Upper, and Lower.
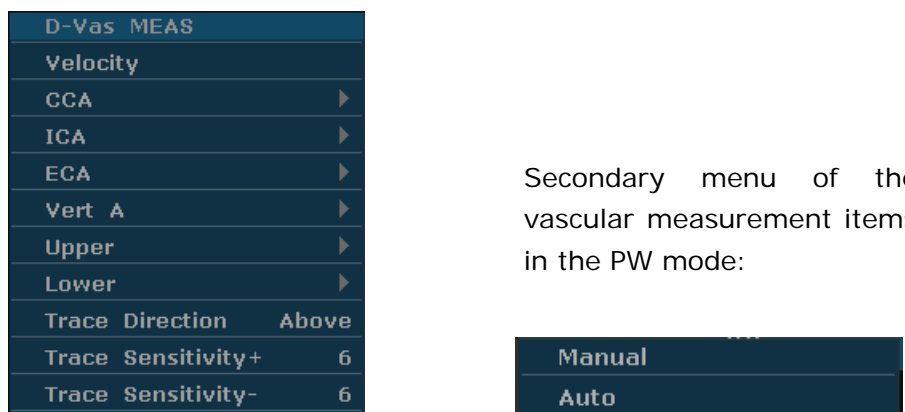
Secondary menu of the vascular measurement items in the PW mode:

Figure 13-1 Vascular Measurement and Calculation Menu in PW Mode

Label	Description	Channel	Method
CCA	Common Cartid Artery	1	D trace
ICA	Internal Cartid Artery	1	
ECA	External Cartid Artery	1	
Vert A	Vertebral Artery	1	

Table 13-1 Vascular Measurement and Calculation Items in PW Mode

13.1.1. CCA

To measure CCA:

1. In the PW-vascular measurement menu, select **CCA**.

2. Measure **CCA**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **CCA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

13.1.2. ICA

To measure ICA:

1. In the PW-vascular measurement menu, select **ICA**.

2. Measure **ICA**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **ICA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

13.1.3. ECA

To measure ECA:

1. In the PW-vascular measurement menu, select **ECA**.

2. Measure **ECA**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **ECA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

13.1.4. Vert A

To measure Vert A:

1. In the PW-vascular measurement menu, select **Vert A**.

2. Measure **Vert A**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **Vert A** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

13.1.5. UPPER

To measure UPPER:

1. In the PW-vascular measurement menu, select **UPPER**.

2. Measure **UPPER**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **UPPER** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

13.1.6. LOWER

To measure LOWER:

1. In the PW-vascular measurement menu, select **LOWER**.

2. Measure **LOWER**, by the method of D trace measurement.

Reference   Section *6.5.4 Generic Measurements in PW Mode*

3. The results are displayed in measurement result window.

4. To begin a new **LOWER** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

13.2. Vascular Report

After finishing the vascular examination, the system generates a vascular worksheet.

1. Select a desired probe model and the exam mode **Peri. Artery/Carotid Artery**.

2. In PW mode, after application measurements press **Report** to open **Vascular Worksheet**, as shown below:

Figure 13-2 Vascular Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the vascular worksheet.

 Printing reference   Section *5.8 Printing.*

Chapter 14 Pediatrics Measurements & Calculations

Usually the pediatrics examination is in the B mode. The pediatrics measurements include HIP.

1   Press **Probe**, select a desired probe model and the exam mode **Pediatrics**, and then press **OK**, or double click on the exam type.

2   Press **B** to enter the B mode.

3   Press **Measure** to activate the application measurement function. The system displays the measurement menu as shown below.

Figure 14-1 Pediatrics Measurement and Calculation Menu

14.1.Measurements and Calculations

Label	Description	Method
HIP	The Angle of Hipbone (/)	
α	The Angle of BL and ARL (°)	HIP
β	The Angle of BL and IL (°)	

Table 14-1 Pediatrics Measurement and Calculation Items

To measure HIP:

1.   In the B-gynecology measurement menu, roll the trackball to highlight **HIP** and press **Set**.

2.   Take three measurements, BL, ARL and IL, by the method of distance measurement.

   Reference   Section *6.5.1 Generic Measurements in B Mode*

3.   After the three measurements, the system calculates the angles of α and β automatically, and the results will be displayed in the measurement result window. You can measure a maximum of one group of data.

14.2.Pediatrics Report

After the Pediatrics examination, the system generates a HIP worksheet.

1.   Select a desired probe model and the exam mode **Pediatrics**.

2.   In B mode, after application measurements press **Report** to open **HIP Worksheet**, as shown below:

Figure 14-2 HIP Worksheet

The diagnosis editing column displays the cursor "I", and you can enter diagnosis information.

To print the report:

Press **Print** in the HIP Worksheet.

 Printing reference   Section *5.8 Printing.*

Chapter 15 Inspection and Maintenance

15.1. Daily Checklist

Check before the system is switched on, if any system malfunction is experienced, eliminate the malfunction before use, or contact EDAN or authorized representatives for service if needed.

- ◆ Visually inspect all the probes. Do not use any damaged probe.

- ◆ Visually inspect all the probe assembly cables and associated connectors.

- ◆ Visually inspect all the power cords. Do not turn on the power if a cord is frayed or split, or shows signs of wear.

- ◆ Verify that the trackball and TGC slide controls are clean and free from gel or contaminants.

Check after the system is switched on:

- ◆ Visually check the on-screen display and lighting. Verify that the monitor displays the current date and time and there isn't any error message.

- ◆ Verify that the probe identification and indicated frequency on the screen are correct for the activated probe.

- ◆ Ensure that there isn't obvious abnormal noise, discontinuous image or dark area.

- ◆ Ensure that it isn't smelly or too hot.

- ◆ Ensure that the ultrasound window isn't too hot, checking with your hand.

- ◆ Verify that the buttons and knobs on the keyboard are good to operate.

- ◆ Ensure that there isn't obvious abnormal noise from the loudspeakers.

- ◆ Ensure that there isn't obvious abnormal noise from the air fan.

15.2. Cleaning and Disinfection

All exterior parts of the device, including the control panel, probes and needle guide bracket, should be cleaned and/or disinfected as necessary or between uses with a recommended cleanser or disinfectant. Clean each part to remove any surface particles. Disinfect the parts to kill vegetative organisms and viruses.

You must take all necessary precautions to eliminate the possibility of exposing patients, operators or third parties to hazardous or infectious materials. Use universal precautions during cleaning and disinfection. You should treat all parts of the device that come in contact with human blood or other body fluids as they were known to be infectious.

After use, clean the outer shell of the device with soft and dry cloth gently. Medical cotton ball immerged with a 75% medical alcohol solution should be used to wipe probes gently and thoroughly.

The cleaning of internal components of the device should be performed by authorized and qualified personnel.

WARNING

1. To avoid electrical shock and damage to the system, always shut down and disconnect the device from the AC power source before cleaning and disinfection.

2. To avoid infection, always use protective gloves when performing cleaning and disinfecting procedures.

3. To avoid infection, ensure that the solution expiration date has not passed.

CAUTION

1. Be careful when cleaning the display screen. Since the display screen is easily scratched or damaged, we should wipe it with a soft and dry cloth.

2. To avoid the possibility of electrostatic shock and damage to the system, avoid the use of aerosol spray cleansers on the monitor.

3. Do not clean the internal base of the device.

4. Do not clean the system with chlorinated or aromatic solvents, acidic or basic solutions, isopropyl alcohol or strong detergents such as ammoniated products as they may damage the surface of the system.

5. Do not use spray detergents on the system or it may force cleaning fluid into the system and damage electronic parts. Solvent fumes build up and form flammable gases or damage internal parts.

CAUTION

6. Do not pour any fluid onto the system surface, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.

7. Do not leave residual detergent on the surface of the device.

15.2.1. System Surface Cleaning

To clean the system surface:

1. Power off the system and disconnect it from power supply.

2. Use a clean gauze pad or lint-free cloth, moistened lightly with a mild detergent, to wipe the surface.

3. After cleaning, reconnect the system to power source.

CAUTION

Make sure the cleaning solution does not seep into the control panel or any other openings.

NOTE:

1. Take particular care when cleaning the areas near trackball and the slide controls.

2. Make sure they are free of gel and any other visible residue.

3. Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

15.2.2. Probe and Probe Holder Cleaning and Disinfection

To clean probe holder:

1. Disassemble the probe holder by uninstalling the two screws.

2. Wash the holder with flowing water, using a mild detergent.

3. After cleaning and drying, assemble the probe holder to the main unit.

Every time before use, layer of medical ultrasound coupling gel should be applied evenly on the area of the acoustical window of the probe. Be careful not to generate any air bubble.

To clean the probes:

1. Disconnect the probe from the system.

2. Wipe off all the gel gently with a soft cloth.

3. Wash the probe with mild soap in lukewarm water. Wipe off the entire residue gently with a soft cloth gently.

4. Rinse the probe with enough distilled water to remove all visible soap residues.

5. Air dry or dry with a soft cloth.

NOTE：The single-use sheath should be used on E612UB probe. Before cleaning the probe, remove the sheath gently and discard it. Put on a new single-use sheath before using the probe.

CAUTION

1. Always wear gloves to perform the following steps.

2. To minimize the disease transmission, use of legally marketed, sterile probe and sheath is strongly recommended for intra-cavitary and intra-operative procedures. Legally marketed, sterile, pyrogen free probe sheath is required to use for neurological intra-operative procedures.

3. DO NOT use an expired probe sheath. Check whether the term of validity has expired prior to using probe sheaths.

4. We recommend that the single-use sheath should be CE marked or FDA 510(k) cleared.

To install probe sheath for clinical application of an invasive nature (such as transvaginal):

1. Place an adequate amount of sterile coupling gel on the acoustic window of the probe;

2. Insert the probe into the sheath;

3. Pull the sheath over the probe and cable until the sheath is fully extended;

4. Secure the sheath using the bands or clips supplied with the sheath;

5. Check and eliminate bubbles between the face of the probe and the sheath. Bubbles between the face of probe and the sheath may affect the ultrasound imaging.

6. Inspect the sheath to ensure that there are no damages (i.e. holes or tears).

To disinfect the probe:

Disinfection should be performed each time after use.

1. Prepare the disinfectant.

2. Place the cleaned and dried probe in contact with the disinfectant (refers to *Figure 15-1* for the contacting area) for the time specified by the disinfectant manufacturer.

The following figure defines how much of the probe can be submerged.
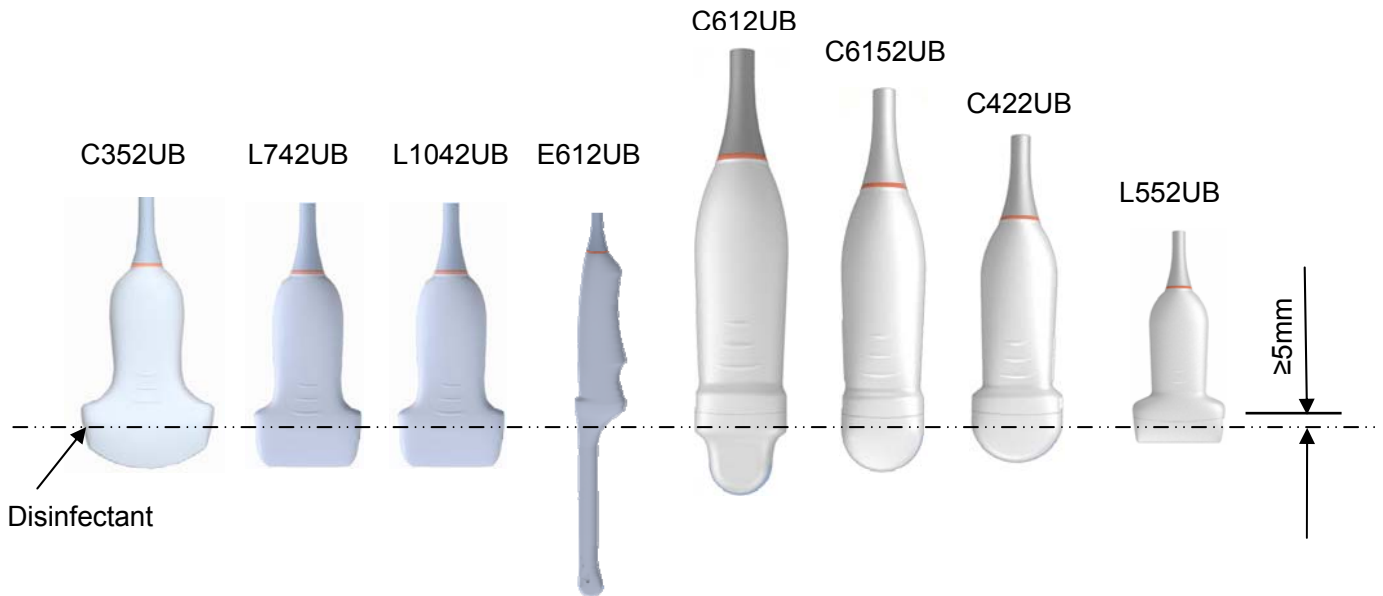
Figure 15-1 Depth of the Probe Immerged into Disinfectant

3. After removing from the disinfectant, rinse the probe according to the disinfectant instructions. Flush all residues from the probe and perform air dry.

WARNING

1. Do not immerse the probe connector. If the cable connector is immersed, do not plug the connector into the system. Rinse the connector under running water and dry it thoroughly. If necessary, contact EDAN for service.

2. Prohibit infiltration of any type of liquid into the device or the probe.

3. Do not sterilize the probe using techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat. Otherwise, severe damage will result.

4. The coupling gel adapted to the probe is a medial ultrasound coupling gel.

5. Do not immerse the power cord and connector of the probe into solutions. Probes can be submerged to, but not including, the strain relief of the probe array. Do not immerse or soak any part of a probe in any cleaning material not listed in the recommended list of disinfectants.

Proper Use of Probes

In order to extend the service life and to obtain optimum performance of the probe, please operate as follows:

Inspect power cord, socket and acoustical window of the probe periodically.

Shut down the machine before connecting or disconnecting the probe.

Do not drop the probe onto the floor or collide with hard objects. Otherwise it will be damaged easily.

When the probe is not used, put it in the probe holder.

Heating the probe is strictly forbidden.

Pulling or bending the power cord of the probe is strictly forbidden; otherwise internal connecting lines of the power cord may rupture.

Coupling gel can only be used on the head of the probe, and it should be wiped off after use.

Each time after use, clean and disinfect the probe.

The acoustical window and the shell of the probe should be examined frequently.

WARNING

The U50 cannot be used together with high-frequency surgical equipment.

CAUTION

1. Do not disinfect or clean probes under high temperature, and the temperature should be below 45°C.

2. In order to avoid damaging the device, the disinfection method is limited to regular maintenance of devices in hospitals. Disinfecting instruments should be cleaned first.

15.2.3. Needle Guide Cleaning and Disinfecting

NOTE:

1. Use proper disinfection technique at all times to perform a biopsy.

2. Disinfect the needle guide before the first use and after each subsequent use.

Cleaning

You should preclean a Needle Guide before disinfecting.

To clean a Needle Guide, use a brush or cloth that has been damped with soap and water or with a specialized soap and precleaner.

Disinfecting

Always disinfect the Needle Guide after use.

15.2.4. Trackball Cleaning

To clean the trackball:

1. Remove the front panel bezel.

2. Remove the trackball as shown in *Figure 15-2*.

3. Clean trackball with a tissue and isopropyl alcohol.

4. Clean the inside of the trackball assembly with a cotton swab and isopropyl alcohol.

5. Assemble the trackball and front panel bezel after the assembly parts completely dry.

Rotate clockwise to mount the fixing ring

Rotate counterclockwise to remove the fixi
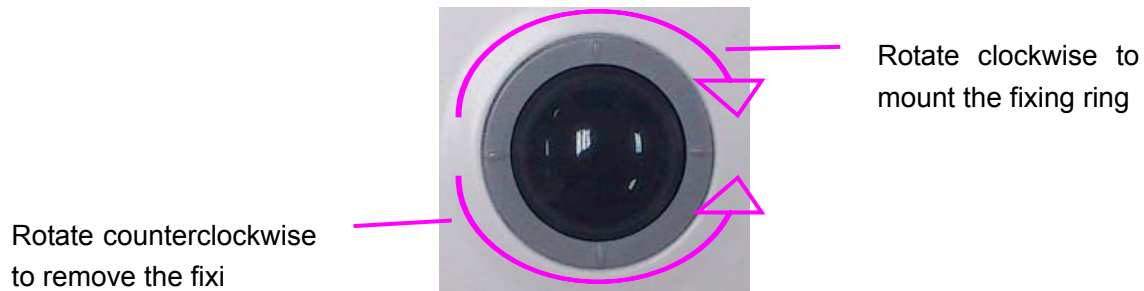
Figure 15-2 Assembling and Disassembling Trackball

CAUTION

Do not drop or place foreign objects inside the trackball assembly or it may affect the trackball operation and damage the system.

NOTE:

Be sure to clean the X and Y encoders and the idler wheel.

15.2.5. Disinfectants

	Disinfectants' chemical name	Disinfectants' trade name
Probe	Glutaraldehyde(2.4%)	Cidex Activated Dialdehyde Solution (2.4%)
	Ortho-Phthalaldehyde (0.55%)	Cidex OPA (0.55%)
Needle guide	75% medical alcohol	/
	Glutaraldehyde(2.4%)	Cidex Activated Dialdehyde Solution (2.4%)

WARNING

1. Be sage to choose the cleansers and disinfectants. The concentration in the air must not exceed an applicable specified limit. Comply with the manufacturer's instructions when using the cleansers and disinfectants.

2. The use of diluent paint, vinyl oxide or other organic solvents is prohibited. These solvents will damage the protective film of the probe surface.

15.3. Replacing Fuses

You can replace the fuses if necessary.

Step 1. Pull out the fuse-box using tweezers;

Step 2. Use the tweezers to pull the fuses out through the small hole on the bottom of the box;

Step 3. Put new fuses (φ5×20, T3.15AH/250V) provided by EDAN in position, and reposition the fuse-box.

Step 1

Step 2

Step 3

Figure 15-3 Replacing Fuses

WARNING

Ruptured fuse must only be replaced with those of the same type and rating as the original.

15.4. Maintenance

CAUTION

Besides the maintenance requirements recommended in this manual, comply with local regulations on maintenance and measurement.

WARNING

Failure on the part of the responsible individual hospital or institution employing this equipment to implement a satisfactory maintenance schedule may cause undue equipment failures and possible health hazards.

Maintenance must be performed every 12 months, including safety and functionality of the system.

The following safety checks should be performed at least every 12 months by a qualified person who has adequate training, knowledge, and practical experience to perform these tests.

◆ Inspect the safety-related labels for legibility.

◆ Inspect the fuse to verify compliance with rated current and breaking characteristics.

◆ Verify that the device function properly as described in the instructions for use.

◆ Test the protection earth resistance according to IEC/EN 60601-1 and IEC/EN 60601-2-37: Limit: 0 - 0.1 Ω.

◆ Test the earth leakage current according to IEC/EN 60601-1 and IEC/EN 60601-2-37: Limit: NC 500 μA, SFC 1000 μA.

◆ Test the patient leakage current according to IEC/EN 60601-1 and IEC/EN 60601-2-37: Limit: AC   NC 100 μA, SFC 500 μA, DC   NC 10 μA, SFC 50 μA.

◆ Test the enclosure leakage current according to IEC/EN 60601-1 and IEC/EN 60601-2-37: Limit: NC100 μA, SFC 500 μA.

◆ The leakage current should never exceed the limit.

The data should be recorded in an equipment log. If the device is not functioning properly or any of the above tests fail, please contact the maintenance personnel of EDAN.

Chapter 16 Transportation and Storage

16.1.Moving the System

The system is designed to be portable and easily transported. Power off the system and secure all accessories before moving it to another location.

CAUTION

1. Switch off the ultrasound system. Unplug the power cord from the power source and secure the power cable.

2. Put the probes in the probe holder, or remove them and place them in the protective carrying cases.

3. Disconnect and secure the footswitch and the connecting cable.

4. Raise the brakes away from the front and back caster wheels.

5. Push the handle to roll the system forward and maneuver it to its new location and lock the wheel caster brakes.

6. Connect optional system accessories, such as the single-pedal footswitch.

7. Secure the system and complete the system setup, and then perform all the daily checking before using it.

16.2. Storage

◆ Do not place the device near the ground, walls or the roof.

◆ Keep good indoor ventilation. Avoid strong and direct sunlight, and erosive gas.

16.3. Transportation

To prepare the system for shipment over long distances or rough terrain, repack the system in the factory packing

To prepare the system for transport over distances: load the system into a vehicle using a lift gate.

To prevent lateral movement of the system, secure the system with cargo straps. To prevent sudden jarring of the system during transport, provide anti-shock cushions beneath the system.

It is suitable for transportation by air, railway, highway and ship. Protect the system from inversion, collision, and splashing with rain and snow.

Chapter 17 Troubleshooting

17.1. Checkup

◆ Check whether the power supply works properly and the power cord is well connected and plugged into the power socket.

◆ Check whether the probe is properly connected to the main unit.

17.2. Troubleshooting

◆ Changing the cartridge fuse (You can replace the fuses if necessary).

◆ Troubleshooting (see *Table 17-1*)

Item	Problem	Solution
1	When the power switch is on, there isn't any image displayed.	1. Check power supply. 2. Check wires and plugs. 3. Check whether the cartridge fuse is melted. 4. Check the brightness control knob.
2	Strip-shape or snowflake-shape disturbance occurs on the display screen.	1. Inspect the power supply. 2. Check whether it is disturbed by the ignition action of any other device. 3. Check the disturbance of electric or magnetic field in the surrounding environment. 4. Check whether the plug and socket of power supply and probe are properly connected.
3	Image is not displayed clearly on the screen.	1. Adjust overall gain (Gain). 2. Adjust eight TGC slide controls. 3. Adjust the brightness. 4. Adjust focus (the number and the position). 5. Clean the light filter of the display screen.
4	Near-field image is not clear.	Adjust the key total gain and the upper TGC
5	Far-field image is not clear.	Adjust the key total gain and the lower TGC
6	Image window is dark.	Adjust the brightness and slide the TGC controls to the right most.

Table 17-1 Troubleshooting Examples

Chapter 18 Warranty and Service Policy

18.1. Warranty

EDAN warrants that EDAN's products meet the labeled specifications of the products and will be free from defects in materials and workmanship that occur within warranty period. The warranty period begins on the date the products are shipped to distributors.

The warranty is void in case of:

➢ Damage caused by handling during shipping.

➢ Subsequent damage caused by improper use or maintenance.

➢ Damage caused by alteration or repair by anyone not authorized by EDAN.

➢ Damage caused by accidents.

➢ Replacement or removal of serial number label and manufacture label.

If a product covered by this warranty is determined to be defective because of defective materials, components, or workmanship, and the warranty claim is made within the warranty period, EDAN will, at its discretion, repair or replace the defective part(s) free of charge. EDAN will not provide a substitute product for use when the defective product is being repaired.

18.2. Service Policy

All repairs on products must be performed or approved by EDAN. Unauthorized repairs will void the warranty. In addition, whether or not covered under warranty, any product repair shall be exclusively be performed by EDAN certified service personnel.

If the product fails to function properly — or if you need assistance, service, or spare parts — contact EDAN's service center. A representative will assist you in troubleshooting the problem and will make every effort to solve it over the phone or Email, avoiding potential unnecessary returns.

In case a return can not be avoided, the representative will record all necessary information and will provide a Return Material Authorization (RMA) form that includes the appropriate return address and instructions. An RMA form must be obtained prior to any return.

Freight policy:

Under warranty: the service claimer is responsible for freight & insurance charges when a retrun is shipped to EDAN for service including custom charges. EDAN is responsible for freight, insurance & custom charges from EDAN to service claimer.

Out of warranty: the service claimer is responsible for any freight, insurance & custom charges

for product.

Contact information:

If you have any question about maintenance, technical specifications or malfunctions of devices, contact your local distributor.

Alternatively, you can send an email to EDAN service department at: support@edan.com.cn.

Appendix I: Specifications

A1.1: Electrical Safety Classifications

According to the type of protection against electric shock	Internally powered equipment, Class I equipment
According to the degree of protection against electric shock	Type BF
According to the degree of protection against harmful ingress of liquid	Whole device: IPX0; Probe (not including the probe connector): IPX7; Footswitch (optional): IP68.
According to the degree of safety of application in the presence of a flammable gas	Equipment not suitable for use in the presence of a flammable gas
According to the mode of operation	Continuous operation
According to the grade of EMC	Group 1, Class A

A1.2: Standards Compliance

The standards listed below are in the currently valid versions.

No.	Standard	Description
1.	MDD 93/42/EEC	COUNCIL DIRECTIVE 93/42/EEC of 14 June 1993 concerning medical devices Amended by: Directive 98/79/EC, Directive 2000/70/EC, Directive 2001/104/EC, Regulation (EC) No 1882/2003, and Directive 2007/47/EC
2.	IEC/EN 60601-1	Medical electrical equipment; Part 1: General requirements for basic safety and essential performance
3.	IEC/EN 60601-1-2	Medical electrical equipment-Part 1-2: General requirements for basic safety and essential performance-Collateral standard: Electromagnetic compatibility -Requirements and tests
4.	IEC/EN 60601-1-6	Medical electrical equipment - Part 1-6: General requirements for safety - Collateral standard: Usability
5.	IEC/EN ISO 10993-1	Biological evaluation of medical devices; Part 1: Evaluation and testing

6.	IEC/EN 60601-2-37	Medical electrical equipment-Part 2-37: Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment
7.	IEC/EN 61157	Requirements for the declaration of the acoustic output of medical diagnostic ultrasonic equipment
8.	NEMA UD 2	Acoustic Output Measurement Standard for Diagnostic Ultrasound Equipment
9.	NEMA UD 3	Standard for real-time display of thermal and mechanical acoustic output indices on diagnostic ultrasound equipment

A1.3: Power Supply

Operating Voltage	100 V-240 V~
Operating Frequency	50 Hz/60 Hz
Input Current	1.8A-0.8A
Lithium battery	
Capacity	6400 mAh
Voltage	14.8 VDC
Average working time	1.5 h
Maximum charging time	8 h
Cycle life	300 times

A1.4: Machine Specifications

Main unit dimensions	220mm（L）x330mm（W）x320mm（H）
Net weight	7.8kg (not including probes and Lithium battery)

A1.5: Display Specifications

Display	TFT-LCD
Diagonal Size	12.1-inch
View Angle	176º
Pixel Number	1024*768
Center Luminance of White	Typ.: 450 cd/m^2
Contrast Ratio	Typ.: 700

A1.6: General Technical Specifications

Display Modes	B, B+B, 4B, B+M, M, B+PW, B+Color, B+Color+PW, B+PDI/DPDI, B+PDI/DPDI +PW.
Image Gray Scale	256 levels
Image Magnification	In area Real time:×1.2, ×1.4, ×1.6, ×2.0, ×2.4, ×3.0, ×4.0； Frozen: ×1.14, ×1.33, ×1.6, ×2.0, ×2.67, ×3.2, ×4.0
Storage	504 MB
Cine Review	409 frames(Color)/1227frames（Black & White）
Depth Adjustment	Adjustable in real time in B, B+B, 4B, B+M, M, B+PW, B+Color, B+Color+PW, B+PDI/DPDI, and B+PDI/DPDI +PW modes
Frame Correlation Coefficient	8 levels to adjust (0-7), (B, B+B, and 4B modes, ineffective when freezing)
Image Conversion	Up/Down flip, Left/Right flip, 90°rotate, B/W invert
Language Conversion	Chinese, English, etc. (The language options varies with language software installed.)
Focus Position	16 levels to adjust
Focus Number	Max. 4
Software Packages	Abdomen, obstetric, small parts, gynecology, cardiology, urology, vascular and Pediatrics.
B mode Measurement	Distance, circumference, area, volume, ratio, % stenosis, angle, and histogram.
M mode Measurement	Distance, time, slope, and heart rate
D mode Measurement	Time, heart rate, velocity, acceleration, RI, PI and Auto (auto trace)
Annotations	Patient name, age, sex, time, date, hospital name, doctor name, comment (full-screen character editing)
Body Mark	130 types
USB Port	USB 1.1

A1.7: Probe Specifications

This device can detect the probe automatically.

Model	Application
C352UB	Abdomen(Adult, difficult), gynecology, obstetrics(fetal), urology, kidney
E612UB	Transvaginal
L742UB/L1042UB	Small parts, peripheral vascular(carotid and peripheral artery), musculo-skeletal (both conventional and superficial)
C612UB/C6152UB	Abdomen(Pediatrics), pediatrics cardiac
C422UB	Abdomen(Adult), adult cardiac
L552UB	Small parts, peripheral vascular(carotid and peripheral artery), musculo-skeletal (both conventional and superficial), pediatrics(abdomen)
NOTE: Maximum endocavity transducer temperature rise during simulated operation: Less than 6 °C. Maximum temperature rise for other transducers during simulated operation: Less than 10 °C. Expanded uncertainty of temperature test: U=0.4°C, k=2.	

Probe Index Table-1:

Index ＼ Probe	C352UB	L742UB	L1042UB	E612UB
Probe type	Convex array probe（R50）	Flat linear array probe	Flat linear array probe	Micro Convex array probe（R10）
Central frequency, MHz	3.5	7.5	9.5	6.5
Elements number	128	128	128	128
Calculation error，％	Perimeter≤5 Area≤8	Perimeter≤5 Area≤8	Perimeter≤5 Area≤8	Perimeter≤5 Area≤8
Slice thickness, mm	≤9	≤5	≤3	≤3
Time display error of M mode，％	≤5	≤5	≤5	≤5
Imaging mode	B mode	M mode	M mode	B mode
Usage	Body surface	Body surface	Body surface	Transvaginal
Clinical applications	Abdomen, Obstetrics,	Small parts, Vascular		Gynecology /Urology
Testing conditions	Adult Abd	Small parts		Gynecology

Probe Index Table-2:

Probe Index	C612UB	C6152UB	C422UB	L552UB
Probe type	Micro Convex array prob（R10）	Micro Convex array prob（R15）	Micro Convex array prob（R20）	Flat linear array probe(L50)
Central frequency, MHz	6.5	6.5	4.0	5.5
Elements number	128	128	128	128
Calculation error，％	Perimeter≤5 Area≤8	Perimeter≤5 Area≤8	Perimeter≤5 Area≤8	Perimeter≤5 Area≤8
Slice thickness, mm	≤5	≤6	≤7	≤6
Time display error of M mode, ％	≤5	≤5	≤5	≤5
Imaging mode	B mode	B mode	B mode	B mode
Usage	Body surface	Body surface	Body surface	Body surface
Clinical applications	Pedia. Cardiac Pedia abd	Pedia. Cardiac Pedia abd	Adult. Cardiac Adult. abd	Pedia.abd, pedia, small parts, peri vascular, carotid artery, musculo-skeletal
Testing conditions	Pedia abd	Pedia abd	Adult. abd	Small parts

Requirements for Probe Index in Color flow imaging and Doppler Imaging:

Table-1；

No.	Probe	C352UB	L742UB	L1042UB	E612UB
1	Depth of penetration in Color mode, mm	≥80	≥50	≥40	≥40
2	Depth of penetration in PW mode, mm	≥90	≥40	≥40	≥40
3	Flow velocity calculation error，％％	≤10	≤10	≤10	≤10
4	Testing conditions	Adult Abd	Small parts		Gynecology

Table-2；

No.	Probe	C422UB	C612UB	C6152UB	L552UB
1	Depth of penetration in Color mode, mm	≥110	≥40	≥60	≥80
2	Depth of penetration in PW mode, mm	≥120	≥40	≥70	≥90
3	Flow velocity calculation error，％％	≤10	≤10	≤10	≤10

| 4 | Testing conditions | Adult Abd | Pedia Abd | Pedia Abd | Small Parts |

Technical Index of ultrasound phantom:

No.	Model	Technical Index
1	KS107BD/ KS107BG	Acoustic velocity of TM material (Ultrasonically Tissue-Mimicking material): 1540±10m/s(23±3℃) Acoustic attenuation coefficient slope of TM material: 0.70±0.05dB/cm/MHz(23±3℃) Nylon target line diameter: 0.3±0.05mm Nylon target line position tolerance: ±0.1mm
2	KS107BQ	Acoustic velocity of TM material: 1540m/s Acoustic attenuation coefficient slope of TM material: 0.70±0.05dB/cm/MHz Plane scattering target slice thickness:＜0.4mm Acoustic window surface---diffuse reflection target angle: 70° Target wire number:19 Nylon target line diameter: 0.3±0.5mm Nylon target line position tolerance: ±0.1mm Angle between the red mark on acoustic window and target wire of ultrasound phantom: 70°

A1.8: Operating, Storage and Transportation Environment

A1.8.1. Operating Environment

Temperature	+5 °C ~ +40 °C
Relative humidity range	25% RH ~ 80% RH (non-condensing)
Atmospheric pressure range	860 hPa ~ 1060 hPa
Maximum altitude	2 km

A1.8.2. Storage and Transportation Environment

Temperature	-20 °C ~ +55 °C
Relative humidity range	25% RH ~ 93% RH (non-condensing)
Atmospheric pressure range	700 hPa ~ 1060 hPa
Maximum altitude	3 km

Appendix II: Ultrasound Intensity and Safety

A2.1: Ultrasound in Medicine

The use of diagnostic ultrasound has proved to be a valuable tool in medical practice. Given its known benefits for non-invasive investigations and medical diagnosis, including investigation of the human fetus, the question of clinical safety with regards to ultrasound intensity arises.

There is no easy answer to the question of safety surrounding the use of diagnostic ultrasound equipment. Application of the ALARA (As Low As Reasonably Achievable) principle serves as a rule-of-thumb that will help you to get reasonable results with the lowest possible ultrasonic output.

The American Institute of Ultrasound in Medicine (AIUM) states that given its track record of over 25 years of use and no confirmed biological effects on patients or instrument operators, the benefits of the prudent use of diagnostic ultrasound clearly outweigh any risks.

A2.2: Ultrasound Safety and the ALARA Principle

Ultrasound waves dissipate energy in the form of heat and can therefore cause tissue warming. Although this effect is extremely low with Transcranial Doppler, it is important to know how to control and limit patient exposure. Major governing bodies in ultrasound have issued statements to the effect that there are no known adverse effects from the use of diagnostic ultrasound, however, exposure levels should always be limited to As Low As Reasonably Achievable (the ALARA principle).

Imaging Functions Affecting Acoustic Output

In addition to the level of voltage transmitted, adjustment of the following imaging functions and /or controls may affect the acoustic output.

Item	Affection
Probe	Acoustic output will be changed with the change of probe.
Imaging mode	There are different parameters applied in B mode, Color mode, M mode, and PW mode, so acoustic output will be changed with the change of among B mode, Color mode, M mode, and PW mode.
Field of view (scan angle or scan width)	Frame rate may be changed with the change of the scan angle of the scan width, and the acoustic output will also be changed.
Image depth	Pulse repeated frequency will be changed with the change of the image depth, and the acoustic output will be changed.
Focus number	Frame rate and focus position will be changed with the change of the focus number, and acoustic output will also be changed.
Focus position	Acoustic output will be changed with the change of the focus position even the beam power level and the beam aperture have not been

	changed. Generally, the acoustic output will be higher with it gets nearer to the probe.
Freeze	When freezing the system, it will stop transmitting ultrasonic wave.
Transmission power	The output of probe will be changed with the change of the transmission power, and acoustic output will be changed.
Multi-frequency	The character of the wave focus will be changed with the change of the frequency, and acoustic output will be changed.
Line density	The acoustic output will be changed with the change of the number of the scanning line (line density).
PRF	The acoustic power will be changed with the change of PRF.
Sample volume	The pulsed wave and the power will be changed with the change of the sample volume, and acoustic output will be changed.
Presets	Presets contain all the parameters above, so any change of the presetting will change acoustic output.
Restart, or power on/off	System will return to the default setting when restarting, or powering on/off the system, and acoustic output will be changed.

A2.3: Explanation of MI/TI

A2.3.1. MI (Mechanical Index)

Cavitations will be generated when ultrasound wave passes through and contacts tissues, resulting in instantaneous local overheating. This phenomenon is determined by acoustic pressure, spectrum, focus, transmission mode, and factors such as states and properties of the tissue and boundary. This mechanical bioeffect is a threshold phenomenon that occurs when a certain level of ultrasound output is exceeded. The threshold is related to the type of tissue. Although no confirmed adverse mechanical effects on patients or mammals caused by exposure at intensities typical of present diagnostic ultrasound instruments have ever been reported, the threshold for cavitation is still undetermined. Generally speaking, the higher the acoustic pressure, the greater the potential for mechanical bioeffects; the lower the acoustic frequency, the greater the potential for mechanical bioeffects.

The AIUM and NEMA formulate mechanical index (MI) in order to indicate the potential for mechanical effects. The MI is defined as the ratio of the peak-rarefactional acoustic pressure (should be calculated by tissue acoustic attenuation coefficient 0.3dB/cm/MHz) to the acoustic frequency.

$$MI = \frac{P_{r, \alpha}}{f_{awf} \times C_{MI}}$$

$$C_{MI} = 1 \ (MPa / MHz)$$

A2.3.2. TI (Thermal Index)

Heating of tissues is caused by absorption of ultrasound when the ultrasound energy is applied.

The temperature rise is determined by the acoustic intensity, exposed area and thermophysical properties of the tissue.

In order to indicate the potential for temperature rise caused by thermal effects, the AIUM and NEMA formulate thermal index (TI). It is defined as the ratio of the total acoustic power to the acoustic power required to raise the tissue temperature by 1ºC.

According to different thermophysical properties of the tissue, TI is divided into three kinds: TIS, TIB and TIC.

TIS (Soft Tissue Thermal Index): It provides an estimate of potential temperature rise in soft or similar tissues.

TIB (Bone Thermal Index): It provides an estimate of potential temperature rise when the ultrasound beam passes through soft tissue and a focal region is in the immediate vicinity of bone.

TIC (Cranial Bone Thermal Index): It provides an estimate of potential temperature rise in the cranial bones or superficial bones.

A2.3.3. Display of MI/TI

The system provides real-time display of MI/TI values in the upper right part of the screen. In different operating conditions, if there is a situation that a MI value is greater than 1.0; the MI value will be displayed and the start point is 0.0. Similarly, if there is a situation that a TI value is greater than 1.0, the TI value will be displayed and the start point is 0.0. You can preset which TI item is to be displayed through **Preset**>**System Preset**>**Application Preset**.

The operator should monitor these values during examinations and keep the exposure time and output level at the minimum amounts needed for effective diagnosis.

The display precision is 0.1.

Display accuracy of MI is ±50%, and TI is ±50%.

A2.4: Acoustic Output

A2.4.1. Factors that Contribute to Uncertainty in the Output Display

A number of factors should be considered in display accuracy determination methods, such as:
- Transducer variability
- System variability
- Measurement variability and accuracy
- The number of operating conditions of which the system is capable and the number tested in obtaining display accuracy results
- Whether display accuracy will be determined by specific combinations of system, mode, transducer assembly and transmit patterns, or all allowed combinations of them
- Accuracy of system software MI and TI calculation algorithms.
- Engineering approximations for real-time calculations

A2.4.2. Differences between Actual and Displayed MI/TI

Actually, many assumptions adopted in the process of measurement and calculations are relatively conservative. Over-estimation of actual in situ intensity exposure, for the majority of tissue paths, is made to the measurement and calculation process. For example, attenuation coefficient of 0.3 dB/cm·MHz, which is much lower than the actual value for most tissues of the body, is adopted. And conservative values of tissue characteristics are selected for use in TI models. Therefore, the display of MI and TI should be used as relative information to assist operator in prudent use of ultrasound system and implementation of ALARA principle, and the values should not be interpreted as the actual physical values in tissues or organs examined.

A2.4.3. Measurement Uncertainty

The uncertainties in the measurements were predominantly systematic in origin; the random uncertainties were negligible in comparison. The overall systematic uncertainties were determined as follows:

1. **Hydrophone Sensitivity:** ± 23 percents for intensity, ± 11.5 percents for pressure. Based on the hydrophone calibration report by ONDA. The uncertainty was determined within ±1dB in frequency range 1-15MHz.
2. **Digitizer:** ±4 percents for intensity. ± 1.5 percents for pressure.
   Based on the stated accuracy of the 8-bit resolution of the Agilent DSO6012A Digital Oscilloscope and the signal-to-noise ratio of the measurement.
3. **Temperature:**   ± 1 percent
   Based on the temperature variation of the water bath of ± 1 ℃.
4. **Spatial Averaging:** ± 10 percents for intensity, ± 5 percents for pressure.
5. **Non-linear Distortion:** N/A.
   No effects of nonlinear propagation are observed

Since all the above error sources are independent, they may be added on an RMS basis, giving a total uncertainty of ± 25.1 percents for all intensity values reported, ± 12.7 percents for all the pressure values and ± 12.6 percents for the Mechanical Index.

A2.5: Operator Control Features

The possibility of producing mechanical/thermal biological effects can be influenced by three kinds of controls: Direct Controls, Indiret Controls, and Receiver Controls. The qualified operator may use the system controls to minimize the ultrasound output while acquiring necessary clinical information.

◆   Direct Controls

The acoustic output of the system can be controlled directly through the level of voltage transmitted. In this case, the maximum acoustic output never exceeds the limits in any mode of operation.

◆   Indirect Controls

The acoustic output of the system can be controlled indirectly through many imaging parameters, including imaging modes, probe frequency, focus number/position, depth and pulse repetition frequency (PRF).

The imaging mode determines whether the ultrasound beam is scanning or non-scanning. Thermal bioeffect is closely associated with M, PW and Color mode.

Acoustic attenuation of tissue is directly connected to probe frequency.

The focus number/position is related to active aperture of probe and beam width.

The higher PRF (pulse repetition frequency), the more output pulses occur over a period of time.

◆   Receiver Controls

The receiver controls (such as gain, TGC, dynamic range and image processing), which are used to improve image quality, have no effect on acoustic output. Thus these controls should be optimized before increasing acoustic output.

It is recommended to use the default (or lowest) output power setting and compensate using Gain control to acquire an image. The default setting is normally around 70% of the allowable power which will not cause any harm to users and is validated to be the most effective for all the transducers.

A2.6: Prudent Use Statement

Although no confirmed bioeffects on patients caused by exposure from present diagnostic ultrasound equipment have ever been reported, the potential exists that such bioeffects may be identified in the future. Therefore, the ultrasound should be used prudently. High levels of acoustic output and long exposure time should be avoided while acquiring necessary clinical information.

A2.7: References for Acoustic Output and Safety

1. "Bioeffects and Safety of Diagnostic Ultrasound" issued by AIUM in 1993

2. "Medical Ultrasound Safety" issued by AIUM in 1994

3. "Acoustic Output Measurement Standard for Diagnostic Ultrasound Equipment, Revision 3" issued by AIUM/NEMA in 2004

4. "Standard for real-time display of thermal and mechanical acoustic output indices on diagnostic ultrasound equipment, Revision 2" issued by AIUM/NEMA in 2004

5. "Information for Manufacturers Seeking Marketing Clearance of Diagnostic Ultrasound Systems and Transducers" issued by FDA in 2008.

6. "Medical electrical equipment – Part 2-37: Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment" issued by IEC in 2005.

A2.8: Probe Acoustic Output Parameters List

A2.8.1: Test of Probe C352UB

Acoustic Output Reporting Table for Track3

System : U50 Operating Mode: B mode

Transducer: C352UB SN：00004A0 Working Frequency: 2.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.21				1.16
Associated Acoustic Parameters	Pr.3 MPa	1.39					
	W0 mW		75.26				75.26
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)						
	z@PII.3max (cm)	5.20					
	deq(Zsp) (cm)						
	Fc (MHz)	2.74	2.74				2.74
	Dim of Aaprt X(cm)		1.59				1.59
	Dim of Aaprt Y (cm)		1.30				1.30
Other Information	PD (usec)	0.49					
	PRF (Hz)	7546.20					
	Pr@PIImax (MPa)	2.22					
	deq@PIImax (cm)	0.01					
	Focal Length FLx (cm)		0.20				0.20
	Focal Length Fly (cm)		0.50				0.50
	Ipa.3@MImax(W/cm^2)	125.20					
Control Conditions	Depth	68mm	68mm				68mm
	Focus	60mm	60mm				60mm
	Freq	2.5MHz	2.5MHz				2.5MHz

Acoustic Output Reporting Table for Track3

System :   U50

Operating Mode: PW mode

Transducer: C352UB SN：00004A0

Working Frequency: 2.5MHz

	Index Label		MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.62			0.55	2.12	1.05
Associated Acoustic Parameters	Pr.3	MPa	1.02					
	W0	mW					68.26	68.26
	Min of[W.3(z1),(mW) Ita.3(z1)]					43.35		
	Z1	(cm)				2.45		
	Zbp	(cm)				2.43		
	Zsp	(cm)					4.60	
	z@PII.3max	(cm)	5.25					
	deq(Zsp)	(cm)					0.01	
	Fc	(MHz)	2.68			2.68	2.68	2.68
	Dim of Aaprt	X(cm)				1.59	1.59	1.59
		Y (cm)				1.30	1.30	1.30
Other Information	PD	(usec)	1.38					
	PRF	(Hz)	4186.70					
	Pr@PIImax (MPa)		1.55					
	deq@PIImax (cm)		0.01				0.01	
	Focal Length	FLx (cm)				0.20		0.20
		Fly (cm)				0.50		0.50
	Ipa.3@MImax(W/cm^2)		62.38					
Control Conditions	Depth		68mm			68mm	68mm	68mm
	Focus		60mm			60mm	60mm	60mm
	Freq		2.5MHz			2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System :　U50　　　　　　　　　　　　　　Operating Mode:　　M mode

Transducer:　C352UB SN：00004A0　　　　Working Frequency:　　2.5MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.68			0.43	1.26	0.72
Associated Acoustic Parameters	Pr.3　　MPa		1.24					
	W0　　　mW						47.01	47.01
	Min of[W.3(z1),(mW) Ita.3(z1)]					26.65		
	Z1　　　(cm)					2.45		
	Zbp　　(cm)					2.43		
	Zsp　　(cm)						4.78	
	z@PII.3max　(cm)		4.56					
	deq(Zsp)　(cm)						0.02	
	Fc　　(MHz)		2.76			2.76	2.76	2.76
	Dim of Aaprt	X(cm)				1.59	1.59	1.59
		Y (cm)				1.30	1.30	1.30
Other Information	PD　　(usec)		0.40					
	PRF　　(Hz)		7704.20					
	Pr@PIImax (MPa)		1.93					
	deq@PIImax (cm)		0.02				0.02	
	Focal Length	FLx (cm)				0.20		0.20
		Fly (cm)				0.50		0.50
	Ipa.3@MImax(W/cm^2)		60.44					
Control Conditions	Depth		68mm			68mm	68mm	68mm
	Focus		60mm			60mm	60mm	60mm
	Freq		2.5MHz			2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System： U50

Operating Mode: B+M mode

Transducer: C352UB SN：00004A0

Working Frequency: 2.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.21		0.43	1.26	1.88
Associated Acoustic Parameters	Pr.3 MPa	1.39					
	W0 mW		122.27			122.27	122.27
	Min of[W.3(z1),(mW) Ita.3(z1)]				26.65		
	Z1 (cm)				2.45		
	Zbp (cm)				2.43		
	Zsp (cm)					4.78	
	z@PII.3max （cm）	5.20					
	deq(Zsp) (cm)					0.02	
	Fc (MHz)	2.74	2.74		2.76	2.76	2.74
	Dim of Aaprt X(cm)		1.59		1.59	1.59	1.59
	Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.49					
	PRF (Hz)	7546.20					
	Pr@PIImax (MPa)	2.22					
	deq@PIImax (cm)	0.01				0.02	
	Focal Length FLx (cm)		0.20		0.20		0.20
	Fly (cm)		0.50		0.50		0.50
	Ipa.3@MImax(W/cm^2)	125.20					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	60mm	60mm		60mm	60mm	60mm
	Freq	2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C mode

Transducer: C352UB SN：00004A0   Working Frequency: 2.5MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.84	0.21		0.27	1.10	1.67
Associated Acoustic Parameters	Pr.3	MPa	1.39					
	W0	mW		108.59			108.59	108.59
	Min of[W.3(z1),(mW) Ita.3(z1)]					21.18		
	Z1	(cm)				2.45		
	Zbp	(cm)				2.43		
	Zsp	(cm)					4.68	
	z@PII.3max	(cm)	5.20					
	deq(Zsp)	(cm)					0.02	
	Fc	(MHz)	2.74	2.74		2.74	2.74	2.74
	Dim of Aaprt	X(cm)		1.59		1.59	1.59	1.59
		Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD	(usec)	0.49					
	PRF	(Hz)	7546.20					
	Pr@PIImax (MPa)		2.22					
	deq@PIImax (cm)		0.01				0.02	
	Focal Length	FLx (cm)		0.20		0.20		0.20
		Fly (cm)		0.50		0.50		0.50
	Ipa.3@MImax(W/cm^2)		125.20					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		60mm	60mm		60mm	60mm	60mm
	Freq		2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>B+PDI mode</u>

Transducer: <u>C352UB SN：00004A0</u>   Working Frequency: <u>2.5MHz</u>

Index Label			MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.84	0.21		0.29	1.10	1.66
Associated Acoustic Parameters	Pr.3	MPa	1.39					
	W0	mW		109.1			109.1	109.1
	Min of[W.3(z1),(mW) Ita.3(z1)]					21.38		
	Z1	(cm)				2.45		
	Zbp	(cm)				2.43		
	Zsp	(cm)					4.70	
	z@PII.3max	(cm)	5.20					
	deq(Zsp)	(cm)					0.020	
	Fc	(MHz)	2.74	2.74		2.74	2.74	2.74
	Dim of Aaprt	X(cm)		1.59		1.59	1.59	1.59
		Y (cm)		1.3		1.3	1.3	1.3
Other Information	PD	(usec)	0.49					
	PRF	(Hz)	7546.2					
	Pr@PIImax (MPa)		2.22					
	deq@PIImax (cm)		0.0095				0.020	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		125.2					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		60mm	60mm		60mm	60mm	60mm
	Freq		2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PWmode

Transducer: C352UB SN：00004A0   Working Frequency: 2.5MHz

Index Label		MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.84	0.21		0.55	2.12	2.21
Associated Acoustic Parameters	Pr.3 MPa	1.39					
	W0 mW		143.52			143.52	143.52
	Min of[W.3(z1),(mW) Ita.3(z1)]				43.35		
	Z1 (cm)				2.45		
	Zbp (cm)				2.43		
	Zsp (cm)					4.60	
	z@PII.3max (cm)	5.20					
	deq(Zsp) (cm)					0.01	
	Fc (MHz)	2.74	2.74		2.68	2.68	2.74
	Dim of Aaprt X(cm)		1.59		1.59	1.59	1.59
	Dim of Aaprt Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.49					
	PRF (Hz)	7546.20					
	Pr@PIImax (MPa)	2.22					
	deq@PIImax (cm)	0.01				0.01	
	Focal Length FLx (cm)		0.20		0.20		0.20
	Focal Length Fly (cm)		0.50		0.50		0.50
	Ipa.3@MImax(W/cm^2)	125.20					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	60mm	60mm		60mm	60mm	60mm
	Freq	2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C+PW mode

Transducer: C352UB SN：00004A0   Working Frequency: 2.5MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.84	0.21		0.82	3.22	2.72
Associated Acoustic Parameters	Pr.3	MPa	1.39					
	W0	mW		176.85			176.85	176.85
	Min of[W.3(z1),(mW) Ita.3(z1)]					43.35		
	Z1	(cm)				2.45		
	Zbp	(cm)				2.43		
	Zsp	(cm)					4.6	
	z@PII.3max (cm)		5.20					
	deq(Zsp)	(cm)					0.011	
	Fc	(MHz)	2.74	2.74		2.68	2.68	2.74
	Dim of Aaprt	X(cm)		1.59		1.59	1.59	1.59
		Y (cm)		1.3		1.3	1.3	1.3
Other Information	PD	(usec)	0.49					
	PRF	(Hz)	7546.2					
	Pr@PIImax (MPa)		2.22					
	deq@PIImax (cm)		0.0095				0.011	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		125.2					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		60mm	60mm		60mm	60mm	60mm
	Freq		2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PDI+PW mode

Transducer: C352UB SN：00004A0   Working Frequency: 2.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.21		0.84	3.22	2.71
Associated Acoustic Parameters	Pr.3 MPa	1.39					
	W0 mW		177.36			177.36	177.36
	Min of[W.3(z1),(mW) Ita.3(z1)]				43.35		
	Z1 (cm)				2.45		
	Zbp (cm)				2.43		
	Zsp (cm)					4.6	
	z@PII.3max (cm)	5.20					
	deq(Zsp) (cm)					0.011	
	Fc (MHz)	2.74	2.74		2.68	2.68	2.74
	Dim of Aaprt X(cm)		1.59		1.59	1.59	1.59
	Y (cm)		1.3		1.3	1.3	1.3
Other Information	PD (usec)	0.49					
	PRF (Hz)	7546.2					
	Pr@PIImax (MPa)	2.22					
	deq@PIImax (cm)	0.0095				0.011	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	125.2					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	60mm	60mm		60mm	60mm	60mm
	Freq	2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System :   <u>U50</u>   Operating Mode: <u>B+DPDI mode</u>

Transducer: <u>C352UB SN：00004A0</u>   Working Frequency: <u>2.5MHz</u>

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.21		0.29	1.19	1.72
Associated Acoustic Parameters	Pr.3 MPa	1.39					
	W0 mW		111.37			111.37	111.37
	Min of[W.3(z1),(mW) Ita.3(z1)]				22.63		
	Z1 (cm)				2.5		
	Zbp (cm)				2.43		
	Zsp (cm)					4.80	
	z@PII.3max (cm)	5.20					
	deq(Zsp) (cm)					0.019	
	Fc (MHz)	2.74	2.74		2.71	2.71	2.74
	Dim of Aaprt X(cm)		1.59		1.59	1.59	1.59
	Dim of Aaprt Y (cm)		1.3		1.3	1.3	1.3
Other Information	PD (usec)	0.49					
	PRF (Hz)	7546.2					
	Pr@PIImax (MPa)	2.22					
	deq@PIImax (cm)	0.0095				0.019	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Focal Length Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	125.2					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	60mm	60mm		60mm	60mm	60mm
	Freq	2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+DPDI+PW mode

Transducer: C352UB SN：00004A0   Working Frequency: 2.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.21		0.84	3.31	2.77
Associated Acoustic Parameters	Pr.3 MPa	1.39					
	W0 mW		179.63			179.63	179.63
	Min of[W.3(z1),(mW) Ita.3(z1)]				43.35		
	Z1 (cm)				2.45		
	Zbp (cm)				2.43		
	Zsp (cm)					4.6	
	z@PII.3max (cm)	5.20					
	deq(Zsp) (cm)					0.011	
	Fc (MHz)	2.74	2.74		2.68	2.68	2.74
	Dim of Aaprt X(cm)		1.59		1.59	1.59	1.59
	Dim of Aaprt Y (cm)		1.3		1.3	1.3	1.3
Other Information	PD (usec)	0.49					
	PRF (Hz)	7546.2					
	Pr@PIImax (MPa)	2.22					
	deq@PIImax (cm)	0.0095				0.011	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Focal Length Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	125.2					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	60mm	60mm		60mm	60mm	60mm
	Freq	2.5MHz	2.5MHz		2.5MHz	2.5MHz	2.5MHz

A2.8.2: Test of Probe L742UB

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>B mode</u>
Transducer: <u>L742UB SN：00001A0</u>   Working Frequency: <u>6.5MHz</u>

				TIS		TIB	
				Non-Scan			
Index Label		MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value		0.84	0.20				0.47
Associated Acoustic Parameters	Pr.3　　　MPa	1.97					
	W0　　　mW		14.85				14.85
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)						
	z@PII.3max　(cm)	1.50					
	deq(Zsp)　(cm)						
	Fc　　　(MHz)	5.43	5.43				5.43
	Dim of Aaprt　X(cm)		0.96				0.96
	Y (cm)		0.58				0.58
Other Information	PD　　　(usec)	0.22					
	PRF　　　(Hz)	12500					
	Pr@PIImax (MPa)	2.56					
	deq@PIImax (cm)	0.02					
	Focal　FLx (cm)		0.20				0.20
	Length　Fly (cm)		0.50				0.50
	Ipa.3@MImax(W/cm^2)	108.60					
Control Conditions	Depth	29mm	29mm				29mm
	Focus	25mm	25mm				25mm
	Freq	6.5MHz	6.5MHz				6.5MHz

Acoustic Output Reporting Table for Track3

System : __U50__　　　　　　　　　　Operating Mode:　　__PW mode__

Transducer:　__L742UB SN：00001A0__　　Working Frequency:　　__5.5MHz__

Index Label			MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.58		0.29		0.85	0.34
Associated Acoustic Parameters	Pr.3	MPa	1.38					
	W0	mW			10.73		10.73	10.73
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.54	
	$z@PII.3max$	(cm)	1.90					
	deq(Zsp)	(cm)					0.03	
	Fc	(MHz)	5.66		5.66		5.66	5.66
	Dim of Aaprt	X(cm)			0.96		0.96	0.96
		Y (cm)			0.58		0.58	0.58
Other Information	PD	(usec)	0.62					
	PRF	(Hz)	4885.20					
	Pr@PIImax (MPa)		1.96					
	deq@PIImax (cm)		0.03				0.03	
	Focal Length	FLx (cm)			0.20			0.20
		Fly (cm)			0.50			0.50
	Ipa.3@MImax(W/cm^2)		114.20					
Control Conditions	Depth		29mm		29mm		29mm	29mm
	Focus		25mm		25mm		25mm	25mm
	Freq		5.5MHz		5.5MHz		5.5MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: M mode

Transducer: L742UB SN：00001A0   Working Frequency: 6.5MHz

Index Label			MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.89		0.37		1.23	0.45
Associated Acoustic Parameters	Pr.3	MPa	2.09					
	W0	mW			14.15		14.15	14.15
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.52	
	z@PII.3max	(cm)	1.70					
	deq(Zsp)	(cm)					0.02	
	Fc	(MHz)	5.54		5.54		5.54	5.54
	Dim of Aaprt	X(cm)			0.96		0.96	0.96
		Y (cm)			0.58		0.58	0.58
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	12726.00					
	Pr@PIImax (MPa)		2.84					
	deq@PIImax (cm)		0.02				0.02	
	Focal Length	FLx (cm)			0.20			0.20
		Fly (cm)			0.50			0.50
	Ipa.3@MImax(W/cm^2)		154.40					
Control Conditions	Depth		29mm		29mm		29mm	29mm
	Focus		25mm		25mm		25mm	25mm
	Freq		6.5MHz		6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+M mode

Transducer: L742UB SN：00001A0   Working Frequency: 6.5MHz

					TIS		TIB	
						Non-Scan		
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.84	0.20	0.37		1.23	0.92
Associated Acoustic Parameters	Pr.3	MPa	1.97					
	W0	mW		29.00	29.00		29.00	29.00
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.52	
	z@PII.3max	(cm)	1.50					
	deq(Zsp)	(cm)					0.02	
	Fc	(MHz)	5.43	5.43	5.54		5.54	5.43
	Dim of Aaprt	X(cm)		0.96	0.96		0.96	0.96
		Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD	(usec)	0.22					
	PRF	(Hz)	12500					
	Pr@PIImax (MPa)		2.56					
	deq@PIImax (cm)		0.02				0.02	
	Focal Length	FLx (cm)		0.20	0.20			0.20
		Fly (cm)		0.50	0.50			0.50
	Ipa.3@MImax(W/cm^2)		108.60					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		25mm	25mm	25mm		25mm	25mm
	Freq		6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+C mode

Transducer: L742UB SN：00001A0   Working Frequency: 5.5MHz

			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
Index Label					Aaprt≤1	Aaprt＞1		
Global Maximum Index Value			0.84	0.20	0.16		0.40	0.66
Associated Acoustic Parameters	Pr.3	MPa	1.97					
	W0	mW		20.67	20.67		20.67	20.67
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.54	
	z@PII.3max	(cm)	1.50					
	deq(Zsp)	(cm)						
	Fc	(MHz)	5.43	5.43	5.62		5.62	5.43
	Dim of Aaprt	X(cm)		0.96	0.96		0.96	0.96
		Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD	(usec)	0.22					
	PRF	(Hz)	12500					
	Pr@PIImax (MPa)		2.56					
	deq@PIImax (cm)		0.02				0.06	
	Focal Length	FLx (cm)		0.20	0.20			0.20
		Fly (cm)		0.50	0.50			0.50
	Ipa.3@MImax(W/cm^2)		108.60					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		25mm	25mm	25mm		25mm	25mm
	Freq		6.5MHz	6.5MHz	5.5MHz		5.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   <u>U50</u>   Operating Mode: <u>B+PDI mode</u>

Transducer: <u>L742UB SN：00001A0</u>   Working Frequency: <u>5.5MHz</u>

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.84	0.20	0.15		0.43	0.67
Associated Acoustic Parameters	Pr.3	MPa	1.97					
	W0	mW		20.51	20.51		20.51	20.51
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.54	
	z@PII.3max	(cm)	1.50					
	deq(Zsp)	(cm)					0.06	
	Fc	(MHz)	5.43	5.43	5.62		5.62	5.43
	Dim of Aaprt	X(cm)		0.96	0.96		0.96	0.96
		Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD	(usec)	0.22					
	PRF	(Hz)	12500					
	Pr@PIImax (MPa)		2.56					
	deq@PIImax (cm)		0.021				0.06	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		108.6					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		25mm	25mm	25mm		25mm	25mm
	Freq		6.5MHz	6.5MHz	5.5MHz		5.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : __U50__ Operating Mode: __B+PW mode__

Transducer: __L742UB SN：00001A0__ Working Frequency: __5.5MHz__

Index Label		MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.84	0.20	0.29		0.85	0.81
Associated Acoustic Parameters	Pr.3　MPa	1.97					
	W0　mW		25.58	25.58		25.58	25.58
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　(cm)						
	Zbp　(cm)						
	Zsp　(cm)					1.54	
	z@PII.3max　(cm)	1.50					
	deq(Zsp)　(cm)					0.03	
	Fc　(MHz)	5.43	5.43	5.66		5.66	5.43
	Dim of Aaprt　X(cm)		0.96	0.96		0.96	0.96
	Dim of Aaprt　Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD　(usec)	0.22					
	PRF　(Hz)	12500					
	Pr@PIImax (MPa)	2.56					
	deq@PIImax (cm)	0.02				0.03	
	Focal Length　FLx (cm)		0.20	0.20			0.20
	Focal Length　Fly (cm)		0.50	0.50			0.50
	Ipa.3@MImax(W/cm^2)	108.60					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	25mm	25mm	25mm		25mm	25mm
	Freq	6.5MHz	6.5MHz	5.5MHz		5.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : ___U50___　　　　Operating Mode: ___B+C+PW mode___

Transducer: ___L742UB SN：00001A0___　　　　Working Frequency: ___5.5MHz___

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.20	0.45		1.25	1.00
Associated Acoustic Parameters	Pr.3　　　MPa	1.97					
	W0　　　mW		31.40	31.40		31.40	31.40
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.54	
	z@PII.3max (cm)	1.50					
	deq(Zsp)　　(cm)					0.027	
	Fc　　　(MHz)	5.43	5.43	5.66		5.66	5.43
	Dim of Aaprt　X(cm)		0.96	0.96		0.96	0.96
	Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD　　　(usec)	0.22					
	PRF　　　(Hz)	12500					
	Pr@PIImax (MPa)	2.56					
	deq@PIImax (cm)	0.021				0.027	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	108.6					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	25mm	25mm	25mm		25mm	25mm
	Freq	6.5MHz	6.5MHz	5.5MHz		5.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :　U50　　　　　　　　　　　　　Operating Mode:　B+PDI+PW mode

Transducer:　L742UB SN：00001A0　　　　Working Frequency:　5.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.20	0.44		1.28	1.01
Associated Acoustic Parameters	Pr.3　　　MPa	1.97					
	W0　　　　mW		31.24	31.24		31.24	31.24
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.54	
	z@PII.3max (cm)	1.50					
	deq(Zsp)　(cm)					0.027	
	Fc　　　(MHz)	5.43	5.43	5.66		5.66	5.43
	Dim of Aaprt　X(cm)		0.96	0.96		0.96	0.96
	Dim of Aaprt　Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD　　　(usec)	0.22					
	PRF　　　(Hz)	12500					
	Pr@PIImax (MPa)	2.56					
	deq@PIImax (cm)	0.021				0.027	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Focal Length　Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	108.6					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	25mm	25mm	25mm		25mm	25mm
	Freq	6.5MHz	6.5MHz	5.5MHz		5.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+DPDI mode

Transducer: L742UB SN：00001A0   Working Frequency: 5.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.84	0.20	0.12		0.32	0.60
Associated Acoustic Parameters	Pr.3 MPa	1.97					
	W0 mW		19.32	19.32		19.32	19.32
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.70	
	z@PII.3max (cm)	1.50					
	deq(Zsp) (cm)					0.071	
	Fc (MHz)	5.43	5.43	5.63		5.63	5.43
	Dim of Aaprt	X(cm)		0.96	0.96		0.96	0.96
		Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD (usec)	0.22					
	PRF (Hz)	125					
	Pr@PIImax (MPa)	2.56					
	deq@PIImax (cm)	0.021				0.071	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	108.6					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	25mm	25mm	25mm		25mm	25mm
	Freq	5.5MHz	5.5MHz	5.5MHz		5.5MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI+PW mode

Transducer: L742UB SN：00001A0   Working Frequency: 5.5MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.84	0.20	0.41		1.17	0.94
Associated Acoustic Parameters	Pr.3	MPa	1.97					
	W0	mW		30.05	30.05		30.05	30.05
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.54	
	z@PII.3max (cm)		1.50					
	deq(Zsp)	(cm)					0.027	
	Fc	(MHz)	5.43	5.43	5.66		5.66	5.43
	Dim of Aaprt	X(cm)		0.96	0.96		0.96	0.96
		Y (cm)		0.58	0.58		0.58	0.58
Other Information	PD	(usec)	0.22					
	PRF	(Hz)	125					
	Pr@PIImax (MPa)		2.56					
	deq@PIImax (cm)		0.021				0.027	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		108.6					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		25mm	25mm	25mm		25mm	25mm
	Freq		5.5MHz	5.5MHz	5.5MHz		5.5MHz	5.5MHz

A2.8.3: Test of Probe L1042UB

Acoustic Output Reporting Table for Track3

System : <u>U50</u> Operating Mode: <u>B mode</u>

Transducer: <u>L1042UB SN：00001A0</u> Working Frequency: <u>8.0MHz</u>

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.67	0.10				0.24
Associated Acoustic Parameters	Pr.3 MPa	1.69					
	W0 mW		6.13				6.13
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)						
	z@PII.3max (cm)	1.55					
	deq(Zsp) (cm)						
	Fc (MHz)	6.45	6.45				6.45
	Dim of Aaprt X(cm)		0.64				0.64
	Dim of Aaprt Y (cm)		0.48				0.48
Other Information	PD (usec)	0.18					
	PRF (Hz)	12464.00					
	Pr@PIImax (MPa)	2.26					
	deq@PIImax (cm)	0.04					
	Focal Length FLx (cm)		0.20				0.20
	Focal Length Fly (cm)		0.50				0.50
	Ipa.3@MImax(W/cm^2)	86.29					
Control Conditions	Depth	29mm	29mm				29mm
	Focus	20mm	20mm				20mm
	Freq	8.0MHz	8.0MHz				8.0MHz

Acoustic Output Reporting Table for Track3

System : __U50__　　　　　　　　　　　　　　　Operating Mode:　　__PW mode__

Transducer: __L1042UB SN：00001A0__　　　　Working Frequency:　　__6.5MHz__

Index Label		MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.44		0.13		0.36	0.17
Associated Acoustic Parameters	Pr.3　　MPa	1.12					
	W0　　　mW			4.21		4.21	4.21
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　(cm)						
	Zsp　　(cm)					1.62	
	z@PII.3max　(cm)	1.55					
	deq(Zsp)　(cm)					0.06	
	Fc　　(MHz)	6.57		6.57		6.57	6.57
	Dim of Aaprt　X(cm)			0.64		0.64	0.64
	Dim of Aaprt　Y (cm)			0.48		0.48	0.48
Other Information	PD　　(usec)	0.54					
	PRF　　(Hz)	4885.10					
	Pr@PIImax (MPa)	1.54					
	deq@PIImax (cm)	0.06				0.06	
	Focal Length　FLx (cm)			0.20			0.20
	Focal Length　Fly (cm)			0.50			0.50
	Ipa.3@MImax(W/cm^2)	47.36					
Control Conditions	Depth	29mm		29mm		29mm	29mm
	Focus	20mm		20mm		20mm	20mm
	Freq	6.5MHz		6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: M mode

Transducer: L1042UB SN：00001A0   Working Frequency: 8.0MHz

Index Label			MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.55		0.18		0.39	0.23
Associated Acoustic Parameters	Pr.3	MPa	1.41					
	W0	mW			5.74		5.74	5.74
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.36	
	z@PII.3max	(cm)	1.31					
	deq(Zsp)	(cm)					0.06	
	Fc	(MHz)	6.61		6.61		6.61	6.61
	Dim of Aaprt	X(cm)			0.64		0.64	0.64
		Y (cm)			0.48		0.48	0.48
Other Information	PD	(usec)	0.16					
	PRF	(Hz)	12727.00					
	Pr@PIImax (MPa)		1.90					
	deq@PIImax (cm)		0.06				0.06	
	Focal Length	FLx (cm)			0.20			0.20
		Fly (cm)			0.50			0.50
	Ipa.3@MImax(W/cm^2)		52.96					
Control Conditions	Depth		29mm		29mm		29mm	29mm
	Focus		20mm		20mm		20mm	20mm
	Freq		8.0MHz		8.0MHz		8.0MHz	8.0MHz

Acoustic Output Reporting Table for Track3

System :   <u>U50</u>   Operating Mode: <u>B+M mode</u>

Transducer: <u>L1042UB SN：00001A0</u>   Working Frequency: <u>8.0MHz</u>

Index Label		MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.67	0.10	0.18		0.39	0.47
Associated Acoustic Parameters	Pr.3 MPa	1.69					
	W0 mW		11.86	11.86		11.86	11.86
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.36	
	z@PII.3max （cm）	1.55					
	deq(Zsp) (cm)					0.06	
	Fc (MHz)	6.45	6.45	6.61		6.61	6.45
	Dim of Aaprt X(cm)		0.64	0.64		0.64	0.64
	Dim of Aaprt Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD (usec)	0.18					
	PRF (Hz)	12464.00					
	Pr@PIImax (MPa)	2.26					
	deq@PIImax (cm)	0.04				0.06	
	Focal Length FLx (cm)		0.20	0.20			0.20
	Focal Length Fly (cm)		0.50	0.50			0.50
	Ipa.3@MImax(W/cm^2)	86.29					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	20mm	20mm	20mm		20mm	20mm
	Freq	8.0MHz	8.0MHz	8.0MHz		8.0MHz	8.0MHz

Acoustic Output Reporting Table for Track3

System： __U50__   Operating Mode: __B+C mode__

Transducer: __L1042UB SN：00001A0__   Working Frequency: __6.5MHz__

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.67	0.10	0.05		0.26	0.35
Associated Acoustic Parameters	Pr.3　　MPa	1.69					
	W0　　mW		7.17	7.17		7.17	7.17
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　(cm)						
	Zbp　　(cm)						
	Zsp　　(cm)					1.38	
	z@PII.3max (cm)	1.55					
	deq(Zsp)　(cm)					0.062	
	Fc　　(MHz)	6.45	6.45	6.56		6.56	6.45
	Dim of Aaprt　X(cm)		0.64	0.64		0.64	0.64
	Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD　　(usec)	0.18					
	PRF　　(Hz)	12464					
	Pr@PIImax (MPa)	2.26					
	deq@PIImax (cm)	0.044				0.062	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	86.29					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	20mm	20mm	20mm		20mm	20mm
	Freq	6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u> Operating Mode: <u>B+PDI mode</u>
Transducer: <u>L1042UB SN：00001A0</u> Working Frequency: <u>6.5MHz</u>

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.67	0.10	0.06		0.27	0.37
Associated Acoustic Parameters	Pr.3	MPa	1.69					
	W0	mW		7.20	7.20		7.20	7.20
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.40	
	z@PII.3max	(cm)	1.55					
	deq(Zsp)	(cm)					0.06	
	Fc	(MHz)	6.45	6.45	6.56		6.56	6.45
	Dim of Aaprt	X(cm)		0.64	0.64		0.64	0.64
		Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD	(usec)	0.18					
	PRF	(Hz)	12464					
	Pr@PIImax (MPa)		2.26					
	deq@PIImax (cm)		0.044				0.06	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		86.29					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		20mm	20mm	20mm		20mm	20mm
	Freq		6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PW mode

Transducer: L1042UB SN：00001A0   Working Frequency: 6.5MHz

	Index Label		MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.67	0.10	0.13		0.36	0.41
Associated Acoustic Parameters	Pr.3	MPa	1.69					
	W0	mW		10.33	10.33		10.33	10.33
	Min of[W.3(z1), Ita.3(z1)]	(mW)						
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.62	
	z@PII.3max	(cm)	1.55					
	deq(Zsp)	(cm)					0.06	
	Fc	(MHz)	6.45	6.45	6.57		6.57	6.45
	Dim of Aaprt	X(cm)		0.64	0.64		0.64	0.64
		Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD	(usec)	0.18					
	PRF	(Hz)	12464.00					
	Pr@PIImax (MPa)		2.26					
	deq@PIImax (cm)		0.04				0.06	
	Focal Length	FLx (cm)		0.20	0.20			0.20
		Fly (cm)		0.50	0.50			0.50
	Ipa.3@MImax(W/cm^2)		86.29					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		20mm	20mm	20mm		20mm	20mm
	Freq		8.0MHz	8.0MHz	6.5MHz		6.5MHz	8.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C+PW mode

Transducer: L1042UB SN：00001A0   Working Frequency: 6.5MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.67	0.10	0.18		0.62	0.52
Associated Acoustic Parameters	Pr.3	MPa	1.69					
	W0	mW		11.37	11.37		11.37	11.37
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.62	
	z@PII.3max	(cm)	1.55					
	deq(Zsp)	(cm)					0.063	
	Fc	(MHz)	6.45	6.45	6.57		6.57	6.45
	Dim of Aaprt	X(cm)		0.64	0.64		0.64	0.64
		Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD	(usec)	0.18					
	PRF	(Hz)	12464					
	Pr@PIImax (MPa)		2.26					
	deq@PIImax (cm)		0.044				0.063	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		86.29					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		20mm	20mm	20mm		20mm	20mm
	Freq		6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>B+PDI+PW mode</u>

Transducer: <u>L1042UB SN：00001A0</u> Working Frequency: <u>6.5MHz</u>

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.67	0.10	0.19		0.63	0.54
Associated Acoustic Parameters	Pr.3 MPa	1.69					
	W0 mW		11.40	11.40		11.40	11.40
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.62	
	z@PII.3max (cm)	1.55					
	deq(Zsp) (cm)					0.063	
	Fc (MHz)	6.45	6.45	6.57		6.57	6.45
	Dim of Aaprt X(cm)		0.64	0.64		0.64	0.64
	Dim of Aaprt Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD (usec)	0.18					
	PRF (Hz)	12464					
	Pr@PIImax (MPa)	2.26					
	deq@PIImax (cm)	0.044				0.063	
	Focal Length FLx (cm)		0.2	0.2			0.2
	Focal Length Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	86.29					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	20mm	20mm	20mm		20mm	20mm
	Freq	6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI mode

Transducer: L1042UB SN：00001A0   Working Frequency: 6.5MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.67	0.10	0.08		0.25	0.34
Associated Acoustic Parameters	Pr.3	MPa	1.69					
	W0	mW		8.68	8.68		8.68	8.68
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.35	
	z@PII.3max	(cm)	1.55					
	deq(Zsp)	(cm)					0.092	
	Fc	(MHz)	6.45	6.45	6.59		6.59	6.45
	Dim of Aaprt	X(cm)		0.64	0.64		0.64	0.64
		Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD	(usec)	0.18					
	PRF	(Hz)	12464					
	Pr@PIImax (MPa)		2.26					
	deq@PIImax (cm)		0.044				0.092	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		86.29					
Control Conditions	Depth		29mm	29mm	29mm		29mm	29mm
	Focus		20mm	20mm	20mm		20mm	20mm
	Freq		6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+DPDI+PW mode

Transducer: L1042UB SN：00001A0 Working Frequency: 6.5MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.67	0.10	0.21		0.61	0.51
Associated Acoustic Parameters	Pr.3 MPa	1.69					
	W0 mW		12.89	12.89		12.89	12.89
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.62	
	z@PII.3max (cm)	1.55					
	deq(Zsp) (cm)					0.063	
	Fc (MHz)	6.45	6.45	6.57		6.57	6.45
	Dim of Aaprt X(cm)		0.64	0.64		0.64	0.64
	Y (cm)		0.48	0.48		0.48	0.48
Other Information	PD (usec)	0.18					
	PRF (Hz)	12464					
	Pr@PIImax (MPa)	2.26					
	deq@PIImax (cm)	0.044				0.063	
	Focal Length FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	86.29					
Control Conditions	Depth	29mm	29mm	29mm		29mm	29mm
	Focus	20mm	20mm	20mm		20mm	20mm
	Freq	6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

A2.8.4: Test of Probe E612UB

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>B mode</u>

Transducer: <u>E612UB SN：00003A0</u>   Working Frequency: <u>5.5MHz</u>

			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.70	0.23				0.60
Associated Acoustic Parameters	Pr.3	MPa	1.59					
	W0	mW		18.74				18.74
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)						
	z@PII.3max	(cm)	2.3					
	deq(Zsp)	(cm)						
	Fc	(MHz)	5.18	5.18				5.18
	Dim of Aaprt	X(cm)		0.656				0.656
		Y (cm)		0.74				0.74
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	8547.1					
	Pr@PIImax (MPa)		2.28					
	deq@PIImax (cm)		0.026					
	Focal Length	FLx (cm)		0.2				0.2
		Fly (cm)		0.5				0.5
	Ipa.3@MImax(W/cm^2)		92.53					
Control Conditions	Depth		58mm	58mm				58mm
	Focus		50mm	50mm				50mm
	Freq		5.5MHz	5.5MHz				5.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: PW mode

Transducer: E612UB SN：00003A0   Working Frequency: 5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.55		0.32		0.73	0.42
Associated Acoustic Parameters	Pr.3 MPa	1.24					
	W0 mW			13.25		13.25	13.25
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.6	
	z@PII.3max (cm)	1.90					
	deq(Zsp) (cm)					0.031189	
	Fc (MHz)	5.10		5.10		5.10	5.10
	Dim of Aaprt X(cm)			0.656		0.656	0.656
	Y (cm)			0.74		0.74	0.74
Other Information	PD (usec)	0.70					
	PRF (Hz)	3654.9					
	Pr@PIImax (MPa)	1.70					
	deq@PIImax (cm)	0.031				0.031	
	Focal Length FLx (cm)			0.2			0.2
	Fly (cm)			0.5			0.5
	Ipa.3@MImax(W/cm^2)	72.46					
Control Conditions	Depth	58mm		58mm		58mm	58mm
	Focus	50mm		50mm		50mm	50mm
	Freq	5.0MHz		5.0MHz		5.0MHz	5.0MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>M mode</u>

Transducer: <u>E612UB SN：00003A0</u>   Working Frequency: <u>5.5MHz</u>

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.76		0.42		0.95	0.56
Associated Acoustic Parameters	Pr.3 MPa	1.71					
	W0 mW			17.59		17.59	17.59
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.64	
	z@PII.3max (cm)	2.30					
	deq(Zsp) (cm)					0.024	
	Fc (MHz)	5.01		5.01		5.01	5.01
	Dim of Aaprt X(cm)			0.656		0.656	0.656
	Y (cm)			0.74		0.74	0.74
Other Information	PD (usec)	0.25					
	PRF (Hz)	8548.9					
	Pr@PIImax (MPa)	2.25					
	deq@PIImax (cm)	0.024				0.024	
	Focal Length FLx (cm)			0.2			0.2
	Fly (cm)			0.5			0.5
	Ipa.3@MImax(W/cm^2)	107.19					
Control Conditions	Depth	58mm		58mm		58mm	58mm
	Focus	50mm		50mm		50mm	50mm
	Freq	5.5MHz		5.5MHz		5.5MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System : __U50__　　　　　　　　　　Operating Mode:　　__B+M mode__

Transducer: __E612UB SN：00003A0__　　　Working Frequency:　　__5.5MHz__

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.70	0.23	0.42		0.95	1.16
Associated Acoustic Parameters	Pr.3　　　MPa	1.59					
	W0　　　　mW		36.33	36.33		36.33	36.33
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　(cm)						
	Zsp　　(cm)					1.64	
	z@PII.3max (cm)	2.3					
	deq(Zsp)　(cm)					0.024	
	Fc　　(MHz)	5.18	5.18	5.01		5.01	5.18
	Dim of Aaprt　X(cm)		0.656	0.656		0.656	0.656
	Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD　　(usec)	0.27					
	PRF　　(Hz)	8547.1					
	Pr@PIImax (MPa)	2.28					
	deq@PIImax (cm)	0.026				0.024	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	92.53					
Control Conditions	Depth	58mm	58mm	58mm		58mm	58mm
	Focus	50mm	50mm	50mm		50mm	50mm
	Freq	5.5MHz	5.5MHz	5.5MHz		5.5MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :　U50　　　　　　　　　　　　Operating Mode:　B+C mode

Transducer:　E612UB SN：00003A0　　　　Working Frequency:　5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.70	0.23	0.17		0.37	0.82
Associated Acoustic Parameters	Pr.3　　　MPa	1.59					
	W0　　　　mW		25.87	25.87		25.87	25.87
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.58	
	z@PII.3max (cm)	2.3					
	deq(Zsp)　(cm)					0.062	
	Fc　　(MHz)	5.18	5.18	5.05		5.05	5.18
	Dim of Aaprt　X(cm)		0.656	0.656		0.656	0.656
	Dim of Aaprt　Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD　　(usec)	0.27					
	PRF　　(Hz)	8547.1					
	Pr@PIImax (MPa)	2.28					
	deq@PIImax (cm)	0.026				0.062	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Focal Length　Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	92.53					
Control Conditions	Depth	58mm	58mm	58mm		58mm	58mm
	Focus	50mm	50mm	50mm		50mm	50mm
	Freq	5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :　U50　　　　　　　　　　　　　　Operating Mode:　B+PDI mode

Transducer:　E612UB SN：00003A0　　　　Working Frequency:　5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.70	0.23	0.20		0.35	0.83
Associated Acoustic Parameters	Pr.3　　　MPa	1.59					
	W0　　　mW		26.12	26.12		26.12	26.12
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.60	
	z@PII.3max (cm)	2.3					
	deq(Zsp)　(cm)					0.062	
	Fc　　　(MHz)	5.18	5.18	5.05		5.05	5.18
	Dim of Aaprt　X(cm)		0.656	0.656		0.656	0.656
	Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD　　　(usec)	0.27					
	PRF　　　(Hz)	8547.1					
	Pr@PIImax (MPa)	2.28					
	deq@PIImax (cm)	0.026				0.062	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	92.53					
Control Conditions	Depth	58mm	58mm	58mm		58mm	58mm
	Focus	50mm	50mm	50mm		50mm	50mm
	Freq	5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+PW mode

Transducer: E612UB SN：00003A0   Working Frequency: 5.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.70	0.23	0.32		0.73	1.02
Associated Acoustic Parameters	Pr.3	MPa	1.59					
	W0	mW		39.93	39.93		39.93	39.93
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.6	
	z@PII.3max (cm)		2.3					
	deq(Zsp)	(cm)					0.031189	
	Fc	(MHz)	5.18	5.18	5.10		5.10	5.18
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	8547.1					
	Pr@PIImax (MPa)		2.28					
	deq@PIImax (cm)		0.026				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		92.53					
Control Conditions	Depth		58mm	58mm	58mm		58mm	58mm
	Focus		50mm	50mm	50mm		50mm	50mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C+PW mode

Transducer: E612UB SN：00003A0   Working Frequency: 5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.70	0.23	0.49		1.10	1.24
Associated Acoustic Parameters	Pr.3 MPa	1.59					
	W0 mW		47.06	47.06		47.06	47.06
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.6	
	z@PII.3max (cm)	2.3					
	deq(Zsp) (cm)					0.031	
	Fc (MHz)	5.18	5.18	5.10		5.10	5.18
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD (usec)	0.27					
	PRF (Hz)	8547.1					
	Pr@PIImax (MPa)	2.28					
	deq@PIImax (cm)	0.026				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	92.53					
Control Conditions	Depth	58mm	58mm	58mm		58mm	58mm
	Focus	50mm	50mm	50mm		50mm	50mm
	Freq	5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PDI+PW mode

Transducer: E612UB SN：00003A0   Working Frequency: 5.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.70	0.23	0.52		1.08	1.25
Associated Acoustic Parameters	Pr.3	MPa	1.59					
	W0	mW		47.31	47.31		47.31	47.31
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.6	
	z@PII.3max (cm)		2.3					
	deq(Zsp)	(cm)					0.031	
	Fc	(MHz)	5.18	5.18	5.10		5.10	5.18
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	8547.1					
	Pr@PIImax (MPa)		2.28					
	deq@PIImax (cm)		0.026				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		92.53					
Control Conditions	Depth		58mm	58mm	58mm		58mm	58mm
	Focus		50mm	50mm	50mm		50mm	50mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+DPDI mode

Transducer: E612UB SN：00003A0 Working Frequency: 5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.70	0.23	0.09		0.20	0.72
Associated Acoustic Parameters	Pr.3 MPa	1.59					
	W0 mW		22.38	22.38		22.38	22.38
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)					1.65	
	z@PII.3max (cm)	2.3					
	deq(Zsp) (cm)					0.11	
	Fc (MHz)	5.18	5.18	4.99		4.99	5.18
	Dim of Aaprt X(cm)		0.656	0.656		0.656	0.656
	Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD (usec)	0.27					
	PRF (Hz)	8547.1					
	Pr@PIImax (MPa)	2.28					
	deq@PIImax (cm)	0.026				0.11	
	Focal Length FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	92.53					
Control Conditions	Depth	58mm	58mm	58mm		58mm	58mm
	Focus	50mm	50mm	50mm		50mm	50mm
	Freq	5.0MHz	5.0MHz	5.0MHz		5.0MHz	5.0MHz

Acoustic Output Reporting Table for Track3

System :　　U50　　　　　　　　　　　Operating Mode:　　B+DPDI+PW mode

Transducer:　　E612UB SN：00003A0　　　Working Frequency:　　5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.70	0.23	0.41		0.93	1.14
Associated Acoustic Parameters	Pr.3　　　MPa	1.59					
	W0　　　　mW		35.63	35.63		35.63	35.63
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.6	
	z@PII.3max (cm)	2.3					
	deq(Zsp)　　(cm)					0.031	
	Fc　　　(MHz)	5.18	5.18	5.10		5.10	5.18
	Dim of Aaprt / X(cm)		0.656	0.656		0.656	0.656
	Y (cm)		0.74	0.74		0.74	0.74
Other Information	PD　　　(usec)	0.27					
	PRF　　　(Hz)	8547.1					
	Pr@PIImax (MPa)	2.28					
	deq@PIImax (cm)	0.026				0.031	
	Focal Length / FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	92.53					
Control Conditions	Depth	58mm	58mm	58mm		58mm	58mm
	Focus	50mm	50mm	50mm		50mm	50mm
	Freq	5.0MHz	5.0MHz	5.0MHz		5.0MHz	5.0MHz

A2.8.5: Test of Probe C612UB

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.5MHz

Index Label		MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.90	0.17				0.43
Associated Acoustic Parameters	Pr.3 MPa	2.10					
	W0 mW		13.06				13.06
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)						
	z@PII.3max (cm)	1.92					
	deq(Zsp) (cm)						
	Fc (MHz)	5.43	5.43				5.43
	Dim of Aaprt X(cm)		0.656				0.656
	Dim of Aaprt Y (cm)		0.69				0.69
Other Information	PD (usec)	0.23					
	PRF (Hz)	9606.4					
	Pr@PIImax (MPa)	2.95					
	deq@PIImax (cm)	0.021					
	Focal Length FLx (cm)		0.2				0.2
	Focal Length Fly (cm)		0.5				0.5
	Ipa.3@MImax(W/cm^2)	183.98					
Control Conditions	Depth	49mm	49mm				49mm
	Focus	30mm	30mm				30mm
	Freq	6.5MHz	6.5MHz				6.5MHz

Acoustic Output Reporting Table for Track3

System :   <u>U50</u>   Operating Mode: <u>PW mode</u>

Transducer: <u>C612UB SN：00012A0</u>   Working Frequency: <u>6.0MHz</u>

Index Label		MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.66		0.18		0.54	0.22
Associated Acoustic Parameters	Pr.3　　　MPa	1.56					
	W0　　　mW			6.7		6.7	6.7
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.55	
	z@PII.3max　(cm)	1.85					
	deq(Zsp)　(cm)					0.042	
	Fc　　　(MHz)	5.64		5.64		5.64	5.64
	Dim of Aaprt　X(cm)			0.656		0.656	0.656
	Dim of Aaprt　Y (cm)			0.69		0.69	0.69
Other Information	PD　　　(usec)	0.62					
	PRF　　　(Hz)	2900					
	Pr@PIImax (MPa)	2.11					
	deq@PIImax (cm)	0.042				0.042	
	Focal Length　FLx (cm)			0.2			0.2
	Focal Length　Fly (cm)			0.5			0.5
	Ipa.3@MImax(W/cm^2)	99.56					
Control Conditions	Depth	49mm		49mm		49mm	49mm
	Focus	30mm		30mm		30mm	30mm
	Freq	6.0MHz		6.0MHz		6.0MHz	6.0MHz

Acoustic Output Reporting Table for Track3

System : 　U50 　　　　　　　　　　Operating Mode: 　M mode

Transducer: 　C612UB SN：00012A0 　　　Working Frequency: 　6.5MHz

Index Label		MI	Scan	TIS		TIB	TIC
				Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.90		0.33		0.99	0.43
Associated Acoustic Parameters	Pr.3　　　MPa	2.09					
	W0　　　　mW			13.00		13.00	13.00
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					1.85	
	z@PII.3max　(cm)	1.90					
	deq(Zsp)　(cm)					0.023	
	Fc　　　(MHz)	5.38		5.38		5.38	5.38
	Dim of Aaprt　X(cm)			0.656		0.656	0.656
	Y (cm)			0.69		0.69	0.69
Other Information	PD　　　(usec)	0.23					
	PRF　　　(Hz)	9599.1					
	Pr@PIImax (MPa)	2.95					
	deq@PIImax (cm)	0.023				0.023	
	Focal Length　FLx (cm)			0.2			0.2
	Fly (cm)			0.5			0.5
	Ipa.3@MImax(W/cm^2)	177.28					
Control Conditions	Depth	49mm		49mm		49mm	49mm
	Focus	30mm		30mm		30mm	30mm
	Freq	6.5MHz		6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+M mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.5MHz

					TIS		TIB	
						Non-Scan		
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.90	0.17	0.33		0.99	0.86
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		26.06	26.06		26.06	26.06
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.85	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.023	
	Fc	(MHz)	5.43	5.43	5.38		5.38	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.023	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.5MHz		6.5MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+C mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.90	0.17	0.54		1.69	1.09
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		33.03	33.03		33.03	33.03
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.70	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.014	
	Fc	(MHz)	5.43	5.43	5.66		5.66	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.014	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PDI mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.90	0.17	0.55		1.71	1.11
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		33.63	33.63		33.63	33.63
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.70	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.013	
	Fc	(MHz)	5.43	5.43	5.66		5.66	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.013	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PW mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.0MHz

					TIS			TIB	
						Non-Scan			
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.90	0.17	0.35		0.54	0.65
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		19.76	19.76		19.76	19.76
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.55	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.042	
	Fc	(MHz)	5.43	5.43	5.64		5.64	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.042	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C+PW mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.0MHz

			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.90	0.17	0.89		2.23	1.31
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		39.73	39.73		39.73	39.73
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.55	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.042	
	Fc	(MHz)	5.43	5.43	5.64		5.64	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.042	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PDI+PW mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.0MHz

Index Label			MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.90	0.17	0.90		2.25	1.33
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		40.33	40.33		40.33	40.33
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.55	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.042	
	Fc	(MHz)	5.43	5.43	5.64		5.64	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.042	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :　U50　　　　　　　　　　　　Operating Mode:　B+DPDI mode

Transducer:　C612UB SN：00012A0　　　Working Frequency:　6.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.90	0.17	0.63		1.73	1.20
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		36.31	36.31		36.31	36.31
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.85	
	z@PII.3max　(cm)		1.92					
	deq(Zsp)	(cm)					0.013	
	Fc	(MHz)	5.43	5.43	5.67		5.67	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.013	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI+PW mode

Transducer: C612UB SN：00012A0   Working Frequency: 6.0MHz

Index Label			MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.90	0.17	0.98		2.27	1.42
Associated Acoustic Parameters	Pr.3	MPa	2.10					
	W0	mW		42.04	42.04		42.04	42.04
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					1.55	
	z@PII.3max	(cm)	1.92					
	deq(Zsp)	(cm)					0.042	
	Fc	(MHz)	5.43	5.43	5.64		5.64	5.43
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.23					
	PRF	(Hz)	9606.4					
	Pr@PIImax (MPa)		2.95					
	deq@PIImax (cm)		0.021				0.042	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		183.98					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		6.5MHz	6.5MHz	6.0MHz		6.0MHz	6.5MHz

A2.8.6: Test of Probe C6152UB

Acoustic Output Reporting Table for Track3

System :　　 U50　　　　　　　　　　 Operating Mode:　　 B mode
Transducer:　 C6152UB SN：00008A0　　 Working Frequency:　 5.5MHz

Index Label		MI	Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.91	0.26				0.73
Associated Acoustic Parameters	Pr.3　　　MPa	2.00					
	W0　　　　mW		22.25				22.25
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)						
	z@PII.3max　(cm)	2.25					
	deq(Zsp)　(cm)						
	Fc　　　(MHz)	4.81	4.81				4.81
	Dim of Aaprt　X(cm)		0.656				0.656
	Dim of Aaprt　Y (cm)		0.69				0.69
Other Information	PD　　　(usec)	0.27					
	PRF　　　(Hz)	9602.4					
	Pr@PIImax (MPa)	2.81					
	deq@PIImax (cm)	0.016					
	Focal Length　FLx (cm)		0.2				0.2
	Focal Length　Fly (cm)		0.5				0.5
	Ipa.3@MImax(W/cm^2)	174.69					
Control Conditions	Depth	49mm	49mm				49mm
	Focus	30mm	30mm				30mm
	Freq	5.5MHz	5.5MHz				5.5MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>PW mode</u>

Transducer: <u>C6152UB SN：00008A0</u>   Working Frequency: <u>5.0MHz</u>

			MI	Scan	TIS		TIB	TIC
					Non-Scan			
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.63		0.28		0.72	0.41
Associated Acoustic Parameters	Pr.3	MPa	1.37					
	W0	mW			12.49		12.49	12.49
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.40	
	z@PII.3max	(cm)	2.60					
	deq(Zsp)	(cm)					0.031	
	Fc	(MHz)	4.76		4.76		4.76	4.76
	Dim of Aaprt	X(cm)			0.656		0.656	0.656
		Y (cm)			0.69		0.69	0.69
Other Information	PD	(usec)	0.75					
	PRF	(Hz)	2900					
	Pr@PIImax (MPa)		2.04					
	deq@PIImax (cm)		0.031				0.031	
	Focal Length	FLx (cm)			0.2			0.2
		Fly (cm)			0.5			0.5
	Ipa.3@MImax(W/cm^2)		123.10					
Control Conditions	Depth		49mm		49mm		49mm	49mm
	Focus		30mm		30mm		30mm	30mm
	Freq		5.0MHz		5.0MHz		5.0MHz	5.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: M mode

Transducer: C6152UB SN：00008A0   Working Frequency: 5.5MHz

Index Label			MI		TIS		TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.93		0.49		1.40	0.70
Associated Acoustic Parameters	Pr.3	MPa	2.04					
	W0	mW			21.32		21.32	21.32
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.05	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.016	
	Fc	(MHz)	4.78		4.78		4.78	4.78
	Dim of Aaprt	X(cm)			0.656		0.656	0.656
		Y (cm)			0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9599.1					
	Pr@PIImax (MPa)		2.86					
	deq@PIImax (cm)		0.016				0.016	
	Focal Length	FLx (cm)			0.2			0.2
		Fly (cm)			0.5			0.5
	Ipa.3@MImax(W/cm^2)		168.29					
Control Conditions	Depth		49mm		49mm		49mm	49mm
	Focus		30mm		30mm		30mm	30mm
	Freq		5.5MHz		5.5MHz		5.5MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :　　U50　　　　　　　　　　　Operating Mode:　　B+M mode

Transducer:　C6152UB SN：00008A0　　　Working Frequency:　　5.5MHz

Index Label		MI	Scan	TIS		TIB	TIC
				Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.91	0.26	0.49		1.40	1.43
Associated Acoustic Parameters	Pr.3　　　　MPa	2.00					
	W0　　　　mW		43.57	43.57		43.57	43.57
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　　(cm)						
	Zbp　　　(cm)						
	Zsp　　　(cm)					2.05	
	z@PII.3max　(cm)	2.25					
	deq(Zsp)　(cm)					0.016	
	Fc　　　(MHz)	4.81	4.81	4.78		4.78	4.81
	Dim of Aaprt　X(cm)		0.656	0.656		0.656	0.656
	Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD　　　(usec)	0.27					
	PRF　　　(Hz)	9602.4					
	Pr@PIImax (MPa)	2.81					
	deq@PIImax (cm)	0.016				0.016	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	174.69					
Control Conditions	Depth	49mm	49mm	49mm		49mm	49mm
	Focus	30mm	30mm	30mm		30mm	30mm
	Freq	5.5MHz	5.5MHz	5.5MHz		5.5MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C mode

Transducer: C6152UB SN：00008A0   Working Frequency: 5.0MHz

			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
Index Label					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.91	0.26	0.83		2.17	1.93
Associated Acoustic Parameters	Pr.3	MPa	2.00					
	W0	mW		58.67	58.67		58.67	58.67
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.50	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.010	
	Fc	(MHz)	4.81	4.81	4.77		4.77	4.81
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9602.4					
	Pr@PIImax (MPa)		2.81					
	deq@PIImax (cm)		0.016				0.010	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		174.69					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :　　U50　　　　　　　　　　Operating Mode:　　B+PDI mode

Transducer:　C6152UB SN：00008A0　　Working Frequency:　　5.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt≤1	Aaprt>1		
Global Maximum Index Value		0.91	0.26	0.81		2.17	1.91
Associated Acoustic Parameters	Pr.3　　MPa	2.00					
	W0　　　mW		58.10	58.10		58.10	58.10
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1　　　(cm)						
	Zbp　　(cm)						
	Zsp　　(cm)					2.45	
	z@PII.3max　(cm)	2.25					
	deq(Zsp)　(cm)					0.010	
	Fc　　(MHz)	4.81	4.81	4.77		4.77	4.81
	Dim of Aaprt　X(cm)		0.656	0.656		0.656	0.656
	Dim of Aaprt　Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD　　(usec)	0.27					
	PRF　　(Hz)	9602.4					
	Pr@PIImax (MPa)	2.81					
	deq@PIImax (cm)	0.016				0.010	
	Focal Length　FLx (cm)		0.2	0.2			0.2
	Focal Length　Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)	174.69					
Control Conditions	Depth	49mm	49mm	49mm		49mm	49mm
	Focus	30mm	30mm	30mm		30mm	30mm
	Freq	5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :　　__U50__　　　　　　　　　　Operating Mode:　　__B+PW mode__

Transducer:　__C6152UB SN：00008A0__　　Working Frequency:　　__5.0MHz__

			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
				TIS			**TIB**	
					Non-Scan			
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.91	0.26	0.54		0.72	1.14
Associated Acoustic Parameters	Pr.3	MPa	2.00					
	W0	mW		34.74	34.74		34.74	34.74
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.40	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.031	
	Fc	(MHz)	4.81	4.81	4.76		4.76	4.81
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9602.4					
	Pr@PIImax (MPa)		2.81					
	deq@PIImax (cm)		0.016				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		174.69					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+C+PW mode
Transducer: C6152UB SN：00008A0   Working Frequency: 5.0MHz

Index Label			MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.91	0.26	1.37		2.89	2.34
Associated Acoustic Parameters	Pr.3	MPa	2.00					
	W0	mW		71.16	71.16		71.16	71.16
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.40	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.031	
	Fc	(MHz)	4.81	4.81	4.76		4.76	4.81
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9602.4					
	Pr@PIImax (MPa)		2.81					
	deq@PIImax (cm)		0.016				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		174.69					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :　　U50　　　　　　　　　　　Operating Mode:　　B+PDI+PW mode

Transducer:　C6152UB SN：00008A0　　　Working Frequency:　　5.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.91	0.26	1.35		2.89	2.32
Associated Acoustic Parameters	Pr.3	MPa	2.00					
	W0	mW		70.59	70.59		70.59	70.59
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.40	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.031	
	Fc	(MHz)	4.81	4.81	4.76		4.76	4.81
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9602.4					
	Pr@PIImax (MPa)		2.81					
	deq@PIImax (cm)		0.016				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		174.69					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI mode

Transducer: C6152UB SN：00008A0   Working Frequency: 5.0MHz

Index Label			MI	TIS Scan	TIS Non-Scan Aaprt≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.91	0.26	0.76		2.02	1.83
Associated Acoustic Parameters	Pr.3	MPa	2.00					
	W0	mW		55.74	55.74		55.74	55.74
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.45	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.011	
	Fc	(MHz)	4.81	4.81	4.77		4.77	4.81
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9602.4					
	Pr@PIImax (MPa)		2.81					
	deq@PIImax (cm)		0.016				0.011	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		174.69					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI+PW mode

Transducer: C6152UB SN：00008A0   Working Frequency: 5.0MHz

				TIS			TIB	
				Scan	Non-Scan		Non-scan	TIC
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.91	0.26	1.30		2.74	2.24
Associated Acoustic Parameters	Pr.3	MPa	2.00					
	W0	mW		71.87	71.87		71.87	71.87
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)					2.40	
	z@PII.3max	(cm)	2.25					
	deq(Zsp)	(cm)					0.031	
	Fc	(MHz)	4.81	4.81	4.76		4.76	4.81
	Dim of Aaprt	X(cm)		0.656	0.656		0.656	0.656
		Y (cm)		0.69	0.69		0.69	0.69
Other Information	PD	(usec)	0.27					
	PRF	(Hz)	9602.4					
	Pr@PIImax (MPa)		2.81					
	deq@PIImax (cm)		0.016				0.031	
	Focal Length	FLx (cm)		0.2	0.2			0.2
		Fly (cm)		0.5	0.5			0.5
	Ipa.3@MImax(W/cm^2)		174.69					
Control Conditions	Depth		49mm	49mm	49mm		49mm	49mm
	Focus		30mm	30mm	30mm		30mm	30mm
	Freq		5.5MHz	5.5MHz	5.0MHz		5.0MHz	5.5MHz

A2.8.7: Test of Probe C422UB

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B mode

Transducer: C422UB SN：00001A0   Working Frequency: 3.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.68	0.33				1.12
Associated Acoustic Parameters	Pr.3	MPa	1.26					
	W0	mW		53.97				53.97
	Min of[W.3(z1),(mW) Ita.3(z1)]							
	Z1	(cm)						
	Zbp	(cm)						
	Zsp	(cm)						
	z@PII.3max	(cm)	4.50					
	deq(Zsp)	(cm)						
	Fc	(MHz)	3.41	3.41				3.41
	Dim of Aaprt	X(cm)		0.88				0.88
		Y (cm)		1.30				1.30
Other Information	PD	(usec)	0.38					
	PRF	(Hz)	7703.4					
	Pr@PIImax (MPa)		1.59					
	deq@PIImax (cm)		0.016					
	Focal Length	FLx (cm)		0.2				0.2
		Fly (cm)		0.5				0.5
	Ipa.3@MImax(W/cm^2)		53.68					
Control Conditions	Depth		68mm	68mm				68mm
	Focus		50mm	50mm				50mm
	Freq		3.0MHz	3.0MHz				3.0MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u> Operating Mode: <u>PW mode</u>

Transducer: <u>C422UB SN：00001A0</u> Working Frequency: <u>3.0MHz</u>

Index Label			MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC
					TIS		TIB	
					Non-Scan			
Global Maximum Index Value			0.66			0.91	2.58	1.97
Associated Acoustic Parameters	Pr.3	MPa	1.16					
	W0	mW					95.11	95.11
	Min of[W.3(z1),(mW) Ita.3(z1)]					62.29		
	Z1	(cm)				2.00		
	Zbp	(cm)				1.808		
	Zsp	(cm)					4.05	
	z@PII.3max	(cm)	4.30					
	deq(Zsp)	(cm)					0.007	
	Fc	(MHz)	3.06			3.06	3.06	3.06
	Dim of Aaprt	X(cm)				0.88	0.88	0.88
		Y (cm)				1.30	1.30	1.30
Other Information	PD	(usec)	1.13					
	PRF	(Hz)	5900					
	Pr@PIImax (MPa)		1.78					
	deq@PIImax (cm)		0.007				0.007	
	Focal Length	FLx (cm)				0.2		0.2
		Fly (cm)				0.5		0.5
	Ipa.3@MImax(W/cm^2)		97.01					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		50mm	50mm		50mm	50mm	50mm
	Freq		3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: M mode

Transducer: C422UB SN：00001A0   Working Frequency: 3.0MHz

| | | | MI | TIS | | | TIB | |
| | | | | | Non-Scan | | | |
Index Label			MI	Scan	Aaprt≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value			0.72			0.56	1.60	1.14
Associated Acoustic Parameters	Pr.3	MPa	1.32					
	W0	mW					55.06	55.06
	Min of[W.3(z1),(mW) Ita.3(z1)]					34.44		
	Z1	(cm)				2.00		
	Zbp	(cm)				1.808		
	Zsp	(cm)					2.00	
	z@PII.3max	(cm)	4.40					
	deq(Zsp)	(cm)					0.014	
	Fc	(MHz)	3.40			3.40	3.40	3.40
	Dim of Aaprt	X(cm)				0.88	0.88	0.88
		Y (cm)				1.30	1.30	1.30
Other Information	PD	(usec)	0.38					
	PRF	(Hz)	7704.1					
	Pr@PIImax (MPa)		1.67					
	deq@PIImax (cm)		0.014				0.014	
	Focal Length	FLx (cm)				0.2		0.2
		Fly (cm)				0.5		0.5
	Ipa.3@MImax(W/cm^2)		63.45					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		50mm	50mm		50mm	50mm	50mm
	Freq		3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System : U50   Operating Mode: B+M mode

Transducer: C422UB SN：00001A0   Working Frequency: 3.0MHz

Index Label			MI	TIS			TIB	TIC
				Scan	Non-Scan		Non-scan	
					Aaprt≤1	Aaprt>1		
Global Maximum Index Value			0.68	0.33		0.56	1.60	2.26
Associated Acoustic Parameters	Pr.3	MPa	1.26					
	W0	mW		109.03			109.03	109.03
	Min of[W.3(z1),(mW) Ita.3(z1)]					34.44		
	Z1	(cm)				2.00		
	Zbp	(cm)				1.808		
	Zsp	(cm)					2.00	
	z@PII.3max	(cm)	4.50					
	deq(Zsp)	(cm)					0.014	
	Fc	(MHz)	3.41	3.41		3.40	3.40	3.41
	Dim of Aaprt	X(cm)		0.88		0.88	0.88	0.88
		Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD	(usec)	0.38					
	PRF	(Hz)	7703.4					
	Pr@PIImax (MPa)		1.59					
	deq@PIImax (cm)		0.016				0.014	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		53.68					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		50mm	50mm		50mm	50mm	50mm
	Freq		3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u>　　　　　　　　　Operating Mode: <u>B+C mode</u>

Transducer: <u>C422UB SN：00001A0</u>　　Working Frequency: <u>3.0MHz</u>

				TIS			TIB	
					Non-Scan			
Index Label		MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value		0.68	0.33		1.03	3.03	2.55
Associated Acoustic Parameters	Pr.3　　MPa	1.26					
	W0　　　mW		161.67			161.67	161.67
	Min of[W.3(z1),(mW) Ita.3(z1)]				70.63		
	Z1　　　(cm)				2.00		
	Zbp　　(cm)				1.808		
	Zsp　　(cm)					3.90	
	z@PII.3max（cm）	4.50					
	deq(Zsp)　(cm)					0.006	
	Fc　　(MHz)	3.41	3.41		3.05	3.05	3.41
	Dim of Aaprt　X(cm)		0.88		0.88	0.88	0.88
	Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD　　(usec)	0.38					
	PRF　　(Hz)	7703.4					
	Pr@PIImax (MPa)	1.59					
	deq@PIImax (cm)	0.016				0.006	
	Focal Length　FLx (cm)		0.2		0.2		0.2
	Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	53.68					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	50mm	50mm		50mm	50mm	50mm
	Freq	3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System :　　U50　　　　　　　　　　　Operating Mode:　　　B+PDI mode

Transducer:　　C422UB SN：00001A0　　　　Working Frequency:　　3.0MHz

Index Label			MI	TIS			TIB	
				Scan	Non-Scan		Non-scan	TIC
					Aaprt ≤1	Aaprt>1		
Global Maximum Index Value			0.68	0.33		1.03	3.02	2.55
Associated Acoustic Parameters	Pr.3　　　MPa		1.26					
	W0　　　　mW			161.77			161.77	161.77
	Min of[W.3(z1),(mW) Ita.3(z1)]					70.70		
	Z1　　　(cm)					2.00		
	Zbp　　　(cm)					1.808		
	Zsp　　　(cm)						3.90	
	z@PII.3max　(cm)		4.50					
	deq(Zsp)　　(cm)						0.006	
	Fc　　　　(MHz)		3.41	3.41		3.05	3.05	3.41
	Dim of Aaprt	X(cm)		0.88		0.88	0.88	0.88
		Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD　　　(usec)		0.38					
	PRF　　　(Hz)		7703.4					
	Pr@PIImax (MPa)		1.59					
	deq@PIImax (cm)		0.016				0.006	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		53.68					
Control Conditions	Depth		68mm	68mm		68mm	68mm	68mm
	Focus		50mm	50mm		50mm	50mm	50mm
	Freq		3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PW mode

Transducer: C422UB SN：00001A0   Working Frequency: 3.0MHz

				TIS			TIB	
					Non-Scan			
Index Label		MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value		0.68	0.33		0.91	2.58	3.09
Associated Acoustic Parameters	Pr.3 MPa	1.26					
	W0 mW		149.08			149.08	149.08
	Min of[W.3(z1),(mW) Ita.3(z1)]				62.29		
	Z1 (cm)				2.00		
	Zbp (cm)				1.808		
	Zsp (cm)					4.05	
	z@PII.3max (cm)	4.50					
	deq(Zsp) (cm)					0.007	
	Fc (MHz)	3.41	3.41		3.06	3.06	3.41
	Dim of Aaprt X(cm)		0.88		0.88	0.88	0.88
	Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.38					
	PRF (Hz)	7703.4					
	Pr@PIImax (MPa)	1.59					
	deq@PIImax (cm)	0.016				0.007	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	53.68					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	50mm	50mm		50mm	50mm	50mm
	Freq	3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C+PW mode

Transducer: C422UB SN：00001A0   Working Frequency: 3.0MHz

Index Label		MI	TIS			TIB	TIC
			Scan	Non-Scan		Non-scan	
				Aaprt ≤1	Aaprt>1		
Global Maximum Index Value		0.68	0.33		1.94	5.61	4.52
Associated Acoustic Parameters	Pr.3 MPa	1.26					
	W0 mW		256.78			256.78	256.78
	Min of[W.3(z1),(mW) Ita.3(z1)]				62.29		
	Z1 (cm)				2.00		
	Zbp (cm)				1.808		
	Zsp (cm)					4.05	
	z@PII.3max （cm）	4.50					
	deq(Zsp) (cm)					0.007	
	Fc (MHz)	3.41	3.41		3.06	3.06	3.41
	Dim of Aaprt X(cm)		0.88		0.88	0.88	0.88
	Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.38					
	PRF (Hz)	7703.4					
	Pr@PIImax (MPa)	1.59					
	deq@PIImax (cm)	0.016				0.007	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	53.68					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	50mm	50mm		50mm	50mm	50mm
	Freq	3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PDI+PW mode

Transducer: C422UB SN：00001A0   Working Frequency: 3.0MHz

				TIS			TIB	
					Non-Scan			
Index Label		MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value		0.68	0.33		1.94	5.60	4.52
Associated Acoustic Parameters	Pr.3 MPa	1.26					
	W0 mW		256.88			256.88	256.88
	Min of[W.3(z1),(mW) Ita.3(z1)]				62.29		
	Z1 (cm)				2.00		
	Zbp (cm)				1.808		
	Zsp (cm)					4.05	
	z@PII.3max （cm）	4.50					
	deq(Zsp) (cm)					0.007	
	Fc (MHz)	3.41	3.41		3.06	3.06	3.41
	Dim of Aaprt X(cm)		0.88		0.88	0.88	0.88
	Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.38					
	PRF (Hz)	7703.4					
	Pr@PIImax (MPa)	1.59					
	deq@PIImax (cm)	0.016				0.007	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	53.68					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	50mm	50mm		50mm	50mm	50mm
	Freq	3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System :   <u>U50</u>   Operating Mode: <u>B+DPDI mode</u>

Transducer: <u>C422UB SN：00001A0</u>   Working Frequency: <u>3.0MHz</u>

				TIS			TIB	
					Non-Scan			
					Aaprt ≤1	Aaprt>1		
Index Label		MI	Scan			Non-scan	TIC
Global Maximum Index Value		0.68	0.33		1.08	3.07	2.59
Associated Acoustic Parameters	Pr.3 MPa	1.26					
	W0 mW		167.27			167.27	167.27
	Min of[W.3(z1),(mW) Ita.3(z1)]				74.27		
	Z1 (cm)				2.00		
	Zbp (cm)				1.81		
	Zsp (cm)					3.95	
	z@PII.3max （cm）	4.50					
	deq(Zsp) (cm)					0.006	
	Fc (MHz)	3.41	3.41		3.06	3.06	3.41
	Dim of Aaprt X(cm)		0.88		0.88	0.88	0.88
	Dim of Aaprt Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.38					
	PRF (Hz)	7703.4					
	Pr@PIImax (MPa)	1.59					
	deq@PIImax (cm)	0.016				0.006	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Focal Length Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	53.68					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	50mm	50mm		50mm	50mm	50mm
	Freq	3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

Acoustic Output Reporting Table for Track3

System : U50 Operating Mode: B+DPDI+PW mode

Transducer: C422UB SN：00001A0 Working Frequency: 3.0MHz

Index Label		MI	TIS Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.68	0.33		1.99	5.65	4.56
Associated Acoustic Parameters	Pr.3 MPa	1.26					
	W0 mW		262.38			262.38	262.38
	Min of[W.3(z1),(mW) Ita.3(z1)]				62.29		
	Z1 (cm)				2.00		
	Zbp (cm)				1.808		
	Zsp (cm)					4.05	
	z@PII.3max (cm)	4.50					
	deq(Zsp) (cm)					0.007	
	Fc (MHz)	3.41	3.41		3.06	3.06	3.41
	Dim of Aaprt X(cm)		0.88		0.88	0.88	0.88
	Dim of Aaprt Y (cm)		1.30		1.30	1.30	1.30
Other Information	PD (usec)	0.38					
	PRF (Hz)	7703.4					
	Pr@PIImax (MPa)	1.59					
	deq@PIImax (cm)	0.016				0.007	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Focal Length Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	53.68					
Control Conditions	Depth	68mm	68mm		68mm	68mm	68mm
	Focus	50mm	50mm		50mm	50mm	50mm
	Freq	3.0MHz	3.0MHz		3.0MHz	3.0MHz	3.0MHz

A2.8.8: Test of Probe L552UB

Acoustic Output Reporting Table for Track3

System : U50 Operating Mode: B mode
Transducer: L552UB SN：00001A0 Working Frequency: 4.5MHz

Index Label		MI	Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.97	0.24				0.93
Associated Acoustic Parameters	Pr.3 MPa	2.03					
	W0 mW		42.58				42.58
	Min of[W.3(z1),(mW) Ita.3(z1)]						
	Z1 (cm)						
	Zbp (cm)						
	Zsp (cm)						
	z@PII.3max (cm)	2.10					
	deq(Zsp) (cm)						
	Fc (MHz)	4.43	4.43				4.43
	Dim of Aaprt X(cm)		1.248				1.248
	Dim of Aaprt Y (cm)		0.83				0.83
Other Information	PD (usec)	0.29					
	PRF (Hz)	12725					
	Pr@PIImax (MPa)	2.70					
	deq@PIImax (cm)	0.009					
	Focal Length FLx (cm)		0.2				0.2
	Focal Length Fly (cm)		0.5				0.5
	Ipa.3@MImax(W/cm^2)	175.12					
Control Conditions	Depth	29mm	29mm				29mm
	Focus	25mm	25mm				25mm
	Freq	4.5MHz	4.5MHz				4.5MHz

Acoustic Output Reporting Table for Track3

System :　　<u>U50</u>　　　　　　Operating Mode:　　<u>PW mode</u>

Transducer:　<u>L552UB SN：00001A0</u>　　Working Frequency:　<u>4.0MHz</u>

Index Label		MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC
				TIS		TIB	
				Non-Scan			
Global Maximum Index Value		0.68			0.39	2.09	0.72
Associated Acoustic Parameters	Pr.3　　MPa	1.36					
	W0　　　mW					33.03	33.03
	Min of[W.3(z1),(mW) Ita.3(z1)]				20.45		
	Z1　　　(cm)				1.75		
	Zbp　　(cm)				1.72		
	Zsp　　(cm)					2.00	
	z@PII.3max　(cm)	2.25					
	deq(Zsp)　(cm)					0.011	
	Fc　　(MHz)	3.96			3.96	3.96	3.96
	Dim of Aaprt　X(cm)				1.248	1.248	1.248
	Dim of Aaprt　Y (cm)				0.83	0.83	0.83
Other Information	PD　　(usec)	0.87					
	PRF　　(Hz)	5899.6					
	Pr@PIImax (MPa)	1.79					
	deq@PIImax (cm)	0.011				0.011	
	Focal Length　FLx (cm)				0.2		0.2
	Focal Length　Fly (cm)				0.5		0.5
	Ipa.3@MImax(W/cm^2)	109.90					
Control Conditions	Depth	29mm			29mm	29mm	29mm
	Focus	25mm			25mm	25mm	25mm
	Freq	4.0MHz			4.0MHz	4.0MHz	4.0MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: M mode

Transducer: L552UB SN：00001A0   Working Frequency: 4.5MHz

				TIS			TIB	
					Non-Scan			
Index Label		MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC	
Global Maximum Index Value		0.95			0.54	2.66	0.96	
Associated Acoustic Parameters	Pr.3 MPa	2.00						
	W0 mW					44.01	44.01	
	Min of[W.3(z1),(mW) Ita.3(z1)]				25.71			
	Z1 (cm)				1.75			
	Zbp (cm)				1.72			
	Zsp (cm)					1.95		
	z@PII.3max (cm)	2.15						
	deq(Zsp) (cm)					0.009		
	Fc (MHz)	4.45			4.45	4.45	4.45	
	Dim of Aaprt X(cm)				1.248	1.248	1.248	
	Y (cm)				0.83	0.83	0.83	
Other Information	PD (usec)	0.30						
	PRF (Hz)	12727						
	Pr@PIImax (MPa)	2.70						
	deq@PIImax (cm)	0.009				0.009		
	Focal FLx (cm)				0.2		0.2	
	Length Fly (cm)				0.5		0.5	
	Ipa.3@MImax(W/cm^2)	185.6						
Control Conditions	Depth	29mm			29mm	29mm	29mm	
	Focus	25mm			25mm	25mm	25mm	
	Freq	4.5MHz			4.5MHz	4.5MHz	4.5MHz	

Acoustic Output Reporting Table for Track3

System :　　U50　　　　　　　　　　Operating Mode:　　B+M mode
Transducer:　L552UB SN：00001A0　　　Working Frequency:　　4.5MHz

Index Label		MI	TIS Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.97	0.24		0.54	2.66	1.89
Associated Acoustic Parameters	Pr.3　　　MPa	2.03					
	W0　　　　mW		86.59			86.59	86.59
	Min of[W.3(z1),(mW) Ita.3(z1)]				25.71		
	Z1　　　(cm)				1.75		
	Zbp　　　(cm)				1.72		
	Zsp　　　(cm)					1.95	
	z@PII.3max　(cm)	2.10					
	deq(Zsp)　(cm)					0.009	
	Fc　　　(MHz)	4.43	4.43		4.45	4.45	4.43
	Dim of Aaprt　X(cm)		1.248		1.248	1.248	1.248
	Y (cm)		0.83		0.83	0.83	0.83
Other Information	PD　　(usec)	0.29					
	PRF　　(Hz)	12725					
	Pr@PIImax (MPa)	2.70					
	deq@PIImax (cm)	0.009				0.009	
	Focal Length　FLx (cm)		0.2		0.2		0.2
	Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	175.12					
Control Conditions	Depth	29mm	29mm		29mm	29mm	29mm
	Focus	25mm	25mm		25mm	25mm	25mm
	Freq	4.5MHz	4.5MHz		4.5MHz	4.5MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System : U50　　　　Operating Mode: B+C mode

Transducer: L552UB SN：00001A0　　　　Working Frequency: 4.0MHz

Index Label		MI	TIS Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value		0.97	0.24		0.46	2.44	1.78
Associated Acoustic Parameters	Pr.3　　　MPa	2.03					
	W0　　　mW		81.58			81.58	81.58
	Min of[W.3(z1),(mW) Ita.3(z1)]				24.15		
	Z1　　　(cm)				1.75		
	Zbp　　　(cm)				1.72		
	Zsp　　　(cm)					1.95	
	z@PII.3max　(cm)	2.10					
	deq(Zsp)　　(cm)					0.009	
	Fc　　　(MHz)	4.43	4.43		3.96	3.96	4.43
	Dim of Aaprt　X(cm)		1.248		1.248	1.248	1.248
	Dim of Aaprt　Y (cm)		0.83		0.83	0.83	0.83
Other Information	PD　　　(usec)	0.29					
	PRF　　　(Hz)	12725					
	Pr@PIImax (MPa)	2.70					
	deq@PIImax (cm)	0.009				0.009	
	Focal Length　FLx (cm)		0.2		0.2		0.2
	Focal Length　Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	175.12					
Control Conditions	Depth	29mm	29mm		29mm	29mm	29mm
	Focus	25mm	25mm		25mm	25mm	25mm
	Freq	4.5MHz	4.5MHz		4.0MHz	4.0MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PDI mode

Transducer: L552UB SN：00001A0   Working Frequency: 4.0MHz

			MI	TIS Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.97	0.24		0.46	2.44	1.79
Associated Acoustic Parameters	Pr.3	MPa	2.03					
	W0	mW		81.98			81.98	81.98
	Min of[W.3(z1),(mW) Ita.3(z1)]					24.41		
	Z1	(cm)				1.75		
	Zbp	(cm)				1.72		
	Zsp	(cm)					2.00	
	z@PII.3max	(cm)	2.10					
	deq(Zsp)	(cm)					0.009	
	Fc	(MHz)	4.43	4.43		3.96	3.96	4.43
	Dim of Aaprt	X(cm)		1.248		1.248	1.248	1.248
		Y (cm)		0.83		0.83	0.83	0.83
Other Information	PD	(usec)	0.29					
	PRF	(Hz)	12725					
	Pr@PIImax (MPa)		2.70					
	deq@PIImax (cm)		0.009				0.009	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		175.12					
Control Conditions	Depth		29mm	29mm		29mm	29mm	29mm
	Focus		25mm	25mm		25mm	25mm	25mm
	Freq		4.5MHz	4.5MHz		4.0MHz	4.0MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+PW mode

Transducer: L552UB SN：00001A0   Working Frequency: 4.0MHz

	Index Label		MI	TIS Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value			0.97	0.24		0.39	2.09	1.65
Associated Acoustic Parameters	Pr.3	MPa	2.03					
	W0	mW		75.61			75.61	75.61
	Min of[W.3(z1),(mW) Ita.3(z1)]					20.45		
	Z1	(cm)				1.75		
	Zbp	(cm)				1.72		
	Zsp	(cm)					2.00	
	z@PII.3max	(cm)	2.10					
	deq(Zsp)	(cm)					0.011	
	Fc	(MHz)	4.43	4.43		3.96	3.96	4.43
	Dim of Aaprt	X(cm)		1.248		1.248	1.248	1.248
		Y (cm)		0.83		0.83	0.83	0.83
Other Information	PD	(usec)	0.29					
	PRF	(Hz)	12725					
	Pr@PIImax (MPa)		2.70					
	deq@PIImax (cm)		0.009				0.011	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		175.12					
Control Conditions	Depth		29mm	29mm		29mm	29mm	29mm
	Focus		25mm	25mm		25mm	25mm	25mm
	Freq		4.5MHz	4.5MHz		4.0MHz	4.0MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+C+PW mode

Transducer: L552UB SN：00001A0   Working Frequency: 4.0MHz

				TIS			TIB	
					Non-Scan			
					Aaprt ≤1			
Index Label		MI	Scan			Aaprt>1	Non-scan	TIC
Global Maximum Index Value		0.97	0.24			0.85	4.53	2.50
Associated Acoustic Parameters	Pr.3 MPa	2.03						
	W0 mW		114.61				114.61	114.61
	Min of[W.3(z1),(mW) Ita.3(z1)]					20.45		
	Z1 (cm)					1.75		
	Zbp (cm)					1.72		
	Zsp (cm)						2.00	
	z@PII.3max (cm)	2.10						
	deq(Zsp) (cm)						0.011	
	Fc (MHz)	4.43	4.43			3.96	3.96	4.43
	Dim of Aaprt X(cm)		1.248			1.248	1.248	1.248
	Y (cm)		0.83			0.83	0.83	0.83
Other Information	PD (usec)	0.29						
	PRF (Hz)	12725						
	Pr@PIImax (MPa)	2.70						
	deq@PIImax (cm)	0.009					0.011	
	Focal Length FLx (cm)		0.2			0.2		0.2
	Fly (cm)		0.5			0.5		0.5
	Ipa.3@MImax(W/cm^2)	175.12						
Control Conditions	Depth	29mm	29mm			29mm	29mm	29mm
	Focus	25mm	25mm			25mm	25mm	25mm
	Freq	4.5MHz	4.5MHz			4.0MHz	4.0MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System : <u>U50</u>   Operating Mode: <u>B+PDI+PW mode</u>

Transducer: <u>L552UB SN：00001A0</u>   Working Frequency: <u>4.0MHz</u>

				TIS			TIB	
					Non-Scan			
					Aaprt ≤ 1	Aaprt>1		
Index Label			MI	Scan			Non-scan	TIC
Global Maximum Index Value			0.97	0.24		0.85	4.53	2.51
Associated Acoustic Parameters	Pr.3 MPa		2.03					
	W0 mW			115.01			115.01	115.01
	Min of[W.3(z1),(mW) Ita.3(z1)]					20.45		
	Z1 (cm)					1.75		
	Zbp (cm)					1.72		
	Zsp (cm)						2.00	
	z@PII.3max （cm）		2.10					
	deq(Zsp) (cm)						0.011	
	Fc (MHz)		4.43	4.43		3.96	3.96	4.43
	Dim of Aaprt	X(cm)		1.248		1.248	1.248	1.248
		Y (cm)		0.83		0.83	0.83	0.83
Other Information	PD (usec)		0.29					
	PRF (Hz)		12725					
	Pr@PIImax (MPa)		2.70					
	deq@PIImax (cm)		0.009				0.011	
	Focal Length	FLx (cm)		0.2		0.2		0.2
		Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)		175.12					
Control Conditions	Depth		29mm	29mm		29mm	29mm	29mm
	Focus		25mm	25mm		25mm	25mm	25mm
	Freq		4.5MHz	4.5MHz		4.0MHz	4.0MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI mode

Transducer: L552UB SN：00001A0   Working Frequency: 4.0MHz

				MI	Scan	TIS Non-Scan Aaprt ≤1	TIS Non-Scan Aaprt>1	TIB Non-scan	TIC
Global Maximum Index Value				0.97	0.24		0.46	2.40	1.78
Associated Acoustic Parameters	Pr.3	MPa		2.03					
	W0	mW			81.67			81.67	81.67
	Min of[W.3(z1),(mW) Ita.3(z1)]						24.21		
	Z1	(cm)					1.75		
	Zbp	(cm)					1.72		
	Zsp	(cm)						2.00	
	z@PII.3max	(cm)		2.10					
	deq(Zsp)	(cm)						0.009	
	Fc	(MHz)		4.43	4.43		3.96	3.96	4.43
	Dim of Aaprt	X(cm)			1.248		1.248	1.248	1.248
		Y (cm)			0.83		0.83	0.83	0.83
Other Information	PD	(usec)		0.29					
	PRF	(Hz)		12725					
	Pr@PIImax (MPa)			2.70					
	deq@PIImax (cm)			0.009				0.009	
	Focal Length	FLx (cm)			0.2		0.2		0.2
		Fly (cm)			0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)			175.12					
Control Conditions	Depth			29mm	29mm		29mm	29mm	29mm
	Focus			25mm	25mm		25mm	25mm	25mm
	Freq			4.5MHz	4.5MHz		4.0MHz	4.0MHz	4.5MHz

Acoustic Output Reporting Table for Track3

System :   U50   Operating Mode: B+DPDI+PW mode
Transducer: L552UB SN：00001A0   Working Frequency: 4.0MHz

		MI	TIS			TIB	
			Scan	Non-Scan		Non-scan	TIC
				Aaprt ≤1	Aaprt>1		
Index Label		MI	Scan	Aaprt ≤1	Aaprt>1	Non-scan	TIC
Global Maximum Index Value		0.97	0.24		0.85	4.49	2.50
Associated Acoustic Parameters	Pr.3 MPa	2.03					
	W0 mW		114.70			114.70	114.70
	Min of[W.3(z1),(mW) Ita.3(z1)]				20.45		
	Z1 (cm)				1.75		
	Zbp (cm)				1.72		
	Zsp (cm)					2.00	
	z@PII.3max (cm)	2.10					
	deq(Zsp) (cm)					0.011	
	Fc (MHz)	4.43	4.43		3.96	3.96	4.43
	Dim of Aaprt X(cm)		1.248		1.248	1.248	1.248
	Dim of Aaprt Y (cm)		0.83		0.83	0.83	0.83
Other Information	PD (usec)	0.29					
	PRF (Hz)	12725					
	Pr@PIImax (MPa)	2.70					
	deq@PIImax (cm)	0.009				0.011	
	Focal Length FLx (cm)		0.2		0.2		0.2
	Focal Length Fly (cm)		0.5		0.5		0.5
	Ipa.3@MImax(W/cm^2)	175.12					
Control Conditions	Depth	29mm	29mm		29mm	29mm	29mm
	Focus	25mm	25mm		25mm	25mm	25mm
	Freq	4.5MHz	4.5MHz		4.0MHz	4.0MHz	4.5MHz

WARNING

The device is not intended for ophthalmic use. Do not use it for examining ophthalmic vessels, or any other procedures which may cause the ultrasound beam to pass through the eye.

Appendix III: Obstetrical References

A3.1: Application Table of Obstetrical Reference Formulas

Parameter	Formula	Measurement range (mm)	MA range	±2 SD
GS	Tokyo	[10, 68]	4w0d ~ 12w1d	See table GS, Tokyo
	Hellman	[17, 60]	6w0d ~ 12w1d	0
	Rempen	[2, 73]	4w6d ~ 14w1d	±12 days See table GS, Rempen for details
	China	[10, 68]	5w0d ~ 12w0d	See table GS, China
CRL	Tokyo	[6, 100]	6w3d ~ 16w0d	See table CRL, Tokyo
	Hadlock	[2, 121.1]	5w5d ~ 18w0d	8.826%
	Robinson	[6.7, 82.4]	6w3d ~ 13w6d	±5 days
	Hansmann	[6, 150]	6w1d ~ 21w3d	See table CRL, Hansmann
	China	[9, 105]	7w0d ~ 17w0d	See table CRL, China
BPD	Tokyo	[16, 92]	11w3d ~ 40w0d	See table BPD, Tokyo
	Hadlock	[15, 102]	12w1d ~ 42w1d	12-18 wk ± 1.19 wk (8 days) 18-24 wk ± 1.73 wk (12 days) 24-30 wk ± 2.18 wk (15 days) 30-36 wk ± 3.08 wk (22 days) 36-42 wk ± 3.20 wk (22 days)
	Merz	[21, 102]	12w1d ~ 40w2d	See table BPD, Merz
	Rempen	[3, 27]	6w6d ~ 13w5d	±10 days See table BPD, Rempen for details
	Osaka	[13.3, 93.6]	10w0d ~ 40w0d	See table BPD, Osaka
	China	[19, 94]	12w0d ~ 40w0d	See table BPD, China
HC	Hadlock	[56, 358]	12w0d ~ 41w6d	12-18 wk ± 1.19 wk (8 days) 18-24 wk ± 1.48 wk (10 days) 24-30 wk ± 2.06 wk (14 days) 30-36 wk ± 2.98 wk (21 days) 36-42 wk ± 2.70 wk (19 days)
	Merz	[72, 364]	12w1d ~ 40w4d	See table HC, Merz
AC	Hadlock	[50, 381]	11w6d ~ 41w6d	12-18 wk ± 1.66 wk (12 days)

				18-24 wk ± 2.06 wk (14 days)
				24-30 wk ± 2.18 wk (15 days)
				30-36 wk ± 2.96 wk (21 days)
				36-42 wk ± 3.04 wk (19 days)
	Merz	[56, 348]	12w1d ~ 39w6d	See table AC, Merz
FL	Tokyo	[8, 72]	12w3d ~ 40w2d	See table FL, Tokyo
	Hadlock	[7, 82]	12w1d ~ 42w0d	12-18 wk ± 1.38 wk (10 days)
				18-24 wk ± 1.80 wk (13 days)
				24-30 wk ± 2.08 wk (15 days)
				30-36 wk ± 2.96 wk (21 days)
				36-42 wk ± 3.12 wk (22 days)
	Jeanty	[10, 80]	12w4d ~ 40w0d	±19 days
	Merz	[10, 80]	12w2d ~ 40w1d	See table FL, Merz
	Osaka	[9.4, 71.2]	13w0d ~ 40w0d	See table FL, Osaka
	China	[6, 75]	12w4d ~ 40w2d	See table FL, China
HUM	Jeanty	[9, 69]	12w0d ~ 40w0d	±23 days (±3.3104 wks)
FTA	Osaka	[5.6, 86.6] (cm^2)	14w0d ~ 40w0d	See table FTA, Osaka
CER	Goldstein	[14, 52] mm	/	/
THD	Hansmann	[20, 130] mm	/	/

A3.2: GS

Hellman:

Hellman LM, Kobayashi M, Fillisti L etc. "Growth and development of the human fetus prior to the 20th week of gestation." Am J Obstetrics Gynecology 103:789, 1969

MA (GS mm) = (GS+25.43)/7.02

Rempen:

Rempen A. "Biometrie in der Frühgravidität" (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." Der Frauenarzt 32:425, 1991

Table GS, Rempen

GS mm	MA	+/- 2SD	GS mm	MA	+/- 2SD	GS mm	MA	+/- 2SD	GS mm	MA	+/- 2SD
02.0	4w6d	12	20.0	6w6d	12	38.0	9w1d	12	56.0	11w4d	12
03.0	5w0d	12	21.0	7w0d	12	39.0	9w2d	12	57.0	11w5d	12
04.0	5w1d	12	22.0	7w1d	12	40.0	9w3d	12	58.0	11w6d	12
05.0	5w1d	12	23.0	7w2d	12	41.0	9w4d	12	59.0	12w0d	12

06.0	5w2d	12	24.0	7w3d	12	42.0	9w5d	12	60.0	12w1d	12
07.0	5w3d	12	25.0	7w4d	12	43.0	9w6d	12	61.0	12w2d	12
08.0	5w4d	12	26.0	7w4d	12	44.0	9w6d	12	62.0	12w3d	12
09.0	5w5d	12	27.0	7w5d	12	45.0	10w0d	12	63.0	12w4d	12
10.0	5w5d	12	28.0	7w6d	12	46.0	10w1d	12	64.0	12w5d	12
11.0	5w6d	12	29.0	8w0d	12	47.0	10w2d	12	65.0	12w6d	12
12.0	6w0d	12	30.0	8w1d	12	48.0	10w3d	12	66.0	13w0d	12
13.0	6w1d	12	31.0	8w2d	12	49.0	10w4d	12	67.0	13w1d	12
14.0	6w2d	12	32.0	8w3d	12	50.0	10w5d	12	68.0	13w2d	12
15.0	6w2d	12	33.0	8w3d	12	51.0	10w6d	12	69.0	13w3d	12
16.0	6w3d	12	34.0	8w4d	12	52.0	11w0d	12	70.0	13w4d	12
17.0	6w4d	12	35.0	8w5d	12	53.0	11w1d	12	71.0	13w5d	12
18.0	6w5d	12	36.0	8w6d	12	54.0	11w2d	12	72.0	14w0d	12
19.0	6w6d	12	37.0	9w0d	12	55.0	11w3d	12	73.0	14w1d	12

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table GS, Tokyo

GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD
1	4w0d	7	2.6	6w6d	12	4.2	9w1d	14	5.8	11w1d	16
1.2	4w1d	7	2.8	7w1d	12	4.4	9w3d	14	6	11w3d	16
1.4	4w4d	7	3	7w3d	12	4.6	9w4d	14	6.2	11w4d	16
1.6	5w0d	8	3.2	7w4d	12	4.8	10w0d	15	6.4	11w6d	16
1.8	5w1d	8	3.4	8w0d	13	5	10w1d	15	6.6	11w6d	16
2	5w4d	8	3.6	8w1d	13	5.2	10w3d	15	6.8	12w1d	17
2.2	6w0d	11	3.8	8w3d	13	5.4	10w4d	15			
2.4	6w1d	11	4	8w6d	13	5.6	10w6d	15			

China:

Wu Zhongyu, "Ultrasound Diagnosis in Obstetrics and Gynecology", Tianjin Science and Technology Publisher, 1995

Table GS, China

GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD
1	5w0d	4	2.5	6w6d	7	4	8w3d	11	5.5	10w3d	12
1.1	5w1d	5	2.6	7w0d	7	4.1	8w4d	11	5.6	10w4d	12
1.2	5w2d	5	2.7	7w0d	7	4.2	8w5d	11	5.7	10w5d	12
1.3	5w3d	5	2.8	7w1d	8	4.3	8w6d	12	5.8	10w5d	12
1.4	5w4d	5	2.9	7w2d	8	4.4	9w0d	12	5.9	10w6d	12

1.5	5w5d	5	3	7w3d	8	4.5	9w1d	12	6	11w0d	12
1.6	5w6d	5	3.1	7w4d	8	4.6	9w2d	12	6.1	11w1d	12
1.7	6w0d	6	3.2	7w4d	9	4.7	9w3d	12	6.2	11w2d	13
1.8	6w0d	6	3.3	7w5d	9	4.8	9w4d	12	6.3	11w3d	13
1.9	6w1d	6	3.4	7w6d	9	4.9	9w4d	12	6.4	11w4d	13
2	6w2d	6	3.5	8w0d	9	5	9w5d	12	6.5	11w5d	13
2.1	6w3d	6	3.6	8w0d	10	5.1	9w6d	12	6.6	11w5d	13
2.2	6w4d	6	3.7	8w1d	10	5.2	10w0d	12	6.7	11w6d	13
2.3	6w4d	6	3.8	8w2d	10	5.3	10w1d	12	6.8	12w0d	13
2.4	6w5d	7	3.9	8w3d	10	5.4	10w2d	12			

A3.3: CRL

Hadlock:

Hadlock FP, Shah YP, Kanon DJ etc. "Fetal Crown-Rump Length: Reevaluation of Relation to Menstrual Age (5-18 weeks) with High-Resolution Real-Time US." Radiology 182(2):501, 1992

$GA(cm)=EXP[1.684969+(0.315646 \times CRL)-(0.049306*CRL^2)+(0.004057*CRL^3)-(0.000120456*CRL^4)]$

Robinson:

Robinson HP and Fleming JEE. "A critical evaluation of sonar 'crown-rump length' measurements." British Journal of Obstetrics and Gynecology 82:702, 1975

$GA=(8.062* CRL^{1/2}+23.73)/7$

Hansmann:

Hansmann M, Hackelöer B-J, Staudach A. Ultrasound Diagnosis in Obstetrics and Gynecology. New York: Spring-Verlag, 1985, P. 439

Table CRL, Hansmann

CRL mm	MA	+/- 2SD	CRL mm	MA	+/- 2SD	CRL mm	MA	+/- 2SD	CRL mm	MA	+/- 2SD
6.0	6w1d	6	22.0	9w1d	7	52.0	12w2d	9	100.0	15w5d	12
7.0	6w2d	7	23.0	9w2d	7	54.0	12w3d	9	103.0	16w0d	13
8.0	6w4d	6	24.0	9w3d	7	56.0	12w4d	9	106.0	16w2d	13
9.0	6w6d	7	26.0	9w5d	7	58.0	12w5d	9	110.0	16w4d	14
10.0	7w0d	7	28.0	10w0d	7	60.0	12w6d	9	113.0	17w0d	14
11.0	7w2d	6	30.0	10w2d	7	63.0	13w0d	10	116.0	17w2d	14
12.0	7w3d	7	32.0	10w3d	8	66.0	13w2d	10	120.0	17w4d	14
13.0	7w4d	7	34.0	10w5d	7	70.0	13w3d	11	123.0	18w0d	14
14.0	7w6d	7	36.0	10w6d	8	73.0	13w5d	10	126.0	18w2d	15
15.0	8w0d	7	38.0	11w1d	8	76.0	13w6d	11	130.0	18w6d	14
16.0	8w2d	6	40.0	11w2d	8	80.0	14w1d	11	133.0	19w1d	15
17.0	8w3d	6	42.0	11w3d	8	83.0	14w2d	12	136.0	19w4d	16

18.0	8w4d	7	44.0	11w4d	9	86.0	14w4d	12	140.0	20w0d	16
19.0	8w5d	7	46.0	11w6d	8	90.0	14w6d	12	143.0	20w3d	16
20.0	8w6d	7	48.0	12w0d	9	93.0	15w1d	12	146.0	20w6d	16
21.0	9w0d	7	50.0	12w1d	9	96.0	15w3d	12	150.0	21w3d	16

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table CRL, Tokyo

CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD
0.6	6w3d	7	3	10w3d	7	5.4	12w4d	7	7.8	14w3d	8
0.8	6w6d	7	3.2	10w4d	7	5.6	12w5d	7	8	14w4d	8
1	7w1d	7	3.4	10w6d	7	5.8	13w0d	7	8.2	14w5d	8
1.2	7w4d	7	3.6	11w0d	7	6	13w1d	7	8.4	14w6d	8
1.4	7w6d	7	3.8	11w1d	7	6.2	13w2d	7	8.6	15w0d	14
1.6	8w1d	7	4	11w3d	7	6.4	13w3d	7	8.8	15w1d	14
1.8	8w4d	7	4.2	11w4d	7	6.6	13w4d	7	9	15w2d	14
2	9w1d	7	4.4	11w6d	7	6.8	13w5d	7	9.2	15w3d	14
2.2	9w2d	7	4.6	12w0d		7	13w6d	7	9.4	15w4d	14
2.4	9w4d	7	4.8	12w1d		7.2	14w0d	7	9.6	15w5d	14
2.6	9w6d	7	5	12w2d		7.4	14w1d	7	9.8	15w6d	14
2.8	10w2d	7	5.2	12w3d		7.6	14w2d	7	10	16w0d	14

China:

Wu Zhongyu, "Ultrasound Diagnosis in Obstetrics and Gynecology", Tianjin Science and Technology Publisher, 1995

Table CRL, China

CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD				CRL cm	MA	+/- 2SD
0.9	7w0d	6	3.4	10w3d	7	5.9	12w6d	10	8.4	15w1d	12
1	7w1d	6	3.5	10w4d	7	6	13w0d	10	8.5	15w1d	13
1.1	7w2d	6	3.6	10w5d	7	6.1	13w0d	10	8.6	15w2d	13
1.2	7w3d	6	3.7	10w5d	7	6.2	13w1d	10	8.7	15w2d	13
1.3	7w4d	6	3.8	10w6d	7	6.3	13w2d	11	8.8	15w3d	13
1.4	7w5d	6	3.9	11w0d	7	6.4	13w2d	11	8.9	15w4d	13
1.5	7w6d	6	4	11w1d	8	6.5	13w3d	11	9	15w4d	13
1.6	8w0d	6	4.1	11w1d	8	6.6	13w3d	11	9.1	15w5d	13
1.7	8w1d	6	4.2	11w2d	8	6.7	13w4d	11	9.2	15w6d	13
1.8	8w2d	6	4.3	11w3d	8	6.8	13w5d	11	9.3	15w6d	13
1.9	8w3d	6	4.4	11w4d	8	6.9	13w5d	11	9.4	16w0d	13

2	8w4d	6	4.5	11w4d	8	7	13w6d	11	9.5	16w1d	13
2.1	8w5d	6	4.6	11w5d	8	7.1	14w0d	11	9.6	16w1d	13
2.2	8w6d	6	4.7	11w6d	9	7.2	14w0d	12	9.7	16w2d	14
2.3	9w0d	6	4.8	11w6d	9	7.3	14w1d	12	9.8	16w3d	14
2.4	9w1d	6	4.9	12w0d	9	7.4	14w1d	12	9.9	16w3d	14
2.5	9w2d	6	5	12w0d	9	7.5	14w2d	12	10	16w4d	14
2.6	9w3d	6	5.1	12w1d	9	7.6	14w3d	12	10.1	16w5d	14
2.7	9w4d	7	5.2	12w2d	9	7.7	14w3d	12	10.2	16w6d	14
2.8	9w5d	7	5.3	12w2d	9	7.8	14w4d	12	10.3	16w6d	14
2.9	9w6d	7	5.4	12w3d	9	7.9	14w5d	12	10.4	17w0d	14
3	10w0d	7	5.5	12w3d	9	8	14w5d	12	10.5	17w0d	14
3.1	10w1d	7	5.6	12w4d	9	8.1	14w6d	12			
3.2	10w2d	7	5.7	12w5d	10	8.2	15w0d	12			
3.3	10w3d	7	5.8	12w5d	10	8.3	15w0d	12			

A3.4: BPD

Hadlock:

Hadlock FP, Deter RL etc. "Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radilolgy 152:497, 1984

MA (BPD cm)= 9.54 + 1.482*(BPD) + 0.1676 * (BPD^2)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table BPD, Merz

BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD
21.0	12w1d	13	41.0	17w5	16	61.0	23w6d	17	82.0	31w2d	19
22.0	12w3d	12	42.0	18w0	16	62.0	24w1d	17	83.0	31w5d	18
23.0	12w5d	12	43.0	18w2	16	63.0	24w4d	17	84.0	32w1d	18
24.0	13w0d	13	44.0	18w4	16	64.0	24w6d	17	85.0	32w4d	18
25.0	13w1d	13	45.0	18w6	16	65.0	25w1d	17	86.0	32w6d	19
26.0	13w4d	12	46.0	19w1	13	66.0	25w4d	17	87.0	33w2d	19
27.0	13w6d	13	47.0	19w3	15	67.0	25w6d	17	89.0	34w1d	21
28.0	14w1d	13	48.0	19w5	16	68.0	26w1d	18	90.0	34w4d	19
29.0	14w2d	13	49.0	20w0	16	69.0	26w4d	17	91.0	35w1d	19
30.0	14w4d	13	50.0	20w3	15	70.0	26w6d	17	92.0	35w4d	19
31.0	14w6d	15	51.0	20w5	16	71.0	27w1d	18	93.0	35w6d	19
32.0	15w1d	15	52.0	21w0	16	72.0	27w4d	18	94.0	36w3d	21
33.0	15w3d	13	53.0	21w2	16	73.0	27w6d	18	95.0	36w6d	21

34.0	15w5d	15	54.0	21w4	17	74.0	28w2d	18	96.0	37w2d	21
35.0	16w0d	15	55.0	21w6	17	75.0	28w4d	18	97.0	37w6d	19
36.0	16w2d	15	56.0	22w1	17	76.0	29w0d	18	98.0	38w2d	21
37.0	16w4d	13	57.0	22w3	16	77.0	29w3d	18	99.0	38w6d	19
38.0	16w6d	15	58.0	22w6	16	78.0	29w6d	18	100.0	39w2d	22
39.0	17w1d	15	59.0	23w1	17	79.0	30w1d	18	101.0	39w6d	21
40.0	17w3d	15	60.0	23w4	17	81.0	30w6d	19	102.0	40w2d	22

Rempen:

Rempen A. "Biometrie in der Frühgravidität" (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." Der Frauenarzt 32:425, 1991

Table BPD, Rempen

BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD
03.0	6w6d	10	10.0	8w6d	10	17.0	10w6d	10	24.0	12w6d	10
04.0	7w1d	10	11.0	9w1d	10	18.0	11w1d	10	25.0	13w1d	10
05.0	7w3d	10	12.0	9w3d	10	19.0	11w3d	10	26.0	13w3d	10
06.0	7w5d	10	13.0	9w5d	10	20.0	11w5d	10	27.0	13w5d	10
07.0	8w0d	10	14.0	10w0d	10	21.0	12w0d	10			
08.0	8w2d	10	15.0	10w2d	10	22.0	12w2d	10			
0.90	8w4d	10	16.0	10w4d	10	23.0	12w4d	10			

Osaka:

Fetal Growth Chart Using the Ultrasonotomographic Technique, Keiichi Kurachi, Mineo Aoki, Department of Obstetrics and Gynecology, Osaka University Medical School Revision 3 (September 1983)

Table BPD, Osaka

BPD cm	MEAN	MIN	MAX	BPD cm	MEAN	MIN	MAX	BPD cm	MEAN	MIN	MAX
1.33	10w0d	9w4d	10w3d	4.94	20w2d	19w3d	21w1d	7.88	30w4d	29w0d	32w1d
1.44	10w2d	9w6d	10w5d	5.03	20w4d	19w5d	21w3d	7.95	30w6d	29w2d	32w3d
1.55	10w4d	10w0d	11w0d	5.12	20w6d	20w0d	21w5d	8.02	31w1d	29w4d	32w5d
1.66	10w6d	10w2d	11w2d	5.21	21w1d	20w1d	22w0d	8.08	31w3d	29w6d	33w0d
1.77	11w1d	10w4d	11w4d	5.30	21w3d	20w3d	22w2d	8.15	31w5d	30w1d	33w3d
1.88	11w3d	10w6d	11w6d	5.39	21w5d	20w5d	22w4d	8.21	32w0d	30w3d	33w5d
1.99	11w5d	11w1d	12w2d	5.48	22w0d	21w0d	22w6d	8.27	32w2d	30w4d	34w0d
2.09	12w0d	11w3d	12w3d	5.57	22w2d	21w2d	23w2d	8.34	32w4d	30w6d	34w3d
2.20	12w2d	11w5d	12w6d	5.66	22w4d	21w4d	23w4d	8.40	32w6d	31w1d	34w5d
2.31	12w4d	12w0d	13w1d	5.74	22w6d	21w5d	23w6d	8.46	33w1d	31w3d	35w1d
2.41	12w6d	12w1d	13w3d	5.83	23w1d	22w1d	24w1d	8.51	33w3d	31w4d	35w3d
2.52	13w1d	12w3d	13w5d	5.92	23w3d	22w3d	24w3d	8.57	33w5d	31w6d	35w6d

2.62	13w3d	12w5d	14w0d	6.00	23w5d	22w4d	24w5d	8.62	34w0d	32w1d	36w1d
2.72	13w5d	13w0d	14w2d	6.09	24w0d	22w6d	25w0d	8.68	34w2d	32w3d	36w4d
2.82	14w0d	13w2d	14w4d	6.17	24w2d	23w1d	25w2d	8.73	34w4d	32w4d	37w0d
2.93	14w2d	13w4d	14w6d	6.26	24w4d	23w3d	25w4d	8.78	34w6d	32w6d	37w3d
3.03	14w4d	13w6d	15w1d	6.34	24w6d	23w5d	25w6d	8.83	35w1d	33w0d	38w0d
3.13	14w6d	14w1d	15w3d	6.43	25w1d	24w0d	26w2d	8.87	35w3d	33w2d	38w2d
3.23	15w1d	14w3d	15w6d	6.51	25w3d	24w2d	26w4d	8.92	35w5d	33w4d	39w0d
3.33	15w3d	14w5d	16w1d	6.59	25w5d	24w4d	26w6d	8.96	36w0d	33w5d	39w4d
3.42	15w5d	14w6d	16w3d	6.67	26w0d	24w6d	27w1d	9.00	36w2d	34w0d	40w0d
3.52	16w0d	15w1d	16w5d	6.75	26w2d	25w0d	27w3d	9.04	36w4d	34w1d	40w1d
3.62	16w2d	15w3d	17w0d	6.84	26w4d	25w3d	27w5d	9.08	36w6d	34w3d	40w2d
3.72	16w4d	15w6d	17w2d	6.92	26w6d	25w4d	28w0d	9.12	37w1d	34w4d	40w3d
3.81	16w6d	16w0d	17w4d	6.99	27w1d	25w6d	28w2d	9.15	37w3d	34w5d	40w4d
3.91	17w1d	16w2d	17w6d	7.07	27w3d	26w1d	28w4d	9.18	37w5d	35w0d	40w5d
4.01	17w3d	16w4d	18w1d	7.15	27w5d	26w3d	29w0d	9.21	38w0d	35w1d	40w6d
4.10	17w5d	16w6d	18w3d	7.23	28w0d	26w5d	29w2d	9.24	38w2d	35w2d	41w0d
4.20	18w0d	17w1d	18w5d	7.30	28w2d	27w0d	29w5d	9.27	38w4d	35w3d	41w0d
4.29	18w2d	17w3d	19w0d	7.38	28w4d	27w2d	29w6d	9.29	38w6d	35w4d	41w0d
4.39	18w4d	17w5d	19w2d	7.45	28w6d	27w3d	30w1d	9.31	39w1d	35w5d	41w0d
4.48	18w6d	18w0d	19w5d	7.53	29w1d	27w5d	30w4d	9.33	39w3d	35w6d	41w0d
4.57	19w1d	18w2d	20w0d	7.60	29w3d	28w0d	30w6d	9.35	39w5d	36w0d	41w0d
4.67	19w3d	18w4d	20w2d	7.67	29w5d	28w2d	31w1d	9.36	40w0d	36w0d	41w0d
4.76	19w5d	18w6d	20w4d	7.74	30w0d	28w4d	31w3d				
4.85	20w0d	19w1d	20w6d	7.81	30w2d	28w6d	31w5d				

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table BPD, Tokyo

BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD
1.6	11w3d	7	3.6	16w3d	8	5.6	23w0d	11	7.6	30w1d	15
1.8	11w6d	7	3.8	17w0d	8	5.8	23w5d	11	7.8	31w0d	16
2	12w0d	7	4	17w5d	8	6	24w2d	12	8	32w0d	16
2.2	12w4d	7	4.2	18w2d	9	6.2	25w0d	12	8.2	33w0d	16
2.4	13w0d	7	4.4	19w0d	9	6.4	25w6d	12	8.4	34w0d	20
2.6	13w6d	7	4.6	19w5d	10	6.6	26w3d	13	8.6	35w5d	25
2.8	14w2d	7	4.8	20w2d	10	6.8	27w3d	13	8.8	37w0d	25
3	14w6d	7	5	21w0d	10	7	28w0d	13	9	39w0d	25
3.2	15w2d	7	5.2	21w4d	10	7.2	29w0d	14	9.2	40w0d	25
3.4	16w0d	8	5.4	22w2d	10	7.4	29w5d	14			

China:

Wu Zhongyu, "Ultrasound Diagnosis in Obstetrics and Gynecology", Tianjin Science and Technology Publisher, 1995

Table BPD, China

BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD
1.9	12w0d	7	3.8	17w3d	9	5.7	23w1d	13	7.6	30w0d	20
2	12w2d	7	3.9	17w5d	9	5.8	23w3d	14	7.7	30w3d	20
2.1	12w4d	7	4	18w0d	9	5.9	23w5d	14	7.8	30w6d	21
2.2	12w6d	7	4.1	18w2d	9	6	24w0d	14	7.9	31w3d	21
2.3	13w1d	7	4.2	18w4d	9	6.1	24w2d	15	8	31w6d	21
2.4	13w3d	7	4.3	18w6d	10	6.2	24w5d	15	8.1	32w3d	22
2.5	13w5d	7	4.4	19w1d	10	6.3	25w0d	15	8.2	32w6d	22
2.6	14w0d	7	4.5	19w4d	10	6.4	25w2d	15	8.3	33w2d	23
2.7	14w2d	7	4.6	19w6d	10	6.5	25w5d	16	8.4	33w6d	23
2.8	14w4d	7	4.7	20w1d	11	6.6	26w0d	16	8.5	34w3d	23
2.9	14w6d	8	4.8	20w3d	11	6.7	26w3d	16	8.6	34w6d	24
3	15w1d	8	4.9	20w5d	11	6.8	26w5d	16	8.7	35w4d	24
3.1	15w3d	8	5	21w0d	11	6.9	27w1d	18	8.8	36w1d	24
3.2	15w5d	8	5.1	21w2d	11	7	27w3d	18	8.9	36w5d	24
3.3	16w0d	8	5.2	21w4d	12	7.1	27w6d	18	9	37w1d	25
3.4	16w2d	8	5.3	21w6d	12	7.2	28w1d	18	9.1	37w1d	25
3.5	16w4d	8	5.4	22w1d	12	7.3	28w4d	19	9.2	38w4d	25
3.6	16w6d	8	5.5	22w3d	13	7.4	29w1d	19	9.3	39w2d	25
3.7	17w1d	8	5.6	22w5d	13	7.5	29w4d	20	9.4	40w0d	25

A3.5: HC

Hadlock:

Hadlock FP, Deter RL etc. "Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radilolgy 152:497, 1984

$$MA(HC\ cm) = 8.96 + 0.540 * (HC) + 0.0003 * (HC^3)$$

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table HC, Merz

HC mm	MA	+/- 2SD	HC mm	MA	+/- 2SD	HC mm	MA	+/- 2SD	HC mm	MA	+/- 2SD
72	12w1	9	146	17w2	12	220	23w2	15	294	30w5	16
74	12w2	11	148	17w4	12	222	23w4	15	296	30w6	17
76	12w3	10	150	17w4	13	224	23w4	15	298	31w1	16
78	12w4	10	152	17w6	12	226	23w6	15	300	31w3	17
80	12w5	10	154	17w6	13	228	24w0	16	302	31w4	17
82	12w6	10	156	18w1	12	230	24w1	16	304	31w6	17
84	12w6	11	158	18w1	13	232	24w3	15	306	32w1	17
86	13w1	10	160	18w3	12	234	24w4	15	308	32w2	17
88	13w1	11	162	18w4	12	236	24w4	15	310	32w4	17
90	13w2	11	164	18w5	12	238	24w6	16	312	32w6	17
92	13w4	10	166	18w6	12	240	25w1	15	314	33w1	17
94	13w4	11	168	19w0	13	242	25w2	16	316	33w3	17
96	13w5	10	170	19w1	12	244	25w4	15	318	33w4	17
98	13w6	11	172	19w2	13	246	25w5	16	320	33w6	18
100	14w0	10	174	19w3	12	248	25w6	16	322	34w1	17
102	14w1	12	176	19w4	13	250	26w0	16	324	34w3	18
104	14w2	11	178	19w6	13	252	26w1	16	326	34w5	18
106	14w3	11	180	19w6	15	254	26w3	15	328	34w6	18
108	14w4	11	182	20w1	13	256	26w4	16	330	35w1	18
110	14w5	11	184	20w1	15	258	26w6	15	332	35w4	18
112	14w6	11	186	20w3	13	260	27w0	16	334	35w6	18
114	15w0	11	188	20w4	13	262	27w1	16	336	36w1	18
116	15w1	11	190	20w5	13	264	27w3	15	338	36w3	18
118	15w2	11	192	20w6	15	266	27w4	16	340	36w4	19
120	15w3	11	194	21w1	13	268	27w6	15	342	36w6	19
122	15w4	12	196	21w1	15	270	28w1	16	344	37w1	19
124	15w5	12	198	21w3	13	272	28w2	16	346	37w4	18
126	15w6	11	200	21w4	15	274	28w4	16	348	37w6	19
128	16w0	12	202	21w5	15	276	28w5	16	350	38w1	21
130	16w1	12	204	21w6	15	278	28w6	17	352	38w4	19
132	16w2	12	206	22w1	15	280	29w1	16	354	38w6	19
134	16w3	12	208	22w1	15	282	29w2	16	356	39w1	19
136	16w4	12	210	22w3	15	284	29w4	17	358	39w4	19
138	16w5	12	212	22w3	15	286	29w6	16	360	39w6	19
140	16w6	12	214	22w5	15	288	30w0	16	362	40w1	19
142	17w0	12	216	22w6	15	290	30w1	17	364	40w4	19
144	17w1	12	218	23w1	15	292	30w4	16			

A3.6: AC

Hadlock:

Hadlock FP, Deter RL etc. "Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radilolgy 152:497, 1984

MA (AC cm) = 8.14 + 0.753 * (AC) + 0.0036 * (AC^2)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table AC, Merz

AC mm	MA	+/- 2SD	AC mm	MA	+/- 2SD	AC mm	MA	+/- 2SD	AC mm	MA	+/- 2SD
56	12w1	10	130	19w1	12	206	26w3	15	280	33w3	17
58	12w2	11	132	19w2	12	208	26w4	15	282	33w4	17
60	12w4	10	134	19w3	12	210	26w6	15	284	33w6	17
62	12w5	10	136	19w5	12	212	27w0	15	286	34w0	17
64	12w6	11	138	19w6	12	214	27w1	15	288	34w1	18
66	13w1	11	140	20w1	12	216	27w2	15	290	34w3	18
68	13w2	11	142	20w2	13	218	27w4	15	292	34w4	18
70	13w4	11	144	20w4	12	220	27w5	16	294	34w5	18
72	13w4	11	146	20w5	12	222	27w6	16	296	34w6	19
74	13w6	11	148	20w6	13	224	28w1	15	298	35w1	17
76	14w0	11	150	21w1	15	226	28w2	16	300	35w2	18
78	14w1	12	152	21w1	15	228	28w4	16	302	35w4	17
80	14w3	11	154	21w3	15	230	28w5	16	304	35w5	18
82	14w4	11	156	21w4	13	232	28w6	16	306	35w6	18
84	14w6	11	158	21w6	13	234	29w0	16	308	36w1	17
86	15w0	11	160	22w0	13	236	29w1	17	310	36w2	18
88	15w1	11	162	22w1	15	238	29w3	16	312	36w4	17
90	15w3	11	164	22w3	13	240	29w4	17	314	36w4	19
92	15w4	11	168	22w6	13	242	29w6	16	316	36w6	18
94	15w5	12	170	23w0	13	244	30w0	16	318	37w0	18
96	15w6	12	172	23w1	15	246	30w1	17	320	37w1	18
98	16w1	12	174	23w2	15	248	30w3	16	322	37w3	18
100	16w2	12	176	23w4	13	250	30w4	17	324	37w4	19
102	16w4	11	178	23w5	15	252	30w6	16	326	37w6	18
104	16w5	12	180	23w6	15	254	30w6	17	328	38w0	18
106	16w6	12	182	24w1	15	256	31w1	17	330	38w1	18
108	17w1	11	184	24w2	15	258	31w2	17	332	38w3	18
110	17w2	11	186	24w4	15	260	31w4	17	334	38w4	18

112	17w3	12	188	24w5	15	262	31w5	17	336	38w5	18
114	17w4	12	190	24w6	16	264	31w6	17	338	38w6	19
116	17w6	12	192	25w0	16	266	32w1	17	340	39w1	19
118	18w0	12	194	25w1	16	268	32w2	17	342	39w2	19
120	18w1	12	196	25w3	15	270	32w4	17	344	39w4	19
122	18w3	12	198	25w4	16	272	32w5	17	346	39w5	19
124	18w4	12	200	25w6	15	274	32w6	17	348	39w6	19
126	18w6	12	202	26w0	16	276	33w0	17			
128	19w0	12	204	26w1	15	278	33w1	17			

A3.7: FL

Hadlock:

Hadlock FP, Deter RL etc. "Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radilolgy 152:497, 1984

MA (FL cm) = 10.35 + 2.460 * (FL) + 0.170 * (FL^2)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table FL, Merz

FL mm	MA	+/- 2SD	FL mm	MA	+/- 2SD	FL mm	MA	+/- 2SD	FL mm	MA	+/- 2SD
10	12w2d	11	28	18w4d	13	47	25w6d	15	65	33w1d	17
11	12w5d	10	29	19w0d	12	48	26w1d	16	66	33w4d	17
12	13w2d	10	30	19w3d	12	49	26w4d	15	68	34w4d	17
13	13w4d	11	31	19w5d	12	50	26w6d	16	69	35w0d	18
14	13w5d	11	32	20w1d	12	51	27w2d	16	70	35w3d	18
15	14w0d	11	33	20w4d	13	52	27w5d	16	71	35w6d	18
16	14w3d	11	34	20w6d	13	53	28w1d	16	72	36w2d	18
17	14w5d	11	35	21w1d	15	54	28w4d	17	73	36w6d	18
18	15w1d	11	36	21w4d	13	55	29w0d	17	74	37w2d	19
19	15w3d	11	37	21w6d	15	56	29w3d	17	75	37w5d	18
20	15w6d	11	38	22w2d	13	57	29w6d	17	76	38w1d	19
21	16w1d	11	40	23w1d	15	58	30w1d	17	77	38w5d	19
22	16w4d	11	41	23w3d	15	59	30w4d	17	78	39w1d	19
23	16w4d	11	42	23w5d	15	60	31w0d	17	79	39w4d	19
24	17w1d	12	43	24w1d	15	61	31w4d	17	80	40w1d	18
25	14w7d	13	44	24w4d	16	62	31w6d	17			
26	17w6d	13	45	25w0d	16	63	32w2d	17			
27	18w2d	13	46	25w3d	15	64	32w6d	17			

Jeanty:

Jeanty P, Rodesch F etc. "Estimation of Gestational Age from measurement of Fetal Long Bones." Journal of Ultrasound in Medicine 3:75, 1984

MA (FL mm) = (9.5411757+0.2977451 * FL) + (0.0010388013 * FL^2)

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table FL, Tokyo

FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD
0.8	12w3d	10	2.6	17w6d	10	4.4	25w2d	25	6.2	34w0d	42
1	13w0d	10	2.8	18w4d	14	4.6	26w0d	25	6.4	35w0d	46
1.2	13w4d	10	3	19w2d	17	4.8	27w0d	25	6.6	36w0d	50
1.4	14w1d	10	3.2	20w5d	17	5	28w0d	25	6.8	38w0d	57
1.6	14w5d	10	3.4	21w5d	18	5.2	29w0d	30	7	40w0d	64
1.8	15w2d	10	3.6	22w3d	19	5.4	29w5d	30	7.2	40w2d	64
2	16w0d	10	3.8	23w0d	21	5.6	30w2d	30			
2.2	16w4d	10	4	24w0d	22	5.8	31w3d	32			
2.4	17w1d	10	4.2	24w5d	24	6	33w0d	38			

China:

Wu Zhongyu, "Ultrasound Diagnosis in Obstetrics and Gynecology", Tianjin Science and Technology Publisher, 1995

Table FL, China

FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD
0.6	12w4d	7	2.4	18w0d	9	4.2	24w0d	16	6	33w0d	18
0.7	12w5d	7	2.5	18w2d	9	4.3	24w3d	16	6.1	33w3d	18
0.8	13w0d	8	2.6	18w4d	10	4.4	24w6d	16	6.2	34w0d	18
0.9	13w2d	8	2.7	18w6d	10	4.5	25w2d	16	6.3	34w3d	19
1	13w5d	8	2.8	19w2d	11	4.6	25w6d	16	6.4	35w0d	20
1.1	14w0d	8	2.9	19w4d	11	4.7	26w3d	16	6.5	35w3d	20
1.2	14w2d	8	3	19w6d	12	4.8	26w6d	16	6.6	35w6d	20
1.3	14w4d	8	3.1	20w1d	13	4.9	27w4d	17	6.7	36w3d	20
1.4	14w6d	8	3.2	20w3d	13	5	27w6d	17	6.8	37w0d	21
1.5	15w1d	8	3.3	20w5d	14	5.1	28w3d	17	6.9	37w3d	22
1.6	15w3d	8	3.4	21w1d	14	5.2	28w6d	17	7	38w0d	23
1.7	15w5d	8	3.5	21w3d	15	5.3	29w3d	17	7.1	38w3d	23
1.8	16w0d	8	3.6	21w6d	15	5.4	29w6d	17	7.2	38w6d	23
1.9	16w3d	8	3.7	22w2d	15	5.5	30w3d	17	7.3	39w3d	23

2	16w5d	8	3.8	22w4d	15	5.6	30w6d	17	7.4	39w6d	23
2.1	17w0d	8	3.9	23w0d	15	5.7	31w3d	17	7.5	40w2d	23
2.2	17w2d	8	4	23w2d	16	5.8	31w6d	18			
2.3	17w4d	8	4.1	23w4d	16	5.9	32w3d	18			

Osaka:

Osaka University (2002/April/08)

Table FL, Osaka

FL cm	Mean	Min	Max	FL cm	Mean	Min	Max	FL cm	Mean	Min	Max
0.94	13w0d	12w3d	13w4d	3.61	22w1d	21w1d	23w1d	5.69	31w2d	29w6d	32w5d
1.03	13w2d	12w5d	13w6d	3.68	22w3d	21w3d	23w3d	5.74	31w4d	30w1d	33w0d
1.12	13w4d	12w6d	14w1d	3.75	22w5d	21w5d	23w4d	5.80	31w6d	30w2d	33w3d
1.21	13w6d	13w1d	14w3d	3.83	23w0d	22w0d	24w0d	5.85	32w1d	30w4d	33w5d
1.30	14w1d	13w3d	14w5d	3.90	23w2d	22w2d	24w2d	5.90	32w3d	30w6d	34w0d
1.39	14w3d	13w5d	15w1d	3.97	23w4d	22w4d	24w4d	5.96	32w5d	31w1d	34w2d
1.48	14w5d	14w0d	15w3d	4.04	23w6d	22w6d	24w6d	6.01	33w0d	31w3d	34w4d
1.57	15w0d	14w2d	15w5d	4.11	24w1d	23w0d	25w1d	6.06	33w2d	31w5d	34w6d
1.66	15w2d	14w4d	16w0d	4.18	24w3d	23w2d	25w3d	6.11	33w4d	32w0d	35w1d
1.75	15w4d	14w6d	16w2d	4.25	24w5d	23w4d	25w5d	6.16	33w6d	32w1d	35w3d
1.83	15w6d	15w1d	16w4d	4.32	25w0d	23w6d	26w0d	6.21	34w1d	32w3d	35w6d
1.92	16w1d	15w3d	16w6d	4.39	25w2d	24w1d	26w3d	6.26	34w3d	32w5d	36w1d
2.01	16w3d	15w4d	17w1d	4.45	25w4d	24w3d	26w4d	6.31	34w5d	33w0d	36w3d
2.09	16w5d	15w6d	17w3d	4.52	25w6d	24w5d	27w0d	6.36	35w0d	33w2d	36w6d
2.18	17w0d	16w1d	17w5d	4.59	26w1d	25w0d	27w2d	6.41	35w2d	33w4d	37w1d
2.26	17w2d	16w3d	18w0d	4.65	26w3d	25w2d	27w4d	6.46	35w4d	33w6d	37w3d
2.34	17w4d	16w5d	18w2d	4.72	26w5d	25w4d	27w6d	6.50	35w6d	34w0d	37w5d
2.43	17w6d	17w0d	18w4d	4.78	27w0d	25w5d	28w1d	6.55	36w1d	34w2d	38w0d
2.51	18w1d	17w2d	18w6d	4.85	27w2d	26w0d	28w3d	6.60	36w3d	34w4d	38w3d
2.59	18w3d	17w4d	19w1d	4.91	27w4d	26w2d	28w5d	6.64	36w5d	34w6d	38w5d
2.67	18w5d	17w6d	19w3d	4.97	27w6d	26w4d	29w0d	6.69	37w0d	35w0d	39w1d
2.75	19w0d	18w1d	19w6d	5.04	28w1d	26w6d	29w3d	6.73	37w2d	35w2d	39w3d
2.83	19w2d	18w3d	20w1d	5.10	28w3d	27w1d	29w5d	6.77	37w4d	35w4d	39w5d
2.91	19w4d	18w5d	20w3d	5.16	28w5d	27w3d	30w0d	6.82	37w6d	35w6d	40w0d
2.99	19w6d	19w0d	20w5d	5.22	29w0d	27w5d	30w2d	6.86	38w1d	36w1d	40w1d
3.07	20w1d	19w2d	21w0d	5.28	29w2d	27w6d	30w4d	6.90	38w3d	36w2d	40w2d
3.15	20w3d	19w4d	21w2d	5.34	29w4d	28w1d	30w6d	6.94	38w5d	36w4d	40w3d
3.23	20w5d	19w6d	21w4d	5.40	29w6d	28w3d	31w1d	6.98	39w0d	36w6d	40w4d
3.30	21w0d	20w0d	21w6d	5.46	30w1d	28w5d	31w4d	7.02	39w2d	37w1d	40w5d
3.38	21w2d	20w2d	22w1d	5.52	30w3d	29w0d	31w6d	7.06	39w4d	37w2d	40w6d
3.46	21w4d	20w4d	22w3d	5.57	30w5d	29w2d	32w1d	7.10	39w6d	37w4d	41w0d
3.53	21w6d	20w6d	22w5d	5.63	31w0d	29w4d	32w3d	7.12	40w0d	37w5d	41w0d

A3.8: FTA

Osaka:

Osaka University (2002/April/08)

Table FTA, Osaka

FTA cm^2	MEAN	MIN	MAX	FTA cm^2	MEAN	MIN	MAX	FTA cm^2	MEAN	MIN	MAX
5.6	14w0d	13w2d	14w5d	26.4	22w6d	21w5d	23w6d	57.2	31w5d	29w6d	33w3d
6.0	14w2d	13w4d	14w6d	27.2	23w1d	22w0d	24w1d	58.3	32w0d	30w1d	33w5d
6.5	14w4d	13w6d	15w2d	28.1	23w3d	22w1d	24w3d	59.4	32w2d	30w3d	34w0d
7.1	14w6d	14w1d	15w4d	29.0	23w5d	22w3d	24w6d	60.4	32w4d	30w5d	34w2d
7.6	15w1d	14w2d	15w6d	29.9	24w0d	22w5d	25w1d	61.5	32w6d	31w0d	34w5d
8.1	15w3d	14w4d	16w1d	30.8	24w2d	23w0d	25w3d	62.6	33w1d	31w1d	35w0d
8.7	15w5d	14w6d	16w3d	31.7	24w4d	23w2d	25w5d	63.7	33w3d	31w3d	35w2d
9.2	16w0d	15w1d	16w5d	32.6	24w6d	23w4d	26w0d	64.7	33w5d	31w5d	35w4d
9.8	16w2d	15w3d	17w0d	33.6	25w1d	23w6d	26w2d	65.8	34w0d	32w0d	36w0d
10.4	16w4d	15w5d	17w2d	34.5	25w3d	24w1d	26w5d	66.9	34w2d	32w1d	36w2d
11.0	16w6d	16w0d	17w5d	35.5	25w5d	24w2d	26w6d	67.9	34w4d	32w3d	36w5d
11.6	17w1d	16w2d	17w6d	36.5	26w0d	24w4d	27w2d	69.0	34w6d	32w5d	37w0d
12.2	17w3d	16w3d	18w2d	37.4	26w2d	24w6d	27w4d	70.1	35w1d	33w0d	37w2d
12.8	17w5d	16w5d	18w4d	38.4	26w4d	25w1d	27w6d	71.1	35w3d	33w1d	37w5d
13.5	18w0d	17w0d	18w6d	39.4	26w6d	25w3d	28w1d	72.2	35w5d	33w3d	38w0d
14.1	18w2d	17w2d	19w1d	40.4	27w1d	25w5d	28w3d	73.2	36w0d	33w5d	38w3d
14.8	18w4d	17w4d	19w3d	41.4	27w3d	26w0d	28w5d	74.2	36w2d	33w6d	38w5d
15.5	18w6d	17w6d	19w5d	42.4	27w5d	26w2d	29w1d	75.2	36w4d	34w1d	39w1d
16.2	19w1d	18w1d	20w0d	43.4	28w0d	26w3d	29w2d	76.2	36w6d	34w3d	39w3d
16.9	19w3d	18w3d	20w2d	44.5	28w2d	26w5d	29w5d	77.3	37w1d	34w4d	39w6d
17.6	19w5d	18w4d	20w4d	45.5	28w4d	27w0d	30w0d	78.2	37w3d	34w6d	40w0d
18.4	20w0d	19w0d	20w6d	46.6	28w6d	27w2d	30w2d	79.2	37w5d	35w0d	40w1d
19.1	20w2d	19w1d	21w1d	47.6	29w1d	27w4d	30w4d	80.2	38w0d	35w2d	40w2d
19.9	20w4d	19w3d	21w4d	48.7	29w3d	27w6d	30w6d	81.1	38w2d	35w3d	40w3d
20.6	20w6d	19w5d	21w6d	49.7	29w5d	28w1d	31w1d	82.1	38w4d	35w5d	40w4d

21.4	21w1d	20w0d	22w1d	50.8	30w0d	28w3d	31w3d	83.0	38w6d	36w0d	40w5d
22.2	21w3d	20w2d	22w3d	51.8	30w2d	28w4d	31w6d	83.9	39w1d	36w1d	40w6d
23.0	21w5d	20w4d	22w5d	52.9	30w4d	28w6d	32w1d	84.8	39w3d	36w3d	41w0d
23.8	22w0d	20w6d	23w0d	54.0	30w6d	29w1d	32w3d	85.7	39w5d	36w4d	41w0d
24.7	22w2d	21w1d	23w2d	55.0	31w1d	29w3d	32w5d	86.6	40w0d	36w6d	41w0d
25.5	22w4d	21w3d	23w4d	56.1	31w3d	29w5d	33w0d				

A3.9: HUM

Jeanty:

Jeanty P, Rodesch F etc. "Estimation of Gestational Age from measurement of Fetal Long Bones." Journal of Ultrasound in Medicine 3:75, 1984

MA (HUM mm) = 9.6519438 + (0.26200391 * HUM) + (0.0026105367 * HUM^2)

A3.10: CER

Goldstein:

MA（CERmm）=6.329+4.807*(CER)/10+1.484*(CER/10)²-0.2474*(CER/10)³

A3.11: THD

Hansmann:

MA（THDmm）=6.963496+3.829853*(THD/10)-0.443065*(THD/10)^2+0.1010238*(THD/10)^3-0.0099702*(THD/10)^4+ 0.0003773(THD/10)^5

A3.12: Estimated Fetal Weight

Merz E. Werner G. & llan E. T., 1991, Ultrasound in Gynecology and Obstetrics Textbook and Atlas 312, 326-336.

Hansmann M, Hackelöer B-J, Staudach A, Ultraschalldiagostik in Geburtshilfe und Gynäkologie 1995.

Campbell S, Wilkin D. "Ultrasonic Measurement if Fetal Abdomen Circumference in the Estimation of Fetal Weight." Br J Obstetrics and Gynecology September 82 (9):689-697, 1975.

Hadlock F, Harrist R, et al. Estimation of fetal weight with the use of head, body, and femur measurement – a prospective study. American Journal of Obstetrics and Gynecology February 1, 151 (3): 333-337, 1985.

Shepard M, Richards V, Berkowitz R, Warsof S, Hobbins J. An Evallluation of Two Equations for Predicting Fetal Weight by Ultrasound. American Journa of f Obstetrics and Gynecology January 142 (1): 47-54, 1982.

Fetal Growth Chart Using the Ultrasonotomographic Technique, Keiichi Kurachi, Mineo Aoki, Department of Obstetrics and Gynecology, Osaka University Medical School Revision 3 (September

1983)

Studies on Fetal Growth and Functional Developments

Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

A3.13: FBP Criterion

FBP is a method to estimate fetus physiological condition through fetus response experiment, placental level and indexes such as amniotic fluid.
The score criterion provided by the system is based on Vintzileos formula, as shown in the following table.

Fetus Index		0	1	2	Observation Time	Note
FHR	FHR	FHR≤1 time	FHR≥15 times/m ，time≥15S，1~4 times	FHR≥15 times/m ，time≥15S，≥5 times	20m	Scores obtained through fetus response experiment can be input into the system on report interface.
Fetal Movement	FM	No FM	1~2 times FM	FM≥3 times	30m	
Fetal Breath Movement	FBM	No FBM, or time≤30S	FBM≥1 time，time 30-60S	FBM≥1 time，time≥60S	30m	
Fetal Tonicity	FT	Limbs stretched, no bending, fingers loose	Limbs or spine stretch-bend >=1 time	Limbs or spine stretch-bend >=1 time	30m	
Amniotic Fluid	AF	AF＜1cm	1cm≤AF≤2cm	AF＞2cm	Obtained by image measurement	
Placental Level	PL	Placental grade is 3.	Placental on posterior wall, no grade	Placental grade is 2.	Placental level includes 0, 1, 2 and 3 according to the fetal acoustic image.	

FBP criterion is as follows:

Total Score	Condition
7-12	Normal, Chronic asphyxia risk low
3-6	Chronic asphyxia suspicious
0-2	Chronic asphyxia risk high

Appendix IV: Measurement Accuracy

Parameter	Range	Accuracy
Image depth range	C352UB:1.9cm-32.4cm L1042UB:1.9cm-10.8cm L742UB:2.9cm-12.7cm E612UB:1.9cm-12.7cm C6152UB:1.9cm-12.7cm C612UB:1.9cm-12.7cm C422UB:1.9cm-19.6cm L552UB:1.9cm-15.7cm	<±5% of full scale
Two-dimension Measurement		
Distance/depth	up to 32.4 cm	< ±5%
Area (Trace)	up to 720 cm^2	< ±10%
Area (Ellipse)	up to 720 cm^2	< ±10%
Angle	0º to 180º	< ±3%
Ratio (A>B)		
-Result B/A and (A-B)/A -Result A/B	up to 1.0 1.0 to 99.9	< ±10% of A < ±10% of A
Time Motion (TM) Measurement		
Depth	up to 32.4 cm	< ± 5%
Time	up to 25 sec	< ± 5%
Heart rate	15 to 999 bpm	< ± 5%
Velocity (ratio)	up to 999 mm/sec	< ±10%
Volume Measurement		
Volume (area, length, diameter)	up to 999 cm^3	< ±15%
Thyroid volume	up to 999 cm^3	< ±15%
Residual urine volume	up to 999 mL	< ±15%
Prostate volume	up to 999 cm^3	< ±15%
PW measurement		
Velocity	5 - 480 cm/s	< ±10%

Appendix V: EMC Information-Guidance and Manufacture's Declaration

Guidance and manufacture's declaration-electromagnetic emissions-
For all EQUIPMENT and SYSTEMS

NOTE:

To protect from EMI, please leave the U50 system away from the EMI sources. For the technical reasons, electromagnetic immunity is limited to 1 Vrms, otherwise, the interfaced images may affect the diagnosis and measurements.

Guidance and manufacture's declaration-electromagnetic emission		
The U50 is intended for use in the electromagnetic environment specified below; The customer or the user of the U50 should assure that it is used in such and environment.		
Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The U50 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The U50 is suitable for use in all establishments, other than domestic and those directly connected to the public low-voltage power supply network that supplies building used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacture's declaration ─ electromagnetic immunity ─ for all EQUIPMENT and SYSTEMS

Guidance and manufacture's declaration – electromagnetic immunity			
The U50 is intended for use in the electromagnetic environment specified below. The customer or the user of U50 should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines	±2KV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line to line ±2 kV line to ground	±1 kV line to line ±2 kV line to ground	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the U50 requires continued operation during power mains interruptions, it is recommended that the U50 be powered from an uninterruptible power supply or a battery.
NOTE UT is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacture's declaration – electromagnetic immunity – for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

Guidance and manufacture's declaration – electromagnetic immunity			
The U50 is intended for use in the electromagnetic environment specified below. The customer or the user of the U50 should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment -guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	1Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the U50, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = \left[\dfrac{3.5}{V_1}\right]\sqrt{P}$ $d = \left[\dfrac{3.5}{E_1}\right]\sqrt{P}$ 80 MHz to 800 MHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	1 V/m	$d = \left[\dfrac{7}{E_1}\right]\sqrt{P}$ 800 MHz to 2.5 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.			
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the U50 is used exceeds the applicable RF compliance level above, the U50 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the U50			
[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 1 *V/m*.			

Recommended separation distances between portable and mobile RF communication equipment and the EQUIPMENT or SYSTEM- For EQUIPMENT or SYSTEM that are not LIFE-SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and the U50

The U50 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the U50 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the U50 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = \left[\dfrac{3.5}{V_1}\right]\sqrt{P}$	80 MHz to 800 MHz $d = \left[\dfrac{3.5}{E_1}\right]\sqrt{P}$	800 MHz to 2.5 GHz $d = \left[\dfrac{7}{E_1}\right]\sqrt{P}$
0.01	0.35	0.35	0.7
0.1	1.1	1.1	2.2
1	3.5	3.5	7
10	11	11	22
100	35	35	70

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Appendix VI: Order List

The following accessories are recommended to be used on the U50.

WARNING

Only accessories supplied or recommended by EDAN can be used, the battery and probes of EDAN can be only used on EDAN's systems. Otherwise, the performance and electric shock protection can not be guaranteed. If electrical or mechanical equipment from other companies need to be connected to the device, please contact EDAN or authorized representatives before connection.

Part Name	Part Number
Probe C352UB	12.01.210396
Probe L1042UB	12.01.210402
Probe L742UB	12.01.210398
Probe E612UB	12.01.210400
Probe C612UB	12.01.210567
Probe C6152UB	12.01.210565
Probe C422UB	12.01.210569
Probe L552UB	12.01.210575
BGK-R50UB Needle Guide Bracket Kit	02.01.210406
BGK-L40UB Needle Guide Bracket Kit	02.01.210407
BGK-CR10UA Needle Guide Bracket Kit	02.01.102963-11
BGK-R10UB Needle Guide Bracket Kit	02.01.210617-10
BGK-R15UB Needle Guide Bracket Kit	02.01.210618-10
BGK-R20UB Needle Guide Bracket Kit	02.01.210619-10
BGK-L50UB Needle Guide Bracket Kit	02.01.210620-10
Coupling gel	11.57.78001
Freeze footswitch	11.10.102414
MT-805 Mobile trolley	03.28.328017
Rechargeable Lithium-Ion battery	01.21.064135
Hand carried bag	01.56.465013
Dustproof cloth	11.57.471026
Black/white video printer (SONY UP-897MD)	11.18.520146

Black/white video printer (MITSUBISHI P93W_Z)	11.18.052194
Black/white video printer (SONY UP-D897)	11.18.052290
Color video printer (SONY UP-20)	11.18.052269
Color video printer (MITSUBISHI CP910E)	11.18.052270
Color video printer (MITSUBISHI CP30W)	11.18.052271
Color video printer (SONY UP-D25MD)	11.18.052283
Color laser printer(HP CP 1525n)	11.18.052284
U Disk	11.18.052245-10
Portable hard disk module	02.04.240652
Probe holder	01.52.113229
Screw (M3×12)	11.19.057154

Appendix VII: Glossary

Abbreviated	Description
Obstetrics	
EDC	Estimated Date of Confinement
MA	Menstrual Age
LMP	Last Menstrual Period
BBT	Basal Body Temperature
EFW	Estimated Fetal Weight
GS	Gestational Sac Diameter
CRL	Crown Rump Length
BPD	Biparietal Diameter
HC	Head Circumference
AC	Abdominal Circumference
FL	Femur Length
AFI	Amniotic Fluid Index
TAD	Transverse Abdominal Diameter/Transverse Trunk Diameter
APAD	Antero Posterior Abdominal Diameter
CER	Cerebellum Diameter
FTA	Fetus Trunk cross section Area
HUM	Humerus Length
OFD	Occipital Frontal Diameter
THD	Thorax Diameter
Umb A	Umbilical Artery
MCA	Middle Cerebral Artery
Fetal AO	Fetal Aorta
Desc.AO	Descending Aorta
Placent A	Placent Aorta
Ductus V	Ductus Venosus
FBP	Fetal Biophysical Profile
Cardiology	
LVIDd	Left Ventricle Internal Diameter (end diastolic)
LVIDs	Left Ventricle Internal Diameter (end systolic)
HR	Heart Rate
ESV	End Systolic Volume
SV	Stroke volume
CO	Cardiac Output
EF	Ejection fraction (M mode)
FS	Fractional Shortening
SI	Stroke Index
CI	Cardiac Index

MVCF	Mean Velocity Circumferential Fiber Shortening
BSA	Body Surface Area
AOD	Aortic root Diameter
LAD	Left Atrium Diameter
LAD/AOD	Left Atrium Diameter / Aortic root Diameter
CA	Cardiac cycle apex A
CE	Cardiac cycle apex E
CA/CE	The ratio of CA to CE
EF SLP	Ejection Fraction Slope
ACV	AC Decreasing Velocity
DEV	Deceleration Velocity
DCT	Deceleration Time
MAVO1	Aortic Valve Volume Opened, beginning
MAVO2	Aortic Valve Volume Opened, ending
AA	Aortic Amplitude
LVMW	Left Ventricular Muscle Weight
AVSV	Aortic Valve Stoma Valve flow
QMV	Mitral Valve Flow
LVLd	Left Ventricle Long-axle Diameter (end diastolic)
LVALd	Left Ventricle Area of Long-axle (end diastolic)
LVLs	Left Ventricle Long-axle Diameter (end systolic)
LVALs	Left Ventricle Area of Long-axle (end systolic)
LVET	Left Ventricular Ejection Time
Gynecology	
UT	Uterus
UT-L	Uterus Length
UT-W	Uterus width
UT-H	Uterus Height
Endo	Uterus Endo-membrane Thickness / Endometrium
L. OV-Vol	Left Ovary Volume
L. OV-L	Left Ovary Length
L. OV-W	Left Ovary Width
L. OV-H	Left Ovary Height
R. OV-Vol	Right Ovary Volume
R. OV-L	Right Ovary Length
R. OV-W	Right Ovary Width
R. OV-H	Right Ovary Height
L. FO-L	Left Follicle Length
L. FO-W	Left Follicle Width
R. FO-L	Right Follicle Length
R. FO-W	Right Follicle Width
CX-L	Cervix Length
UT-L/CX-L	Uterus Length / Cervix Length

L UT A	Left Uterus Aorta
R UT A	Right Uterus Aorta
L OV A	Left Ovary Aorta
R OV A	Right Ovary Aorta
Small Parts	
THY	Thyroid
L. THY-V	Left Thyroid Volume
L. THY-L	Left Thyroid Length
L. THY-W	Left Thyroid Width
L. THY-H	Left Thyroid Height
R. THY-V	Right Thyroid Volume
R. THY-L	Right Thyroid Length
R. THY-W	Right Thyroid Width
R. THY-H	Right Thyroid Height
Urology	
RUV	Residual Urine Volume (mL or L)
RUV-L	Residual Urine Length
RUV-W	Residual Urine Width
RUV-H	Residual Urine Height
PV	Prostate Volume (mm3, cm3, or dm3)
PV-L	Prostate Length
PV-W	Prostate Width
PV-H	Prostate Height
SPSA	Serum of Prostate Specific Antigen
PPSA	Predicted Prostate Specific Antigen Density
PSAD	Prostate Specific Antigen Density
Pediatrics	
HIP	Hip joint
Vascular	
CCA	Common Cartid Artery
ICA	Internal Cartid Artery
ECA	External Cartid Artery
Vert A	Vertebral Artery
Others	
TI	Thermal Index
MI	Mechanical Index
TIS	Soft-tissue thermal index
TIB	Bone thermal index
TIC	Cranial-bone thermal index

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