



Technical Publication

Direction 5610735-100 English

Rev. 2



LOGIQ V2/LOGIQ V1 Basic User Manual

R1.X.X

Operating Documentation

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Regulatory Requirement

This product complies with regulatory requirements of the following European Directive 93/42/EEC concerning medical devices.



This manual is a reference for the LOGIQ V2, LOGIQ V1. It applies to all versions of the R1.x.x for the LOGIQ V2/LOGIQ V1 ultrasound system.



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Revision History

Reason for Change

REV	DATE (YYYY/MM/DD)	REASON FOR CHANGE
Rev. 1	2015/07/14	Initial release
Rev. 2	2015/11/24	1. Update label information and probe feature 2. Update B steer description 3. Update peripheral list

List of Effective Pages

PAGE NUMBER	REVISION NUMBER	PAGE NUMBER	REVISION NUMBER
Title Page	Rev. 2	Chapter 9	Rev. 2
Revision History	Rev. 2	Chapter 10	Rev. 2
Regulatory Requirements	Rev. 2	Chapter 11	Rev. 2
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Chapter 2	Rev. 2	Chapter 13	Rev. 2
Chapter 3	Rev. 2	Chapter 14	Rev. 2
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Chapter 5	Rev. 2	Chapter 16	Rev. 2
Chapter 6	Rev. 2	Chapter 17	Rev. 2
Chapter 7	Rev. 2	Chapter 18	Rev. 2
Chapter 8	Rev. 2	Index	Rev. 2

Please verify that you are using the latest revision of this document. Information pertaining to this document is maintained on MyWorkshop/ePDM (GE Electronic Product Data Management). If you need to know the latest revision, contact your distributor, local GE Sales Representative or in the USA call the GE Ultrasound Clinical Answer Center at 1 800 682 5327 or 1 262 524 5698.

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Regulatory Requirements

Conformance Standards

The following classifications are in accordance with the IEC/EN 60601-1:

- According to 93/42/EEC Medical Device Directive, this is Class IIa Medical Device.
- According to IEC/EN 60601-1,
 - Equipment is Class I, Type BF Applied Parts.
 - Continuous Operation
- According to CISPR 11,
 - Equipment is Group 1, Class A ISM Equipment.
- According to IEC 60529,
 - The footswitch rate is IPX8.
 - Probe head (immersible portion) and cable are IPX7Probe connector is not waterproof.

This product complies with the regulatory requirement of the following:

- Council Directive 93/42/EEC concerning medical devices: the CE label affixed to the product testifies compliance to the Directive.



The location of the CE marking is shown in the safety chapter of this manual.

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Conformance Standards (continued)

- International Electrotechnical Commission (IEC).
 - IEC/EN 60601-1 Medical Electrical Equipment, Part 1 General Requirements for Safety.
 - IEC/EN 60601-1-2 Electromagnetic compatibility - Requirements and tests.
 - IEC/EN 60601-1-6 (Usability), EN 1041 (Information supplied with medical devices)
 - IEC/EN 60601-2-37 Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment.
- International Organization of Standards (ISO)
 - ISO 10993-1 Biological evaluation of medical devices.
- ANSI/AAMI ES60601-1 Medical Electrical Equipment, Part 1 General Requirements for Safety.
- Canadian Standards Association (CSA).
 - CSA 22.2, 601.1 Medical Electrical Equipment, Part 1 General Requirements for Safety.
- NEMA/AIUM Acoustic Output Display Standard (NEMA UD3).
- Medical Device Good Manufacturing Practice Manual issued by the FDA (Food and Drug Administration, Department of Health, USA).

Certifications

- General Electric Medical Systems is ISO 13485 certified.

Original Documentation

- The original document was written in English.

Country-Specific Approval

- JAPAN
Certified Number:

Importer Information

- Turkey

İTHALATÇI
PENTA ELEKTRONİK MEDİKAL
SİSTEMLER SAN. VE TİC. A. Ş.
HOŞDERE CAD. FUAR SOK. 5 / 3
Y. AYRANCI / ANKARA



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Chapter 1

Introduction

This chapter consists of information concerning indications for use/contraindications, and how this documentation is organized.

Attention

This manual is for LOGIQ V2 and LOGIQ V1, .

This manual contains necessary and sufficient information to operate the system safely. Advanced equipment training may be provided by a factory trained Applications Specialist for the agreed-upon time period.

Read and understand all instructions in all manuals supplied with the system before attempting to use the LOGIQ V2/LOGIQ V1 system.

Keep this manual with the equipment at all times. Periodically review the procedures for operation and safety precautions.

Disregarding information on safety is considered abnormal use.

Not all products, features, probes or peripherals described in this document may be available or cleared for sale in all markets. Please contact your local GE Ultrasound representative to get the latest information.

NOTE: Please note that orders are based on the individually agreed specifications and may not contain all features listed in this manual.

NOTE: All references to standards / regulations and their revisions are valid for the time of publication of the user manual.



CAUTION

Safety instructions must be reviewed before operating the unit.

NOTE: The system color varies.

Documentation

LOGIQ V2/LOGIQ V1 documentation consists of various manuals:

- The Basic User Manual (ENGLISH ONLY), and Online Help (ENGLISH ONLY) provides information needed by the user to operate the system safely. It describes the basic functions of the system, safety features, operating modes, measurements/calculations, probes, user care and maintenance.
- The User Guide (TRANSLATED) is a condensed user instruction guide.
- The Release Notes (TRANSLATED) provide precautions and instructions that supplement the Basic User Manual.
- The Advanced Reference Manual (ENGLISH ONLY) contains data tables, such as OB and Acoustic Output tables.
- The Basic Service Manual (ENGLISH ONLY) supplies block diagrams, lists of spare parts, descriptions, adjustment instructions or similar information which help adequately qualified technical personnel in repairing those parts of the system which have been defined repairable by the manufacturer.
- AIUM Booklet (USA only)

The LOGIQ V2/LOGIQ V1 manuals are written for users who are familiar with basic ultrasound principles and techniques. They do not include sonographic training or detailed clinical procedures.

NOTE: *Dates on screenshots are represented in MM/DD/YYYY format throughout the manual. Information on how to change the system's date can be found in Customizing Your System.*

NOTE: *The Electronic Documentation CD includes English and all translations.*

NOTE: *The screen graphics in this manual are only for illustrational purposes. Actual screen output may differ with the different software versions.*

Principles of Operation

Medical ultrasound images are created by computer and digital memory from the transmission and reception of mechanical high-frequency waves applied through a transducer. The mechanical ultrasound waves spread through the body, producing an echo where density changes occur. For example, in the case of human tissue, an echo is created where a signal passes from an adipose tissue (fat) region to a muscular tissue region. The echoes return to the transducer where they are converted back into electrical signals.

These echo signals are highly amplified and processed by several analog and digital circuits having filters with many frequency and time response options, transforming the high-frequency electrical signals into a series of digital image signals which are stored in memory. Once in memory, the image can be displayed in real-time on the image monitor. All signal transmission, reception and processing characteristics are controlled by the main computer. By selection from the system control panel, the user can alter the characteristics and features of the system, allowing a wide range of uses, from obstetrics to peripheral vascular examinations.

Transducers are accurate, solid-state devices, providing multiple image formats. The digital design and use of solid-state components provides highly stable and consistent imaging performance with minimal required maintenance. Sophisticated design with computer control offers a system with extensive features and functions which is user-friendly and easy to use.

Indications for Use

The LOGIQ V2/LOGIQ V1 is intended for ultrasound imaging, measurement and analysis of the human body for multiple clinical applications including: Fetal/OB; GYN; Abdominal; Pediatric; Small Organ (breast, testes, thyroid); Neonatal and Adult Cephalic; Cardiac (adult & pediatric); Peripheral Vascular; Musculoskeletal Conventional & Superficial; Urology; Transrectal; Transvaginal; imaging guidance of interventional procedures (e.g Nerve Block; Vascular Access; Tissue Biopsy/ Fluid Drainage).

Frequency of Use

Daily (Typically 8 hours)

Operator Profile

- Qualified and trained physicians or sonographers with at least basic ultrasound knowledge.
- The operator must have read and understood the user manual.

NOTE: *Only qualified physicians or sonographers should perform ultrasound scanning on human subjects for medical diagnostic reasons. Request training, if needed.*

Clinical Applications

Specific clinical applications and exam types include:

- Abdominal
- Obstetrics
- Gynecological
- Cardiac
- Vascular
- Transcranial
- Musculoskeletal
- Urological
- Small parts
- Pediatric and Neonatal

Image Acquisition is for diagnostic purposes including measurements on acquired image.



CAUTION

This machine should be used in compliance with law. Some jurisdictions restrict certain uses, such as gender determination.

Contraindication

The LOGIQ V2/LOGIQ V1 ultrasound system is not intended for ophthalmic use or any use causing the acoustic beam to pass through the eye.

Prescription Device



CAUTION: United States law restricts this device to sale or use by, or on the order of a physician.

Contact Information

Contacting GE Ultrasound

For additional information or assistance, please contact your local distributor or the appropriate support resource listed on the following pages:

INTERNET

<http://www.gehealthcare.com>

http://www.gehealthcare.com/usen/ultrasound/products/probe_care.html

Clinical Questions

For information in the United States, Canada, Mexico and parts of the Caribbean, call the Customer Answer Center.

TEL: (1) 800-682-5327 or (1) 262-524-5698

In other locations, contact your local Applications, Sales, or Service Representative.

Service Questions

For service in the United States, call GE CARES.

TEL: (1) 800-437-1171

In other locations, contact your local Service Representative.

Information Requests

To request technical product information in the United States, call GE Healthcare.

TEL: (1) 800-643-6439

In other locations, contact your local Applications, Sales, or Service Representative.

Placing an Order

To order accessories, supplies, or service parts in the United States, call the GE Healthcare Technologies Contact Center.

TEL: (1) 800-558-5102

In other locations, contact your local Applications, Sales, or Service Representative.

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For all other European countries not listed, please contact your local GE distributor or the appropriate support resource listed on www.gehealthcare.com.

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Manufacturer



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Chapter 2

Safety

Describes the safety and regulatory information pertinent for operating this ultrasound system.

Owner Responsibility

It is the responsibility of the owner to ensure that anyone operating the system reads and understands this section of the manual. However, there is no representation that the act of reading this manual renders the reader qualified to operate, inspect, test, align, calibrate, troubleshoot, repair or modify the system. The owner should make certain that only properly trained, fully-qualified service personnel undertake the installation, maintenance, troubleshooting, calibration and repair of the equipment.

The owner of the ultrasound unit should ensure that only properly trained, fully qualified personnel are authorized to operate the system. Before authorizing anyone to operate the system, it should be verified that the person has read, and fully understands, the operating instructions contained in this manual. It is advisable to maintain a list of authorized operators.

Should the system fail to operate correctly, or if the unit does not respond to the commands described in this manual, the operator should contact the nearest field GE Ultrasound Service Office.

For information about specific requirements and regulations applicable to the use of electronic medical equipment, consult the local, state and federal agencies.

Notice against user modification

Never modify this product, including system components, software, cables, and so on. User modification may cause safety hazards and degradation in system performance. All modification must be done by a GE qualified person.

Safety Precautions

Precaution Levels

Icon description

Various levels of safety precautions may be found on the equipment and different levels of concern are identified by one of the following flag words and icons which precede the precautionary statement.



DANGER

Indicates that a specific hazard is known to exist which through inappropriate conditions or actions will cause:

- Severe or fatal personal injury
- Substantial property damage.



WARNING

Indicates that a specific hazard is known to exist which through inappropriate conditions or actions may cause:

- Severe personal injury
- Substantial property damage.



CAUTION

Indicates that a potential hazard may exist which through inappropriate conditions or actions will or can cause:

- Minor injury
- Property damage.

NOTE: *Indicates precautions or recommendations that should be used in the operation of the ultrasound system, specifically:*







- *Maintaining an optimum system environment*
- *Using this Manual*
- *Notes to emphasize or clarify a point.*

Hazard Symbols

Icon Description

Potential hazards are indicated by the following icons:

Table 2-1: Potential Hazards

Icon	Potential Hazard	Usage	Source
	<p>Biological Hazard Describes precautions necessary to prevent the risk of disease transmission or infections.</p> <ul style="list-style-type: none"> • Patient/user infection due to contaminated equipment. 	<ul style="list-style-type: none"> • Cleaning and care instructions • Sheath and glove guidelines 	ISO 7000 No. 0659
	<p>Electrical Hazard Describes precautions necessary to prevent the risk of injury through electric hazards.</p> <ul style="list-style-type: none"> • Electrical micro-shock to patient, e.g., ventricular 	<ul style="list-style-type: none"> • Probes • Connections to back panel 	
	<p>Moving Hazard Describes precautions necessary to prevent the risk of injury through moving or tipping hazard!</p> <ul style="list-style-type: none"> • Console, accessories or optional storage devices that can fall on patient, user, or others. • Collision with persons or objects may result in injury while maneuvering or during system transport. • Injury to user from moving the console. 	<ul style="list-style-type: none"> • Moving • Using brakes • Transporting 	
	<p>Acoustic Output Hazard</p> <ul style="list-style-type: none"> • Patient injury or tissue damage from ultrasound radiation. 	<ul style="list-style-type: none"> • ALARA, the use of Power Output following the 'as low as reasonably achievable' principle 	
	<p>Explosion Hazard Describes precautions necessary to prevent the risk of injury through explosion hazard!</p> <ul style="list-style-type: none"> • Risk of explosion if used in the presence of flammable anesthetics. 	<ul style="list-style-type: none"> • Flammable anesthetic 	
	<p>Fire and Smoke Hazard</p> <ul style="list-style-type: none"> • Patient/user injury or adverse reaction from fire or smoke. • Patient/user injury from explosion and fire. 	<ul style="list-style-type: none"> • Replacing fuses • Outlet guidelines 	

Important Safety Considerations

The following topic headings (Patient Safety, and Equipment and Personnel Safety) are intended to make the equipment user aware of particular hazards associated with the use of this equipment and the extent to which injury can occur if precautions are not observed. Additional precautions may be provided throughout the manual.



CAUTION

Improper use can result in serious injury. The use of the system outside the described conditions or intended use, and disregarding safety related information is considered abnormal use. The user must be thoroughly familiar with the instructions and potential hazards involving ultrasound examination before attempting to use the device. Training assistance is available from GE if needed.

Disregarding information on safety is considered abnormal use.

The manufacturer is not liable for damage caused by abnormal use of the device.

Patient Safety

Related Hazards



WARNING

The concerns listed can seriously affect the safety of patients undergoing a diagnostic ultrasound examination.

Patient identification

Always include proper identification with all patient data and verify the accuracy of the patient's name and ID numbers when entering such data. Make sure correct patient ID is provided on all recorded data and hard copy prints. Identification errors could result in an incorrect diagnosis.

The ultrasound system is not meant to be long term storage for patient data or images. The customers are responsible for the data on the system and a regular backup is highly recommended.

It is advisable to back up system data prior to any service repairs to the hard drive. It is always possible during system failure and repair to lose patient data. GE will not be held responsible for the loss of this data.

Diagnostic information

The images and calculations provided by the system are intended for use by competent operators, as a diagnostic tool. They are explicitly not to be regarded as the sole, irrefutable basis for clinical diagnosis. Operators are encouraged to study the literature and reach their own professional conclusions regarding the clinical utility of the system.

The operator should be aware of the product specifications and of the system accuracy and stability limitations. These limitations must be considered before making any decision based on quantitative values. If in doubt, the nearest GE Ultrasound Service Office should be consulted.

Equipment malfunction or incorrect settings can result in measurement errors or failure to detect details within the image. The equipment user must become thoroughly familiar with the equipment operation in order to optimize its performance and recognize possible malfunctions. Applications training is available through the local GE representative. Added confidence in the equipment operation can be gained by establishing a quality assurance program.



CAUTION

The system provides calculations (e.g. estimated fetal weight) and charts based on published scientific literature. The selection of the appropriate chart and clinical interpretation of calculations and charts is the sole responsibility of the operator. The operator must consider contraindications for the use of a calculation or chart as described in the scientific literature. The diagnosis, decision for further examinations and medical treatment must be performed by qualified personnel following good clinical practice.



CAUTION

Be certain to ensure privacy data of patient information.

Mechanical hazards

The use of damaged probes or improper use and manipulation of intracavity probes can result in injury or increased risk of infection. Inspect probes often for sharp, pointed, or rough surface damage that could cause injury or tear protective barriers. Become familiar with all instructions and precautions provided with special purpose probes.



Electrical
Hazard

A damaged probe can also increase the risk of electric shock if conductive solutions come in contact with internal live parts. Inspect probes often for cracks or openings in the housing and holes in and around the acoustic lens or other damage that could allow liquid entry. Become familiar with the probe's use and care precautions outlined in *Probes and Biopsy*.



CAUTION

Ultrasound transducers are sensitive instruments which can easily be damaged by rough handling. Take extra care not to drop transducers and avoid contact with sharp or abrasive surfaces. A damaged housing, lens or cable can result in patient injury or serious impairment or operation.

Scanner and electrosurgical units



CAUTION

This equipment provides no special means of protection from high frequency (HF) burns that may result from using an electrosurgical unit (ESU). To reduce the risk of HF burns, avoid contact between the patient and ultrasound transducer while operating the ESU. Where contact cannot be avoided, make sure the transducer is not located between the ESU active and dispersive electrodes and keep the ESU cables away from the transducers.

ALARA



CAUTION

Ultrasound can produce harmful effects in tissue and potentially result in patient injury. Always minimize exposure time and keep ultrasound levels low when there is no medical benefit. Use the principle of ALARA (As Low As Reasonably Achievable), increasing output only when needed to obtain diagnostic image quality. Observe the acoustic output display and be familiar with all controls affecting the output level. See the *Bioeffects* section of the *Acoustic Output* chapter in the *Advanced Reference Manual* for more information.



CAUTION

The operator of the device must sufficiently understand the acoustic output and be able to obtain the related thermal index values. The probe with self-heating in the air cannot be used in transvaginal scanning. Always minimize exposure time to the irradiation and keep ultrasound acoustic output level low for embryos or fetuses.

Training

It is recommended that all users receive proper training in applications before performing them in a clinical setting. Please contact the local GE representative for training assistance.

Equipment and Personnel Safety

The concerns listed below can seriously affect the safety of equipment and personnel during a diagnostic ultrasound examination.



CAUTION

Do not use this equipment if a safety problem is known to exist. Have the unit repaired and performance verified by qualified service personnel before returning to use.

Related Hazards



WARNING

This equipment contains dangerous voltages that are capable of serious injury or death.

If any defects are observed or malfunctions occur, stop operating the equipment and perform the proper action for the patient. Inform a qualified service person and contact a Service Representative for information.


There are no user serviceable components inside the console. Refer all servicing to qualified service personnel only.

Ensure that unauthorized personnel do not tamper with the unit.



Electrical Hazard

To avoid injury:

- Do not remove protective covers. No user serviceable parts are inside. Refer servicing to qualified service personnel.
- To assure adequate grounding, connect the attachment plug to a reliable (hospital grade) grounding outlet (having equalization conductor ).
- Never use any adaptor or converter of a three-prong-to-two-prong type to connect with a mains power plug. The protective earth connection will loosen.
- Do not place liquids on or above the console. Spilled liquid may contact live parts and increase the risk of shock.



Smoke & Fire Hazard

The system must be supplied from an adequately rated electrical circuit. The capacity of the supply circuit must be as specified.

Related Hazards (continued)



WARNING

Only approved and recommended peripherals and accessories should be used.

All peripherals and accessories must be securely mounted to the LOGIQ V2/LOGIQ V1.



WARNING

The LOGIQ V2/LOGIQ V1 is not intended to be used as a data storage device; backup of the Patient and Image Database is your institution's responsibility. GE is NOT responsible for any lost patient information or for lost images.



Explosion Hazard

Risk of explosion if used in the presence of flammable anesthetics.



Explosion Hazard

Never operate the equipment in the presence of flammable or explosive liquids, vapors or gases. Malfunctions in the unit, or sparks generated by fan motors, can electrically ignite these substances. Operators should be aware of the following points to prevent such explosion hazards.

- If flammable substances are detected in the environment, do not plug in or turn on the system.
- If flammable substances are detected after the system has been turned on, do not attempt to turn off the unit, or to unplug it.
- If flammable substances are detected, evacuate and ventilate the area before turning off the unit.



CAUTION

Do not unpack the LOGIQ V2/LOGIQ V1. This must be performed by qualified service personnel only.

Related Hazards (continued)



Biological Hazard

For patient and personnel safety, be aware of biological hazards while performing invasive procedures. To avoid the risk of disease transmission:

- Use protective barriers (gloves and probe sheaths) whenever possible. Follow sterile procedures when appropriate.
- Thoroughly clean probes and reusable accessories after each patient examination and disinfect or sterilize as needed. Refer to *Probes and Biopsy* for probe use and care instructions.
- Follow all infection control policies established by your office, department or institution as they apply to personnel and equipment.



CAUTION

To avoid injury or system damage, NEVER place any object or liquid on the operator panel.



CAUTION

Archived data is managed at the individual sites. Performing data backup (to any device) is recommended.



CAUTION

- Make sure to verify the media after writing of data, such as EZBackup, SaveAs or Export.
- Before deleting a patient or image from the patient screen, make sure you have saved the data by EZBackup/Backup or Export and verify that the media transfer of data was successful.



CAUTION

DO NOT load non-system software on the system computer.

Related Hazards (continued)



CAUTION

DO NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.

DO NOT touch the conducting parts of the USB, Ethernet, Video, Audio cables when connecting equipment to the unit.



CAUTION

To minimize accidental loss of data, perform EZBackup and Backup on a regular basis.

1. First, perform EZBackup to save the images.
2. Next, perform Backup at Utility -> Backup/Restore. Enable the following checkboxes under Backup:
 - Patient Archive
 - Report Archive
 - User defined configuration
 - Service



CAUTION

- **DO NOT** scratch or press on the panel with any sharp objects, such as a pencil or pen, as this may result in damage to the panel.
- To avoid injury or damage, make sure nothing is within the range of motion before moving the system. This includes both objects and people.
- The LCD screen may have defective pixels. These pixels may appear as a slightly light or dark area on the screen. This is due to the characteristics of the panel itself, and not the product.
- The backlight of the LCD panel has a fixed life span. When the screen becomes dark or begins to flicker, contact a qualified Service Representative for information.

Material Safe Data

Rubber part

Material: Silicon

Where Used: Handle Screw Cap/LCD Rubber

Allergic reactions to latex-containing medical devices



CAUTION

Due to reports of severe allergic reactions to medical devices containing latex (natural rubber), the FDA advises health-care professionals to identify latex-sensitive patients, and be prepared to treat allergic reactions promptly. Latex is a component of many medical devices, including surgical and examination gloves, catheters, incubation tubes, anesthesia masks and dental dams. Patient reaction to latex has ranged from contact urticaria, to systemic anaphylaxis.

For more details regarding allergic reaction to latex, refer to FDA Medical Alert MDA91-1, March 29.

EMC (Electromagnetic Compatibility)

NOTE: *This equipment generates, uses and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications. To provide reasonable protection against such interference, this product complies with emissions limits for a Group 1, Class A Medical Devices Directive as stated in EN 60601-1-2. However, there is no guarantee that interference will not occur in a particular installation.*

NOTE: *If this equipment is found to cause interference (which may be determined by turning the equipment on and off), the user (or qualified service personnel) should attempt to correct the problem by one or more of the following measure(s):*

- *reorient or relocate the affected device(s)*
- *increase the separation between the equipment and the affected device*
- *power the equipment from a source different from that of the affected device*
- *consult the point of purchase or service representative for further suggestions.*

NOTE: *The manufacturer is not responsible for any interference caused by using other than recommended interconnect cables or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users' authority to operate the equipment.*

NOTE: *To comply with the regulations on electromagnetic interference for a Class A FCC Device, all interconnect cables to peripheral devices must be shielded and properly grounded. Use of cables not properly shielded and grounded may result in the equipment causing radio frequency interference in violation of the FCC regulations.*

EMC (Electromagnetic Compatibility) (continued)

NOTE: Do not use devices which intentionally transmit RF Signals (cellular phones, transceivers, or radio controlled products) other than those supplied by GE (wireless microphone, broadband over power lines, for example) in the vicinity of the equipment as it may cause performance outside the published specifications. Keep the power to these type devices turned off when near this equipment.

The medical staff in charge of this equipment is required to instruct technicians, patients, and other people who maybe around this equipment to fully comply with the above requirement.

EMC Performance

All types of electronic equipment may characteristically cause electromagnetic interference with other equipment, either transmitted through air or connecting cables. The term EMC (Electromagnetic Compatibility) indicates the capability of equipment to curb electromagnetic influence from other equipment and at the same time not affect other equipment with similar electromagnetic radiation from itself.

Proper installation following the service manual is required in order to achieve the full EMC performance of the product.

The product must be installed as stipulated in 'Notice upon Installation of Product' on *page 2-18*.

In case of issues related to EMC, please call your service personnel.

The manufacturer is not responsible for any interference caused by using other than recommended interconnect cables or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users' authority to operate the equipment.

EMC Performance (continued)

Portable and mobile radio communications equipment (e.g. two-way radio, cellular/cordless telephones and similar equipment) should be used no closer to any part of this system, including cables, than determined according to the following method:

Table 2-2: Portable and mobile radio communications equipment distance requirements

Frequency Range:	150 kHz - 80 MHz	80 MHz - 800 MHz	800 MHz - 2.5 GHz
Calculation Method:	$d = [3.5/V_1]$ square root of P	$d = [3.5/E_1]$ square root of P	$d = [7/E_1]$ square root of P
Where: d= separation distance in meters, P = rated power of the transmitter, V_1 =compliance value for conducted RF, E_1 = compliance value for radiated RF			
If the maximum transmitter power in watts is rated	The separation distance in meters should be		
5	2.6	2.6	5.2
20	5.2	5.2	10.5
100	12.0	12.0	24.0

Notice upon Installation of Product

Separation distance and effect from fixed radio communications equipment: 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 transmitter 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 ultrasound system is used exceeds the applicable RF compliance level as stated in the immunity declaration, the ultrasound system should be observed to verify normal operation. If abnormal operation is observed, additional measures may be necessary, such as re-orienting or relocating the ultrasound system or using an RF shielded examination room may be necessary.

1. Use either power supply cords provided by GE or ones designated by GE. Products equipped with a power source plug should be plugged into the fixed power socket which has the protective grounding conductor. Never use any adaptor or converter to connect with a power source plug (e.g. three-prong-to-two-prong converter).
2. Locate the equipment as far away as possible from other electronic equipment.
3. Be sure to use only the cables provided by or designated by GE. Connect these cables following the installation procedures (e.g. wire power cables separately from signal cables).
4. Lay out the main equipment and other peripherals following the installation procedures described in the service manuals and peripherals manufacture's manuals.

General Notice

1. Designation of Peripheral Equipment Connectable to This Product.

The equipment indicated in the Supplies/Accessories section can be hooked up to the product without compromising its EMC performance.

Avoid using equipment not designated in the list. Failure to comply with this instruction may result in poor EMC performance of the product.

2. Notice against User Modification

The user should never modify this product. User modifications may cause degradation in EMC performance.

Modification of the product includes changes in:

- a. Cables (length, material, wiring, etc.)
 - b. System installation/layout
 - c. System configuration/components
 - d. Securing system parts (cover open/close, cover screwing)
3. Operate the system with all covers closed. If a cover is opened for some reason, be sure to shut it before starting/resuming operation.
 4. Operating the system with any cover open may affect EMC performance.

Peripheral Update for EC countries

The following is intended to provide the users in EC countries with updated information concerning the connection of the LOGIQ V2/LOGIQ V1 to image recording and other devices or communication networks.

Peripherals used in the patient environment

The LOGIQ V2/LOGIQ V1 has been verified for overall safety, compatibility and compliance with the image recording devices listed in Supplies/Accessories section.

The LOGIQ V2/LOGIQ V1 has also been verified for compatibility, and compliance for connection to a local area network (LAN) via the rear panel Ethernet connection, provided the LAN components are IEC/EN 60950 compliant.

The LOGIQ V2/LOGIQ V1 has also been verified for compatibility, and compliance for connection to a DVD-RW via the system USB port, provided the DVD-RW is IEC/EN 60950 compliant.

A Wireless LAN option is available.

The LOGIQ V2/LOGIQ V1 may also be used safely while connected to devices other than those recommended above if the devices and their specifications, installation, and interconnection with the system conform to the requirements of IEC/EN 60601-1.

Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC standards (i.e., IEC60950 for data processing equipment and IEC60601-1 for medical equipment). Furthermore, all complete configurations shall comply with the valid version of the system standard IEC60601-1. Everyone who connects additional equipment to the signal input part or signal output part of the LOGIQ V2/LOGIQ V1 system configures a medical system, and is therefore responsible to ensure that the system complies with the requirement of the valid version of IEC60601-1. If in doubt, consult the technical service department or your local GE representative.

Peripherals used in the patient environment (continued)

General precautions for installing an alternate on-board device would include:

1. The added device(s) must have appropriate safety standard conformance and CE Marking.
2. The total power consumption of the added devices, which connect to the LOGIQ V2/LOGIQ V1 and are used simultaneously, must be less than or equal to the rated supply of the LOGIQ V2/LOGIQ V1.
3. There must be adequate heat dissipation and ventilation to prevent overheating of the device.
4. There must be adequate mechanical mounting of the device and stability of the combination.
5. Risk and leakage current of the combination must comply with IEC/EN 60601-1.
6. Electromagnetic emissions and immunity of the combination must conform to IEC/EN 60601-1-2.

General precautions for installing an alternate off-board, remote device or a network would include:

1. The added device(s) must have appropriate safety standard conformance and CE Marking.
2. The added device(s) must be used for their intended purpose having a compatible interface.
3. Signal or mains isolation devices and additional protective earth may be needed to assure compliance with IEC/EN 60601-1.



CAUTION

The connection of equipment or transmission networks other than as specified in the user instructions can result in an electric shock hazard or equipment malfunction. Substitute or alternate equipment and connections requires verification of compatibility and conformity to IEC/EN 60601-1 by the installer. Equipment modifications and possible resulting malfunctions and electromagnetic interference are the responsibility of the owner.

Declaration of Emissions

This system is suitable for use in the following environment. The user must assure that it is used only in the electromagnetic environment as specified.


Table 2-3: Declaration of Emissions

Guidance and manufacturer's declaration - electromagnetic emissions		
The system is intended for use in the electromagnetic environment specified below. The user of the system should assure that it is used in such an environment.		
Emission Type	Compliance	Electromagnetic Environment
RF Emissions CISPR 11	Group 1	This system 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	This system is suitable for use in all establishments, other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: WARNING: This system is intended for use by healthcare professionals only. This system may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the system or shielding the location.
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage Fluctuations/Flicker Emissions IEC 61000-3-3	Complies	

Declaration of Immunity

This system is suitable for use in the following environment. The user must assure that the system is used according to the specified guidance and only in the electromagnetic environment listed.

Table 2-4: Declaration of Immunity

Immunity Type	Equipment Capability	Regulatory Acceptable Level	EMC Environment and Guidance
IEC 61000-4-2 Static discharge (ESD)	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	<p>Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%. Mains power quality should be that of a typical commercial and/or hospital environment. If the user requires continued operation during power mains interruptions, it is recommended that the system be powered from a UPS or a battery. NOTE: UT is the a.c. mains voltage prior to application of the test level. Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial and/or hospital environment. Separation distance to radio communication equipment must be maintained according to the method below. Interference may occur in the vicinity of equipment marked with the symbol:</p>  <p>Image degradation or interference may occur due to conducted RF noise on the equipment mains power supply or other signal cable. Such interference is easily recognized and distinguishable from patient anatomy and physiological waveforms. Interference of this type may delay the examination without affecting diagnostic accuracy. Additional mains/signal RF isolation or filtering may be needed if this type interference occurs frequently.</p>
IEC 61000-4-4 Electrical fast transient/burst	± 2 kV for mains ± 1 kV for SIP/SOP	± 2 kV for mains ± 1 kV for SIP/SOP	
IEC 61000-4-5 Surge Immunity	± 1 kV differential ± 2 kV common	± 1 kV differential ± 2 kV common	
IEC 61000-4-11 Voltage dips, short interruptions and voltage variations on mains supply	< 5% U_T (> 95% dip in U_T) for 0.5 cycle; 40% U_T (60% dip in U_T) for 5 cycles; 70% U_T (30% dip in U_T) for 25 cycles; < 5% U_T (>95% dip in U_T) for 5 sec	< 5% U_T (> 95% dip in U_T) for 0.5 cycle; 40% U_T (60% dip in U_T) for 5 cycles; 70% U_T (30% dip in U_T) for 25 cycles; < 5% U_T (>95% dip in U_T) for 5 sec	
IEC 61000-4-8 Power frequency (50/60 Hz) magnetic field	3 A/m	3 A/m	
IEC 61000-4-6 Conducted RF	3 V_{RMS} 150 kHz - 80 MHz	3 V_{RMS} 150 kHz - 80 MHz	
IEC 61000-4-3 Radiated RF	3 V/m 80 MHz - 2.5 GHz	3 V/m 80 MHz - 2.5 GHz	
<p>NOTE: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people. If noise generated from other electronic equipment is near the probe's center frequency, noise may appear on the image. Good power line isolation is required.</p>			

Patient Environmental Devices



Figure 2-1. Patient Environmental Devices for LOGIQ V2/
LOGIQ V1

1. Rear panel:
 - Port for DC In (AC Adapter)
 - Composite out
 - S-Video Out
 - 1 HDMI Port
 - 1 Network Port
 - 1 Security Lock
2. Left side:
 - 1 Isolated USB printer port
 - 2 general USB ports — USB Flash Drive, USB HDD, DVD-RW, Footswitch, Wireless Lan Adapter
 - 1 SD Card port
3. Bottom side: Lithium-ion battery port
4. Right side: Probe port

Acceptable Devices

The Patient Environmental devices shown on the previous page are specified to be suitable for use within the PATIENT ENVIRONMENT.



CAUTION

DO NOT connect any probes or accessories without approval by GE within the PATIENT ENVIRONMENT.

See 'Supplies/Accessories' on *page 18-47 for more information.*

Unapproved Devices



CAUTION

DO NOT use unapproved devices.

If devices are connected without the approval of GE, the warranty will be INVALID.

Any device connected to the LOGIQ V2/LOGIQ V1 must conform to one or more of the requirements listed below:

1. IEC standard or equivalent standards appropriate to devices.
2. The devices shall be connected to PROTECTIVE EARTH (GROUND).

Accessories, Options, Supplies



CAUTION

Unsafe operation or malfunction may result. Use only the accessories, options and supplies approved or recommended in these instructions for use.



CAUTION

For compatibility reasons, use only GE-approved probes, peripherals, or accessories.

DO NOT connect any probes or accessories without approval by GE.

Acoustic Output



CAUTION

Allowing the machine to transmit acoustic output with the probe not in use (or in its holder) can cause the transducer to build up heat. Always lower the acoustic power or freeze the image when not in use.

When the “Auto Freeze” preset is selected on the Utility -> System -> System Imaging screen, the system auto freezes if it detects no change in the image.

Located on the upper right section of the system display monitor, the acoustic output display provides the operator with real-time indication of acoustic levels being generated by the system. See the *Acoustic Output chapter* in the *Advanced Reference Manual* for more information. This display is based on NEMA/AIUM Standards for Real-time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment.

Acoustic Output Display Specifications

The display consists of three parts: Thermal Index (TI), Mechanical Index (MI), and a relative Acoustic Output (AO) value. Although not part of the NEMA/AIUM standard, the AO value informs the user of where the system is operating within the range of available output.

Always be aware of the acoustic output level by observing the Acoustic Output Display. In addition, become thoroughly familiar with the Acoustic Output Display and equipment controls affecting output.

Thermal Index

Depending on the examination and type of tissue involved, the TI parameter will be one of three types:

- **Soft Tissue Thermal Index (TIS).** Used when imaging soft tissue only, it provides an estimate of potential temperature increase in soft tissue.
- **Bone Thermal Index (TIB).** Used when bone is near the focus of the image as in the third trimester OB examination, it provides an estimate of potential temperature increase in the bone or adjacent soft tissue.
- **Cranial Bone Thermal Index (TIC).** Used when bone is near the skin surface as in transcranial examination, it provides an estimate of potential temperature increase in the bone or adjacent soft tissue.

Acoustic Output Display Specifications (continued)

Mechanical Index

MI recognizes the importance of non-thermal processes, cavitation in particular, and the Index is an attempt to indicate the probability that they might occur within the tissue.

Changing the Thermal Index Type

You can select the displayed TI type on Utility -> Imaging -> B-Mode. This preset is application dependent so each application could specify a different TI type.

TI and MI Display and Accuracy

The TI and MI display starts at a value of 0 and increments do not exceed 0.2 for the entire range of display.

When display $MI \geq 0.6$, $TI \geq 3.6$, the displayed values of MI and TI is not lower than 50% or higher than 150% of the measured value.

When display $MI < 0.6$, $TI < 3.6$, the absolute error of $MI \leq 0.3$, the absolute error of $TI \leq 1.8$.

Controls Affecting Acoustic Output

The potential for producing mechanical bioeffects (MI) or thermal bioeffects (TI) can be influenced by certain controls.

Direct. The Acoustic Output control has the most significant effect on Acoustic Output.

Indirect. Indirect effects may occur when adjusting controls. Controls that can influence MI and TI are detailed under the Bioeffects portion of each control in the Optimizing the Image sections.

Always observe the Acoustic Output display for possible effects.

Best practices while scanning



HINTS

Raise the Acoustic Output only after attempting image optimization with controls that have no effect on Acoustic Output, such as Gain and TGC.

NOTE: *Refer to the Optimizing the Image sections for a complete discussion of each control.*



WARNING

Be sure to have read and understood control explanations for each mode used before attempting to adjust the Acoustic Output control or any control that can effect Acoustic Output.



Acoustic Output Hazard

Use the minimum necessary acoustic output to get the best diagnostic image or measurement during an examination. Begin the exam with the probe that provides an optimum focal depth and penetration.

Acoustic Output Default Levels

In order to assure that an exam does not start at a high output level, the LOGIQ V2/LOGIQ V1 initiates scanning at a reduced default output level. This reduced level is preset programmable and depends upon the exam category and probe selected. It takes effect when the system is powered on or **Patient** is selected.

To modify acoustic output, adjust the Power Output level.

RoHS LOGIQ V2/LOGIQ V1 Hazardous Substances



This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572 Requirements for Concentration Limits for Certain restricted Substances in electrical and electronic Products.

The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions so that the use of such electrical and electronic products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures. This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

Name and Concentration of Hazardous Substances

Table 2-5: Table of hazardous substances' name and concentration for LOGIQ V2/ LOGIQ V1

Component Name	Hazardous substances' name					
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
LCD Panel	X	O	O	O	O	O
Printed Circuit Board Assemblies	X	O	O	O	O	O
Keyboard Assemblies	X	O	O	O	O	O
Power Assemblies	X	O	O	O	O	O
Battery	X	O	O	O	O	O
Ultrasound Probes	X	O	O	O	O	O

This table is prepared according to SJ/T 11364.
O: Indicates that hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.
X: Indicates that hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

- Data listed in the table represents best information available at the time of publication.
- Applications of hazardous substances in this medical device are required to achieve its intended clinical uses, and/or to provide better protection to human beings and/or to environment, due to lack of reasonably (economically or technically) available substitutes. For example: Lead is could be used in Printed circuit solder.

Device Labels

Label Icon Description

The following table describes the purpose and location of safety labels and other important information provided on the equipment.

Table 2-6: Label Icons









Label/Icon	Purpose/Meaning	Location
Identification and Rating Plate 	<ul style="list-style-type: none"> • Manufacture's name and address • Date of manufacture • Model and serial numbers • Electrical ratings (Volts, Amps, phase, and frequency) 	Rating Plate, labels
Identification and Rating Plate 	Date of manufacture: The date could be a year, year and month, or year, month and day, as appropriate. See ISO 8601 for date formats.	Rating Plate, labels
	Serial Number	Rating Plate, labels
	Catalog Number	Rating Plate, labels
	Direct Current: For products to be powered from a DC supply	Rating Plate, labels
	Input	Rating Plate, labels
	Description	Rating Plate, labels
	Made in China	Rating Plate, labels

Table 2-6: Label Icons (continued)





Label/Icon	Purpose/Meaning	Location
MODEL	Model	Rating Plate, labels
AC adapter for LOGIQ V2 /V1	AC adapter for LOGIQ V2/LOGIQ V1	AC adapter
NO-LOAD POWER CONSUMPTION	No-Load power consumption	AC adapter
AVERAGE ACTIVE EFFICIENCY	Average Active Efficiency	AC adapter
TEST	Test	Battery
Rechargeable Smart Battery Pack	Rechargeable Smart Battery Pack	Battery
Only for LOGIQ V2/V1 system	Only for LOGIQ V2/LOGIQ V1 system	Battery
OUTPUT	Output	Rating Plate, labels
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8) IPX8: FSU-1000, MKF 2-MED GP26	Indicates the degree of protection provided by the enclosure per IEC60 529.	Bottom of footswitch
	Authorized European Representative address.	Bottom panel
	United States only Prescription Requirement label. CAUTION: United States law restricts this device to sale or use by, or on the order of a physician.	Bottom panel
	Type BF Applied Part (man in the box) symbol is in accordance with IEC 60878-02-03.	Beside the probe connector
	General Warning.	Various

Table 2-6: Label Icons (continued)









Label/Icon	Purpose/Meaning	Location
	<p>“CAUTION” - Dangerous voltage” (the lightning flash with arrowhead) is used to indicate electric shock hazards.</p>	<p>Various</p>
	<p>Indicates the power on and power off position of the power switch. CAUTION: This Power Switch DOES NOT ISOLATE Mains Supply.</p>	<p>See the Console Overview section for location information.</p>
	<p>“Protective Earth” indicates the protective earth (grounding) terminal.</p>	<p>Inside Power Box and Console</p>
	<p>NRTL Listing and Certification Mark is used to designate conformance to nationally recognized product safety standards. The Mark bears the name and/or logo of the testing laboratory, product category, safety standard to which conformity is assessed and a control number.</p>	<p>Bottom</p>
	<p>Do not use the following devices near this equipment: cellular phone, radio receiver, mobile radio transmitter, radio controlled toy, broadband power lines, etc. Use of these devices near this equipment could cause this equipment to perform outside the published specifications. Keep power to these devices turned off when near this equipment.</p>	<p>Bottom of the system</p>
	<p>Be careful of static</p>	<p>Bottom of the system</p>
	<p>“Consult accompanying documents” is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.</p>	<p>Various</p>
	<p>The CE Mark of Conformity indicates this equipment conforms with the Council Directive 93/42/EEC</p>	<p>Various</p>

Table 2-6: Label Icons (continued)



Label/Icon	Purpose/Meaning	Location
<p>CISPR 11 / EN 55011 CLASS : A GROUP : 1 CLASSE : A GROUPE : 1</p>	<p>CISPR CAUTION: The LOGIQ V2/LOGIQ V1 conforms to the CISPR11, Group 1, Class A of the international standard for Electromagnetic disturbance characteristics.</p>	<p>Bottom of the system</p>
	<p>This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.</p>	<p>Bottom and probe connector</p>
	<p>The separate collection symbol is affixed to a battery, or its packaging, to advise you that the battery must be recycled or disposed of in accordance with local or country laws. The letters below the separate collection symbol indicate whether certain elements (Pb=Lead, Cd=Cadmium, Hg=Mercury) are contained in the battery. To minimize potential effects on the environment and human health, it is important that all marked batteries that you remove from the product are properly recycled or disposed. For information on how the battery may be safely removed from the device, please consult the service manual or equipment instructions. Information on the potential effects on the environment and human health of the substances used in batteries is available at this url: http://www.gehealthcare.com/euen/weee-recycling/index.html</p>	<p>Battery Pack if contains Pb/Cd/Hg</p>

Table 2-6: Label Icons (continued)








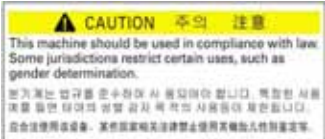
Label/Icon	Purpose/Meaning	Location
	<p>This symbol indicates that this electrical and electronic product does not contain any hazardous substances above the maximum concentration value established by the Chinese standard GB/T 26572, and can be recycled after being discarded, and should not be casually discarded.</p>	
	<p>This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572 Requirements of concentration limits for certain restricted substances in electrical and electronic products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions so that the use of such electrical and electronic products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year"</p>	<p>Probe and Bottom, China Rating Plate.</p>
	<p>When closing the LCD cover, use caution to avoid injuring hands or fingers as there is a closing mechanism which allows the LCD cover to automatically close.</p>	<p>Bottom of the system</p>
	<p>Do not connect the DVD-RW to the system while scanning.</p>	<p>DVD-RW</p>
	<p>GOST symbol: Russia Regulatory Country Clearance.</p>	<p>Rating plate Note: Only after Russian regulatory registration is complete, this label will be located on the console.</p>

Table 2-6: Label Icons (continued)

Label/Icon	Purpose/Meaning	Location
	<p>INMETRO Certification: TUV Rheinland Brazil</p>	<p>Rating plate Note: Only after Brazilian regulatory registration is complete, this label will be located on the console.</p>
	<p>“Eurasian Conformity” mark; the single conformity mark for circulation of products on the markets of member-states of Customs Union. This product passed all conformity assessment (approval) procedures that correspond to the requirements of applicable technical regulations of the Customs Union.</p>	<p>Bottom.</p>
	<p>This machine should be used in compliance with law. Some jurisdictions restrict certain uses, such as gender determination.</p>	<p>Bottom of the system Note: For China, Korea and India only.</p>

Label Locations

LOGIQ V2/LOGIQ V1 labels are provided in English.

The labels are at the bottom of the system. The label content may be different for different regions. Please refer to the labels on the system for the actual content



Figure 2-2. LOGIQ V1 Label Locations

Label Locations (continued)



Figure 2-3. LOGIQ V2 Label Locations

1. Warning label
2. Rating Plate
3. Gender Caution (For China, Korea and India only)

Label Locations (continued)



Figure 2-4. LOGIQ V2/LOGIQ V1 Label Locations (for China)

1. Warning label
2. Rating Plate for China
3. Gender Caution (For China, Korea and India only)

Label Locations (continued)

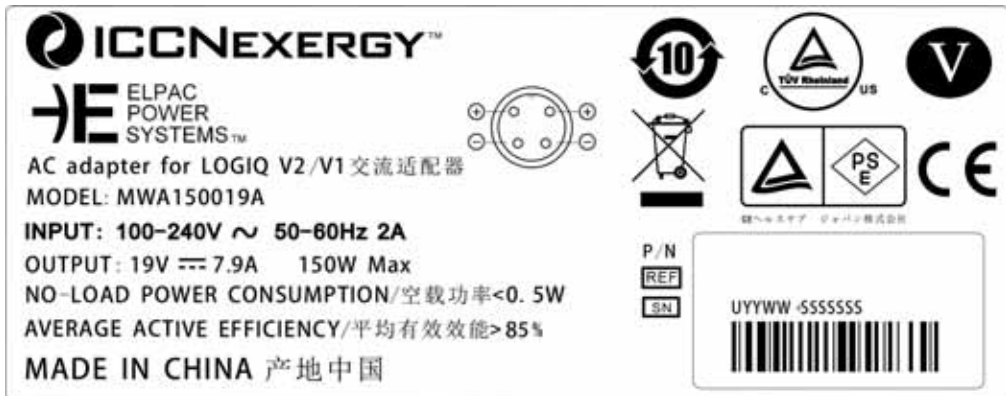


Figure 2-5. AC Adapter label

Label Locations (continued)



Figure 2-6. Battery Label

1. Do not put the battery in fire.
2. Do not disassemble or mistreat the battery.

**CAUTION**

Do not disassemble or mistreat the battery. Do not put the battery in fire. Replace the battery with the same battery type only. Failure to follow these instructions may present risk of explosion fire or high temperature. See the battery user manual for additional safety instructions.

Chapter 3

Preparing the System for Use

Describes the site requirements, console overview, system positioning/transporting, powering on the system, adjusting the display monitor, probes and operator controls.

Site Requirements

Introduction



WARNING

All the warnings in the Safety chapter should be read and understood before operating the unit.



CAUTION

Always use the system on a flat surface in the patient environment.

Do not attempt to install the system alone. General Electric, Affiliate, or Distributor Field Engineers and Application Specialists will install and setup the system. See 'Contact Information' on *page 1-8 for more information*.

The LOGIQ V2/LOGIQ V1 does not contain any operator serviceable internal components. Ensure that unauthorized personnel do not tamper with the unit.

Perform regular preventive maintenance. See 'System Care and Maintenance' on *page 18-10 for more information*.

Maintain a clean environment. Turn off the system and disconnect the power cord before cleaning the unit. See 'Cleaning the system' on *page 18-13 for more information*.



CAUTION

The LOGIQ V2/LOGIQ V1 system and probe connector are not waterproof. Do not expose the device to water or any kind of liquid.

Never set liquids on the unit to ensure that liquid does not drip into the control panel or unit.

Before the system arrives

The ultrasound unit must operate within the proper environment and in accordance with the requirements described in this section. Before using the system, ensure that the requirements are met.

Power Requirements

- A separate power outlet with a 6.5 amp circuit breaker.
- Frequency: 50/60 Hz
- 100V - 240V AC (+/-10%)

Electromagnetic interferences

This medical equipment is approved, in terms of the prevention of radio wave interference, to be used in hospitals, clinics and other institutions which are environmentally qualified. The use of this equipment in an inappropriate environment may cause some electronic interference to radios and televisions around the equipment.

Ensure that the following is provided for the new system:

- Take precautions to ensure that the console is protected from electromagnetic interference.

Precautions include:

- Operate the console at least 15 feet away from motors, typewriters, elevators, and other sources of strong electromagnetic radiation.
- Operation in an enclosed area (wood, plaster or concrete walls, floors and ceilings) helps prevent electromagnetic interference.
- Special shielding may be required if the console is to be operated in the vicinity of radio broadcast equipment.



CAUTION

Do not operate the system in the vicinity of a heat source, of strong electric or magnetic fields (close to a transformer), or near instruments generating high-frequency signals, such as HF surgery. These can affect the ultrasound images adversely.

Before the system arrives (continued)



WARNING

To avoid risk of fire, the system power must be supplied from a separate, properly rated outlet. See 'Before the system arrives' on page 3-3 for more information.

Under no circumstances should the AC power plug be altered, changed, or adapted to a configuration rated less than specified. Never use an extension cord or adapter plug.

To help assure grounding reliability, connect to a "hospital grade" or "hospital only" grounded power outlet.

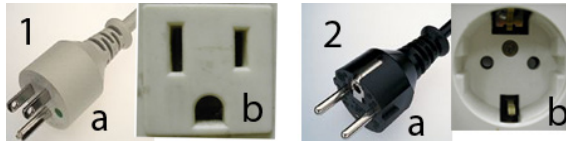


Figure 3-1. Example Plug and Outlet Configurations

1. 100-120 VAC, 10A
Plug and Outlet Configuration
2. 220-240 VAC, 10A
Plug and Outlet Configuration

NOTE: *Country-specific power cords are currently available for Argentina, Australia/New Zealand, China, Denmark, India/South Africa, Switzerland, United Kingdom, Europe, the United States, Israel, Brazil and Japan.*

Environmental Requirements

The system should be operated, stored, or transported within the parameters outlined below. Either its operational environment must be constantly maintained or the unit must be turned off.

NOTE: *You may get an overheating message with regard to fan speed. Ensure adequate system/room ventilation.*

Table 3-1: System Environmental Requirements

	Operational (with probe)	Storage (LOGIQ V2/LOGIQ V1)	Transport (LOGIQ V2/LOGIQ V1)
Temperature	10 - 40° C 50 - 104° F	-5 - 50° C 23 - 122° F	-5 - 50° C 23 - 122° F
Humidity	30 - 80% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa



CAUTION

Ensure that the probe face temperature does not exceed the normal operation temperature range.

Operating Environment

Ensure that there is sufficient air flow around the ultrasound unit when installed in a fixed location.



CAUTION

Do not cover the ventilation holes of the LOGIQ V2/LOGIQ V1.



CAUTION

The LOGIQ V2/LOGIQ V1 system and probe connector are not waterproof. Do not expose the device to water or any kind of liquid.

Console Overview

Console Graphics

The following are illustrations of the console:

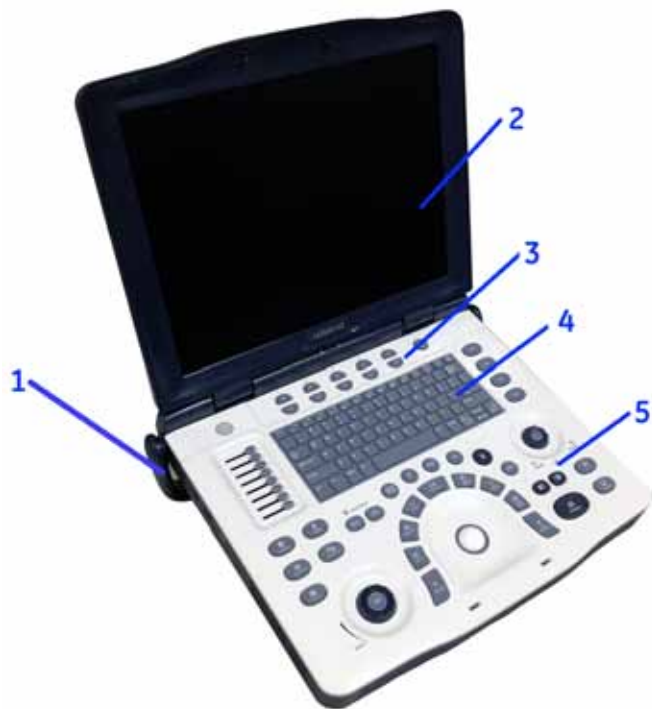


Figure 3-2. LOGIQ V2/LOGIQ V1 System - an example

1. Handle
2. LCD
3. Primary Menu keys
4. Alphanumeric keys
5. Control Panel

Console Graphics (continued)



Figure 3-3. LOGIQ V2/LOGIQ V1 System



CAUTION

Do not push objects into air vents and openings of LOGIQ V2/ LOGIQ V1. Doing so can cause fire or electric shock by shorting out interior components.



WARNING

DO NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.

DO NOT touch the conducting parts of the USB, Ethernet, Video, Audio cables when connecting equipment to the unit.

Battery

The lithium ion battery provides power when an AC power source is not available. A battery in the battery bay is standard with the LOGIQ V2/LOGIQ V1. Lithium ion batteries last longer than conventional batteries and do not require replacement as often. You can expect 30 minutes of battery life with a single fully charged battery in use to supply power to the system.

NOTE: *While scanning with the battery supplying power only, the battery life may be shorter. Always archive the data and keep your attention on the battery status. When the battery power is low, charge the battery immediately in case that scanning will be interrupted and the data will be lost due to the automatic shutdown of the system.*

The lithium ion technology used in your system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such as watch batteries). Used batteries should not be placed with common household waste products. Contact local authorities for the location of a chemical waste collection program nearest you.

NOTE: *The battery is designed to work with LOGIQ V2/LOGIQ V1 systems only. Only use the batteries authorized by GE.*

Temperature Requirements

The battery should be charged, discharged and stored within the parameters outlined below:

- Operating temperature:
 - Charge: 10 - 40°C (50 - 104°F).
 - Discharge: 10 - 40°C (50 - 104°F)
- Storage temperature:

NOTE: *It is recommended that the battery remaining capacity should be 40% ~ 60% when the battery storage begins.*

It is recommended that the battery remaining capacity should be 40%~60% when the battery storage begins.

- Storage time < 3 months: -20 - 40°C (-4 - 104°F)
- Storage time >= 3 months: -20 - 20°C (-4 - 68°F)



WARNING

Do not expose the battery to temperature over 60°C (140°F). Keep it away from fire and other heat sources.

Battery (continued)



WARNING

- The battery has a safety device. Do not disassemble or alter the battery.
- Do not short-circuit the battery by directly connecting the negative terminals with metal objects.
- Do not heat the battery or discard it in a fire.
- Do not charge the battery near a heat source, such as a fire or heater.
- Do not leave the battery in direct sunlight.
- Do not pierce the battery with a sharp object, hit it, or step on it.
- Do not use a damaged battery.
- Do not solder a battery.
- Do not connect the battery to an electrical power outlet.



WARNING

If the LOGIQ V2/LOGIQ V1 is not being used on a monthly basis, the battery needs to be removed during the lengthy non-use period.



CAUTION

To avoid the battery bursting, igniting, or fumes from the battery causing equipment damage, observe the following precautions:

- Do not immerse the battery in water or allow it to get wet.
- Do not put the battery into a microwave oven or pressurized container.
- If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove it and stop using it. If you have any questions about the battery, consult GE or your local representative.

Discharge/Charge Cycle

When the battery is stored for three months or more, the customer should perform one full discharge/charge cycle.

NOTE: *A full discharge/charge cycle means the system is turned on using battery power until the battery loses its charge completely and the system shuts down. Plug the LOGIQ V2/LOGIQ V1 in until the battery is fully charged as indicated by a green LCD light.*

Upon receipt of the LOGIQ V2/LOGIQ V1 and before first time usage, it is highly recommended that the customer perform one full discharge/charge cycle.

If the battery has not been used for >2 months, the customer is recommended to perform one full discharge/charge cycle. It is also recommended to store the battery in a shady and cool area with FCC (full current capacity).

One Full Discharge/Charge Cycle Process:

1. Full discharge of battery to let the LOGIQ V2/LOGIQ V1 automatically shut down.
2. Charge the LOGIQ V2/LOGIQ V1 to 100% FCC (full current capacity).
3. Discharge of LOGIQ V2/LOGIQ V1 for complete shut down (takes about one hour for discharge).

When storing packs for more than 6 months, charge the pack at least once during the 6 month timeframe to prevent leakage and deterioration in performance.



CAUTION

Use only GE recognized batteries.

View current battery status

When the system is running on battery, there is a battery icon in the system status bar. When there is no battery, the AC plug icon is displayed in the system status bar.



Figure 3-4. Battery icon



Figure 3-5. Low Power Battery Icon



Figure 3-6. Warning Battery Icon

If the battery is in charge, the battery icon appears as being charged in the system status bar.



Figure 3-7. Charging Battery icon

Select the battery icon and the following information window appears:



Figure 3-8. Battery Status Message

Battery power low warning

If the battery is in use and the battery power is low, the battery icon become yellow. A warning message appears to warn the user that the battery power is low and it needs to be charged.



Figure 3-9. Low battery power warning

The same warning message in red will continually appears in the status bar at the bottom of the screen.

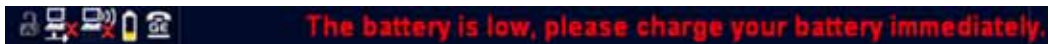


Figure 3-10. Low battery power warning on status bar

When the estimated current power remaining time is less than 3 minute, the below warning message appears on the screen to warn the user to charge the battery immediately, or the system will shut down automatically in 1 minute.

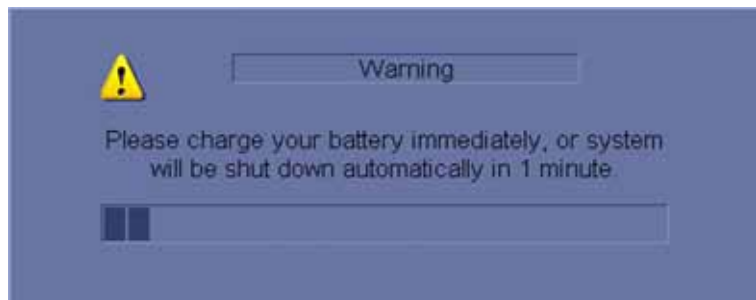


Figure 3-11. System shutdown warning

NOTE: *When the battery power is low and the user cannot charge the battery in time, the system automatically shuts down in 1 minute. This protects the whole system. You need to charge the battery immediately before the system shuts down or you may lose useful information.*

Battery error

If there is an error on the battery, the battery error icon displays.



Figure 3-12. Battery Error Icon

Follow below steps to resolve the issue:

1. Shutdown the system and disconnect AC power cable if it is connected.
2. Remove and install the battery
3. Connect the AC power cable
4. Power on the system with AC power supply
5. Disconnect AC power cable to use the battery to supply power to the system.

If it is still error, shutdown the system, disconnect AC power cable if it is connected, remove the battery and contact GE Service.

Battery Installation

To install the battery to the bottom cover of the system:

1. Shut down the system and disconnect the AC/DC power cord.
2. Put the battery into the battery box through the opening place.



Figure 3-13. Place the battery on the bottom cover

3. Push the battery completely into the box until the battery is locked and the battery lock is in the lock position.



Figure 3-14. Lock the battery

Battery Removal

To remove the battery from the bottom cover of the system:

1. Shut down the system and disconnect the AC/DC power cord.
2. Push up the battery lock to another end of the slot. While hold on to the lock without release, put another hand at the embossed position on the battery and push the battery in the direction away from the battery box.



Figure 3-15. Unlock and push the battery

3. When the battery is away from the lock, remove it from the battery box.



Figure 3-16. Remove the battery

AC Adapter



CAUTION

Do not use an AC adapter without approval by GE.

Be sure that nothing rests on the AC adapter's power cable and that the cable is not located where it can be tripped over or stepped on.

Place the AC adapter in a ventilated area, such as a desk, when you use it to run LOGIQ V2/LOGIQ V1. Do not cover the AC adapter with paper or other items that will reduce cooling; do not use the AC adapter inside a carrying case.

To prevent damage to the power cable of the AC adapter, **DO NOT** pull excessively on the cable; **DO NOT** make any sharp bends; **DO NOT** bend the power cable frequently.

Peripheral/Accessory Connection

Peripheral/Accessory Connector Panel

LOGIQ V2/LOGIQ V1 peripherals and accessories can be properly connected using the connector panel.



CAUTION

Each outer (case) ground line of peripheral/accessory connectors are **Earth Grounded**.

Signal ground lines are Not Isolated.



CAUTION

For compatibility reasons, use only GE-approved probes, peripherals, or accessories.

DO NOT connect any peripherals and accessories without approval by GE.



CAUTION

The connection of equipment or transmission networks other than as specified in these instructions can result in electric shock hazard. Alternate connections will require verification of compatibility and conformity to IEC/EN 60601-1 by the installer.



CAUTION

DO NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.

DO NOT touch the conducting parts of the USB, Ethernet, Video, Audio cables when connecting equipment to the unit.



CAUTION

When using peripheral device, observe all warnings and cautions given in peripheral operator manuals.

Peripheral/Accessory Connector Panel (continued)

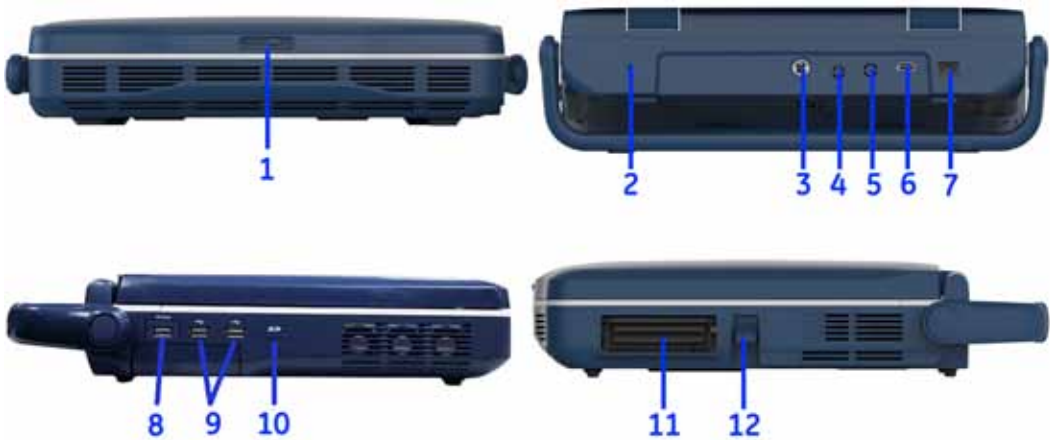


Figure 3-17. Peripheral/Accessory Connector Panel

1. LCD Monitor Locker
2. Security lock
3. Port for DC In (AC Adapter)
4. Composite out port
5. S-Video out port
6. HDMI Port
7. Network Port
8. 1 Isolated USB printer port
9. 2 general USB ports — USB Flash Drive, USB HDD, DVD-RW, Footswitch, Wireless Lan Adapter
10. 1 SD Card port
11. 1 Probe Connector Port
12. Probe Connector Locking Lever

Peripherals Connection

- 1. Connect the printer to the system. The printer can be properly connected using the Isolated USB printer port.

Table 3-2: Printers Connection






Printers	Illustration
Sony UP-D897 printer	 A photograph showing a white Sony UP-D897 printer on the left and a blue GE console on the right. A black USB cable is connected from the printer to the console's isolated USB printer port.
Sony UP-D898MD printer	 A photograph showing a white Sony UP-D898MD printer on the left and a blue GE console on the right. A black USB cable is connected from the printer to the console's isolated USB printer port.

Table 3-2: Printers Connection

Printers	Illustration
Sony UP-D25MD printer	 A photograph showing a white Sony UP-D25MD printer on the left and a blue laptop on the right. A black cable is connected between the printer and the laptop.
HP Officejet 100 printer	 A photograph showing a silver HP Officejet 100 printer on the left and a blue laptop on the right. A black cable is connected between the printer and the laptop.
HP Officejet Pro 8100 printer	 A photograph showing a black HP Officejet Pro 8100 printer on the left and a blue laptop on the right. A black cable is connected between the printer and the laptop.

Peripherals Connection (continued)

2. The USB connection peripherals in below table can be properly connected using general USB ports.

Table 3-3: Peripherals Connection




Peripherals	Illustration
<p>1 Pedal Footswitch</p>	
<p>3 Pedal Footswitch</p> <p>You can configure 3-pedal Footswitch functionality via the Utility -> Applications -> Footswitch parameters.</p>	
<p>DVD-RW</p> <p>Note: Do not connect the DVD-RW to the system while scanning.</p> <p>Note: Be sure the 2 connectors on the USB Y cable are connected to the system at the same time.</p>	

Table 3-3: Peripherals Connection

Peripherals	Illustration
Wireless Card	
USB Flash Drive	
USB Hard Disk	

Peripherals Connection (continued)

3. Other peripheral ports connection

Table 3-4: Other Peripheral ports connection







Peripherals	Illustration
SD Card connection	
Ethernet connection	
HDMI port connection	
VGA output connection (through an external video adapter from HDMI)	

Table 3-4: Other Peripheral ports connection

Peripherals	Illustration
<p>Composite out port You can configure the output format via the Utility -> System -> Peripherals.</p>	
<p>S-Video out port You can configure the output format via the Utility -> System -> Peripherals.</p>	



CAUTION

When using the Footswitch, DO NOT hold down the footswitch pedal. Press and release the Footswitch pedal. Pushing and holding down the pedal behaves the same way as pushing and holding down a key on the keyboard.

NOTE: *Please refer to the manufacture's operation manual of each peripheral for information needed by the user to operate the peripheral safely.*

Attaching the Security Cable

To ensure that the LOGIQ V2/LOGIQ V1 is not removed from the premises, attach the security cable.

1. Wrap the cable around an immovable object.



Figure 3-18. Security Cable

2. Be sure to rotate the key to the unlocked position (to the right).
3. Insert the lock into the security slot to the system's rear side.



Figure 3-19. LOGIQ V2/LOGIQ V1 with Security Cable

4. Rotate the key to the locked position (to the left).

Set Up Wired Footswitch

Use only the GE recommended footswitch. The footswitch may be used as select keys.

You can attach this Footswitch to the system by connecting it to the USB port on the system.

You can configure its functionality via the Utility -> Applications -> Settings -> Footswitch parameters.

For 3-pedal footswitch, you can configure its functionality from the pull-down menu list of Left, Middle and Right.



Figure 3-20. 3-footswitch setting

For 1-pedal footswitch, you can configure its functionality from the pull-down list of the Middle.



Figure 3-21. 1-footswitch setting



CAUTION

When using the Footswitch, DO NOT hold down the footswitch pedal. Press and release the Footswitch pedal. Pushing and holding down the pedal behaves the same way as pushing and holding down a key on the keyboard.

Powering the System

Voltage level check

Check the rating label at the bottom of the system. Check the voltage range indicated on the label.

Connecting to the electrical outlet



WARNING

POWER OUTAGE MAY OCCUR. The ultrasound unit requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you **DO NOT** have other equipment operating on the same circuit.

To connect the system to the electrical supply:

1. Ensure that the wall outlet is of the appropriate type.
2. Unwrap the power cable. Make sure to allow sufficient slack in the cable so that the plug is not pulled out of the wall if the system is moved slightly.
3. Attach the power plug to the system.



CAUTION

Use the appropriate power cord provided by or designated by GE.

4. Connect the power cable to the adapter, if it is not connected.
5. Push the power plug securely into the wall outlet.

NOTE: *Do not use an extension cord or adapter plug.*

Connecting to the electrical outlet (continued)



CAUTION

To avoid leakage current above safety limits as prescribed by IEC 60601-1 and to ensure continuity of protective earth. Only connect LOGIQ V2/LOGIQ V1 and mains-operated accessories to the appropriate wall outlet. **DO NOT** connect them to a single or multiple socket outlets, an extension cord, power strip or an adapter plug.



CAUTION

Disconnect the plug from the wall outlet in case an emergency should occur. Ensure easy access to the power outlet.



Figure 3-22. Connect the system to the electrical supply

Connecting to the electrical outlet (continued)



WARNING

The system should rest on the handle to allow an air gap to prevent overheating.



WARNING

DO NOT use the LOGIQ V2/LOGIQ V1 on plastic foam, paper or similar type surfaces. The system could overheat and slow down. Ensure that the is on a sturdy, heat resistant surface.



WARNING

To avoid risk of fire, the system power must be supplied from a separate, properly rated outlet. See 'Before the system arrives' on *page 3-3 for more information*.

Under no circumstances should the AC power plug be altered, changed, or adapted to a configuration rated less than specified. Never use an extension cord or adapter plug.

To help assure grounding reliability, connect to a "hospital grade" or "hospital only" grounded power outlet.



CAUTION

Use caution to ensure that the power cable does not disconnect during system use.

If the system is accidentally unplugged, data may be lost.



WARNING

Failure to provide an adequate earth circuit can cause electrical shock, resulting in serious injury.

Connection of additional protective earth conductors or potential equalization conductors is not necessary in most cases and is only recommended for situations involving multiple equipment in a high-risk patient environment to provide assurance that all equipment is at the same potential and operates within acceptable leakage current limits. An example of a high-risk patient would be a special procedure where the patient has an accessible conductive path to the heart such as exposed cardiac pacing leads.

Connecting to the electrical outlet (continued)



WARNING

To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

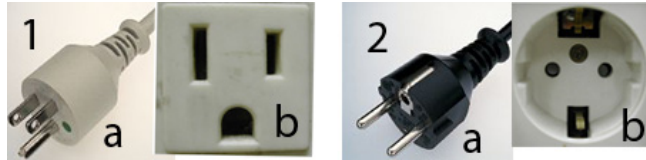


Figure 3-23. Example Plug and Outlet Configurations

1. 100-120 VAC, 10A
Plug (a) and Outlet (b) Configuration example
2. 220-240 VAC, 10A
Plug (a) and Outlet (b) Configuration example

NOTE: *Country-specific power cords are currently available for Argentina, Australia/New Zealand, China, Denmark, India/South Africa, Switzerland, United Kingdom, Europe, United States, Israel, Brazil and Japan.*

Acclimation Time

After being transported or stored, the system requires one hour for each 2.5 degree increment or decrement when its temperature is beyond the operational temperature.

Table 3-5: System Acclimation Time Chart

Degree C	50	45	40	35	30	25	20	15	10	5	0	-5
Degree F	122	113	104	95	86	77	68	59	50	41	32	23
hours	4	2	0	0	0	0	0	0	0	2	4	6

Power On

To turn on the system

1. Check the rating label at the bottom of the system. Check the voltage range indicated on the label.
2. Momentarily press the On/Off switch to turn the power on.
3. The system should now go through its boot-up process with no further user intervention.



Figure 3-24. Power On/Off Switch Location

Power Up Sequence

The system is initialized. During this time:

- The system boots up and the status is reflected on the monitor.



Figure 3-25. Power Up Graphic Sequence

- Probes are initialized for immediate operation.
- NOTE:** *If no probe is connected, the system goes into freeze mode.*

- Peripheral devices are activated on power up.

After initialization is complete, the default B-Mode screen is displayed on the monitor (if a probe is connected).

LED

Press the On/Off switch to turn the power on.

After a successful boot-up process, the Power On/Off switch illumination turns to green.



Figure 3-26. LED Indicators

1. Indicates hard disk working status. When the LED is flashing, the system is writing or reading from the hard disk.
Color: Green
2. Indicates battery status. When the battery is charged, the LED is green. When battery power is low, the LED is orange.
Color: Green and Orange

Keyboard Backlight

The keyboard backlight is lit for operation in dimly lit room.

Login

Personal IDs and associated passwords can be preset in Utility -> Admin -> Users on the LOGIQ V2/LOGIQ V1.

If the User Auto Logon is preset in Utility -> Admin -> Logon is blank, you are prompted to login.



Figure 3-27. Operator Login Window

1. **Operator:** Select the Operator.
2. **Password:** Enter Operator's password (optional).
3. Select type of Logon or Cancel.
 - **OK:** Standard logon
 - **Cancel:** Cancel logon

Logoff

To logoff, press the **Power On/Off** switch momentarily and a SYSTEM-EXIT window appears.

Power Off

For optimum system operation, we recommend that you restart the system at least once every 24-hour period. If you shut down the system at the end of the day, no other action is needed.

To power off the system:

1. When you shutdown the system, enter the scan screen and lightly press the **Power On/Off** switch on the control panel. The System-Exit window is displayed.

NOTE: DO NOT press and hold down the Power On/Off switch to shutdown the system. Instead, lightly press the Power On/Off switch and select Shutdown.

2. Using the **Trackball**, select **Shutdown**.

The shutdown process takes a few seconds and is completed when the Power On/Off switch illumination turns from green to off.

*NOTE: DO NOT select **Exit** for Shutdown. **Exit** is only available to Service representative.*

NOTE: If the system has not fully shut down in 60 seconds in the power-off sequence, press and hold down the On/Off switch until the system shuts down.

3. Disconnect the probes.

Clean or disinfect all probes as necessary. Store them in their shipping cases or another appropriate probe storage system to avoid damage.

4. Disconnect AC adapter mains plug from the power outlet.

NOTE: Disconnect the AC adapter mains plug from the outlet if the system has been fully charged. Connect the AC adapter mains plug to the outlet if the system needs to be charged and then disconnect it when the system has been fully charged.

Check System Date and Time

A warning message “*Please check the system date and time are correct*” appears on the screen when the system is powered up. This warning message appears for the possible reasons:

- The system is not boot up for more than 14 days.
- The system time has been changed by 24 hours earlier than the current system time of last boot-up.

This warning message is to remind the user to check the system date in case the system date and time is incorrect.

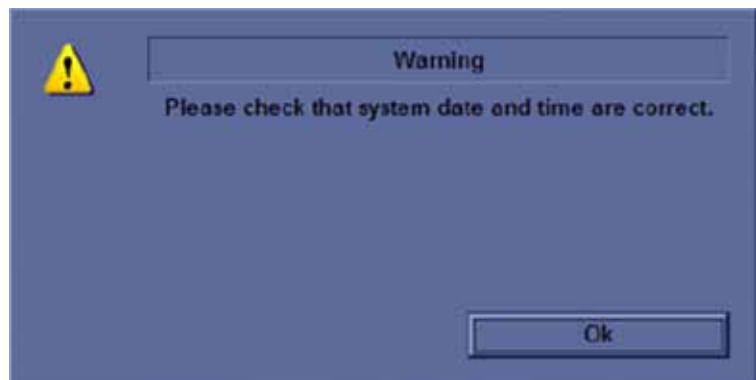


Figure 3-28. Check system date and time message

Move the cursor to **OK** and press the **Cursor** key to select **OK**. The system enters scanning mode.

Check the system date and time. If it is incorrect, follow below steps to reset the system date and time.

1. Enter Utility -> System -> General -> Date/Time.
2. Reset the system date and time.
3. Select **Apply** and select **OK**.
4. Select **Save**.

Crash Recovery Instructions

In cases where the system detects an internal error, the system may reboot on its own. If this happens, the system will automatically end the current exam and permanent store all the images and measurements.

The system automatically ends the current exam and permanently stores all the images and measurements. When the system reboots, check whether all the images and measurements have been preserved in the system. Then, simply hold down the power switch to initiate a normal power down sequence.

NOTE: If the image is not updated properly when the system is up, shut down the system again.

NOTE: Generic worksheets are not saved if the system crashes before you save it.



WARNING

The system crash may cause the internal HDD corruption. Avoid using the internal HDD as a permanent storage device. Backup data on a regular basis.

System Positioning/Transporting

Moving the system

When moving or transporting the system, follow the precautions below to ensure the maximum safety for personnel, the system, and other equipment.

Before moving the system



CAUTION

DO NOT attempt to move the console using any cables or fixtures, such as the probe connectors.



CAUTION

Handle carefully. A drop of more than 5 cm can cause mechanical damages.

1. Shut down the system. See 'Power Off' on *page 3-35 for more information*.
2. Unplug the power cord (if the system is plugged in).
3. Disconnect all cables from off-board peripheral devices (external printer, etc.) and the ethernet connection from the console.

NOTE: *To prevent damage to the Power Cord, **DO NOT** pull excessively on the cord or make sharp bends while wrapping.*

4. Store all probes in their original cases or in soft cloth or foam to prevent damage.
5. Store sufficient gel and other essential accessories in the special storage case.

When moving the system

1. Always use the handle to move the system.



CAUTION

The system weighs approximately 6 kg (13.23 lbs). To avoid possible injury and equipment damage:

- Do not let the system strike walls or door frame.

Transporting the System

Use extra care when transporting the system using vehicles. In addition to the instructions used when moving the system (see 'Moving the system' on *page 3-38* for more information), also perform the following:

1. Before transporting, place the system in its special storage case.
2. Ensure that the system is firmly secured while inside the vehicle.

Attaching the Security Cable

To ensure that the LOGIQ V2/LOGIQ V1 is not removed from the premises, attach the security cable.

1. Wrap the cable around an immovable object.



Figure 3-29. Security Cable

2. Be sure to rotate the key to the unlocked position (to the right).
3. Insert the lock into the security slot to the system's side cover.



Figure 3-30. LOGIQ V2/LOGIQ V1 with Security Cable

4. Rotate the key to the locked position (to the left).

LCD Monitor

Locking/unlocking the LCD monitor

The LCD monitor will be locked automatically when the system is closed with a little force.

Push and slide the LCD latch slider to the right and hold on to unlock the LCD, LCD monitor can be opened.



Figure 3-31. Unlock the LCD Monitor

Adjusting the LCD monitor

The LCD monitor position can be adjusted for easy viewing.

- Tilt the LCD monitor for the optimum viewing angle. The maximum angle is 170.



CAUTION

To avoid damage, DO NOT push the LCD monitor over the maximum opening angle.

DO NOT scratch or press on the panel with any sharp objects, such as a pencil or pen, as this may result in damage to the panel.

NOTE: *Bright light could impact readability of screen.*

Brightness

Adjusting the monitor's brightness is one of the most important factors for proper image quality. If these controls are set incorrectly, the Gain, TGC, Dynamic Range and even Power Output may have to be changed more often than necessary to compensate.

The proper setup displays a complete gray scale. The lowest level of black should just disappear into the background and the highest white should be bright, but not saturated.

To adjust the brightness:

On the alphanumeric keyboard, adjust brightness with the **Fn + Left/Right** keys

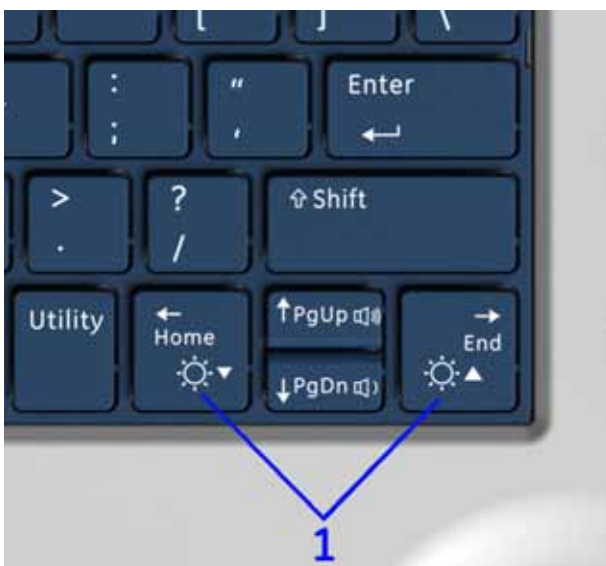


Figure 3-32. Brightness

1. Brightness

NOTE: After readjusting the LCD monitor's Brightness, readjust all preset and peripheral settings.

NOTE: The brightness of the LCD monitor should be set first as it affects the Gain and Dynamic Range settings of your image. Once set, this should not be changed unless the brightness of your scanning environment changes.

Volume

To adjust the volume:

On the alphanumeric keyboard, adjust volume with the **Fn + Up/Down** keys



Figure 3-33. Volume

1. Volume

Introduction

Only use approved probes.

All approved imaging probes can be connected into the probe port of the LOGIQ V2/LOGIQ V1.

See 'Probes and Biopsy' on *page 17-1 for more information.*

Selecting probes

- Always start out with a probe that provides optimum focal depths and penetration for the patient size and exam.
- Begin the scanning session by choosing the correct application and preset for the examination by selecting **Preset**.
- Begin the scan session using the default Power Output setting for the probe and exam.

Connecting the Probe



CAUTION

Remove any dust or foam rests from the probe pins.



CAUTION

Inspect the probe before and after each use for damage or degradation to the housing, strain relief, lens, seal, cable and connector. **DO NOT** use a transducer which appears damaged until functional and safe performance is verified. A thorough inspection should be conducted during the cleaning process.



CAUTION

Fault conditions can result in electric shock hazard. Do not touch the surface of probe connectors which are exposed when the probe is removed. Do not touch the patient when connecting or disconnecting a probe.

Probes can be connected at any time, regardless of whether the console is powered on or off. To ensure that the ports are not active, place the system in the image freeze condition.

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 cord.



CAUTION

DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.

Connecting the Probe (continued)

3. Align the connector with the probe port and carefully push into place with the cable facing the front of the system.



Figure 3-34. Probe connection to LOGIQ V2/LOGIQ V1

4. Flip the connector locking lever up.



Figure 3-35. Probe connector locking lever

5. Carefully position the probe cord so it is free to move and is not resting on the floor.
6. When the probe is connected, it is automatically activated.



CAUTION

Make sure that the probe and application names displayed on the screen correspond to the actual probe and application selection.

Cable Handling

Take the following precautions with probe cables:

- Do not bend the cable acutely
- Avoid crossing cables between probes.



CAUTION

Make sure that the probe and application names displayed on the screen correspond to the actual probe and application selection.

Deactivating the Probe

To deactivate a probe:

1. Ensure LOGIQ V2/LOGIQ V1 is in freeze mode. If necessary, press the **Freeze** key.
2. Gently wipe the excess gel from the face of the probe.

Disconnecting the Probe

Probes can be disconnected at any time, regardless of whether the console is powered on or off.

1. Press the connector locking lever down.



Figure 3-36. Probe connector unlocking lever

2. Pull the probe connector straight out of the probe port carefully.



Figure 3-37. Probe disconnection from LOGIQ V2/LOGIQ V1

3. Ensure the cable is free.
4. Be sure that the probe head is clean before placing the probe in its storage box or wall hanging unit.

2-Probe Port Adapter (option)

Mounting 2-Probe Port Adapter to LOGIQ V2/LOGIQ V1

1. Turn over LOGIQ V2/LOGIQ V1 and 2-Probe Port Adapter to let the back upward.



Figure 3-38. 2-Probe Port Adapter connection 1

2. Align the 2 location pins of 2 Probe Port with the location holes of LOGIQ V2/LOGIQ V1 and carefully push into place, then screw 3 screws.

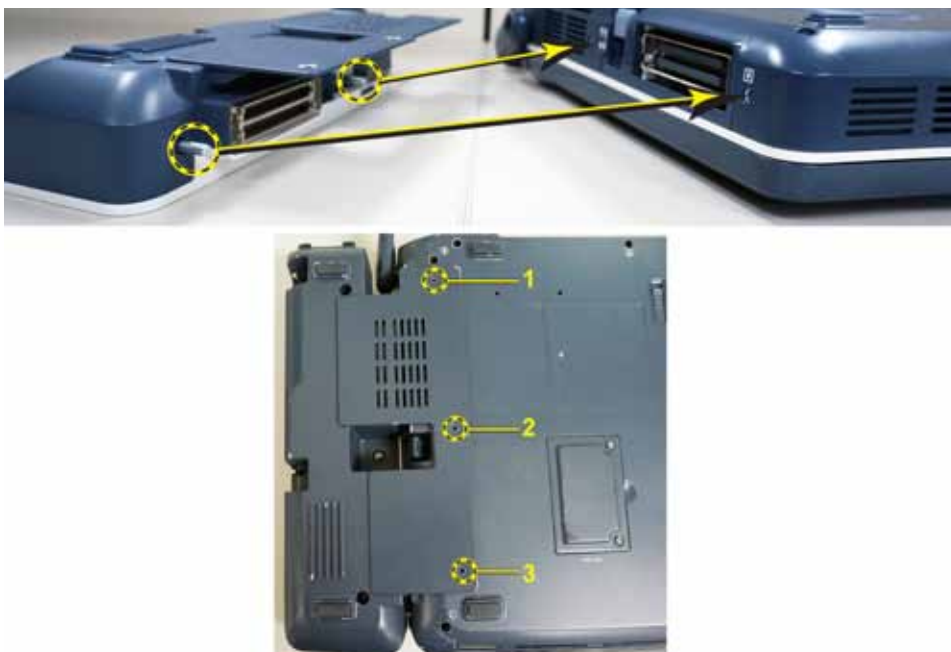


Figure 3-39. 2-Probe Port Adapter connection 2

Mounting 2-Probe Port Adapter to LOGIQ V2/LOGIQ V1 (continued)

3. Flip the connector locking lever down.

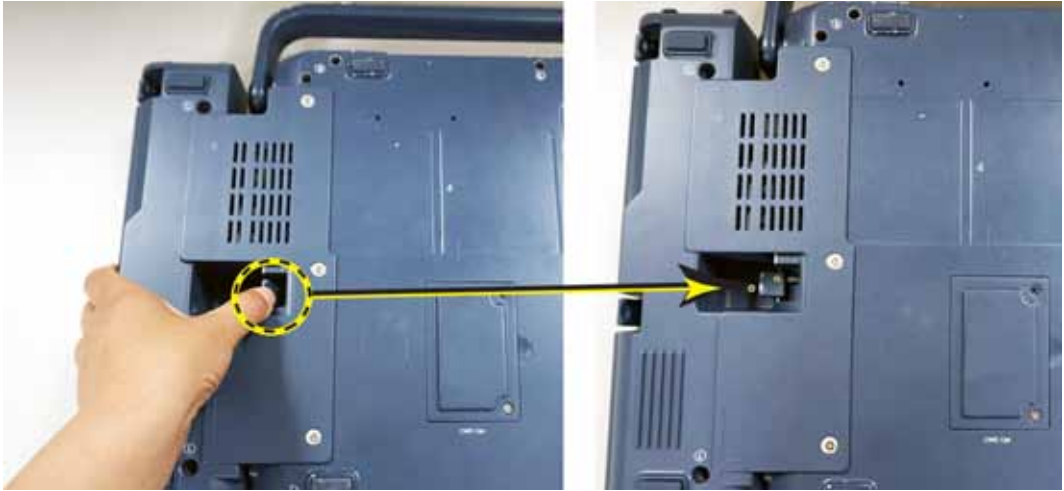


Figure 3-40. 2-Probe Port Adapter connection 3

4. Turn over the system with 2-Probe Port Adapter, now the 2-Probe Port Adapter is connected successfully.



Figure 3-41. 2-Probe Port Adapter connection 4

Connecting Probes to the 2-Probe Port Adapter

Follow the probe connection procedure to connect the probe to the 2-Probe Port Adapter.



Figure 3-42. 2-Probe Port Adapter connection 5

Selecting the probe

Press **Patient** or **Preset** on the control panel to select the probe.



Figure 3-43. Select the probe

Transporting Probes

When transporting a probe a long distance, store it in its carrying case.

Storing the Probe

It is recommended that all probes be stored in the provided carrying case for probe storage.

Carrying case:

- First place the probe connector into the carrying case.
- Carefully wind the cable into the carrying case.
- Carefully place the probe head into the carrying case. DO NOT use excessive force or impact the probe head.

Operator Controls

Control Panel Map

Controls are grouped together by function for ease of use. See the call-out for this figure on the following page.



Figure 3-44. Console panel map

- | | | |
|----------------------|----------------------|----------------------------|
| 1. Power On/Off | 12. End Exam key | 23. M/D Cursor key |
| 2. Primary Menu keys | 13. Archive key | 24. Scan Area key |
| 3. Next key | 14. Gain/AO key | 25. Set/B Pause key |
| 4. TGC | 15. Scan Coach keys | 26. Trackball |
| 5. A/N Keyboard | 16. Mode keys | 27. Depth/Zoom/Ellipse key |
| 6. User Defined keys | 17. Cursor key | 28. Left/Right key |
| 7. Report key | 18. Clear key | 29. Freeze key |
| 8. Utility key | 19. Comment key | 30. Print key |
| 9. Patient key | 20. Active key | 31. Store key |
| 10. Preset key | 21. Measure key | |
| 11. Worksheet key | 22. Body Pattern key | |

NOTE: Do not apply too much force to the TGC slide pots as this could damage the slide pots.

Keyboard

The standard alpha-numeric keyboard has some special functions.

Esc	Exit current display screen.
Help (F1 Key)	Access Online help.
Arrow (F2 Key)	Annotation arrow.
Eject (F3 Key)	Eject media.
Spooler (F4 Key)	Activates DICOM Job Spooler screen.
Create a Fast Key (F5 Key)	Creates a Fast Key.
Play a Fast Key (F6 Key)	Plays a Fast Key.
Home/Set Home (F7 Key)	Move annotation cursor to home position; shift+key to set current annotation cursor position as the new home position.
Text1/Text2 (F8 Key)	Switch between user text annotation overlays.
Grab Last (F9 Key)	Activate the last selected data for edit.
Word Delete (F10 Key)	Erase word associated with comment cursor.

If you encounter a problem and cannot collect the logs immediately:

Alt+D Collect the logs.

Once the logs are collected, the engineering team would be able to see the marker you added which will help engineering to troubleshoot the problem.

NOTE: Logs can be collected by pressing Alt+D, Only when peripheral storage devices are connected.

Detachable keys

Report key, Scan Coach key, CF key, PDI key and User defined keys are detachable keys.

Report, Scan Coach, CF and PDI are option features for the system, after the options are installed on the system, use the key caps in the option kits to replace the blank key caps.

User Defined Key

NOTE: The factory default settings for the User Defined Keys are TVI, LOGIQ View, Easy 3D and Report from top to bottom. The settings can be modified in Utility ->System -> User Configurable Key.

After programming the user defined keys in utility page, please adjust the key caps of user defined key on the control panel to match with the assigned function.



Figure 3-45. User Configurable Key Preset Menu

Primary Menu keys

The Primary Menu keys contain exam function and mode/function specific controls.

NOTE: Different Primary Menu are displayed depending on which function is selected.



Figure 3-46. Primary Menu keys

Press up/down buttons to adjust the value of the softmenu associated with it. Press **Next** to display the next group of Primary Menu.

The Primary Menu can be configured in Utility -> Application -> Imaging Controls.

Button description

Mode, Display and Record

This group of controls provides various functions relating to the display mode, display orientation, image recording/saving, freeze, gain and Cine scroll.

The Mode Controls select the desired display mode or combinations of display modes.

- During dual display modes the **L** and **R** keys activate the Left or Right displayed image. See 'Split Screen' on *page 6-6 for more information*.
- **Gain/AO** is used to:
 - Gain: rotate to adjust gain
 - AO: press to initiate/turn off auto optimize.
- **Depth/Zoom/Ellipse** controls the image depth/width and activates the area/ellipse measurement function.
- **Print** key is used to activate/print the designated recording device.
- **Store** key is used to store the images/loops to the defined designation.
- The **Freeze** key is used to stop the acquisition of ultrasound data and freeze the image in system memory. Pressing **Freeze** a second time continues live image data acquisition.
- To activate a specific mode, press the appropriate mode key.

Measurement and Annotation

This group of controls performs various functions related to making measurements, annotating and adjusting the image information.

- The **Comment** key enables the image text editor and displays the annotation library.
- The **Clear** key is generally used to erase functions, such as annotations/comments, body patterns and measurements. Pressing the **Clear** key again exits the selected function.
- Press the **Body Pattern** control, it enables the Body Pattern and displays the default pattern on the screen. When body patterns are active, the knob rotates the probe position indicator.
- Press **Set** to fix the measurement after the ellipse adjustment is complete. The measurement is then displayed in the measurement result window.
- The **Measure** key is used in all types of basic measurements. When the **Measure** key is pressed, the measurement menu is displayed.
- The **Set** key is used for various functions, but is generally used to fix or finish an operation (e.g. to fix a measurement caliper).
- The **Trackball** is used with almost every key function in this group. Trackball control depends on the last key function pressed.

Monitor Display

Monitor Display

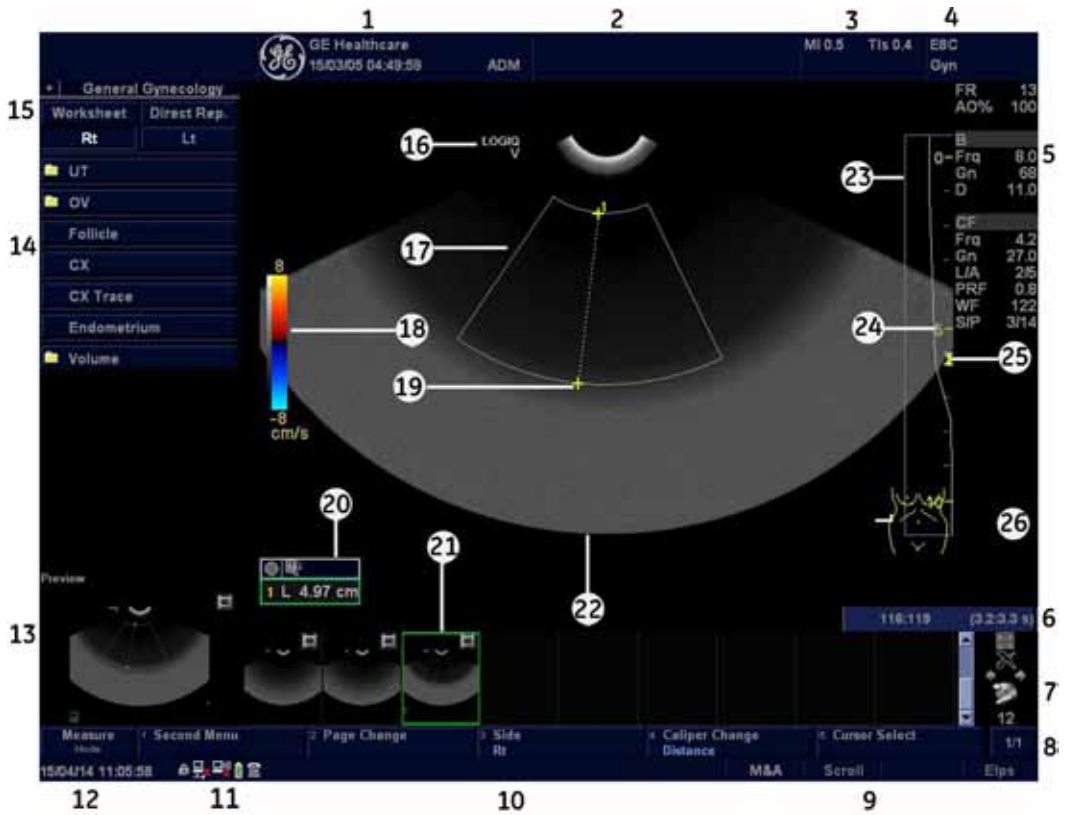


Figure 3-47. Monitor Display Tour

Monitor Display (continued)

1. Institution/Hospital Name, Date, Time, Operator Identification
2. Patient Name, Patient Identification
3. Power Output Readout
4. Probe Identifier. Exam Preset
5. Imaging Parameters by Mode
6. Cine Gauge
7. Image manage controls
8. Primary Menu
9. Trackball Functionality Status
10. System messages
11. Caps Lock: (lit when on), network connection indicator (PC=connected, PC with X=not connected), Battery Icon/Plug Icon, InSite status, InSite controls
12. Current date and time
13. Image Preview
14. Measurement Summary Window
15. Worksheet/Direct Report
16. Probe Orientation Marker
17. Region of interest.
18. Gray/Color Bar
19. Measurement Calipers
20. Measurement Results Window
21. Image Clipboard
22. Image
23. TGC
24. Depth Scale
25. Focal Zone Indicator
26. Body Pattern

Using the Monitor Display Controls to Manage Images

You can manage images from the display via these on-display controls.



Figure 3-48. Menu Icons

- | | |
|----------------------------|-----------------------------|
| 1. Active Images Screen | 4. Save As Menu |
| 2. Delete Image | 5. Number of Images in Exam |
| 3. Next/Previous Image(s). | |

Active Images Page

Press Active Images Page to go to the Patient Active Images page. See 'Active Images' on *page 4-19 for more information*.

Delete

You can use this to delete an image from the clipboard.

To delete an image from the clipboard

1. Select the **Cursor** key to obtain a cursor arrow.
2. Place the cursor on the clipboard image you want to delete, then press **Set** to select the image.
3. Place the cursor on the **Delete** icon and press **Set**.
A warning message is displayed asking the user to confirm the action to perform.
4. Select **Yes**.

Next Clipboard Image

Press the left arrow to move to the previous image; press the right arrow to move to the next image.

Clipboard Slide Show

The Clipboard Slide Show plays all images on the clipboard and wraps around the ends. To activate, press and hold [Ctrl] + [Previous Arrow] or [Ctrl] + [next Arrow].

- Each image recalls for three seconds, or the length of the loop, whichever is longer.
- You can manually skip to a new image during the slide show by recalling it, as usual.
- To end the slide show manually, press [Ctrl] + [Previous]/[Next] again.
- Slide Show ends when you go to live scanning, or if the clipboard is not shown when it's time for the next image to load.

SaveAs menu

Activate SaveAs feature. See 'Save As' on *page 15-9 for more information.*

Number of Images in Exam

The number of images in an exam is tracked on the bottom of these Monitor Display Controls.

Chapter 4

Preparing for an Exam

Describes how to begin an exam.

Beginning an Exam

Introduction

Begin an exam by entering new patient information.

The operator should enter as much information as possible, such as:

1. Dataflow
2. Exam category
3. Patient ID
4. Patient name
5. Exam Information

The patient's name and ID number is retained with each patient's image and transferred with each image during archiving or hard copy printing.



CAUTION

To avoid patient identification errors, always verify the identification with the patient. Make sure the correct patient identification appears on all screens and hard copy prints.

Beginning a New Patient

Pressing the **Patient** on the control panel displays the patient screen on the monitor.

Patient Screen

The screenshot shows a patient entry form with the following elements:

- 1**: Patient ID: 150306-203821
- 2**: Last Name: [text box], First Name: [text box], DOB: [text box], Age: [text box], Gender: female male
- 3**: Scan Assistant: None (dropdown menu)
- 4**: Weight: [text box] kg, Height: [text box] cm, BSA: [text box] m²
- Category Selection: ABD, OB, GYN, CARD, VAS, UR, SM P, PED (tabs)
- Exam Information: Abd, Abd_2, Renal, Aorta (buttons)
- Buttons: Scan, Cancel

Figure 4-1. Patient Screen Example

1. Patient Information
2. Probe information
3. Category Selection
4. Exam Information

Enter Patient Data with the alphanumeric keyboard.

To navigate through the Patient Entry menu, use the **Tab** key or **Trackball** and **Set** to move and fix the cursor.

Patient Information

- Patient ID Number
- Other ID

The Other ID is used to add additional information of the patient, such as Citizen ID.

NOTE: To enable/disable the Other ID field, go to Utility --> Connectivity --> Miscellaneous.

NOTE: To select Other ID format, go to Utility --> Connectivity --> Miscellaneous.

- Patient Name—Last and First
- DOB- Date of Birth
- Age
- Gender

Probe information

It displays the active probes connected to the system. Select the appropriate probe for current exam.

Category Selection

Select from 8 exam application categories: Abdomen, Obstetrics, Gynecology, Cardiology, Vascular, Urology, Small Parts or Pediatrics.

When a category is selected, the measurement and category presets are displayed.

Exam information

Shows the Current/Active Exam information. Information pertinent to the selected exam category appears in the window. All possible information needs to be entered.

Archive Screen

Pressing the **Archive** on the control panel displays the Archive screen on the monitor.



Figure 4-2. Archive Screen 1

1. Image management: Select to manage the images
 - Archive View—Provides a list of images per exam for the currently selected patient.
 - Active Images—Provides preview of the currently selected exam.
 - Data Transfer—Provides an interface to handle patient data from a remote device.
2. EZBackup: One-step method to backup patient images to an external media.
EZMove: Move and delete patient images.
3. Review: Select to review the image.
4. Thumbnail image: Provide a thumbnail image of current selected image.
5. Scan: Select to start scanning.

Archive Screen (continued)

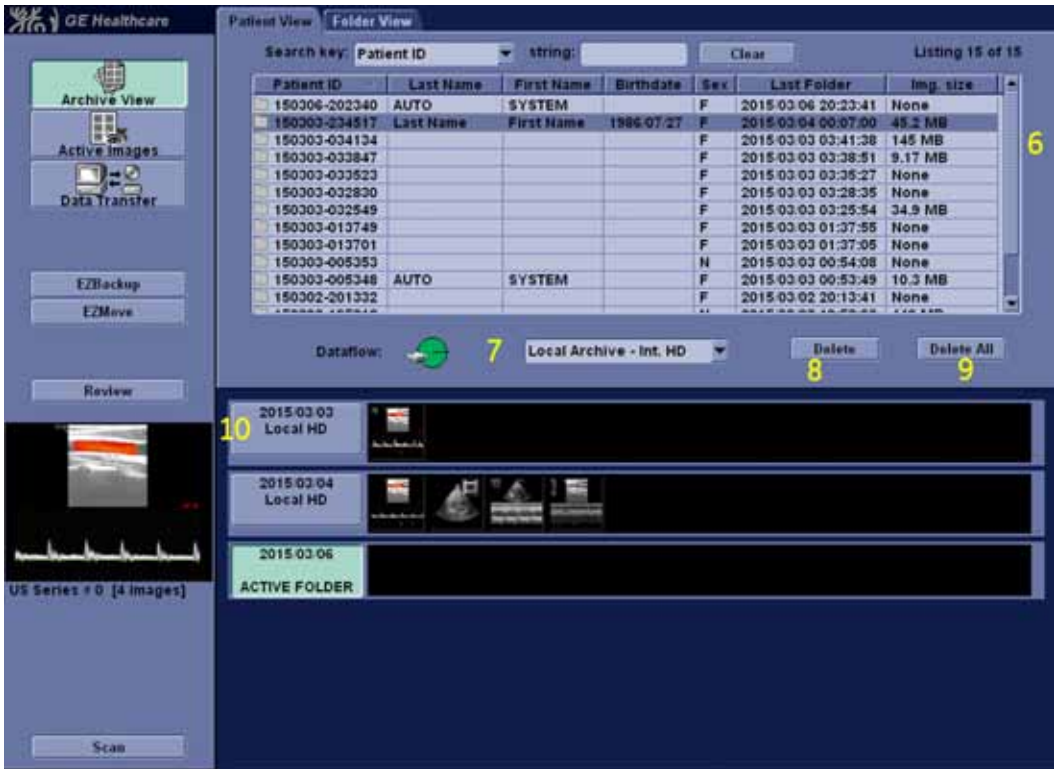


Figure 4-3. Archive Screen 2

6. Patient View: List the patients in the database.
7. Dataflow Selection: Select the appropriate patient dataflow.
8. Delete: Select to delete the selected patient.
9. Delete All: Select to delete all the patient.
10. Folder Information: Displays the Exam History of the selected patient.

Dataflow Selection

Select the appropriate dataflow.

NOTE: *If you use a DVD-R, select DICOM CD Read in Dataflow.*

If you place the cursor on the icon, the pop-up menu displays disk capacity.



Figure 4-4. Dataflow Pop-up

Patient View Screen

Lists the patients in the database.

NOTE: *When you double-click the patient on the patient list with the **Set** key, the Review screen displays.*

- Search key—select search key item.

NOTE: *If “Exam Date Between” is selected, the Input Dialog displays and you can select the date from the displayed calendar.*

NOTE: *Img. Archived means that the exam was backed up to external media by EZBackup or Export.*

- String—enter appropriate information.

If you select Archived (Y, N) for the Search key, enter Y (Yes) or N (No).

NOTE: *If “Exam Date Between” is used for the Search key, the From and To dates are separated by a “-” (dash) in the Search String.*

- Clear—Clears the entered string.
- Listing XX of XXX -- Displays the quantity of patients in the search window and the quantity of patients in the database.
- Delete—Deletes Patient/Exam.

NOTE: *“Delete” is only displayed when you login as Administrator.*

Archive Screen (continued)

- Folder View—Displays the Exam History of the selected patient.

Disk - Displays the disk name on which you saved the exam's image data.

See 'Review images in archive' on *page 4-18 for more information.*

See 'Send To (Send the image to the DICOM Device)' on *page 15-32 for more information.*



CAUTION

To maintain optimum performance and to safeguard patient data, keep the total number of patients in the database below 1,000.

To reduce the total number of patients in the database, perform the following procedure.

1. Prepare the unformatted CD-R or DVD-R or USB HDD before EZBackup.

NOTE: Formatted CD-R or DVD-R cannot be used for EZBackup.

2. First perform EZBackup and then Backup (Patient Archive and Report Archive).
3. Go to the archive screen, select the patients/exams to delete. Select "Delete" to delete the selected data.

NOTE: Removing image data with the "EZMove" function does not reduce the patient number in the database.

NOTE: Ensure that all patients are exported or backed up BEFORE deleting them.

Scanning a New Patient



WARNING

Imaging functions may be lost without warning. Develop emergency procedures to prepare for such an occurrence.



WARNING

Ensure you have selected a dataflow. If No Archive is selected, no patient data is saved. It displays as below if No Archive is selected.



CAUTION

To avoid patient identification errors, always verify the identification with the patient. Make sure the correct patient identification appears on all screens and hard copy prints.



CAUTION

Always use the minimum power required to obtain acceptable images in accordance with applicable guidelines and policies.



CAUTION

Always use the system on a flat surface in the patient environment.



CAUTION

Ensure that the hands of the patient are away from the system during the exam.

The position of the operator and the patient vary by scan region.

In most case, the operator sits/stands straight in front of the operator console and the patient lies on the bed on the right (or left) side of the system.

Scanning a New Patient (continued)

When starting a new patient's exam, ensure you do the following:

1. Select **Patient** on the control panel.



Figure 4-5. Create a new patient

2. Patient ID will be generated automatically by the system. The operator is able to edit the Patient ID and fill in other patient information.
3. Select the probe and application.
4. Select **Scan** to start scanning.
5. Perform the exam.
If the patient information needs to change while scanning, select **Patient** again. If the probe or preset needs to change while scanning, select **Preset** again.
6. Press **Store** key to store the static image or cine loop saved in the exam to the clipboard.
7. When the scanning is complete, select **End Exam** on the control panel to end current patient. The system permanently stores all images of the current patient automatically.

The system creates the new patient and the new folder to store all images in the archive screen. Each patient has only one folder per day, regardless how many exams are performed in that day.

Starting a new exam on an existing patient

1. Select **Archive** on the control panel.
2. Select the patient from the Patient List.
3. Select **Scan** to enter into scanning, perform the exam.
If the patient information needs to change while scanning, select **Patient**.
4. Select **Preset** on the control panel to select the probe and application.
If the probe and preset needs to change while scanning, select **Preset** again.
5. Press **Store** key to store the static image or cineloop saved in the exam to the clipboard.
6. When you have completed the study, select **End Exam** on the control panel to end current patient. The system permanently stores all images of the current patient automatically.

A new folder is automatically created on that patient unless a folder already exists on that day for that patient.

Scanning without entering any patient data

To scan a patient without entering any patient data until the end of the exam:

1. Select **End Exam** on the control panel to end the last patient's exam. The system permanently stores all images of that patient automatically.
2. Scan the new patient and save images to the clipboard without patient information. The system displays a warning message "Warning: A patient must be selected for permanent storage of image". Select **OK**.
3. Select **Patient** on the control panel to create a new patient, the following dialog displays if there is unsaved exam data.

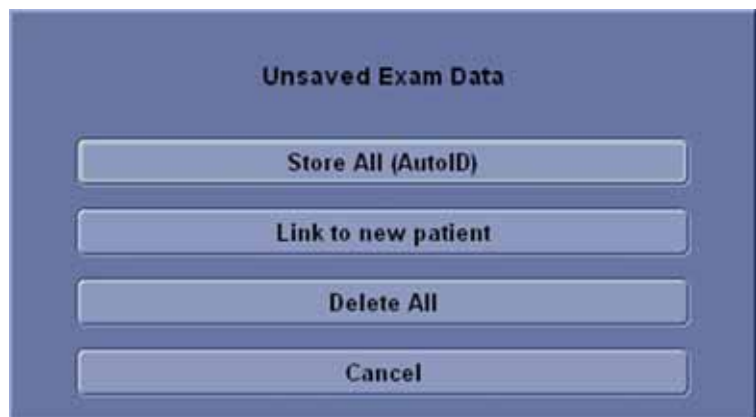


Figure 4-6. Unsaved Exam Data

- a. **Store All (Auto ID)**. Store the unsaved data to the patient that is auto created by the system, and then a new patient screen displays.
- b. **Link to new patient**. A new patient screen displays, and link the unsaved images to the new patient.
- c. **Delete All**. Delete all the unsaved images, and then a new patient screen displays.
- d. **Cancel**. Do nothing with the unsaved data, and return to scanning.

Changing Current Scanning Patient to an Existing Patient

To change the current scanning patient (with/without patient ID) to an existing patient, when there are some unsaved images on the clipboard for the current patient:

1. Scan current patient and store images/cineloops to the clipboard
2. Press **Archive** on the control panel to go to **Archive** Screen and select the existing patient.



Figure 4-7. Unsaved Exam Data (Archive)

3. The option is different if the current patient is with or without patient ID.
 - a. With Patient ID: **Store All (xxx)**. Store the unsaved data under the patient ID. The patient ID should be the current patient ID.
Then Select **Scan** to begin scanning, a dialog displays: "Current Patient will be changed to ID: xxx. Do you want to continue?" Select **Yes** to change to the selected patient, select **No** to keep the current patient.
 - b. Without Patient ID: **Store All (Auto ID)**. Store the unsaved data to the patient that is auto created by the system.
4. **Review Images**. Review the unsaved images in **Active Image** page.
Then Select **Scan** to begin scanning on the current patient.
5. **Delete All**. Delete all the unsaved images.
Then Select **Scan** to begin scanning, a dialog displays: "Do you really want to delete all temporary images?" Select **Ok** to delete all temporary images, select **Cancel** to do nothing with the unsaved data, and return to **Archive** page.
6. **Cancel**. Do nothing with the unsaved data, and return to **Archive** page.

End Exam

End Exam should be selected at the end of each exam. The system will automatically store all images of current patient permanently.

The system creates the new patient and the new folder to store all images in the archive screen. Each patient has only one folder per day, regardless how many exams are performed in that day.

Retrieving and editing archived information

Searching for an existing patient

1. Select **Archive** to display the Patient Screen.
2. Select the search key. Enter the search string.

NOTE:

When the number of patients on a hard disk is in the hundreds, it takes time to search for a patient or switch to another screen. In this case, do one of the following:

- *Uncheck the “Auto search for patient” preset, found under Patient/Exam Menu Options in Utility -> Connectivity -> Miscellaneous.*
- *Delete unnecessary patient data.*

3. An appropriate patient is displayed.



Figure 4-8. Patient Search Screen

Select **Delete** to delete this patient. See ‘Deleting the existing patient’ on page 4-17 for more information..

NOTE:

“Delete” is only displayed when you login as Administrator.

Changing Patient Information



CAUTION

The user is responsible for patient data, diagnostic information or any other patient related information entered in the database.

NOTE: The patient information can be changed only when the an folder already exists on that day for that patient.

To Change Patient information or an exam:

1. Select the patient for the patient list in the **Archive** Screen if the patient is not active
2. Press **Patient** on the control panel to display patient screen
3. Modify patient information.

NOTE: The patient information can be changed only when the an folder already exists on that day for that patient.

Deleting the existing patient/exam/image



CAUTION

Before deleting a patient or image from the Patient view page, make sure you have already saved the data with EZBackup/EZMove or Export. Verify the media before deletion.

Deleting the existing patient

1. Search and select the patient in the patient list.
2. Select **Delete**. The confirmation dialog box displays.

NOTE: "Delete" is only displayed when you login as Administrator.

3. Select **OK** to delete or **Cancel**.

Delete multiple patients from the patient list

1. Select the multiple patients to be deleted from the patient list with **Ctrl** or **Shift** keys.
2. Select **Delete**. The confirmation dialog box displays.
3. Select **OK** to delete or **Cancel**.

Deleting the existing exam

1. Search the patient in the patient list.
2. Select **Folder View** or double click the patient name by **Set** key to review the exam.
3. The patient exam screen displays. Select the exam to be deleted.
4. Select **Delete Folder**. The confirmation dialog box displays.
5. Select **OK** to delete or **Cancel**.

Deleting the existing image

1. Search and select the patient in the patient list.
2. Select the exam which contains the image to be deleted.
3. Select **Active Images** to display the image list.
4. Select the image to delete and select **Delete**. The confirmation dialog box displays.
5. Select **Yes** to delete or **No** to cancel.

Review images in archive

There are two ways to access to archived images:

- Review the images in Archive view Screen.
- Review the images in Active images screen.

Review the patient exam/image

To review the patient exam,

1. Move the cursor to the patient in the Patient View and double-click. Folder View displays.
or
Move the cursor to the patient and select Folder View tab. Folder View Displays.
2. Move the cursor to the desired exam and double-click.
3. Active Images screen displays. Move the cursor to the image and double click or press **Review**.
4. The review screen displays. Select the image from clipboard.

NOTE: See 'Clipboard' on page 15-6 for more information.

Active Images

Active Images displays the images of the exam.

NOTE: *CINE loops are not played interactively as you view the active images on the Archive screen.*

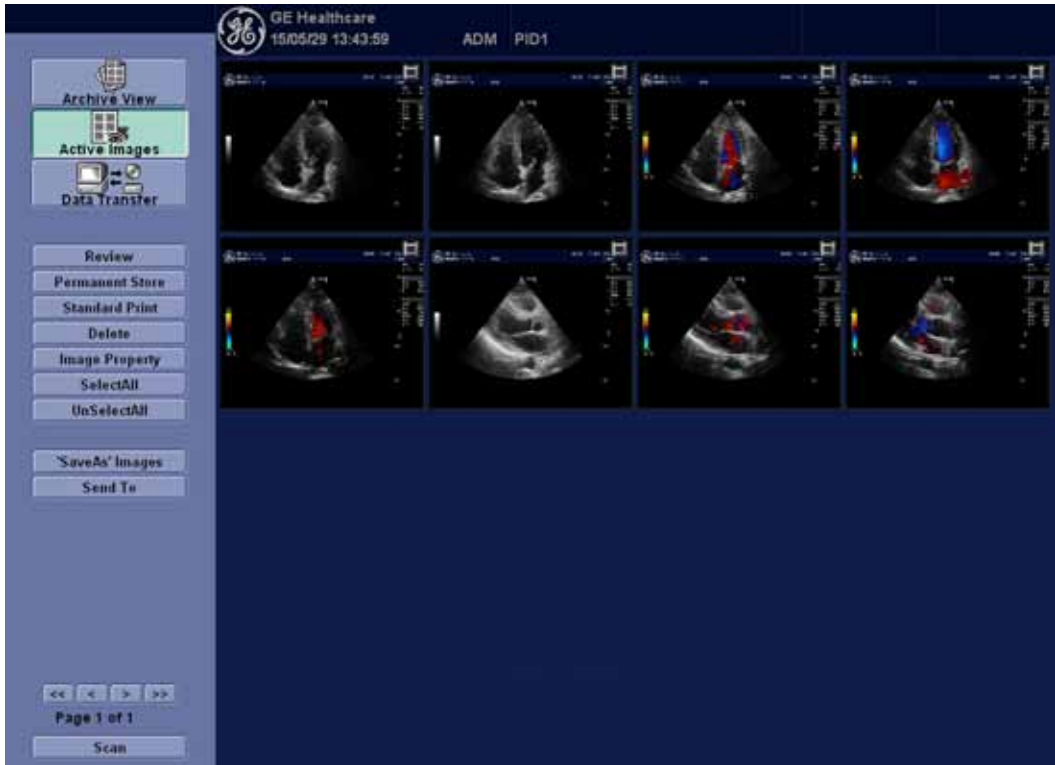


Figure 4-9. Active Images Screen

1. Select the exam which includes the image to review.
2. Select **Active Images**.
3. Select the image and press **Review** or double click on the image. The image is displayed.

If you select 2 - 4 images and select **Review**, the archived images are displayed in the split screen.

Active Images (continued)

Table 4-1: Active Images

Parameters	Description
Review	Select the image and press Review , the image is displayed.
Permanent Store	Select the images which you want save to the Local hard disk drive.
Standard Print	<p>To print an image,</p> <ol style="list-style-type: none"> 1. Select the image you want to print from the Active Images screen. You can print one (1) image per sheet or 2x3 images per sheet. 2. Press Standard Print. <p>NOTE: If the printer is not assigned to the button, you will get a message telling you to Check Printer Button Configuration.</p> <p>NOTE: There is no warning to let you know that the printer is not functioning. Check the printer.</p> <p>You need to configure the printer to the Standard Print button via Utility --> Connectivity --> Button.</p>
Delete	To delete images, select the images in the active screen, then select "Delete" on the monitor display.
Image Property	Select to display image Property.
Select All/Unselect All	<p>Select SelectAll to select all images.</p> <p>Select UnselectAll to deselect all images.</p>
SaveAs Images	<p>Refer to "SaveAs' Images' on <i>page 15-13</i> for the detail.</p> <p>You can select the multiple images collectively in Active Image screen which you want save by SaveAs.</p> <p>NOTE: We suggest that you save the images page by page with 'SaveAs' Images in Active Images. It takes time if you have many images or raw data.</p>
Send To	<p>Refer to 'Send To (Send the image to the DICOM Device)' on <i>page 15-32</i> for the detail.</p> <p>Note: "Send To" button is not displayed in Active Images menu if the patient is not selected.</p>

Analyzing Images

To analyze the archived images, select the image, then select **Review**. The archived images is displayed with the date and time of archival.

To compare the analyzed image to a live image, press **L/R**. Now both the archived and live images appear on the monitor display. Unfreeze the live image area.

Selecting an Application Preset and a probe

Selecting an Application Preset

The exam category preset that best describes the desired exam to be performed is chosen after the exam category is selected. The factory default preset selections are displayed on the menu area.

Use these parameters as a starting point for the exam.

User-Defined Application Presets

There are four user-defined application presets that can be set on the system.

To set up User-Defined Application Presets,

1. Press **Preset** on the control panel, then select **User Preset**. The Create New Application menu appears.



Figure 4-10. Create New User Application Menu

User-Defined Application Presets (continued)

2. Type the name of the new application, select **Save**. The new application now appears on the menu area.

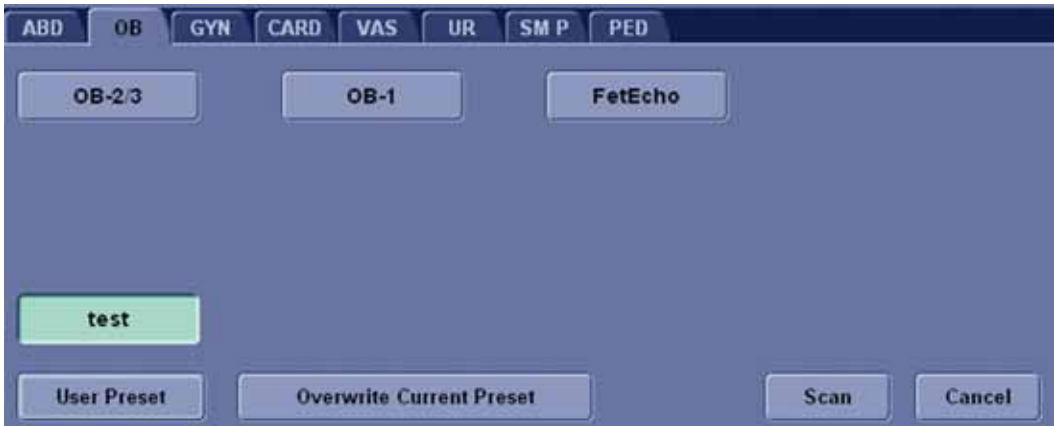


Figure 4-11. User Application Menu

NOTE: The name of the new application must start with letter or _, and contain a-z, A-Z, 0-9, _.

NOTE: You can set up to four (4) user-defined model presets for each exam category.

3. To view/edit the parameters for the user-defined preset, press Utility --> Imaging.

NOTE: If you select Reload Factory Defaults for the User-Defined application that you created, the settings for this user-defined application revert back to the factory settings for the exam category and application it was based upon.

NOTE: You cannot delete a user-defined application. However, you can change it by overwriting the user-defined application you want to delete with a new one.

Selecting a probe

- Always start out with a probe that provides optimum focal depths and penetration for the patient size and exam.
- Begin the scan session using the default Power Output setting for the probe and exam.

Chapter 5

Optimizing the Image

Describes how to adjust the image. This chapter is broken into the following sections: B-Mode, M-Mode, Color Flow Mode, M Color Flow, Doppler Mode, Using Easy 3D Mode and TruScan.

Optimizing B-Mode

Intended Uses

B-Mode is intended to provide two-dimensional images and measurement capabilities concerning the anatomical structure of soft tissue.



Figure 5-1. B-Mode Display -- Representative Example

B Mode Primary Menu

Different parameters can be assigned to the Primary Menu, the Primary Menu can be configured in Utility -> Application -> Imaging Controls.

Typical B-Mode Exam Protocol

A typical examination using B-Mode might proceed

1. Record exam-related patient information. Verify system setup (probes and presets).
2. Position the patient and the console for optimum operator and patient comfort. Perform the scan.
3. Complete the study by collecting all the data.



CAUTION

Ensure that the hands of the patient are away from the system during the exam.

The position of the operator and the patient vary by scan region.

In most case, the operator sits/stands straight in front of the operator console and the patient lies on the bed on the right (or left) side of the system.



CAUTION

Always use the minimum power required to obtain acceptable images in accordance with applicable guidelines and policies.

B-Mode Scanning Hints



These B-Mode controls produce the following results:

Auto Optimize. Automatically improves the contrast resolution of the image by changing the gray scale to match the image data. Available in B-Mode and Doppler Mode.

Coded Harmonics. Enhances near field resolution for improved small parts imaging as well as far field penetration.

Frequency. Changes system parameters to best optimize for a particular patient type.

Gray Map. Affects the presentation of B-Mode information. Choose the gray map prior to making other adjustments. There is an interdependency between gray maps, gain, and dynamic range. If you change a map, revisit gain and dynamic range settings.

Dynamic Range. Changes the amount of gray scale information displayed. A higher dynamic range shows more gray scale information displayed, while a lower dynamic range displays less gray scale information onto the same display scale. If you increase the gain, you may want to decrease the Dynamic Range.

Frame Average. Smooths the image by averaging frames. Affects the amount of speckle reduction.

TGC. Adjust TGC to adjust Gain in specific areas.

Focus Zones. Focal zones should be placed roughly in the lower half of the display depth, at or below the organ of interest.

Width. Sizes region of interest. Adjust the Width to the smallest reasonable size to maximize frame rate.

Depth

Description	Depth controls the distance over which the B-Mode images anatomy, and the field of view. To visualize deeper structures, increase the depth. To visualize flatter structures, decrease the depth.
Adjusting	Each adjustment cycles you to the next Depth setting. Imaging and display parameters adjust automatically. To increase/decrease, adjust Depth .
Preset	You can set the depth by probe and application on the Utility --> Imaging page.
Values	Depth increments vary by probe and application. Depth displays on the monitor in centimeters. Depth values are returned to the factory or user preset value when you change the following: Patient/Preset, Exam Calc, or End Exam.
Benefits	Depth adjusts your field of view. It increases your field of view to look at larger or deeper structures; it decreases your field of view to look at structures near the skin line.
Affect on other controls	After adjusting the depth, you may need to adjust the TGC and focus. Changing the depth may change the TI and/or MI. Observe the output display for possible effects.



HINTS

Make sure enough space is left below the anatomy of interest to demonstrate shadowing or enhancement.

Gain

Description	B-Mode Gain increases or decreases the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated.
Adjusting	To decrease/increase, rotate Gain . Gain values vary depending on the probe; they are not associated with a particular position of the knob. <i>NOTE: B-Mode gain is independent of M-Mode and Doppler and Color Flow Gain. Changing the M-Mode Gain while in M-Mode does not affect the B-Mode image gain.</i>
Preset	You can set gain by probe and application on the Utility --> Imaging page.
Values	Gain displays on the monitor in Gn. Maximum gain varies by probe. Gain values vary by probe, application, and frequency setting. <i>NOTE: Maximum gain is factory preset to an optimum setting to eliminate noise in the display.</i> Gain values are returned to the factory or user preset value when you change the following: Probe, Exam Category/Exam Calc, or Patient.
Benefits	Gain allows you to balance echo contrast so that cystic structures appear echo-free and reflecting tissue fills in.
Affect on other controls	After you adjust the Power Output, you may need to adjust the gain. Generally speaking, if you increase the Power Output, you need to decrease the gain; if you decrease the Power Output, you need to increase the gain. Gain and TGC interact by adding together.
Bioeffects	Gain has no affect on Power Output. However, with increased gain, the power output level can usually be reduced to produce an equivalent image quality. <i>NOTE: Always optimize gain before increasing the Power Output.</i>

Focus

Description	Increases the number of focal zones, moves the focal zone(s) and changes the zone width so that you can tighten up the beam for a specific area. A graphic corresponding to the focal zone position(s) appears on the right edge of the image.
Adjusting	To increase/decrease the number of focal zones, adjust Focus Number . To move the focal zone to the near/far field, adjust Focus Position .
NOTE:	<i>You can set the focus (Depth % and Number, and Number CrossXbeam) by probe and application on the Utility--> Imaging page.</i>
Values	Focus zone number and position vary depending on the depth, zoom, probe, application, and frequency setting selected. Focal zone number values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calc, or Patient.
Benefits	Focus optimizes the image by increasing the resolution for a specific area.
Affect on other controls	Changing the focal number affects the frame rate. The greater number of focal zones, the slower the frame rate.
Bioeffects	Changing the focal zone may change the TI and/or MI. Observe the output display for possible effects.

Auto Optimize

Description

Auto Optimize (Auto) lets you optimize the image based upon the actual B Mode image data (Auto Tissue Optimize, ATO). The preset levels (Low, Medium, and High) allow you to pick a preference for the contrast enhancement in the resulting image. Low does the least amount of contrast enhancement, high does the most.

Auto is available in single or multi image, on live, frozen or CINE images (in B-Mode only), and while in zoom and in Spectral Doppler.

Auto in PW Doppler Mode (ASO: Auto Spectral Optimization) optimizes the spectral data. Auto adjusts the Velocity Scale/PRF (live imaging only), baseline shift, dynamic range, and invert (if preset). Upon deactivation, the spectrum is still optimized.

Benefit

Auto can be found in reduced optimization time and a more consistent and accurate optimization process.

Adjusting

To activate Auto, press **AO** key.

Press AO key again to turn off Auto.

Preset

Specify the ATO Level: Low, Medium, or High via Utility --> Imaging --> B-Mode.

Specify the Auto Invert on ASO for Doppler mode: On or Off via Utility --> System -> System Imaging.

Values

Auto is active until you deactivate it or when you change the following: Probe, Exam Category, Exam Calc, or Patient.

Affect on other controls

You may need to adjust the Gain.

CrossXBeam

Description

CrossXBeam is the process of combining three or more frames from different steering angles into a single frame. CrossXBeam is available on Convex and Linear probes.

CrossXBeam combines multiple co-planar images from different view angles into a single image at real-time frame rates, using bi-cubic interpolation.

Adjusting

To activate CrossXBeam, select **CrossXBeam**.

To adjust the number of frames being compounded, adjust CrossXBeam.

Select CrossXBeam Type (Off, Low, Medium or High) for Convex probe. Select CrossXBeam Type (Off, Low, Medium, High or Max) for Linear probe. **Max** detects maximum values; **Mean** detects averaged values; **Hybrid** detects a mix of both average and maximum values.

Preset

You can preset B-Mode CrossXBeam:

- Preset the CrossXBeam #
- Preset Focus Number for CrossXBeam
- Preset Line Density CrossXBeam
- Preset Focus Width for CrossXBeam
- Frame Average CrossXBeam

These presets can be made via the Utility --> Imaging page.

CrossXBeam (continued)

Values

CrossXBeam is available on Convex and Linear probes. Multiple focal zones are supported. B-Mode CrossXBeam is available while in B-Mode, Color Flow, or PW Doppler Mode. Steering is optimized by probe. The displayed compound image depth is equal to the image depth of the non-steered frame.

The following features are supported in CrossXBeam:

- Harmonic Imaging
- CINE Loops acquired using CrossXBeam.
- Read Zoom
- All Measurement and Analysis packages
- SRI HD, Rejection, Colorize, Revert, Edge Enhance, Gray Map, Rotation, Biopsy Kit, Dynamic Range, Depth, TGC, Gain, Acoustic Output, Auto, Virtual Convex, LOGIQ View and Easy 3D.

Benefits

The combined single image has the benefits of reduced speckle noise, reduced clutter, and continuity of specular reflectors. Therefore, this technique can improve contrast resolution with increased conspicuity of low contrast lesions, better detection of calcifications, biopsy needle visualization, and cystic boundary definition.

SRI-HD (High Detection Speckle Reduction Imaging)

Description

SRI-HD (High Detection Speckle Reduction Imaging) is an adaptive algorithm to reduce the unwanted effects of speckle in the ultrasound image. Image speckle usually appears as a grainy texture in otherwise uniform areas of tissue. Its appearance is related to image system characteristics, rather than tissue characteristics, so that changes in system settings, such as probe type, frequency, depth, and others, can change the appearance of the speckle. Too much speckle can impair image quality and make it difficult to see the desired detail in the image. Likewise, too much filtering of speckle can mask or obscure desired image detail. Extra care must be taken to select the optimal SRI-HD level.

SRI-HD is available in B-Mode imaging and may be used with any transducer or clinical application when image speckle appears to interfere with the desired image detail.



Figure 5-2. B-Mode Image before SRI-HD (left) and After SRI-HD (right)

SRI-HD (High Detection Speckle Reduction Imaging) (continued)

Values

We recommend that you select the SRI-HD level by observing the enhanced image in side-by-side dual image comparison with the original, unprocessed image. Dual display mode is activated by pressing the L and R keys simultaneously.

In selecting the level of SRI-HD, you must observe the effects of SRI-HD in the desired region of interest and should make a real-time comparison with the original image. The optimal level depends on the clinical situation and improves with experience. Observing the original and SRI-HD-processed images together helps to determine whether too much or too little SRI-HD has been applied.

Dual image mode for SRI-HD can also be activated on a stored CINE Loop. This allows you to always see the original, unprocessed or enhanced image by going into the Dual display mode and to change the SRI-HD settings when reviewing the CINE Loop.

SRI-HD is available on 3D.

- You cannot change SRI-HD after the scan starts.
- The effects for the rendered image are less than the 2D-image.

Benefits

Smooths the image when image speckle interferes with the desired image detail.

Coded Harmonic Imaging (CHI)

Description	Harmonic imaging utilizes Digitally Encoded Ultrasound (DEU). Coded Harmonics enhances near field resolution for improved small parts imaging as well as far field penetration.
Adjusting	To activate Coded Harmonic imaging, press CHI key on the control panel.
	<i>NOTE: You can assign CHI On/Off function to the User Defined key. See 'System/User Configurable Key' on page 16-35 for more information.</i>
	<i>NOTE: You can specify the parameters for CHI in Utility -> Imaging -> HAR.</i>
Values	On/Off. 'CHI' appears in place of 'B' in the imaging parameters.
Benefits	Coded Harmonics diminishes low frequency high amplitude noise and improves imaging technically difficult patients. Coded Harmonics may be especially beneficial when imaging isoechoic lesions in shallow-depth anatomy in the breast, liver, and hard-to-visualize fetal anatomy.
Bioeffects	Activating CHI mode may change the TI and/or MI. Observe the output display for possible effects.

Frequency

Description	Multi Frequency mode lets you downshift to the probe's next lower frequency or shift up to a higher frequency.
Adjusting	Adjust Frequency until the desired frequency is selected.
	The selected frequency appears as "Frq" in the upper, right-hand portion of the monitor display.
	<i>NOTE: Frequency change is not active when the image is frozen.</i>
	<i>NOTE: Changing frequency resets those parameters which are presettable by frequency to their preset values for the current frequency.</i>
Values	Vary, depending on the probe and application.
	Frequency values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or begin a new patient.
Benefits	This optimizes the probe's wide band imaging capabilities at multiple frequencies to image at greater depths.
Bioeffects	Adjusting frequency may change the TI and/or MI. Observe the output display for possible effects.

B Steer

Description	You can slant the B-Mode or Color Flow acoustic beam without moving the probe. The steer function only applies to linear probes. The steer function is only available in CrossXBeam Off.
Adjusting	To slant the linear image to the left/right, adjust B Steer .
Values	Linear probes can be steered left, center, or right up to a maximum of 15 degrees, depending on the probe. Steer values are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or Patient.
Preset	Preset the steer angle via Utility --> Imaging --> B --> B Steer.
Benefits	Slant the linear image left or right to get more information without moving the probe.
Bioeffects	Activating steer may change the TI and/or MI. Observe the output display for possible effects.

M/D Cursor

Description	Displays the M/D-Mode cursor on the B-Mode image.
Adjusting	To activate/deactivate the M/D-Mode cursor, press M/D Cursor key. Trackball to position M/D-Mode cursor. Adjust Angle and SV Length as necessary.
Benefits	Lets you position the cursor before you go into M-Mode or Doppler Mode so that you can make optimum use of the larger B-Mode image.

Virtual Convex

Description	On Linear and Sector probes, Virtual Convex provides a larger field of view in the far field.
Adjusting	To activate/deactivate Virtual Convex, select Virtual Convex .
Values	On/Off
Benefits	Virtual Convex allows for a wider field of view. Available in B-Mode, Color Flow Mode, and Doppler Mode. CrossXBeam is available on Virtual Convex with linear probes.
Bioeffects	Activating Virtual Convex may change the TI and/or MI. Observe the output display for possible effects.

TGC

Description	TGC amplifies returning signals to correct for the attenuation caused by tissues at increasing depths. TGC slide pots are spaced proportionately to the depth. The area each pot amplifies varies as well. A TGC curve may appear on the display (if preset), matching the controls that you have set (except during zoom). You can choose to deactivate the TGC curve on the image.
Adjusting	To decrease/increase TGC, move slide pot to the left/right.
Values	When you change the depth, TGC is rescaled across the new depth range. Each pot is proportionately scaled across the depth.
Preset	TGC Display On/Off -- preset via Utility --> System --> System Imaging.
Benefits	TGC balances the image so that the density of echoes is the same throughout the image.



CAUTION

Do not apply too much power to the TGC slide pots as this could damage the slide pots.

Scan Area

Description	You can widen or narrow the size of the sector angle to maximize the image's region of interest (ROI).
Adjusting	To narrow/widen the angle, press Scan Area until the Width is highlighted, then move the Trackball to move left/right to decrease/increase the angle size. Then press Scan Area to set the ROI.
Values	Varies, depending upon the probe (not applicable to linear probes) and application.
Benefits	Increase the sector angle to see a wide field of view; decrease the sector angle when you need to have a faster frame rate, as in fetal heart.
Affect on other controls	Changing the sector angle affects the frame rate. The narrower the sector angle, the faster the frame rate.
Bioeffects	Changing the sector angle may change the TI and/or MI. Observe the output display for possible effects.

Tilt

Description	You can steer the sector angle to get more information without moving the probe while in B-Mode, M-Mode, Doppler Mode, and Color Flow Mode. Tilt is not available on Linear probes. Tilt disappears when CrossXBeam is activated.
Adjusting	To tilt the angle to the left/right, press Scan Area until Tilt is highlighted, then move the Trackball to the left/right.
Values	Varies, depending on the probe.
Benefits	Allows you to move a reduced sector angle laterally, without moving the probe. Beneficial in GYN.
Bioeffects	Steering the sector angle may change the TI and/or MI. Observe the output display for possible effects.

Dynamic Range

Description	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.
Adjusting	To increase/decrease, adjust Dynamic Range .
Values	Dynamic Range values vary by probe, application, and frequency setting. Dynamic Range levels are returned to the factory or user preset value when you change the following: Patient/Preset, Exam Calcs, Probe, or Multi Frequency.
Benefits	Dynamic Range is useful for optimizing tissue texture for different anatomy. Dynamic Range should be adjusted so that the highest amplitude edges appear as white while lowest levels (such as blood) are just visible.
Affect on other controls	Dynamic range operates in real-time, Freeze and CINE. It also affects Gain.

Revert

Description

Flips the image 180 degrees left/right.

Adjusting

To flip the image 180 degrees, select **Revert**.

Values

The image rotates in 180 degrees left/right. Revert settings vary by probe and application.

Revert settings are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or Patient.

Benefits

Used for anatomical correctness.



CAUTION

When reading a reverse image, be careful to observe the probe orientation to avoid possible confusion over scan direction or left/right image reversal.

NOTE:

*The Image can be easily identified as being reversed as the **LOGIQ V** logo will be on the opposite side of the image monitor.*

Line Density

Description	Optimizes B-Mode frame rate or spatial resolution for the best possible image.
Adjusting	Adjust Line Density to increase resolution or to increase frame rate. Select the default value via Utility -> Imaging -> B -> Line Density and press Save .
Values	Varies by probe. <i>NOTE:</i> <i>Not available in cine mode.</i> Values vary by probe and application. Line Density values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or Patient.
Benefits	A lower line density is useful in fetal heart beat, adult cardiac applications and in clinical Radiology applications requiring significantly higher frame rates. A higher line density is useful in obtaining very high resolution, e.g., thyroid, testicles.
Affect on other controls	Line density changes the vector density and frame rate.
Bioeffects	Activating color flow line density may change the TI and/or MI. Observe the output display for possible effects.

Line Density Zoom

Description	You can set the default value for Line Density in zoom independently.
Adjusting	Select the default value via Utility -> Imaging -> B -> Line Density Zoom and press Save .

Colorize

Description

Colorize is the colorization of a conventional B-Mode image or Doppler Spectrum to enhance the user's ability to discern B, M, and Doppler Mode intensity valuations. Colorize is NOT a Doppler Mode.

NOTE: You can colorize real-time or CINE images.

Colorizes the gray scale image to enhance the eye's discrimination capability.

Spectrum Colorize colorizes the spectrum as a function of power using the inverse of the Colorize map for the signal intensity in each Doppler line.

Colorize enhances the visibility of the spectrum's characteristics and enhances your ability to identify spectral broadening and the edge contours of the spectrum used to define the peak frequency/velocity.

The gray bar displays while Colorize is activated.

Adjusting

To activate Colorize,

1. Select **Colorize**.
2. **Trackball** to cycle through available maps.
3. Press **Set** to select.

To deselect, select a gray map.

PRF

Description Reduces noise artifacts in the image. When you activate PRF, the frame rate decreases and the noise artifacts are filtered.

NOTE: Available for only Cardiac application.

Edge Enhance

Description Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M-Mode's edge enhancement affects the M-Mode only.

Adjusting To cycle through settings, adjust **Edge Enhance**.

Values Values vary by probe, application and multi frequency setting. Edge Enhance values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or Patient.

Benefits Edge Enhance cleans out the B-Mode image/M-Mode time line by subduing some of the gray scale in order to highlight the vessel wall or organ. This is helpful when you cannot differentiate between the chambers of the heart.

Affect on other controls Edge Enhance operates in real-time only; not in Freeze or CINE.

Frame Average

Description Temporal filter that averages frames together, thereby using more pixels to make up one image. This has the effect of presenting a smoother, softer image.

Adjusting To adjust frame averaging, adjust **Frame Average**.

Values Values vary by probe, application and multi frequency setting. Frame Average values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or Patient.

Benefits Smooths the image.

Gray Map

Description	The system supplies B, M, and PW Mode system maps. In Doppler mode, the Clear map offers a bluish coloring compared to the standard gray map. Clear Maps provide a more transparent map. Clear maps are displayed under gray maps.
Adjusting	To select a map, select the Gray Map . A map window displays. The image reflects the map as you go through the selections.
Values	Map values vary by probe, application, and frequency setting. Map values are returned to the factory or user preset value when you change the following: Probe, Preset, Exam Calcs, or Patient.

Rejection

Description	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).
Benefits	Allows for the elimination of lower echoes (caused by noise) from the display.

Rotation

Description	Flips the image 180 degrees up/down.
Benefits	Beneficial in transvaginal scanning.



CAUTION

When reading a rotated image, be careful to observe the probe orientation to avoid possible confusion over scan direction or left/right image reversal.

Suppression

Description	Suppresses the noise in the image.
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Needle Recognition

Description

Needle recognition allows you to obtain better needle imaging in the area surrounded by the yellow dashed line (Figure 5-3.a). Needle recognition functionality is only available with linear probes (12L-RS, L6-12-RS).

Figure 5-3.b illustrates the position between the needle and probe. Needle recognition can only enhance in-plane needles. The **needle angle** is defined as the angle between the needle and probe surface.

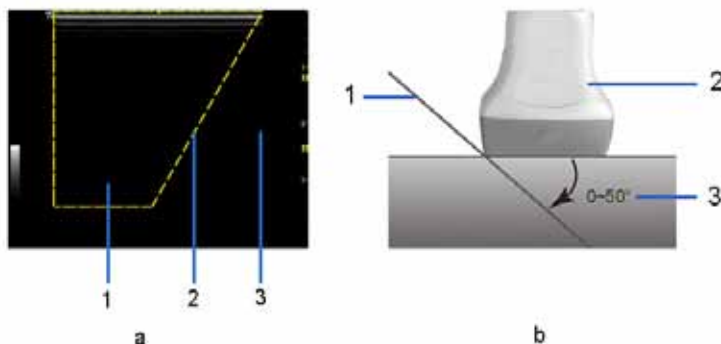


Figure 5-3. a. Enhanced area b. Needle Angle

a

1. Enhanced area
2. Needle guide line
3. Unenhanced area

b

1. Needle
2. Probe
3. Needle angle

NOTE: *Needle Recognition is only available in B/CF/PDI.*

NOTE: *Define a key from U1 - U4 on the control panel for activating/deactivating Needle via Utility -> System -> User Configurable Key.*

Adjusting

- Activating Needle Recognition:
Press the key assigned for Needle on the control panel to activate Needle Recognition
- Adjusting steer direction:
Press the key assigned for Needle on the control panel to adjust the steer direction.
- Adjusting the needle recognition beam angle:
Adjust **Beam Angle** by rotating the Primary Menu control. Max available angles are up to 50 degrees on 12L-RS, 30 degrees on L6-12-RS.

Needle Recognition (continued)

NOTE: Adjust the needle recognition steering angle to form the needle and the beam angle as perpendicular as possible to get the best needle enhancement.

NOTE: To help verify the location and trajectory of the needle tip, please use needle movement and / or fluid injection.

NOTE: Make sure the needle is always in the ultrasound plane by slightly moving or tilting the probe to get the best needle enhancement during the needle procedure.

Preset

Needle Direction - preset via Utility -> Imaging -> B Tab.

Beam Angle - preset via Utility -> Imaging -> B Tab.

Needle Gain - preset via Utility -> Imaging -> B Tab.

Needle Thickness - preset via Utility -> Imaging -> B Tab.

Benefits

Provides better biopsy needle visualization than normal B-Mode with steered beam angle and post processing.

Bioeffects

Activating angle Needle Recognition may change the TI and/or MI. Observe the output display for possible effect.

LOGIQ View (Option)

Description

LOGIQ View provides the ability to construct and view a static 2D image which is wider than the field of view of a given transducer. This feature allows viewing and measurements of anatomy that is larger than what would fit in a single image. Examples include scanning of vascular structures and connective tissues in the arms and legs.

LOGIQ View constructs the extended image from individual image frames as the operator slides the transducer along the surface of the skin in the direction of the scan plane. The quality of the resulting image is somewhat user-dependent and requires some additional skill and practice to develop proper technique and become fully proficient.

LOGIQ View is not available for the following:

- Multi Image
- Timeline Modes
- Color Flow Mode
- PDI Mode

Benefits

The user can look at a larger region of interest within one field of view that is wider than any given probe would normally provide.

Clinical Use

LOGIQ View is intended for scanning areas too large to fit on one image.

Using LOGIQ View

To perform an exam using LOGIQ View,

1. Perform a detailed examination of the anatomy/pathology. Optimize parameters for tissue texture and visible window PRIOR TO activating LOGIQ View.
2. Press the user defined key for **LOGIQ View**.
3. To start acquiring the image, press **L** key.



When you scan, scan slowly and in a uniform motion lengthwise, end-to-end (with or against the probe orientation marker). LOGIQ View acquires images via leading edge vectors (and does not acquire slices, as in CINE). The image is being stored as you perform the scan and you can watch the LOGIQ View as it is being acquired.

LOGIQ View (Option) (continued)

4. To restart the scan, press **L** again. You can back up the probe, realign it, then go forward to redo a portion of the scan.
5. To complete the scan, press **R** or Freeze (or allow the scan to auto complete). The LOGIQ View is then displayed, scaled to fit entirely on the screen.
6. Perform measurements and record images.

Uniform Motion

The quality and usefulness of LOGIQ View images is affected by transducer motion. Incorrect technique can contribute to image distortion.

Guidance and precautions for uniform motion:

- Continuous contact is required throughout the length of the extended image. DO NOT lift the transducer from the skin surface.
- Always keep the transducer perpendicular to the skin surface. DO NOT rock the transducer.
- Keep the motion within the same scan plane, if possible. DO NOT slide the transducer laterally.
- Lateral turning (change in direction to follow anatomical structure) can be accommodated with slower motion. DO NOT make abrupt changes in direction.
- The system accommodates a reasonable range of motion velocity. DO NOT make abrupt changes in speed of motion. Deeper scans generally require reduced speed.

Bioeffects

Activating LOGIQ View has no affect upon Acoustic Output values.

Optimizing M-Mode

Intended Use

M-Mode is intended to provide a display format and measurement capability that represents tissue displacement (motion) occurring over time along a single vector.

Introduction

M-Mode is used to determine patterns of motion for objects within the ultrasound beam. The most common use is for viewing motion patterns of the heart.

Typical exam protocol

A typical examination using M-Mode might proceed as follows:

1. Get a good B-Mode image. Survey the anatomy and place the area of interest near the center of the B-Mode image.
2. Press **M/D Cursor**.
3. Trackball to position the mode cursor over the area that you want to display in M-Mode.
4. Press **M-Mode**.
5. Adjust the Sweep Speed, TGC, Gain, Power Output, and Focus Position, as needed.
6. Press **Freeze** to stop the M trace.
7. Record the trace to disk or to the hard copy device.
8. Press **Freeze** to continue imaging.
9. To exit, press **M-Mode**.

M-Mode Display

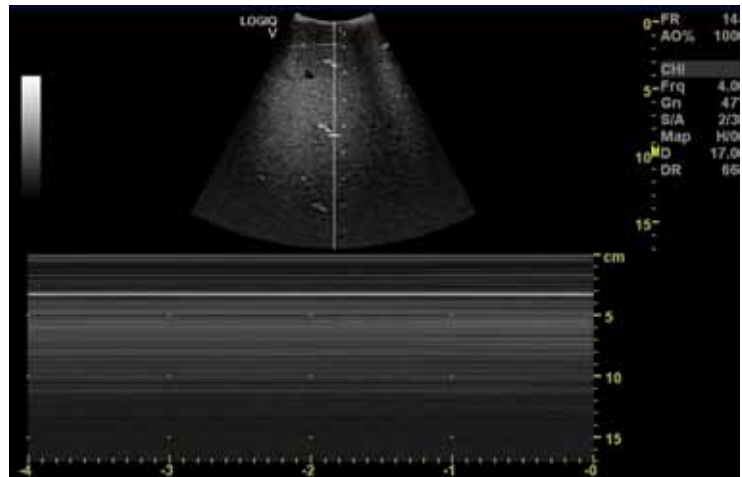


Figure 5-4. M-Mode Display -- Representative Example

M Mode Primary Menu

Different parameters can be assigned to the Primary Menu, the Primary Menu can be configured in Utility -> Application -> Imaging Controls.

Scanning Hints



These M-Mode controls produce the following results:

Sweep Speed. Controls speed of M-Mode update.

Dynamic Range. Affects the amount of gray scale information displayed.

Sweep Speed

Description

Changes the speed at which the time line is swept.

Available in M-Mode and Doppler Mode.

Available in M Color Flow Mode.

Adjusting

To increase/decrease, select **Sweep Speed**.

Values

Each selection represents a different sweep time.

Sweep Speed values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or Patient.

Benefits

You can speed up or slow down the time line to see more or fewer occurrences over time.

NOTE: The sweep speed information represents the user selected sweep speed and should be used only as a reference to confirm that the image was acquired at the selected sweep speed. It is not to be used for measurements or analysis. This is not an absolute value, but simply a reference number. Users performing studies using standardized protocols may find this sweep speed information useful for reading studies from other institutions.

Anatomical M-Mode

Description

Anatomical M-Mode gives you the ability to manipulate the cursor at different angles and positions. The M-Mode display changes according to the position of the cursor.

Anatomical M-Mode displays a distance/time plot from a cursor line, which is independent from the axial plane.

NOTE: To set up AMM, go to Utility--> Imaging--> AMM. Select the specific probe and parameters.

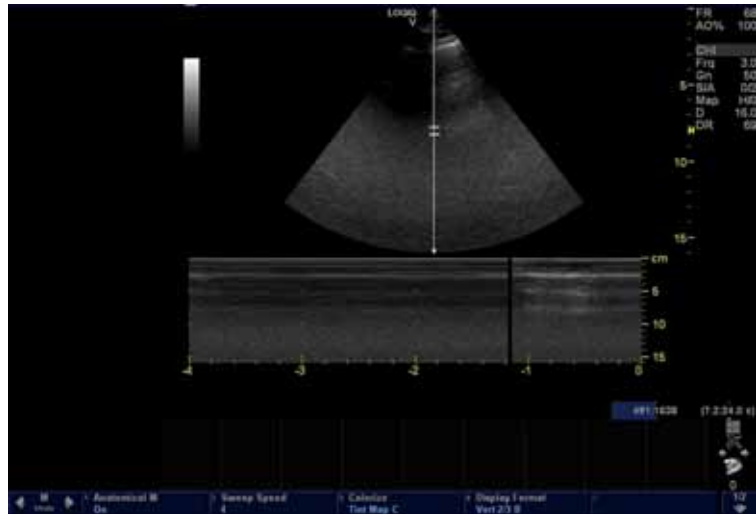


Figure 5-5. Anatomical M Mode

Activating

To activate Anatomical M-Mode:

NOTE: AMM is only available on the sector probe.

1. While in M-Mode, adjust **Anatomical M**.
2. Press **Scan Area** until **Pos** is highlighted, move the trackball to position the M cursor over the required area of the image.
3. Press **Scan Area** until **Angle** is highlighted, move the trackball to allow free rotation of the solid arrow line throughout the 2D image.

Benefits

Anatomical M-Mode gives you the ability to manipulate the cursor at different angles and positions.

Bioeffects

Activate Anatomical M-Mode change the TI and/or MI. Observe the output display for possible effects.

Optimizing Color Flow

Intended Use

Color Flow Mode is a Doppler Mode intended to add color-coded qualitative information concerning the relative velocity and direction of fluid motion within the B-Mode image.

Introduction

A typical examination using Color Flow Mode,

1. Follow the same procedure as described under B-Mode to locate the anatomical area of interest.
2. After optimizing the B-Mode image, add Color Flow.
NOTE: Use all noise reduction controls with care. Excessive application may obscure low level diagnostic information.
3. Move the color flow area of interest as close to the center of the image as possible.
4. Optimize the color flow parameters so that a high frame rate can be achieved and appropriate flow velocities are visualized.
5. Press **Freeze** to hold the image in memory.
6. Record color flow images as necessary.
7. If more definitive information is needed about flow, utilize the procedures described under Doppler Mode.
8. To exit Color Flow, press **CF-Mode** or **B-Mode**.

Color Flow Mode

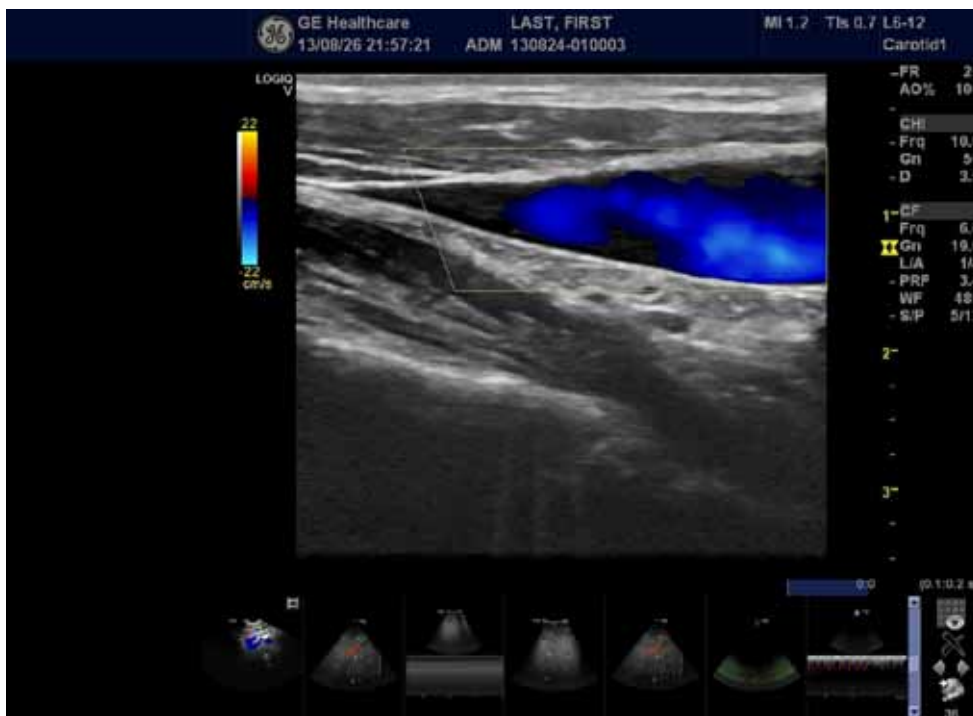


Figure 5-6. Color Flow Mode screen -- Representative Example

Color Flow Mode Primary Menu

Different parameters can be assigned to the Primary Menu, the Primary Menu can be configured in Utility -> Application -> Imaging Controls.

Uses

Color Flow is useful to see flow in a broad area. Color Flow allows visualization of flow in the CF ROI, whereas Doppler Mode provides spectral information in a smaller area.

Color Flow is also sometimes used as a stepping stone to Doppler. You use Color Flow to locate flow and vessels prior to activating Doppler.



HINTS

Color Flow Mode controls produce the following results:

Line Density. The spacing between the lines or pulses from each element. Low line density has widely spaced lines, fewer pulses per frame, shorter times for each frame, higher frame rate, superior temporal resolution, and inferior spatial resolution.

High line density has tightly packed lines, more pulses per frame, longer times for each frame, lower frame rate, inferior temporal resolution, and superior spatial resolution.

Lower line density is useful for applications that requires significantly higher frame rates like the fetal heartbeat.

High line density is useful where very small vessels are being images like the thyroid and testicle.

Wall Filter. Electronic erasers that can filter out clutter caused by tissue and vessel wall motion. Consider increasing for high velocity arterial flow with a lot of pulsatile wall motion. Consider lowering the wall filter for low flow situations. Increasing the wall filter eliminates the flow toward and away from the transducer, so use caution so you don't eliminate real flow or the reversal component of a triphasic waveform.

Threshold. Threshold prioritizes between color flow and the gray scale image. Select the gray-scale echo strength below which color, instead of gray, will be shown at each pixel location. Decrease threshold to reduce the color component of the image.

With threshold set low, weak, non-Doppler-shifted reverberation and off-axis echoes within the vessel take precedence over the Doppler-shifted echoes, and little color is displayed. With higher threshold, the Doppler-shifted echoes, and little color is displayed. With higher threshold, the Doppler-shifted echoes or color take precedence over weaker gray-scale echoes.



HINTS

Frame Average. Averages color frames, When more frames are used to make up the image, it is easier for the system to decide what portion of the image is noise and what part is true signal.

Higher frame averaging keeps the color displayed longer for increased flow visualization. Lower frame averaging provides real time dynamic.

Packet Size. The number of pulses used for each; line of color information. indirectly related to frame rate.

Improves CF when it is increased but this results in a decrease in your frame rate.

Greater ensemble lengths or packet size provide more accurate estimates of mean Doppler shift, improve detection of slow flow, and complete representation of flow within a vessel but at the expense of longer time per frame and therefore frame rate.

Scan Area. The size of ROI has an effect on the frame.

The width of the ROI has a significant effect on FR and sensitivity even more than the height of the ROI.

Keep the box sized just to the anatomy of interest and as close to center as possible.

Focus Position. Moving the focus to the area of interest narrows the width of the beam at that point and increase the lateral or side to side resolution and improves the image quality in that area.

Flow Model

Flow Model provide flow state information. The values vary by application, and can be selected via Utility --> Imaging --> CF.

Gain

Description	Gain amplifies the overall strength of echoes processed in the Color Flow window or spectral Doppler time line.
Adjusting	To decrease/increase Gain, rotate Gain . Gain values change depending on the probe and application; they are not associated with a particular position of the button.
Values	Values vary by probe, application, and frequency setting. Gain displays as Gn on the screen. Gain values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, Patient, or Multi Frequency.
Benefits	Allows you to control the amount of color within a vessel or to fill in or clean out spectral information.
Bioeffects	Gain has no affect on Power Output. However, with increased Gain, the power output level can usually be reduced to produce an equivalent image quality.

PRF/Scale (Velocity Scale)

Description	Increases/decreases the Scale on the color bar.
Adjusting	To raise/lower the velocity scale, adjust PRF . Scale is displayed as PRF on the screen.
Values	PRF/Velocity Scale values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or Patient.
Benefits	Imaging of higher velocity flow requires increased scale values to avoid aliasing.
Affect on other controls	Changing the PRF/Velocity Scale may affect Power Output, frame rate, and wall filter. When you adjust the PRF/velocity scale, CINE memory is cleared.
Bioeffects	Changing the PRF/Velocity Scale range may change the TI and/or MI. Observe the output display for possible effects.

Wall Filter

Description	Filters out low flow velocity signals. It helps get rid of motion artifacts caused from breathing and other patient motion.
Values	Values vary, depending upon probe, application, and packet size. The wall filter is displayed numerically on the monitor (Hz). Wall Filter values vary by probe and application and are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or Patient.
Benefits	Gets rid of excess, unnecessary low frequency signals caused by motion.

Wall Filter Target Override (Hz)

Description	Wall filter target override sets to "0". The algorithm selects a new regression wall filter it updates the wall filter setting and the wall filter cutoff on the user display. If using this algorithm, then the system automatically maintains a target wall filter cutoff as the scale is changed. The target wall filter cutoff is initially set by the results of the user-defined presets for wall filter, scale. The target regression wall filter cutoff shall be updated when the user changes the wall filter setting. Wall filter target override sets to "-1". The algorithm keeps a user selected regression wall filter, when the user changes the color scale. Wall filter target override sets to other value. The algorithm selects a new regression wall filter it updates the wall filter setting and the wall filter cutoff on the user display. In this case, the selected value from the user is the target cut off (Hz).
Values	Set the value on the Utility -> Imaging -> PDF -> Wall filter Target Override (Hz) and press Save .

Size/Position of the color window

Description	Adjust size and position of the color window.
Adjusting	The window grows from the center of the color window. To adjust the size, press Scan Area until Size (Size/Position appears in the Trackball status area on the monitor display) is highlighted, then move the Trackball left/right, up/down. To adjust the position, press Scan Area until Pos is highlighted, then move the Trackball to position the color window.
Benefits	Increase the color window to see a larger area; decrease the color window to improve frame rate and spatial resolution.
Affect on other controls	The smaller the color window, the faster the frame rate and vice versa.
Bioeffects	Sizing the color window may change the TI and/or MI. Observe the output display for possible effects.

CF/PDI Width

Description	You can set the default CF/PDI ROI width.
Adjusting	Select the value on the Utility -> Imaging -> CF mode and press Save .

CF/PDI Vertical Size

Description	You can set the default CF/PDI ROI vertical size.
Adjusting	Select the value on the Utility -> Imaging -> CF mode and press Save .

Invert (Color Invert)

Description Lets you view blood flow from a different perspective, e.g., red away (negative velocities) and blue toward (positive velocities). You can invert a real-time or frozen image.

NOTE: Invert reverses the color map, NOT the color PRF.

Adjusting To reverse the color flow, adjust **Invert**.

In Triplex, both Color Flow and Doppler Mode velocity scales are inverted.

Values Invert values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or New Patient.

Benefits Allows you to view blood flow according to your personal preference, without flipping the probe.

Baseline

Description Changes the Color Flow or Doppler spectrum baseline to accommodate higher velocity blood flow. Minimizes aliasing by displaying a greater range of forward flow with respect to reverse flow, or vice versa.

Baseline adjusts the alias point. The default baseline is at the midpoint of the color display and at the midpoint of the color bar reference display.

Adjusting To adjust the baseline, adjust **Baseline**.

Values Zero velocity follows the baseline. The total PRF range remains the same. Values vary by probe and application.

Baseline values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or new patient.

Benefits Unwraps the alias during color flow imaging. Higher velocities can be displayed without reversal of colors.

Angle Steer

Description	You can slant the ROI of the Color Flow linear image left or right to get more information without moving the probe. The Angle Steer function only applies to linear probes.
Adjusting	To slant the ROI of Color Flow linear image to the left/right, Adjust Angle Steer . Angle Steer can be set in Utility -> Imaging -> CF/PDI.
Values	Angle Steer values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or new patient.
Benefits	Provides a Doppler cursor angle suitable for linear probe orientation. Beneficial in Peripheral Vascular to image carotids.
Bioeffects	Activating angle steer may change the TI and/or MI. Observe the output display for possible effects.

Accumulation

Description	Accumulation enhances the flow in an image.
Values	If Accumulation is turned off, then Frame Averaging is used; if Accumulation is set, then Accumulation is used.
Availability	Available in Color Flow, PDI.
Benefit	Accumulation detects the maximum signal and holds it for the level specified.

Color Flow Line Density

Description	Optimizes the Color Flow frame rate or spatial resolution for the best possible color image.
Adjusting	To adjust the line density, adjust Line Density . Select the default value on the Utility -> Imaging -> CF -> Line Density and press Save .
Values	Values vary by: Probe, Exam Category, Exam Calcs, new patient, and Frequency. Settings are returned to factory or user preset value when you change any of the above.
Benefits	Low line density is useful in fetal heartbeat, adult cardiac applications, and clinical Radiology applications which require significantly higher frame rates. High resolution is useful in situations where very small vessels are being imaged, e.g., thyroid, testicles.
Affect on other controls	Line density changes the vector density and frame rate.
Bioeffects	Modifying line density may change the TI and/or MI. Observe the output display for possible effects.

Line Density Zoom

Description	You can set the default value for Line Density in zoom independently.
Adjusting	Select the default value via Utility -> Imaging -> CF -> Line Density Zoom and press Save .

Map

Description	Allows you to select a specific color map. After you have made your selection, the color bar displays the resultant map.
Adjusting	After you activate Color Flow, the Color Flow menu displays. To cycle through available maps, select Map , move the Trackball to view available maps, and press Set to select.
Values	Velocity Maps (V). Flow shown as blue away/red toward the probe. Velocity Variance Maps (VV). Provides a measure of turbulence (stenosis). Adds green to velocity maps.
Benefits	Shows the direction of the flow and highlights the higher velocity flows.

Map Compress

Description	When you increase the value, high velocity elements in the map are compressed so that the map darkens. When you decrease the value, low velocity elements in the map are compressed so that the map lightens. The effect is visible in the color bar.
Benefits	Changes the gradation in the map.

Threshold

Description	Threshold assigns the gray scale level at which color information stops.
Adjusting	To increase/decrease the gray scale threshold, adjust Threshold .
Values	High values display more color; low values displays more B-Mode gray scale data. Values vary by probe and application and are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or new patient.
Benefits	Limits color flow overlay to low level echoes inside vessel walls. Helps minimize color 'bleeding' outside vessel walls.

Frame Average

Description	Averages color frames.
Adjusting	To smooth temporal averaging, adjust Frame Average .
Values	Frame Average values vary by probe and application. The values are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or new patient.
Benefits	Higher frame averaging keeps the color displayed longer for increased flow visualization while lower frame averaging provides greater flow dynamics.
Affect on other controls	Trades off between frame rate and color quality. As the color quality increases, the frame rate may decrease and as the frame rate increases, the color image quality decreases.

Transparency Map

Description	Brings out the tissue behind the color data.
Adjusting	Adjust Transparency Map .
Benefits	Helps demonstrate the tissues behind the color.

Spatial Filter

Description	Smooths out the color, makes it look less pixely.
Adjusting	Select Spatial Filter to adjust.
	<i>NOTE: Select the default value on the Utility -> Imaging -> CF -> Spatial Filter and press Save.</i>
Benefits	Smooths the image.

Flash Suppression

Description	Activates/deactivates Flash Suppression, a motion artifact elimination process.
Values	Values are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or new patient.
Benefits	Beneficial to suppress flash.

Packet Size

Description	Controls the number of samples gathered for a single color flow vector.
Values	Values vary by probe and application and are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or new patient. Values are displayed on the monitor display as P.
Benefits	Allows you to improve the color sensitivity and accuracy of color averaging (increase packet size) or frame rate (decrease packet size), as needed.
Affect on other controls	When you decrease the packet size, you increase the frame rate at the expense of image quality. When you increase the packet size, you improve image quality at the expense of frame rate.
Bioeffects	Changing packet size may change the TI and/or MI. Observe the output display for possible effects.

Sample Vol (Sample Volume)

Description	Adjusts the size of the color flow doppler transmit wave (or pulse) and size (or length). Lower setting gives better flow resolution and a higher setting increases sensitivity.
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CF/PDI Sample Volume

Description	You can set the default CF/PDI Sample Volume.
Adjusting	Select the value on the Utility -> Imaging -> CF -> CF/PDI Sample Volume and press Save .

CF/PDI Center Depth

Description	You can set the default CF/PDI center depth.
Adjusting	Select the value on the Utility -> Imaging -> CF mode and press Save .

CF/PDI Focus Depth (%)

Description	You can set the default CF/PDI center depth.
Adjusting	Select the value on the Utility -> Imaging -> CF mode and press Save .

CF/PDI Frequency (MHz)

Description You can set the default CF/PDI Frequency (MHz).

Adjusting Select the value on the Utility -> Imaging -> CF mode and press **Save**.

CF/PDI Auto Frequency

Description You can set the default CF/PDI Auto Frequency.

Adjusting Select the value on the Utility -> Imaging -> CF mode and press **Save**.

CF/PDI Vertical Size

Description You can set the default CF/PDI ROI vertical size.

Adjusting Select the value on the Utility -> Imaging -> CF -> CF/PDI Vertical Size and press **Save**.

CF/PDI Width

Description You can set the default CF/PDI ROI width.

Adjusting Select the value on the Utility -> Imaging -> CF -> CF/PDI Width and press **Save**.

Power Doppler Imaging (PDI)

Description Power Doppler Imaging (PDI) is a color flow mapping technique used to map the strength of the Doppler signal coming from the flow rather than the frequency shift of the signal. Using this technique, the ultrasound system plots color flow based on the number of reflectors that are moving, regardless of their velocity. PDI does not map velocity, therefore it is not subject to aliasing.

Adjusting Press **PDI**. The color flow window appears over the B-Mode image. Move the Trackball to move the CF window. To exit, press **PDI** or select a new mode.

Values On/Off.

Benefits Since PDI does not display velocity, it does not alias.

Affect on other controls When PDI is activated, the following controls are adjusted: Color Map is set to a power map. Line Density is adjusted. Threshold is adjusted. Frame Averaging is adjusted. Packet Size is adjusted.

NOTE: These controls are reset to their previous values upon exiting PDI.



HINTS

When changing maps, higher gain settings may be needed.

Directional Power Doppler

You can select the P7 Directional Power Doppler map while in PDI.

NOTE: If you store a PDI image and recall it, you can still switch to the Directional Power Doppler map and vice versa. However, an image stored as non-directional then switched to directional just adds direction to a non-directional map and vice versa.



HINTS

If the image is aliasing while in Directional Power Doppler, increase the Scale and reduce the Wall Filter.

Tissue Velocity Imaging (Option)

Intended Use

Tissue Velocity Imaging (TVI) calculates and color-codes the velocities in tissue. The tissue velocity information is acquired by sampling of tissue Doppler velocity values at discrete points. The information is stored in a combined format with gray scale imaging during one or several cardiac cycles with high temporal resolution.

TVI can be activated on the sector probes only.

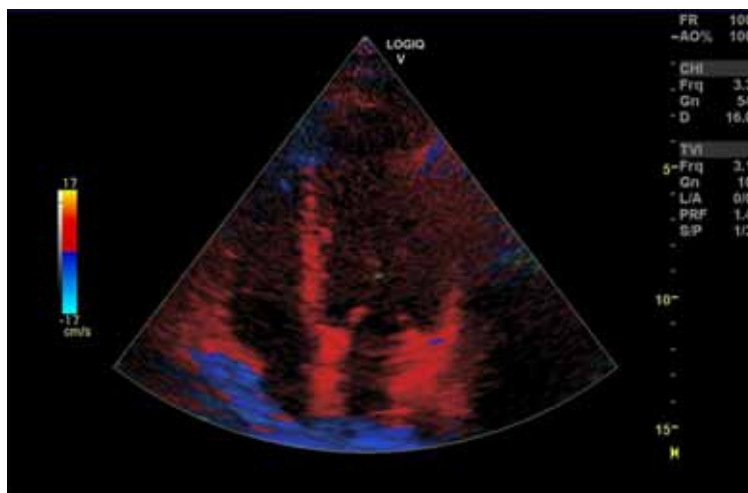


Figure 5-7. Tissue Velocity Imaging Display

Activating TVI

1. Select the sector probe 3Sc-RS.
2. While in B-Mode, press the user defined key for TVI. The TVI image and the menu display.
While in TVI, press **PW** to activate TVD.
3. Press **Scan Area** until **Pos** is highlighted, then move the **Trackball** to position the ROI frame over the area to be examined.
4. Press **Scan Area** until **Size** is highlighted, then move the **Trackball** to adjust the dimension of the ROI.

Optimizing TVI

The use of preset gives optimum performance with minimum adjustment. If necessary, the following controls can be adjusted to further optimize the TVI display:

- To reduce quantification noise (variance), the Nyquist limit should be as low as possible, without creating aliasing. To reduce the Nyquist limit: Reduce the Scale value.
- TVI provides velocity information only in the beam direction. The apical view typically provides the best window since the beams are then approximately aligned to the longitudinal direction of the myocardium (except near the apex). To obtain radial or circumferential tissue velocities, a parasternal view must be used. However, from this window the beam cannot be aligned to the muscle for all the parts of the ventricle.

NOTE: The Scale value also affects the frame rate. There is a trade off between the frame rate and quantification noise.

NOTE: PW will be optimized for Tissue Velocities when activated from inside TVI.

*NOTE: You can preset the value on the Utility -> Imaging -> TVI or TVD mode and press **Save**.*

TVI Parameters

You can preset all parameters in Utility -> Imaging ->TVI.

The TVI parameters function the same as those described in the Color Flow specific section. The only differences would be that it pertains to tissue velocity rather than the color flow image. In the table below any TVI parameter or parameter specifics are noted.

About optimizing other parameters, see 'Optimizing Color Flow' on *page 5-30* for details.

Table 5-1: TVI Parameters

Control	Details
Visible	In LIVE/Freeze/Archive, you can display TVI Color with TVI. Select Visible . On or Off.
Line Density	0 or 1. Optimizes B-Mode frame rate or spatial resolution for the best possible image.
Map	Values: TVI1 and TVI2.
Threshold	High values display more color. Low values limit the color to lower tissue echo (Opposite of Threshold in Color Flow Mode).
Spatial Filter	Values 0, 1 and 2.
TVI Gain	Control color transparency. High values display more color; low values display more tissue. This parameter is assigned to the Color Gain control.

TVD Parameters

About optimizing other parameters, see 'Optimizing Spectral Doppler' on *page 5-50* for details.

Optimizing M Color Flow

M Color Flow Mode

Description

M Color Flow is used for adult, pediatric and fetal cardiac applications. Color Flow overlays color on the M-Mode image using velocity and variance color maps. The Color Flow wedge overlays the B-Mode image and M-Mode time line.

The Color Flow maps available in M-Mode are the same as in Color Flow Mode. The size and position of the Color Flow window in B-Mode determines the size and position of the Color Flow window in M-Mode.

All M-Mode measurements are available with M Color Flow active: depth, distance along a straight line, % stenosis, volume, trace, circumference, enclosed area, distance, time, slope, and heart rate.

M Color Flow mode can be activated on the sector probes only.

M Color Flow Mode (continued)

Activating To activate M Color Flow Mode, press **M** (M-Mode). Then press **CF** (Color Flow) - or - press **CF**, then press **M**. CM tab is displayed.

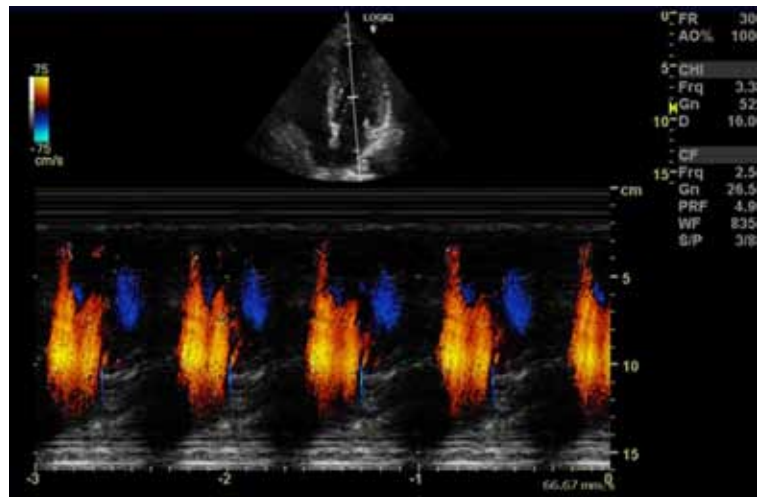


Figure 5-8. M Color Flow screen -- Representative Example

Benefits Color Flow Mode and Color Flow M-Mode are Doppler Modes intended to add color-coded qualitative information concerning the relative velocity and direction of fluid motion within the B-Mode or M-Mode image.

Bioeffects Changing the Sweep Speed, Packet Size, Frame Rate/Resolution, Zoom, PRF, and ROI size may change the TI and/or MI. Observe the output display for possible effects.

Optimizing Spectral Doppler

Intended Use

Doppler is intended to provide measurement data concerning the velocity of moving tissues and fluids. PW Doppler lets you examine blood flow data selectively from a small region called the sample volume.

Typical Use - PW Doppler

In Pulsed Wave Doppler (PW) Mode, energy is transmitted from the ultrasound probe into the patient, as in B-Mode. However, the received echoes are processed to extract the difference in frequency between the transmitted and received signals. Differences in frequencies can be caused by moving objects in the path of the ultrasound signal, such as moving blood cells. The resultant signals are presented audibly through the system speakers and graphically on the system display. The X axis of the graph represents time while the Y axis represents the shift in frequency. The Y axis can also be calibrated to represent velocity in either a forward or reverse direction.

PW Doppler is typically used for displaying the speed, direction, and spectral content of blood flow at selected anatomical sites. PW Doppler operates in two different modes: conventional PW and High Pulse Repetition Frequency (HPRF).

PW Doppler can be combined with B-Mode for rapidly selecting the anatomical site for PW Doppler examination. The site where PW Doppler data is derived appears graphically on the B-Mode image (Sample Volume Gate). The sample volume gate can be moved anywhere within the B-Mode image.

Spectral Doppler Display

Time zero (the start of the trace) appears on the left side of the graph. As time progresses, the trace moves to the right. The baseline of the graph (representing zero velocity, zero frequency shift, or no detected flow), appears as a solid line running horizontally across the display. By convention, movement toward the probe is positive and movement away from the probe is negative. Positive frequencies or velocities appear above the baseline. Negative frequencies or velocities appear below the baseline.

Typically, blood flow is not uniform but is composed of a mix of blood cells moving at different velocities and in different directions. Thus, the display is composed of a spectrum as gray scale values. Strong signals are displayed as bright while weak signals are displayed as varying shades of gray.

HPRF (High Pulse Repetition Frequency) is invoked when you are operating in PW Doppler Mode and conditions activate HPRF (when the velocity scale factor or sample volume gate depth exceeds certain limits). When HPRF is active, multiple sample volume gates appear along the Doppler mode cursor. Doppler information can be received from any of the multiple sample volume gates. The Doppler signals from all the gates are added together and displayed in one spectrum.

Information about the PW Doppler display is automatically written on the screen and updated when scanning parameters are changed.

This chapter includes:

- A discussion of PW Doppler.
- Activating Pulsed Wave Doppler.
- Optimizing the Doppler spectrum.

Typical exam protocol

A typical examination using PW Doppler Mode might proceed as follows:

1. Connect the appropriate probe, leaving the probes in their respective holders.
2. Position the patient for the examination.
3. Press **Patient**. Enter the appropriate patient data using the appropriate exam category.
4. Select the preset, application and probe to be used.
5. Locate the anatomy to be examined. Get a good B Mode image. Press CF to help locate the vessel you wish to examine.
6. Press **M/D Cursor** to display the sample volume cursor and gate. Press **PW**. The PW Doppler spectrum appears and the system operates in combined B+Doppler Mode. Adjust **Volume** to adjust Doppler audio. The Doppler signal is heard through the speakers.
7. Position the sample volume cursor by moving the **Trackball** left and right. Position the sample volume gate by moving the **Trackball** up and down. Size the gate by clicking **SV Length**.
8. Optimize the PW Doppler spectrum, as necessary. Refer to the *Doppler Optimization* section of this chapter for more information.

Typical exam protocol (continued)

9. Press **Set/B Pause** to toggle between real time B-Mode with Doppler Mode (with audio).
10. Sample along the whole length of the vessel. Make sure that the probe is parallel to flow. Listen, then look, when positioning the sample volume cursor.
11. Press **Freeze** to hold the trace in memory and stop imaging. Activate CINE Timeline, as necessary. See 'Activating CINE' on page 6-10 for more information.
12. Perform measurements and calculations, as necessary. Refer to the Measurements and Calculations chapter for more information.
13. Record results by pressing the appropriate store/print key, depending on the setup of your recording devices.
14. Press **Freeze** to resume imaging.
15. Repeat the above procedure until all relevant flow sites have been examined.
16. Replace the probe in its respective holder.
17. To exit PW, press **PW**.

Doppler Mode Primary Menu

Different parameters can be assigned to the Primary Menu, the Primary Menu can be configured in Utility -> Application -> Imaging Controls.

Activating Doppler Mode

To activate PW Doppler Mode, press M/D cursor and place the cursor in the appropriate position, then press **PW**.

The Doppler spectrum displays along with the B-Mode image. The cursor changes to a Doppler cursor.

You can now position and size the sample volume gate to get a velocity. Use Doppler Audio to listen for when the sample volume gate is positioned over an area of flow.

M/D Cursor toggles between real time B-Mode/Color Flow with Doppler Mode and real time spectral display.

Use

Doppler is used to examine blood flow information.

To exit

Press PW or B-Mode.

Doppler Mode Display

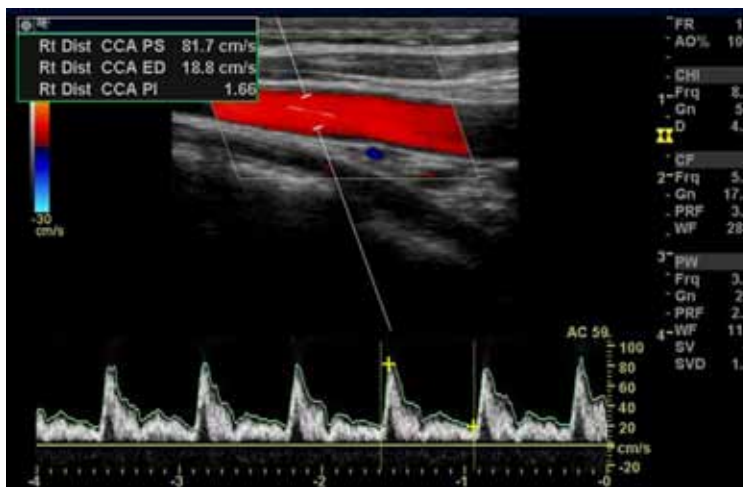


Figure 5-9. PW Doppler Mode Display -- Representative Example

Table 5-2: Doppler Mode Display Explanations

Doppler Display	Description, Format, Values
PRF	Pulse repetition frequency, displayed as PRF in kHz.
Wall Filter	Wall filter size, displayed as WF in Hz.
Doppler Gain	Displays as GN in decibels (dB).
Sample Volume Depth	Displays (in Cm) when Doppler cursor is present.
Doppler Angle (AC ##)	Indicates angle in degrees between the Doppler mode cursor and the angle correction indicator. Displays when Doppler cursor is present. The Doppler Angle displays in red when the angle exceeds 60°. Velocities obtained when the angle is greater than 80° are displayed as asterisks (**).
Spectral Invert	INVERT appears when the spectral trace is inverted and the plus/minus signs (+/-) are reversed.
HPRF	HPRF mode is used when detected velocities exceed the processing capabilities of the currently selected PW Doppler scale or when the selected anatomical site is too deep for the selected PW Doppler scale.
Time Scale	Each selection represents a different sweep time.
Angle Correct	Indicates flow direction.
Sample Volume Gate	Indicates sample volume box. Each probe defaults to a specific range gate.
Doppler Velocity Scale	Flow direction has a positive and negative indicator, noted in centimeters per second (cm/sec.). The Doppler velocity scale adjust as you adjust the PRF.

Doppler Sample Volume Gate Position (Trackball)

Description	Moves the sample volume gate on the B-Mode's Doppler Mode cursor. The gate is positioned over a specific position within the vessel.
Adjusting	To move Doppler Mode cursor position, move Trackball left or right until positioned over the vessel. To move sample volume gate position, move Trackball up or down until positioned inside the vessel.
Values	Defaults to 50% of the depth and can move continuously throughout the field of view.
Benefits	Positions the sample volume gate to sample blood flow.
Bioeffects	Changing the sample volume gate position may change the TI and/or MI. Observe the output display for possible effects.

Doppler Sample Volume Length

Description	Sizes the sample volume gate.
Adjusting	To increase/decrease the gate size, adjust SV Length . You can adjust the sample volume gate length whenever the sample volume gate appears on the display. <i>NOTE: Adjustments to the sample volume gate size are made from the center point of the sample volume position.</i>
Values	Values vary by probe and application. Sample volume gate size values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or new patient.
Benefits	A smaller gate produces accurate sampling results because it is more sensitive. You can also enlarge the gate for sampling large vessels or areas.
Bioeffects	Changing the sample volume gate size may change the TI and/or MI. Observe the output display for possible effects.

Angle Correct/Auto Angle

Description	Estimates the flow velocity in a direction at an angle to the Doppler vector by computing the angle between the Doppler vector and the flow to be measured.
	<i>NOTE: When the Doppler Mode Cursor and angle correct indicator are aligned (the angle is 0), you cannot see the angle correct indicator.</i>
Adjusting	Flow toward the probe is mapped above the baseline and vice versa. To adjust the angle relative to the probe face, adjust Angle Correct or Auto Angle . The velocity scale changes when you adjust angle correct. Angle Correct and Auto Angle values vary by probe and application. Angle Correct values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or New Patient.
Benefits	Optimizes the accuracy of the flow velocity. This is especially useful in vascular applications where you need to measure velocity.

Quick Angle

Description	Quickly adjusts the angle by 60 degrees.
Adjusting	Adjust Quick Angle .

Steer/Fine Steer

Description	You can slant the mode cursor of the linear image left or right to get more information without moving the probe. The angle steer function only applies to linear probes.
Adjusting	To slant the mode cursor to the left/right, adjust Steer or Fine Steer .
Values	Linear probes can be steered left, center, or right. Steer values are returned to factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or new patient. Fine Steer value can be changed in small degree increments.
Benefits	Provides a doppler cursor angle suitable for linear probe orientation. Beneficial in Vascular applications.
Bioeffects	Activating angle steer may change the TI and/or MI. Observe the output display for possible effects.

Volume

Description Controls audio output.



CAUTION

Audio sounds change rapidly, often abruptly. Increase the volume in small steps to avoid startling the patient.

Benefits

An audio representation of the flow within a vessel can be used to evaluate proper probe angle and position.

Auto Spectrum Optimize (Auto)

For details on Auto, See 'Auto Optimize' on *page 5-8 for more information.*

Cycles to Average

Description

The average value over a number of cycles (from 1-5). For example, if you set the number of cycles at 3, values would be averaged for 3 cycles. If you have 5 cycles on the display, the PS would be the average of 3 of the 5 cycles, which are identified by a line drawn over the 3 averaged cycles.

Available for live and frozen images.

Display Format

Description

Changes the horizontal/vertical layout between B-Mode and Doppler Mode, or time line only.

Benefits

You can select how to have your Doppler time line and anatomy displayed.

Set/ B Pause

Description	Toggles between simultaneous and update presentation while viewing the timeline.
Adjusting	To activate, press Set/ B Pause to toggle between simultaneous and Spectral Doppler display. Doppler Mode does not restart each time the image is updated; however, a black bar may appear with a lightning bolt signalling a break in the timeline.
Values	On/Off.
Benefits	Increases the Spectral Doppler display quality.
Bioeffects	May change the TI and/or MI. Observe the output display for possible effects.

Simultaneous

Description	When you select Simultaneous, everything is live. For example, both B-Mode and PW Doppler Modes are active; or B-Mode, PW Doppler Mode, and CF Modes are active. If Simultaneous is not selected, use M/D Cursor to toggle between modes.
Adjusting	Adjust Simultaneous .
Benefits	Allows the user to have multiple modes active at the same time.

Baseline

Description	Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing.
Adjusting	Baseline adjusts the point in the spectrum where the velocity trace is at zero. The default baseline is at the midpoint of the spectrum. The baseline displays as a solid line running across the spectrum. The baseline is raised and lowered in equal increments, depending on the current Doppler scale factor. The control does not wrap when the maximum baseline shift (in either direction) has been reached.
Values	Baseline values vary by probe and application and are returned to the factory or user preset value when you change: Probe, Exam Category, Exam Calcs, or New Patient.
Benefits	Unwraps the alias. Rearranges the velocity scale without changing the velocity scale. Readjusts the positive and negative velocities limit without changing the total velocity range.

Compression

Description	Compression controls how echo intensities are converted to shades of gray, thereby increasing the range of contrast you can adjust.
Values	The values can be set in Utility -> Imaging -> PW. Compression values vary by probe and application and are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or New Patient.
Benefits	Optimizes the image's texture and smoothness by increasing or decreasing the amount of gray scale.

Invert

Description	<p>Vertically inverts the spectral trace without affecting the baseline position.</p> <p>To invert the spectral trace, adjust Invert. The minus (-) signs on the velocity scale reverse when the spectrum is inverted.</p> <p>Positive velocities display below the baseline.</p>
Values	The trace corresponds to flow direction (positive flow is forward flow toward the probe or negative flow is reverse flow away from the probe). The invert setting is returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or New Patient. In simultaneous mode, both Color Flow and Doppler Mode velocity scales are inverted.
Benefits	If you change the probe angle to accommodate anatomy, blood flow still moves in the same direction, but the Doppler information will be reversed. It is easier in cases like this to invert the spectrum instead of reversing the probe orientation.

Cursor Moving

Description	<p>On Utility--> Imaging --> PW, specify the value.</p> <p>Cursor Moving lets you 'walk' Doppler through a vessel while the Doppler gate is moving. Updates are more frequent on Fast vs. Medium vs. Slow. If you set the preset to Update 2D/CF, this causes the B Mode/Color Flow image to go live while you move the Doppler cursor.</p>
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PRF

Description	<p>Adjusts the PRF to accommodate faster/slower blood flow velocities. Pulse repetition frequency is determined by Velocity scale.</p> <p>If the sample volume gate range exceeds single gate Scale capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.</p>
High PRF	<p>High Pulse Repetition Frequency (HPRF) is a special operating mode of PW Doppler. In HPRF mode, multiple energy pulses are used. This allows higher velocities to be detected without causing aliasing artifacts. HPRF mode is used when detected velocities exceed the processing capabilities of the currently selected PW Doppler scale or when the selected anatomical site is too deep for the selected PW Doppler scale. The pulse repetition frequency (PRF) is displayed to the left of the spectrum in frames per second.</p> <p><i>NOTE: Ensure that only one gate overlays a blood vessel at a time. Otherwise, signals from more than one flow area are superimposed.</i></p>
Adjusting	<p>Adjust the PRF. The display updates velocity scale parameters after you adjust the PRF.</p>
Values	<p>PRF values vary by probe and application. In Simultaneous mode, when you change the PRF in Color Flow, the Doppler Mode velocity scale is also updated if Simultaneous is on.</p> <p>PRF values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, or New Patient.</p>
Benefits	<p>Blood flow information is not cut off due to the effect of aliasing.</p>
Affect on other controls	<p>When you raise the PRF, the spectral waveform may decrease in size; when you lower the PRF, the spectral waveform may increase in size. Changes in the spectrum are relative to changes in the velocity scale, that is, it sizes accordingly. Adjustments may affect sample volume size and Doppler wall filter.</p>
Bioeffects	<p>Changing the PRF may change the TI and/or MI. Observe the output display for possible effects.</p>

Wall Filter

Description	Insulates the Doppler signal from excessive noise caused from vessel movement.
Adjusting	To increase/decrease, adjust Wall Filter .
Values	Values vary, depending upon the probe and application. The current value displays on the monitor. Wall Filter values are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, New Patient.
Benefits	Gets rid of excess, unnecessary information. Cleans out low level noise above and below the baseline so you don't see or hear it on the spectrum.
Affect on other controls	Wall filter may be changed by changes to the velocity scale.

Trace Method

Description	Traces the average mean and peak velocities in real-time or frozen images.
Adjusting	To get a peak trace, click MAX. A green trace displays on the spectrum. To get a mean trace, click MEAN. A green trace displays on the spectrum.
Benefits	Lets you trace the cardiac cycle.

Trace Sensitivity

Description	Adjust the trace to follow the waveform for signal strength.
Benefits	If the signal is very faint, increasing the Trace Sensitivity will allow the system to trace that signal strength.

Trace Direction

Description	Specifies trace direction.
Selecting Trace Position	You can select where on the waveform to perform the trace, above, below, or both (above and below).

Continuous Wave Doppler (CWD) (Option)

Allows examination of blood flow data all along the Doppler Mode cursor rather than from any specific depth. Gather samples along the entire Doppler beam for rapid scanning of the heart. Range gated CW allows information to be gathered at higher velocities.

Steerable

Allows viewing of the B-Mode image to position the Doppler cursor to the area of interest while viewing the Doppler spectrum (shown below in the B-Mode image) and listening to the Doppler Audio signal.

Works with the sector probes.

Activating CW Doppler

To activate CW Doppler Mode, press user defined key for **CW**.

The Steerable CW Doppler spectrum displays along with the B-Mode image. The cursor changes to a Doppler cursor.

You can now position and size the sample volume gate to get a velocity. Use Doppler Audio to listen for when the sample volume gate is positioned over an area of flow.

Set/B Pause toggles between real time B-Mode with Doppler Mode and real time spectral display.

Exiting CW Doppler

To exit CW Doppler Mode, press user defined key for **CW** again.

TruScan

TruScan allows you to change imaging parameters to help optimize the images that are set/frozen or archived. TruScan is applicable on entire cine loops, not just single static DICOM images. This feature provides the user with an opportunity to review and manipulate images after the scan.

The function allows you to select a specific area of interest, zoom in and optimize for closer observation.

TruScan on B-mode

To apply various post-processing tools to the image:

1. Recall a B-mode raw data image. For example: Fetal cardiac image.
2. Resize the acquired image by using the zoom function.
3. Adjust the image by using various imaging controls.
 - a. Use the Active key on control panel to access B-mode menu.
 - b. Reduce posterior saturation by adjusting the TGC.
 - c. Adjust the image gain and dynamic range.
 - d. Use the SRI function to reduce the speckle noise in the image and get an enhanced image.
 - e. Use the colorize option to further adjust the image.
 - f. Annotate and save the image.

TruScan on Color-Flow

To adjust an image acquired in the Color Flow mode using the post-processing controls:

Obtain an image in B-mode and color mode. For example: Carotid image.

1. Freeze and then store the image.
2. Use the Invert function to flip the color map for correct color mapping.
3. Customize the Color Flow by adjusting color gain and choosing a different color map. Choose a transparency map instead of the regular color maps to see the underlying B-mode anatomy.
4. Adjust The baseline and threshold values to optimize the Color Flow and get maximum Color Flow information from the image.

TruScan on Pulse Wave Doppler

To work on a Pulse Wave Doppler spectrum after image acquisition:

NOTE: Set **Start M&A on Freeze (D)** to **Off** in Utility -> Measure -> Measure -> Advanced.

1. Acquire a B+Color+spectral Doppler image of the carotid.
2. Obtain a PW spectrum and then freeze.
3. Store the image obtained.
4. Use the Angle correct function to optimize the angle between the Doppler cursor and the vessel to get a velocity measurement.
5. Adjust the baseline, sweep speed and the display format to customize the spectral display.

TruScan and Measurements

LOGIQ V2/LOGIQ V1 supports Auto Doppler calcs in both live and frozen mode. This is configured from the secondary menu in the measurement mode. The parameters selected for calculation can be changed later after the image is acquired.

Measurements are also supported on recalled grey scale images saved in DICOM format. This enables users to review patient images and redo measurements and calculations without reimaging or inconveniencing the patients.

Reporting

The raw data acquisition capabilities of TruScan enables re-annotation and re-measurement during remote reporting using a reporting software.

Q Analysis (Option)

NOTE: Quantitative Analysis is optional in LOGIQ V2/LOGIQ V1.

Quantitative Analysis is available for the following CINE loops obtained in the following modes: Tissue Velocity Imaging, Color Flow Mode, Power Doppler Image. All of the Quantitative Analysis modes operate similarly, with some variation.

Activating QAnalysis

1. Scan and Freeze the patient in the desired live mode or recall a desired cine loop from the stored images.

NOTE: QAnalysis is only available when the system is in CINE mode.

NOTE: Images from the current scan session acquired in the desired analysis mode (already in CINE) or from a saved image loop can be used for QAnalysis.

2. **QAnalysis** displays on the Cine Primary Menu.
3. Select **QAnalysis**. The QAnalysis screen and QA Primary Menu displays. To toggle the trackball function between QA and Scroll, press the **Scan Area** on the control panel.

Q-Analysis Screen Description

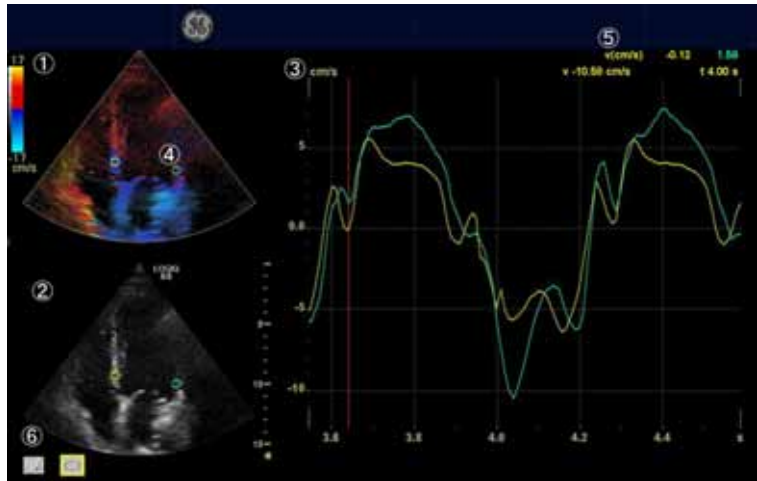


Figure 5-10. TVI mode Q-Analysis Example

Table 5-3: QAnalysis Screen Description

1.	TVI Cineloop Window Sample Area: Indicates sampling position of the velocity. The sample area is color-coded: the first sample area is yellow, the second green, etc.
2.	B Cineloop Window Sample Area: Indicates sampling position of the velocity. The sample area is color-coded: the first sample area is yellow, the second green, etc.
3.	Analysis Window. <ul style="list-style-type: none"> • Y axis: Velocity scale (cm/s) • X axis: Time(s) • Time at cursor position. • Velocity at Cursor position. • Velocity at frame marker position (Color coded)
4.	Sample Area
5.	Time at cursor position and velocity at cursor position. Position the pointer cursor over the analysis window.
6.	Sample Area Tools. <ul style="list-style-type: none"> • Pencil Icon: Creates a sample area based on freehand drawing. • Shape Icon: Creates a sample area with a pre-defined circular/ellipse shape.

Q-Analysis Screen Description (continued)

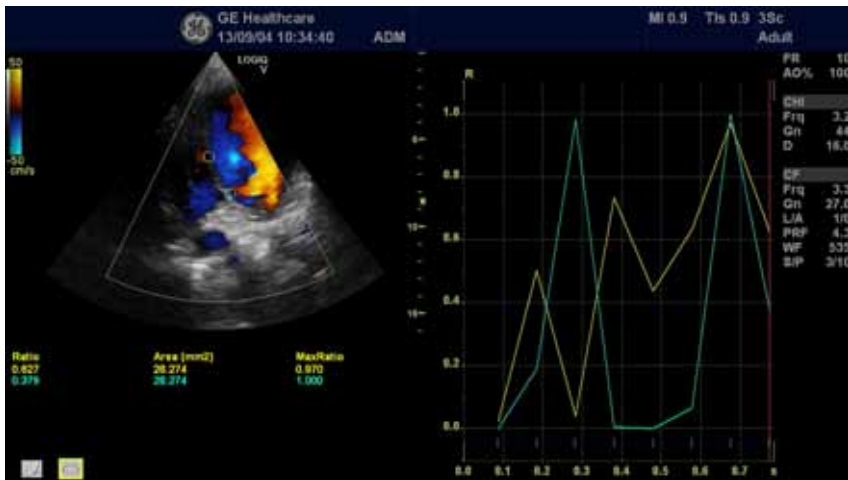


Figure 5-11. CF Mode Q-Analysis Example

Selecting QAnalysis Image Range

A range of frames is selected for the Qanalysis in Cine mode (before accessing QAnalysis). Only the frames in this range are used for the QAnalysis.

If a range is not selected prior to accessing the QAnalysis, the system uses the default Cine start and end frames as the default start and stop frames.

1. The first frame in the analysis series is selected by adjusting the **Start Frame** control to the desired frame. Using the **Trackball** or the **Frame by Frame** control to select the desired first frame and then selecting the **Start Frame** control.
2. The last frame in the analysis series is selected by adjusting the CINE **End Frame** control to the desired frame. Using the **Trackball** or the **Frame by Frame** control to select the desired last frame and then selecting the **End Frame** control.

Generating a Trace

Trace from a pre-defined sample area

1. Select the sample area Ellipse ROI button (shape icon on the monitor display).
2. Move the cursor to one of the Cineloop windows using the **Trackball**.
3. Press **Set** to anchor the sample area.

In this frame, the sample area is marked with an anchor. If the cineloop has more than one heart cycle, a sample area will also be anchored in the corresponding frame in the next heart cycle.

The trace is updated accordingly in the Analysis window.

Trace from freehand sample area

1. Select the Freehand ROI button (pencil icon on the monitor display).
2. Move the cursor to one of the Cineloop windows using the **Trackball**.
3. Trace the outline of the desired ROI by moving the caliper with the **Trackball**.
4. Press **Set** to anchor the sample area.

The sample area is automatically closed and the trace is updated accordingly in the Analysis window.

Manual tracking of the sample area (dynamic anchored sample area)

1. Place a sample area over a region of interest. Note the anatomical location of the sample area.
2. Scroll to a new frame using the **Trackball**.
3. Press **Scan Area** key until the QA trackball assignment is selected.
4. Move the cursor to the sample area using the **Trackball**.
5. Press **Set**. The sample area is unanchored.
6. Drag the sample area to the corresponding anatomical location in the new frame.

When the sample area is anchored in more than one frame, linear interpolation is performed so that the sample area is smoothly moved between the anchored positions in the selected frames when running the cineloop.

7. Press **Scan Area** key until the scroll trackball assignment is selected.
8. Using the **Trackball**, scroll through the cineloop and control that the sample area follows the moving anatomical structure.
9. Add anchored sample areas in several frames to obtain a more accurate displacement of the sample area.

Moving a dynamic anchored sample area

1. Press **Scan Area** key until the scroll trackball assignment is selected.
2. Using the **Trackball**, browse through the cineloop to display one of the frames where the sample area was anchored.

NOTE: In these frames, the sample area is marked with an anchor.

3. Press the **Scan Area** key until the QA trackball assignment is selected.
4. Move the cursor to the sample area using the **Trackball**.
5. Press **Set**. The sample area is unanchored.
6. Drag the sample area to a new location.
7. Press **Set** to anchor the sample area to the new location.

If you want to move the sample area to the same depth, select **Move (same depth)** from the System Menu.

Delete a trace

The user can delete all traces at once or one at a time.

1. Move the cursor over one of the sample area. Confirm that cursor is changed to hand icon.
2. Select **Delete Current Sample** or **Delete all samples** as necessary.

Manipulating the Sample Area

Up to eight ROIs can be saved on the reference image, with the corresponding eight traces plotted simultaneously on the graph. Each ROI display has a different color, and its corresponding trace data is plotted using that same color.

Once eight ROIs have been saved, the system does not automatically generate an active ROI when the cursor is positioned over the displayed reference image.

The saved ROIs can be a mixture of elliptical and freehand ROIs.

When the user repositions an ROI, the old trace data is erased from the plot and the trace data for the new position replotted.

If the ROI position on the last frame of the selected image range is moved, the corresponding ROIs on all frames are repositioned to match the last frame.

The user shall also have the capability of setting separate ROI positions on different frames of the images, and the system shall linearly interpolate the ROI positions for the frames in between the selected frames.

Manipulating the Sample Area (continued)

Setting the default sample area shape

1. Position the cursor on the ROI on the Cineloop windows, a white hand appears.

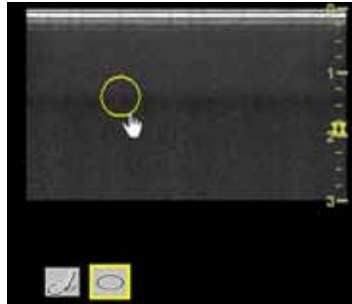


Figure 5-12. A White hand appears

2. Select **Set sample area shape**. The Information Box displays.

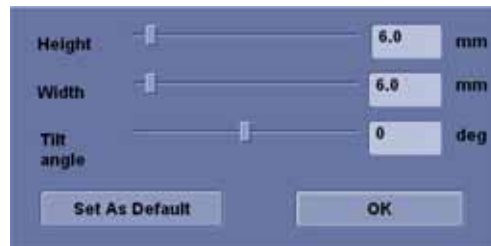


Figure 5-13. Sample Area Information Box

3. Select Height, Width and Tilt angle.
4. Select **Set as default**. The current ROI size is set as the default for subsequent Ellipse ROIs.

Reshaping a Sample Area

To reshape the sample area:

1. Position the cursor on the ROI on the Cineloop windows, a white hand appears.
2. Select **Set sample area shape**.
3. Adjust Height, Width and Tilt angle.
4. Press **OK**. The selected ROI size changes.

Manipulating the Sample Area (continued)

Sample Area Shapes

There are two different methods for determining the shapes of the sample area.

Ellipse ROI

1. Select the ellipse icon (shape icon on the monitor display).
2. When the trackball positions the image display cursor over the reference image(s), an elliptical ROI is automatically generated and displays on the reference image(s).
3. The average velocity value inside the ellipse is calculated for every image in the image analysis range and plotted in the image display area.
4. The last generated or selected ellipse is considered the active ROI, and its trace plot automatically updates as the user repositions it on the reference image. Old traces are erased.
5. When scanning with an elliptical ROI, press **Set** to fix the ROI position and freeze its corresponding trace on the plot. A new active ROI is generated whose position is manipulated by the trackball and whose velocity curve traces will be plotted as before, while the previous ROI and trace remain fixed at the points they were saved at.

NOTE: Elliptical ROIs can be positioned in any manner that keeps their center within the image boundaries. In the case that part of the ROI is outside the image boundary, only data from within the image boundary is used for calculating the mean velocity value.

NOTE: You can change the size of the Ellipse ROI by adjusting the Ellipse control.

Freehand ROI

1. Select Freehand icon (pencil icon on the monitor display).
Use the **Trackball** to position the caliper on the reference image at the start point. Press **Set** to fix the start point.
2. Trace the outline of the desired ROI by moving the caliper with the **Trackball**.
3. When a suitable ROI has been drawn, release the **Set** key.
The caliper is then free for repositioning for another freehand ROI.

NOTE: You cannot go outside the image boundary when drawing a freehand ROI.

Deleting a Sample Area

Sample ROIs and their corresponding traces can be deleted.

1. Move the cursor over one of the sample area. Confirm that cursor is changed to hand icon.
2. Select **Delete Current Sample** or **Delete all samples** as necessary.

NOTE: The corresponding traces for the deleted ROIs are erased from the plot.

NOTE: Deleting an ROI causes the ROIs to be deleted from all frames in the analysis loop.

Disabling/Enabling the frame

Frame disabling excludes the actual frame from the cineloop display. Frame disabling is available only with contrast data.

Disabling the frame from the frame marker

To disable One Frame:

1. Use the **Trackball** to move the cursor to the frame maker to disable.
2. Press **Set** to disable the frame.
3. The frame marker is changed from green to red to indicate the frame has been disabled.

NOTE: The disabled frame is no longer displayed in the reference window when scrolling through CINE memory.

Disabling multi-frames from the frame marker

1. Use the trackball to move the cursor to the first frame maker to disable.
2. Press and hold down **Set**.
3. Move the cursor with the Trackball to the last frame to be disabled and release Set.

The marker is turn red and the data from that frame is removed from the trace and any subsequent trace processing.

Disabling a frame from the cineloop window

1. Use the trackball to move the cursor to the cineloop window.
2. Select **Disable frame**.

The current frame is disabled and the corresponding frame marker displays red.

To enable the frames

To re-enable all deleted frames:

1. Position the cursor on the Frame Marker line.
2. Select **Enable all frames**.
3. All disabled frames are re-enabled.

Smoothing

NOTE: *Smoothing is not available when entering QAnalysis from CF/PDI mode.*

The system can smooth the traces displayed by applying a filter over a defined time window. The type of filter available is depending on the analysis signal displayed.

1. Select **Smoothing**.

NOTE: *When smoothing is turned on, it applies to all traces in the plot window.*

2. The smoothing filter list displays. Select the appropriate parameter.

Horizontal Sweep

Horizontal Sweep allows you to increase or decrease the time interval over which to plot the analysis curve.

The Horizontal Sweep control can range from TBD on the short side to the time interval between the user selected first and last frame. The default is the user selected image range. If the user has not yet selected a first and last frame, the first and last default frames from the displayed CINE loop are used.

Drift Compensation

NOTE: *Drift Compensation is only available when entering QAnalysis from TVI mode.*

Drift Compensation compensates drifting of Tissue Tracking curves by either resetting the curve to zero at the tracking start point (cycle resetting) or by linear compensation throughout the cycle (linear compensation).

NOTE: *When Displacement is chosen by Analysis Signal, Drift Compensation is active.*

Statistics

Select **Statistics** to enable/disable display of statistics of the frame or loop. The statistics are shown only when the loop is stopped.

- Ratio: Ratio of Color (Power) Doppler pixel over total ROI area.
- Area (mm²): The size of ROI.
- Max Ratio/ Time of Max Ratio: Maximum Ratio of Color (Power) Doppler pixels in each ROI, and which frame that occurs in.
- Min Ratio/Time of Min Ratio: Minimum Ratio of Color (Power) Doppler pixels in each ROI, and which frame that occurs in.

Trace Measurements

Max Gradient

Displays the time and gradient that becomes the maximum gradient between the CINE start and end frame.

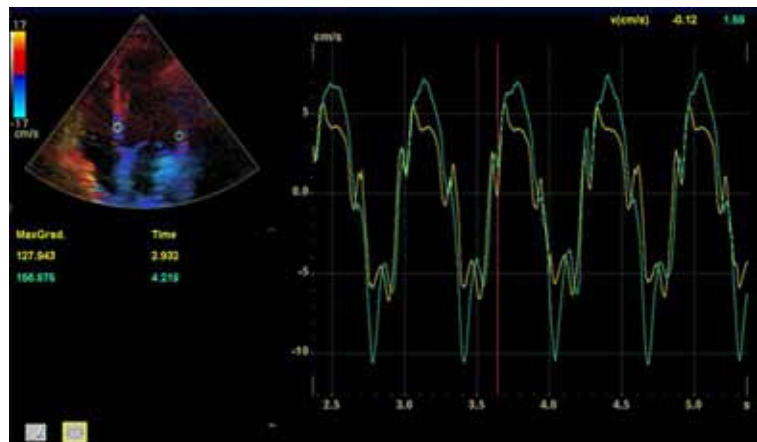


Figure 5-14. Max Gradient

Exporting Traces (Saving the Trace Data)

You can save the trace data to an external file.

1. Select **Export Traces** to save the trace data.
2. The following window displays.



Figure 5-15. Export Trace Window

- Location: Select Location which to save.
 - Filename: Enter the filename. (Only Text)
3. Select **OK** to save the data and return to the QAnalysis screen.
 - All displayed ROI traces are saved in the exported file.

All plot data (intensity, gradient and gradient derivative) are exported to a text file by “Export Trace”.

Table 5-4: Example of exported file

Time(s):	Trace 1:	Trace 1 dGrad.:	Trace 1 dGrad.
0.00000	-3.97995e+000	-2.15924e+001	8.05159e+001
0.03121	-5.14631e+000	-1.64719e+001	1.74256e+001
0.06242	-5.75798e+000	-1.27675e+001	-7.78004e+001
0.09362	-6.02222e+000	-1.27675e+001	-1.93426e+002
0.12483	-6.11224e+000	-1.44515e+001	-4.17252e+002

NOTE: *The Smoothed trace is the one saved if the user has applied a smoothing filter.*

NOTE: *Only data from the user selected image range is included in the exported trace file.*

NOTE: *No trace results are saved in the standard image database.*

Annotating the QAnalysis Data

The user can annotate both the reference image and the trace plot displays. Use **Comment** key to type the annotation. See Chapter 6 for reference.

Exiting QAnalysis

There are several methods to exit QAnalysis.

- Select **Exit QAnalysis** on the QA Primary Menu.
- Press **Freeze** to unfreeze and resume scanning.
- Press any other button that returns the system to real-time scanning.

Using Easy 3D (Option)

Overview

Table 5-5: 3D Package Options

3D Type	Description	Sensor/No Sensor	Available Tabs
Easy 3D	Designed for rendering B Mode images, e.g., Fetal Face scans.	No sensor	3D Acquisition, Easy 3D, Movie

3D Acquisition

Acquiring a 3D Scan

To acquire a 3D scan,

1. Optimize the B-Mode image. Ensure even gel coverage.
2. Press the User defined key assigned to 3D. Two screens appear.

NOTE: Set appropriate values for Acq Mode and Scan Plane parameters before scanning, for example scan distance.

3. To start acquiring the image, press **L** (Left key).
4. To perform a parallel scan, scan evenly across anatomy keeping probe perpendicular to anatomy being scanned. To perform a sweep (fan) scan, plant the probe and then rock it across the desired anatomy. Note the distance of the scan.
5. The 3D volume of interest (VOI) is dynamically assembled on the right side of the screen.

NOTE: If the image stops before you're done scanning, start acquiring the 3D volume of interest again.

6. To complete the 3D scan, press **R** (Right key).

3D Notes

- Adjust the 3D data set brightness with B-Mode.
- Use Colorize to change the color of the active data set.
- Use Zoom to increase the zoom factor of the active dataset.
- Vertical lines may be seen in a resliced image. This usually happens when you scan too fast or if the scan distance is set to a high value.

Scan more slowly, adjust the frame rate for a faster rate or adjust the scan distance.

Manipulating the Volume of Interest

Imagine you are able to manipulate the 3D volume of interest (VOI) in your hand. The 3D VOI is a tangible anatomical object that you can see and manipulate easily using the Trackball and Set control panel keys.

Practice positioning the pointer at different places within the 3D VOI. Highlight different colors (white, red, yellow, or green). Press Set to select a VOI for manipulation. Use the hand to manipulate the 3D VOI.

Rotating the 3D VOI Left/Right or Forward/Backward

You can rotate it left to right or right to left. You can rotate it forward/backward. Press Set key when the white pointer finger is positioned outside the 3D VOI. This makes it a white closed fist. Move the fist using the trackball to manipulate the 3D VOI.

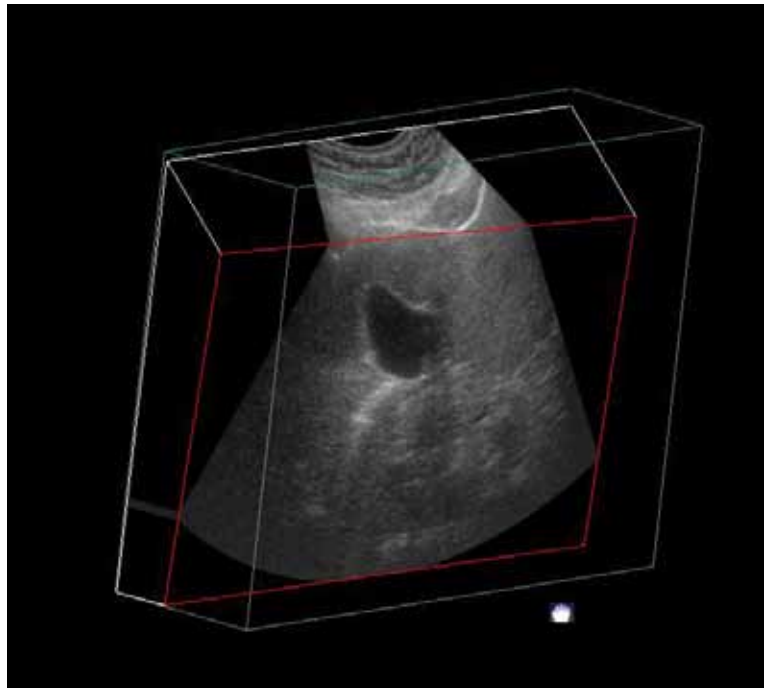


Figure 5-16. Manipulating the 3D Volume of Interest (White Hand)

Moving Through the 3D VOI

You can move through the 3D VOI using the red hand. Press Set when the red pointer finger is positioned on the red box. Move the closed red hand to move through the 3D VOI.

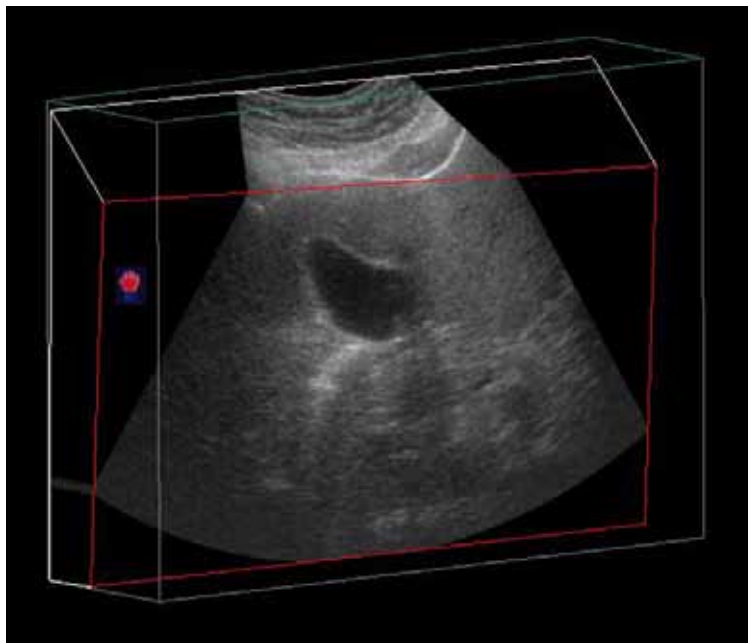


Figure 5-17. Moving through a 3D Volume of Interest (Red Hand)

NOTE: Any plane in the volume can be made active (highlighted with red box) by clicking on it.

Viewing Specific Portions of the Anatomy

You can move a plane of the 3D VOI by using the yellow hand. When the white hand becomes yellow, press Set to form a yellow fist. This allows the user to manipulate a plane of the 3D VOI, displaying a new view of specific anatomy when moving the trackball.

NOTE: *A yellow hand appears only when the pointer is on an edge of the VOI.*

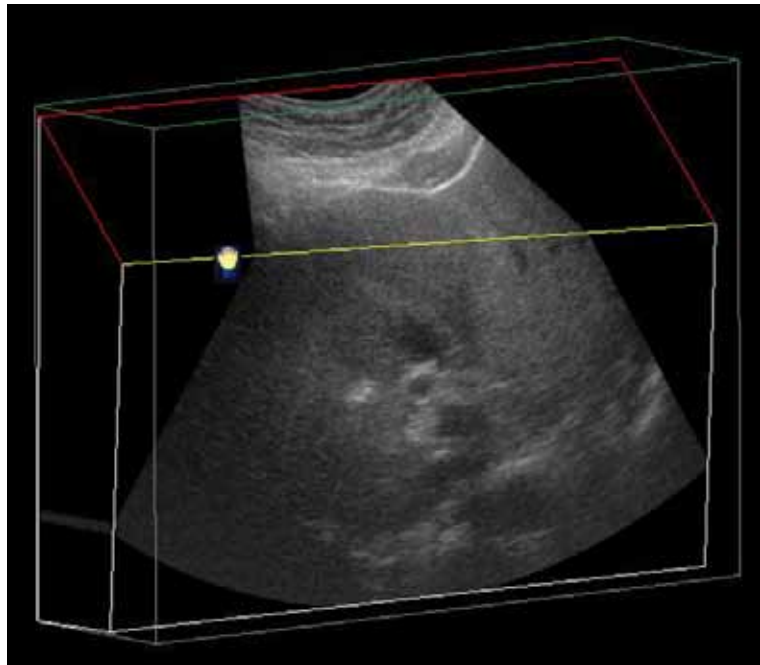


Figure 5-18. Manipulating the Edge of a 3D Volume of Interest (Yellow Hand)

Pulling Back a Corner of the VOI to View Specific Anatomy

You can move a corner of the 3D VOI by using the green hand. When the white hand becomes green, press Set to form a green fist. This allows the user to manipulate an edge of the 3D VOI, displaying a new view of specific anatomy when moving the trackball.

NOTE: A green hand appears only when the pointer is on a corner of the VOI.

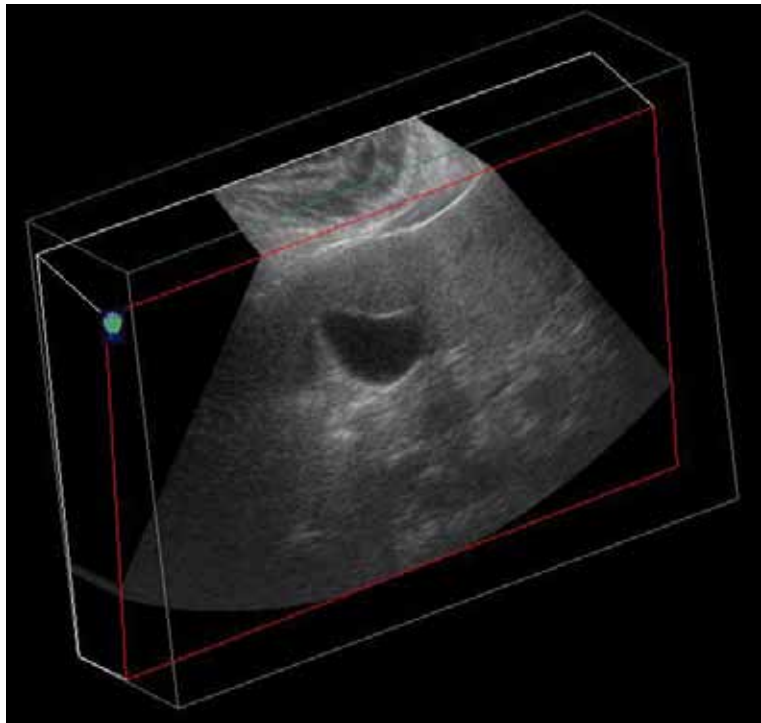


Figure 5-19. Manipulating a Corner of the 3D Volume of Interest (Green Hand)

3D Acquisition Parameter Description

Table 5-6: 3D Acquisition Description and Instructions for Use

3D Parameter	Description
App (Application) Presets	<p>Selections: None, OB - Baby Face, User 1, User 2, User 3</p> <p>None. No application preset applied.</p> <p>OB - Baby Face. After having scanned in this mode, certain rendering parameters are set automatically. The gray surface mode is activated and the texture mode is switched off. The gray surface mode values for opacity and threshold are set automatically according to the datasets histogram.</p>
Delete Active User Preset	<p>Select to delete a user preset (User 1, User 2, or User 3).</p>
Acquisition Mode	<p>Selections: Sensorless Parallel, Sensorless Sweep</p> <p>Sensorless Parallel. In this mode the probe must be moved during 3D data acquisition without angling it. You should scan the object you want to render in 2-4 seconds. The speed at which you scan should be constant. No sensor is mounted on the probe.</p> <ul style="list-style-type: none"> • Since the time for rendering depends on the acquired number of frames, it is recommended that you check the frame rate. Low frame rates result in fewer acquired frames for the 3D dataset which results in intensive rendering (interpolation). Therefore, low frame rate = long render times. <p>Sensorless Sweep. In this mode the probe must be moved to a position where you can clearly see a middle cut of the object you want to scan and render. Tilt the probe to about 30 degrees until the object you want to scan disappears. Start the acquisition and tilt the probe over a distance of around 60 degrees until the object disappears again. The entire scan time should be around 2-4 seconds. During the sweep, the probe may not be moved parallel, just tilted. No sensor is mounted on the probe.</p> <p>Before starting an acquisition, take care that the transmitter is positioned correctly during data acquisition and that the transmitter cannot move.</p>

Table 5-6: 3D Acquisition Description and Instructions for Use (continued)

3D Parameter	Description
Scan Plane	<p>Selections: Front to Back, Side to Side</p> <p>Front to Back. After having scanned in this mode, the rendered dataset is shown in a frontal view. For acquiring a fetal face in sagittal cuts, use this mode.</p> <p>Side to Side. After having scanned in this mode, the rendered dataset is shown from a side view. For acquiring a fetal face in coronal cuts, use this mode.</p>
Display Format	<p>50/50. Display in Dual Image (2D and 3D).</p> <p>Only 2D. Display in Single Image.</p>
3D	Starts the rendering process.
Scan Distance	<p>Adjusts the distance covered during the scan. Depending on the real width of a scan acquired during a 3D acquisition, the volume of interest's width can be enlarged or reduced. You can adjust the shape of a fetal face if the baby's head looks oval instead of round. The assumed default width of a parallel scan is 6 cm; or 60 degrees for a sweep scan.</p>

NOTE: The selection of user presets is effective only while 3D mode is active. Exiting 3D mode and activating 3D mode again resets the 3D presets to the default setting, regardless if Patient or application changes.

NOTE: When a 3D image is recalled, no 3D presets are active and parameters are recalled from the image file.

NOTE: Default Scan Distance, Opacity and Threshold may not be consistent and may change per scan. After the User Preset is saved and recalled, Opacity and Threshold are consistent.

Easy 3D

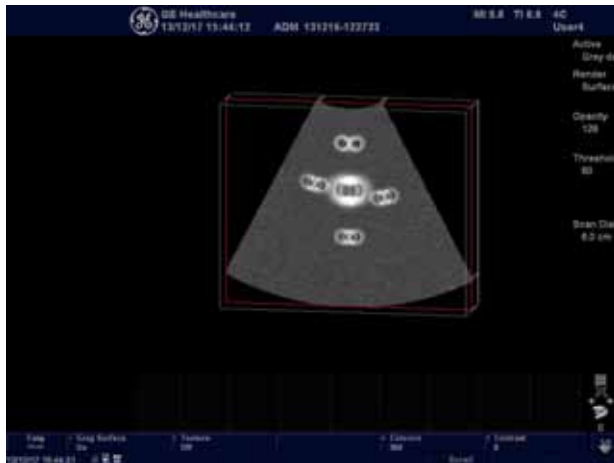


Figure 5-20. Easy 3D

Descriptions and instructions for using Easy 3D follow:

Table 5-7: Easy 3D Description and Instructions for Use

3D Parameter	Description
Reset	Resets the 3D volume of interest back to its original orientation.
Utilities	Select Average Off, Average Light, Average Medium, or Average Strong.
Undo	Undoes any manipulation you have done to your 3D dataset.
Auto Movie	Initializes the calculation and display of a 3D movie. A rotation of 30 degrees left and right around the actual image position (either the default position after acquisition or the position that was manually defined by manipulating the 3D volume of interest) is shown.

Table 5-7: Easy 3D Description and Instructions for Use (continued)

3D Parameter	Description
Scalpel	<p>Structures, for example a part of the placenta hiding the view to a fetal face, can be cut out in a rendered image. All visible structures can be cut out.</p> <p>The option of 'Erase In' deletes all structures inside the marked region. The option of 'Erase Outside' deletes all structures outside the marked region.</p> <p>To activate the scalpel tool, select "Scalpel" in the Primary Menu. Next, select "Erase In" or "Erase Out" and then move the cursor arrow into the 3D VOI to access the scalpel tool. Place the scalpel tool where you wish to begin cutting away anatomy and press Set. As you trace using the trackball, press Set for each vortex until the contour is closed. Double click the Set key to perform the cut. As long as a contour is not closed, it can be traced back with the cursor key. The cut out process can be undone by the Undo Last function.</p> <p>As soon as the Apply button is pressed, a new dataset is generated.</p>
Gray Surface	<p>Activates the gray surface rendering mode. It leads to a transparent appearance of the object, generated by displaying only a surrounding shell of structures.</p>
Texture	<p>Activates the texture or photorealistic rendering mode. It creates a photorealistic appearance of the object. The shading depends on the orientation of the surface of the object.</p> <p>If both Texture and Gray Surface mode are switched on, the mixture percentage of both modes can be defined.</p>
Render	<p>Changes between the rendered image view and the view of a volume of interest. The volume of interest shows the acquired ultrasound images transformed into an isotropic rectangular coordinate system. The volume of interest can be manipulated as described above.</p>
Threshold/Opacity	<p>Threshold defines which gray values are used for rendering and which are considered noise.</p> <p>Opacity defines how strict Threshold is used for discrimination. A low opacity value creates a firmer appearance of the surface. A high opacity value leads to a transparent appearance of the rendered image.</p>

Table 5-7: Easy 3D Description and Instructions for Use (continued)

3D Parameter	Description
Colorize/Contrast	<p>Colorize: Colorizes the 3D render.</p> <p>Contrast: Adds contrast to the 3D rendered image.</p>
Orientation Marker	<p>You can now specify/define, then add the following orientation markers while in 3D via the Orientation Marker key:</p> <ul style="list-style-type: none"> • TRV Sup to Inf <ul style="list-style-type: none"> • Ant Scan • Prb Rt • TRV Inf to Sup <ul style="list-style-type: none"> • Ant Scan • Prb Rt • SAG Lt to Rt <ul style="list-style-type: none"> • Ant Scan • Prb Sup • SAG Rt to Lft <ul style="list-style-type: none"> • Ant Scan • Prb Sup • Defined <ul style="list-style-type: none"> • Superior • Inferior • Left • Right • Anterior • Posterior • Cancel • None

Movie 3D

Descriptions and instructions for using Movie 3D follow

Table 5-8: Movie 3D Descriptions and Instructions for Use

3D Parameter	Description
Manual	An animated rotation of the rendered image can be calculated and displayed by this function. Using this function, you first need to define the start and end position of the rotation. To define this, move the VOI to the start position, the press Define Start. Move the VOI to the end position and press Define End.
Movie 360 Degrees	The calculation and display of a complete rotation around the axis, defined by the Axis button, starts in steps of 15 degrees.
Auto Movie	Initializes the calculation and display of a 3D movie. A rotation of 30 degrees left and right around the actual image position (either the default position after acquisition or the position that was manually defined by manipulating the 3D volume of interest) is shown. For this 60 degree rotation, eleven images in steps of 6 degrees are calculated.
Axis	All rotations (Auto Move and Movie 360) are calculated as rotations around the specified axis (X, or Y).
Movie Speed	You can adjust the speed of any 3D rotation.
Pause	Stops and restarts the rotation. As soon as Pause is pressed, the different rotation steps can be displayed by moving the Trackball.

Scan Assistant

Introduction

Scan Assistant provides an automated exam script that moves you through an exam step-by-step. This allows you to focus on performing the exam rather than on controlling the system and can help you to increase consistency while reducing keystrokes. The system automatically invokes the correct mode and imaging parameters, advances to the next step in an exam, annotates the image, initiates measurements, and assigns the measurements to the worksheet/report.

Availability

The following additional imaging parameters and preferences are available for use in a Scan Assistant program: CW Doppler, Dual on Freeze, Depth, Color Scale, PW Doppler Scale, PW Sample Volume size, and Flow Model Selection.

You can initiate one or more manual Doppler measurements/calculations.

Body Patterns are available for use during a Scan Assistant program. You can turn a Body Pattern on/off, select a particular Body Pattern graphic, and specify the position of the probe mark on the Body Pattern graphic.

The footswitch can be used with Scan Assistant. You can map Pause/Resume, Previous Step, and Next Step to the footswitch.

The "Always Use Doppler Cursor" preset, available on the Utility --> System --> General page, allows all PW Doppler steps to start with full screen 2D image plus mode cursor. You can specify the Store Order in Scan Assistant to set the Reading Order for the radiologist. The Learn Probe attribute can be set to learn and change the probe for the user in the middle of the exam.

Scan Assistant Definitions

Scan Assistant definitions:

- **Scan Assistant Manager.** Available via the Utility -> Scan Assistant page to import/export Programs created via the Scan Assistant Creator and to assign Programs to a user/exam category.
- **Import.** Used to load Programs created via the Scan Assistant Creator on to the LOGIQ V2/LOGIQ V1.
- **Export.** Used to move Programs from one LOGIQ V2/LOGIQ V1 system to another LOGIQ V2/LOGIQ V1.
- **Scan Assistant Creator.** Used to create Scan Assistant Programs.

Scan Assistant Description



Figure 5-21. Scan Assistant Display Description

1. Program name, completed steps/out of total number of steps, and step description area.
2. Program step status (Complete/Incomplete), step number, step name. A checkmark indicates that this step has been completed. You can also manually check the box to bypass this step.
3. This column indicates the mode or when a measurement needs to be made.
4. This column indicates that the action moves the Program to the next step.
5. Active step: the box is green when the program is active or yellow when it is paused.
6. Edit (Pencil Icon).
7. Stop. Stop allows the program to be stopped, restarted, or a new program selected.
8. Pause/Resume.
9. Enter/Exit Reference images/Videos.

Setting up Scan Assistant

To set up Scan Assistant,

1. Import the Scan Assistant Program created using the Scan Assistant Creator or exported from another LOGIQ V2/ LOGIQ V1 program.
 - a. Insert the media with the saved Program from the Scan Assistant Creator or exported program from another LOGIQ V2/LOGIQ V1.
 - b. Select Utility -> Scan Assistant.
 - c. Select Import from the Scan Assistant Manager page.

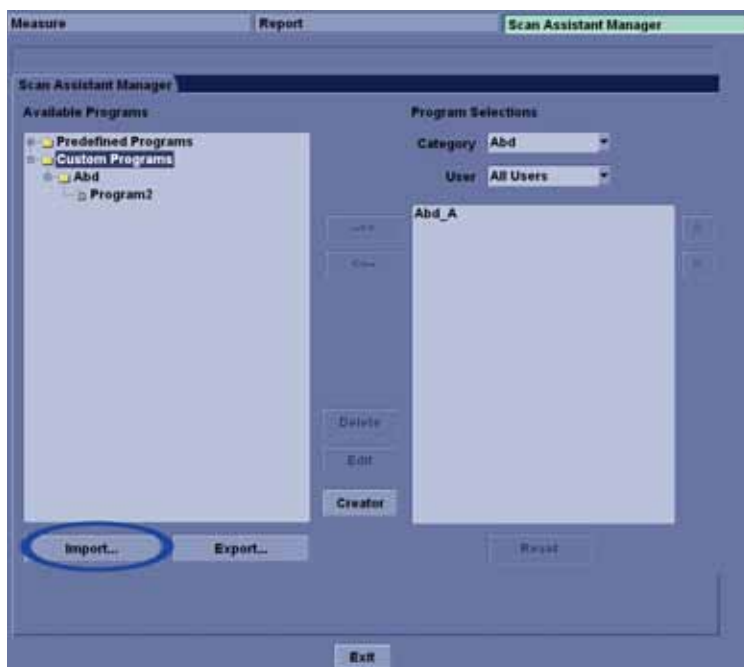


Figure 5-22. Import Programs

- d. In the Source field at the top of the Import Programs pop-up, select the media that the Program is stored on.

Setting up Scan Assistant (continued)

- e. Select the Program(s) to be imported. If a folder is selected, all programs in the folder will be imported.



Figure 5-23. Import Programs

Setting up Scan Assistant (continued)

- f. Select Import. The Program(s) you selected are stored to the LOGIQ V2/LOGIQ V1. You can add it to the exam category and user.

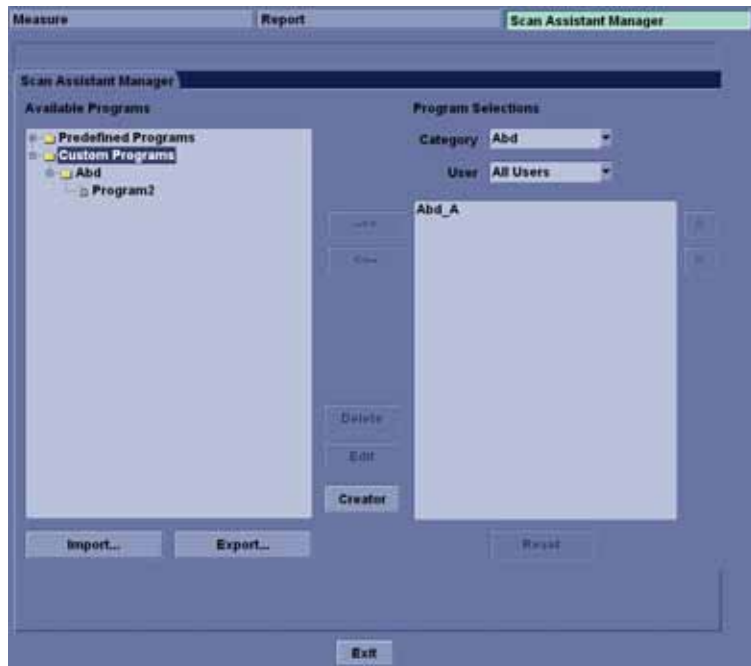


Figure 5-24. Add Program

Setting up Scan Assistant (continued)

2. Assign the imported Program to the exam category and user. Under Program Selections on the right-hand side of the Scan Assistant Manager page, specify the Exam Category and User for this Program. You can select All Users, or a specific user. If you specify All Users, all users will have the ability to use this Program while in the specified exam category, unless the user has his/her own list defined.
3. Select the imported Program from Available Programs -> Custom Programs on the left-hand side of the page. Then press the right arrow button to move the imported Program to the exam category and user selected above.

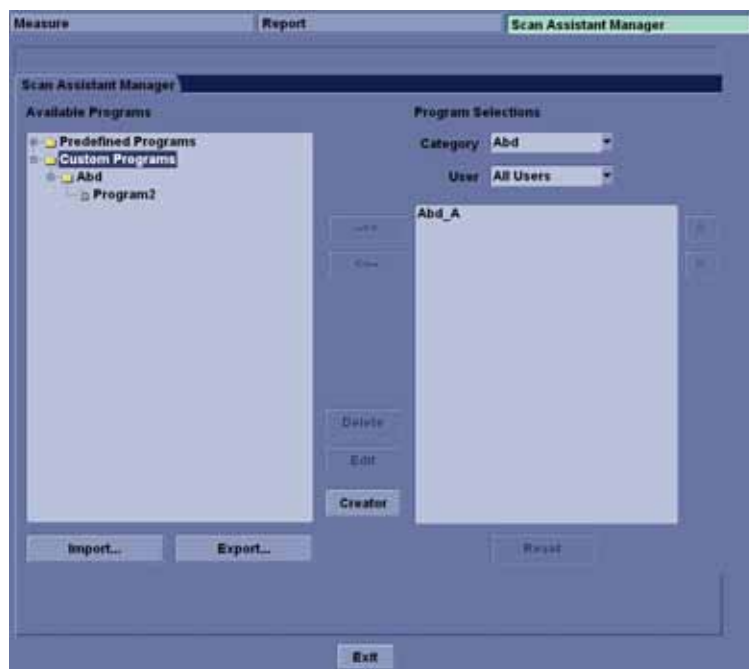


Figure 5-25. Add Program

Setting up Scan Assistant (continued)

4. The Program list you created in Utility ->Scan Assistant is visible in the Program field on the Patient menu. First press **Patient** and then set up patient data and Scan Assistant program, and finally, press **Scan**.



Figure 5-26. Patient Scan Assistant Program

You can access the Scan Assistant Creator to edit the exam's program from the imaging display via the Creator Icon located at the bottom, left-hand corner of the Scan Assistant Program monitor on the display. You can activate the Scan Assistant Creator from the image screen, make edits, and then run Scan Assistant to test your changes.

NOTE: *If you edit the program after you have already stored several images, and your edits change the number of program steps, you are prompted to Restart or Continue the Scan Assistant program.*

NOTE: *If you edit the program after you have already completed several steps, checkmarked steps remain checkmarked, even if you insert a new step between checkmarked steps. If this is not correct, you can edit the checkmarks or restart the program.*

Using Scan Assistant

After you have set up Scan Assistant, the Program is active when you enter the scanning page. The Program is located on the left-hand side of the display and as you can see in the example below, the annotation for the first step has been automatically noted on the image, ready for you to scan the specified anatomy.



Figure 5-27. Scan Assistant Display

Using Scan Assistant (continued)

1. Follow the steps indicated in the Program: image/measure the appropriate anatomy.
2. Perform the indicated trigger (press the **Store** key) to move to the next step in the Program.

NOTE: The footswitch can be used with Scan Assistant. You can map Pause/Resume, Previous Step, and Next Step to the footswitch.

3. To pause or unpause Scan Assistant, press the pause button on the display.
4. To stop or restart a Program, press the Stop icon at the bottom of the Scan Assistant Program. A dialog pops up. This dialog lets you restart the current Program, start another Program, or stop Scan Assistant.
5. To skip a step or move to a certain step, press the up/down arrows on the keyboard or select the step you want to move to using the Trackball and Set keys.

Exporting Scan Assistant Programs

Exporting Scan Assistant Programs allows them to be imported to another LOGIQ V2/LOGIQ V1 or to be edited offline with the Scan Assistant Creator tool. To export a Program,

1. Insert the media to save the Program to.
2. Press Utility -> Scan Assistant.
3. Select Export from the Scan Assistant Manager page.
4. In the Destination field at the top of the Export Programs pop-up, select the media that the Program is to be stored on.
5. Specify the Program Directory using the drop-down menu if the desired Program Directory already exists on the media. If not, or if you want to export the Program to a new Program Directory, type a new Program Directory name in the field.
6. Select the Program(s) to be exported. If a folder is selected, all programs in the folder will be exported.

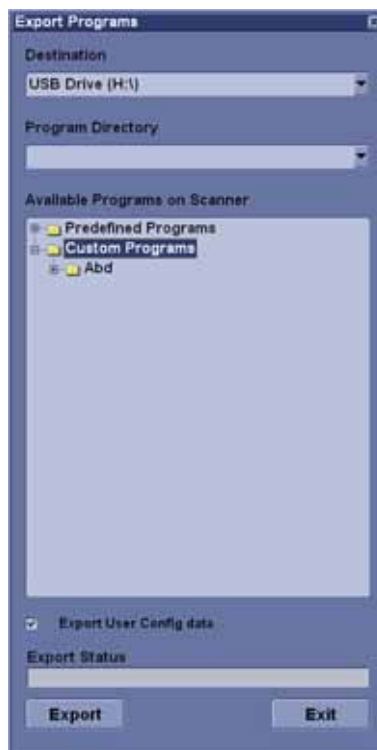


Figure 5-28. Export Programs

7. Select Export. The Program(s) you selected are stored to the media. You can now import it to a new LOGIQ V2/LOGIQ V1.

Scan Coach

Scan Coach

Before performing Scan Coach function on the system, please read and accept the Statement, Disclaimer and Limitation of liability described below:

Statement

Scan Coach IS NOT MEANT TO REPLACE TRAINING, OR TUTORIALS/HANDS-ON. IT IS MERELY A REFRESHER TOOL OF ALREADY RECEIVED EDUCATION AND TRAINING.

Scan Coach IS AN ON –DEMAND REFRESHER AND REMINDER TOOL WHICH DISPLAYS INFORMATION IN THE FORM OF DICOM IMAGES AND ANIMATIONS; THE PROVIDED REFERENCE MATERIAL MAY HELP USER IN ACQUIRING ULTRASOUND IMAGES.

Scan Coach DOES NOT PROVIDE A DIAGNOSIS, BUT DOES PROVIDE REFERENCE MATERIAL FOR SOME TYPES OF ACQUISITIONS.

Scan Coach IS MEANT TO PROVIDE REFERENCE MATERIAL FOR ACQUISITION, BUT IT IS NOT INTENDED TO IDENTIFY DIAGNOSTIC IMAGE QUALITY. ACTUAL IMAGES, INCLUDING IMAGE QUALITY, OF THE DEVICE MAY VARY VERSUS THE PROVIDED REFERENCE MATERIAL.

Scan Coach (continued)

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Introduction

Scan Assistant is a series of built-in examination and workflow protocols, with automated exam script superimposed on them. The protocol steps allows you to refresh what steps should be performed in a given exam, while the superimposed automated script allows you to focus on performing the exam by reducing your efforts in controlling the system. Scan Assistant can help you to increase consistency and efficiency while reducing keystrokes. The system automatically invokes the correct mode and imaging parameters, advances to the next step in an exam, annotates the image, initiates measurements, and assigns the measurements to the worksheet/report.

Scan Coach is an extension of the utility of Scan Assistant. Scan Coach leverages the built-in examination script of Scan Assistant and overlays it with clinical content that can be displayed on-demand by the user to quickly refresh herself of some key information. Refreshing such information about an exam step just before scanning may help the user to acquire the right scan plane. The reference image indicates how the scan plane image for a given step should look like. The probe/beam anime image shows the corresponding probe placement, or beam formation for getting the correct scan plane. The schema anime shows the key anatomical structures to be visualized in two dimensional mode.

Scan Coach can be used as an on-demand refresher/reminder tool in live scanning.

Using Scan Coach

1. Go to Utility -> Measure -> Scan Assistant Manager, select the protocol from the left column, and select >> to move it to the **Program Selections** column. Then select **Exit** to the Scanning page.

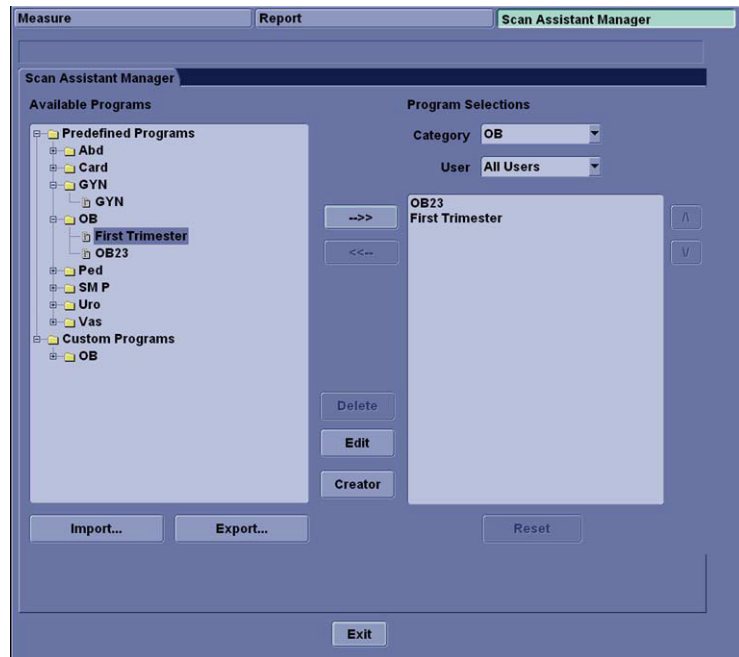


Figure 5-29. Select Scan Coach Protocol

2. Press **Patient** key on the control panel to register a new patient. Then select the protocol from the pull-down menu, and then select **Scan** to navigate to the Scan Coach screen.

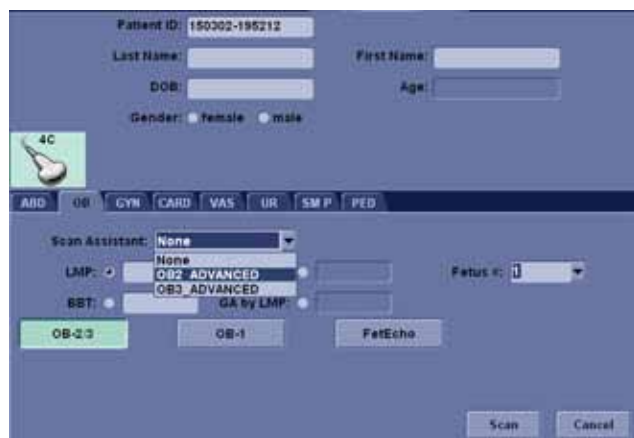


Figure 5-30. Scan Coach Start

Using Scan Coach (continued)



Figure 5-31. Scan Coach Display Description

- a. Program name, completed steps/ total number of steps.
- b. Program step status (Complete/Incomplete). A checkmark indicates that this step has been completed. You can also manually check the box to bypass this step.
- c. Step Number, Step Name
- d. Select this icon to view the reference image.
- e. This column indicates the mode or when a measurement needs to be made.
- f. This column indicates that the action moves the Program to the next step.
- g. Active step. The box is green when the program is active or yellow when it is paused.
- h. Edit (Pencil Icon)
- i. Stop
- j. Pause or Resume
- k. In/Out Step

Using Scan Coach (continued)





3. Select  or press the button  to activate the reference image screen for the current active step.
4. Select  or press the button  to activate the probe position and schema image along with the reference image. It displays reference image, probe position and schema to guide the user to acquire the right scan plane.



Figure 5-32. Scan Coach Reference, Probe position and Schema Images

5. Complete the scan and make the measurements if necessary, press **Store** key to store the image and go to next step.

Setting up Scan Coach

Go to Utility -> Scan Assistant -> Scan Assistant Manager to create, import/export and manage the Scan Assistant /Scan Coach programs.

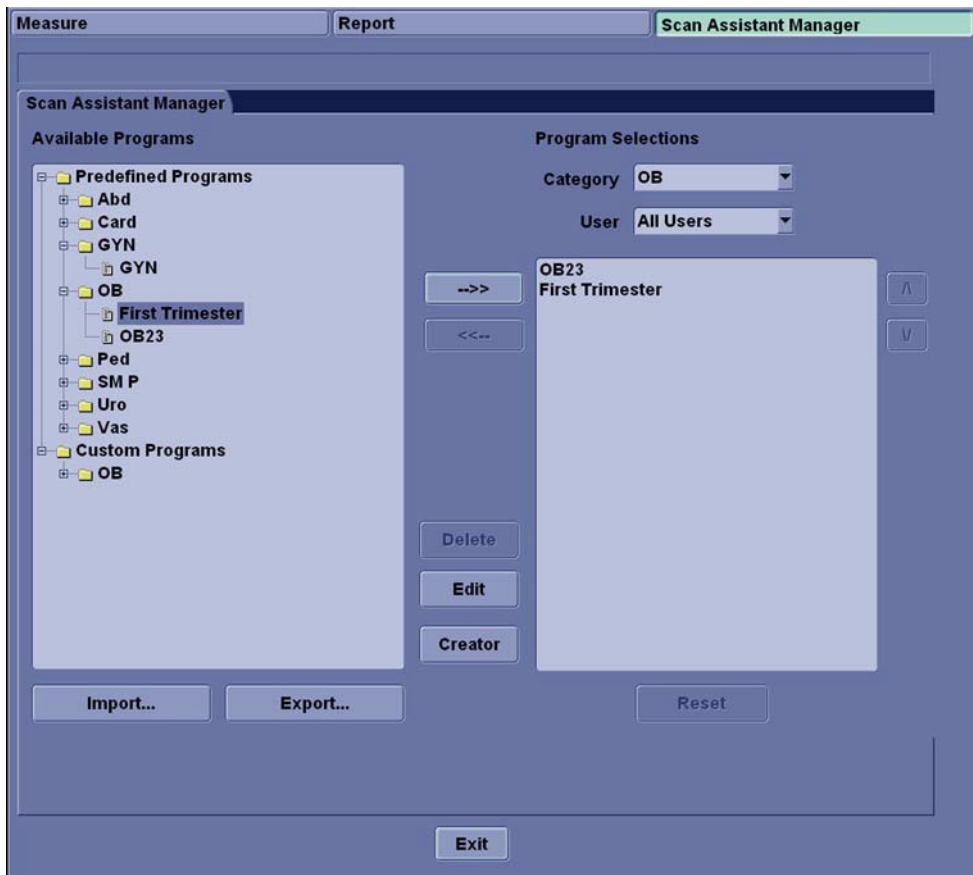


Figure 5-33. Setting up Scan Coach

Edit Scan Coach Protocol

- To edit Scan Coach protocols, go to Utility -> Scan Assistant -> Scan Assistant Manager and select **Creator**.



Figure 5-34. Scan Assistant Manager

- The Scan Assistant Creator is used to build customized programs that can be imported onto the LOGIQ V2/LOGIQ V1. Select **Scan Coach** on the tool bar to display the Scan Coach edit page.

NOTE: *By default Apply All Parameters checkbox is checked. This applies all the parameters of the reference image to the live image. When you uncheck the checkbox the parameters from the reference image will not be applied to the live image.*

Edit Scan Coach Protocol (continued)

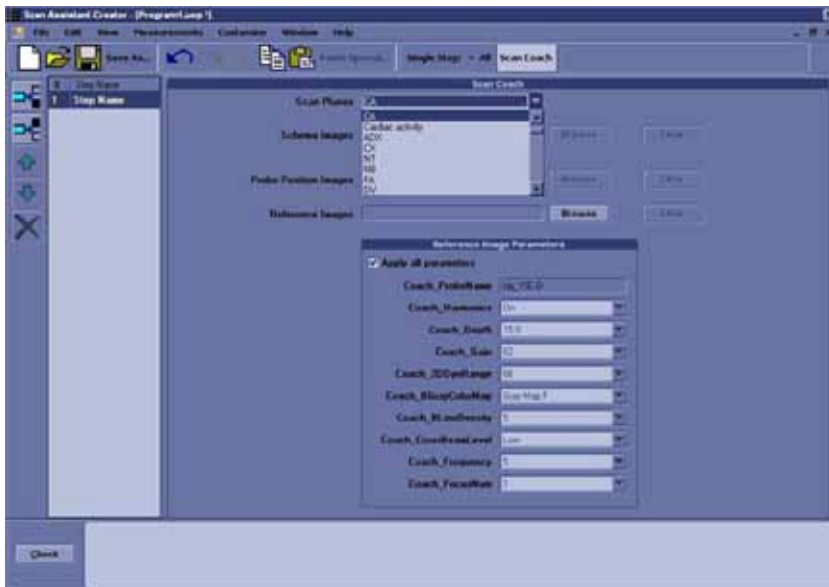


Figure 5-35. Scan Assistant Creator

3. Select the Scan Plane.

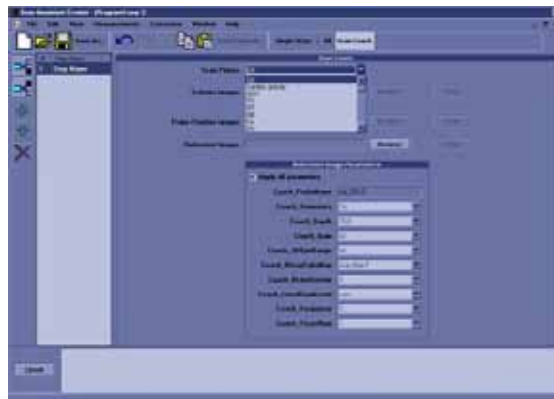


Figure 5-36. Select Scan Plane

Edit Scan Coach Protocol (continued)

4. Select **Browse** to upload the reference image.
Select **Upload** to Upload the reference image from the folder called "Reference Images" of the corresponding application. Then select **Close** after the upload is complete.

*NOTE: The reference image only supports *.dcm file.*

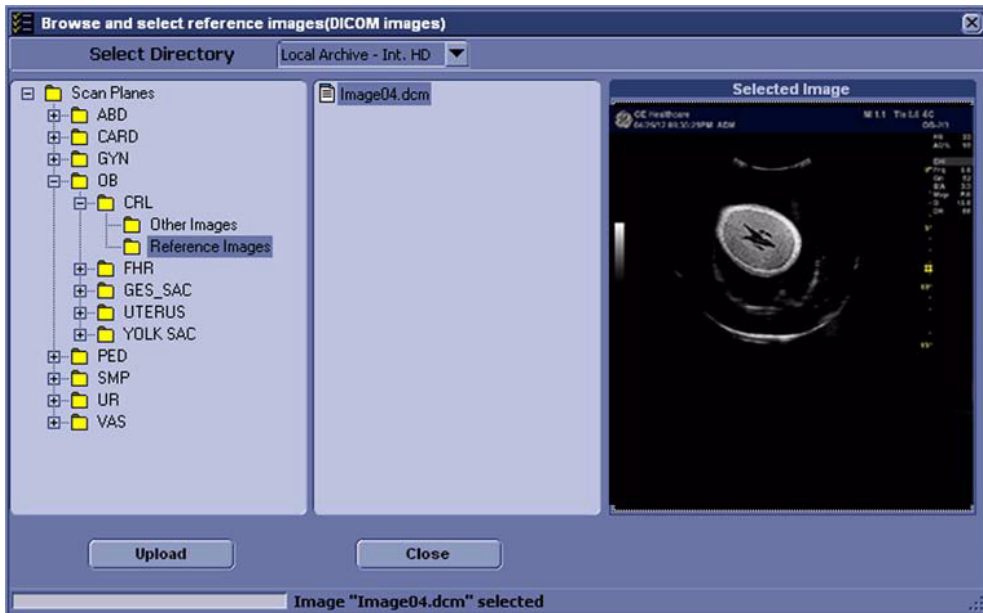


Figure 5-37. Upload Reference Image

Edit Scan Coach Protocol (continued)

The reference image can also be uploaded from external USB flash drive/HDD/CD/DVD. Select the correct directory from the pull-down menu, and then select the appropriate image to upload.

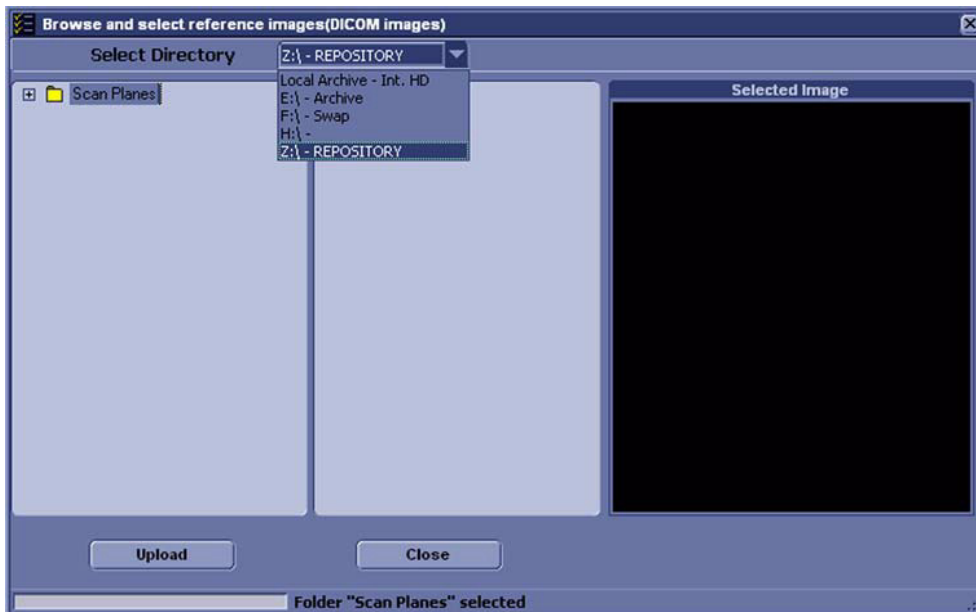


Figure 5-38. Upload Reference Image 2

5. Upload Probe Position Image and Schema Image from the folder called "Other Images" of the corresponding application, or from the external devices.

SonoBiometry (AFB) (Option)

SonoBiometry

SonoBiometry (AFB) is an alternative to the common fetal biometry measurements. It provides system suggested measurements for AC, BPD, FL and HC which need to be confirmed by the user or can be changed manually. AFB is Auto Fetal Biometry.

Table 5-9: List of Abbreviations

Abbreviation	Full Form	Definition
AC	Abdominal Circumference	Measure of fetal growth in pregnancy
BPD	Biparietal Diameter	Transverse distance between the protuberances of the two parietal bones of the skull
FL	Femur Length	The length in centimeters of the developing baby's femur (the femur is the long bone in the human thigh)
HC	Head Circumference	Head Circumference of the baby's head

Using SonoBiometry

1. Go to **Utility** -> System -> System Measure.
2. Check the desired boxes under SonoBiometry Option Selection to enable system suggested measurements.

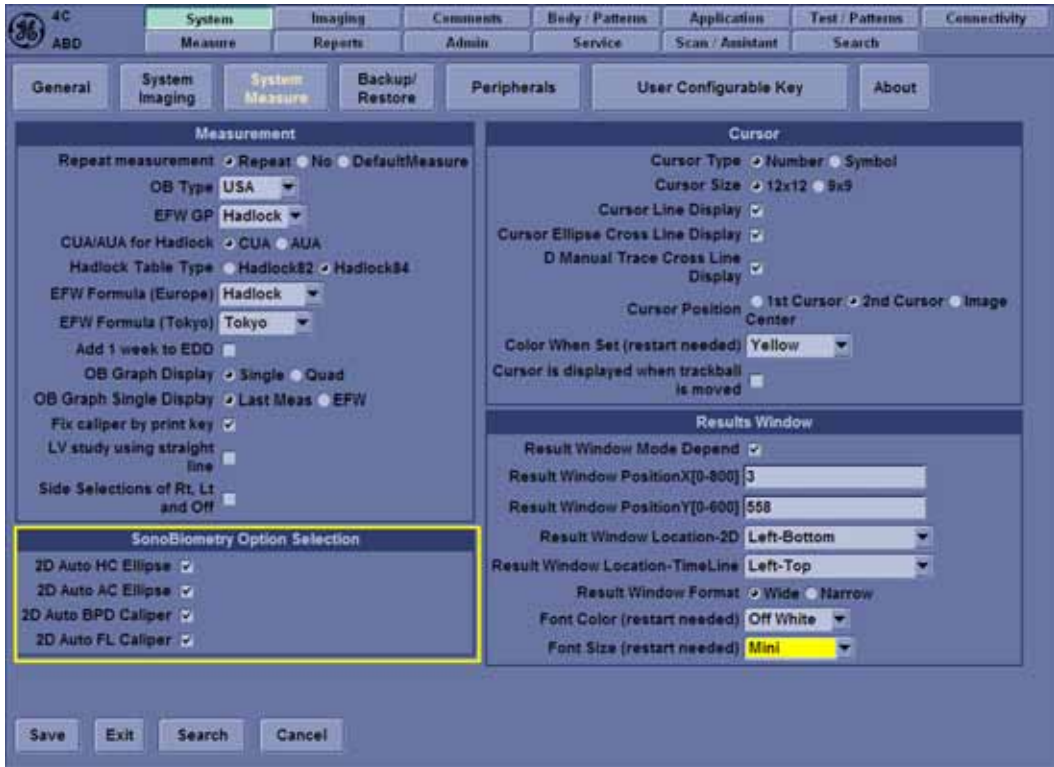


Figure 5-39. SonoBiometry checkboxes

3. Select **Exit** to return to scanning.
4. Setup the patient with OB preset.
5. Perform the scanning
6. Press **Measure**.
7. Select **BPD** or **HC** or **AC** or **FL**.

Using SonoBiometry (continued)

There are three options to complete the SonoBiometry measurements:

- **Accept** – Press **Accept** if you accept the current measurement. The system completes the measurement.
- **Edit** – Press **Edit** to get into the edit mode and make the required changes.
- **Manual** – Press **Manual** to ignore the auto measurements completely. The system goes into the Manual measurement mode.

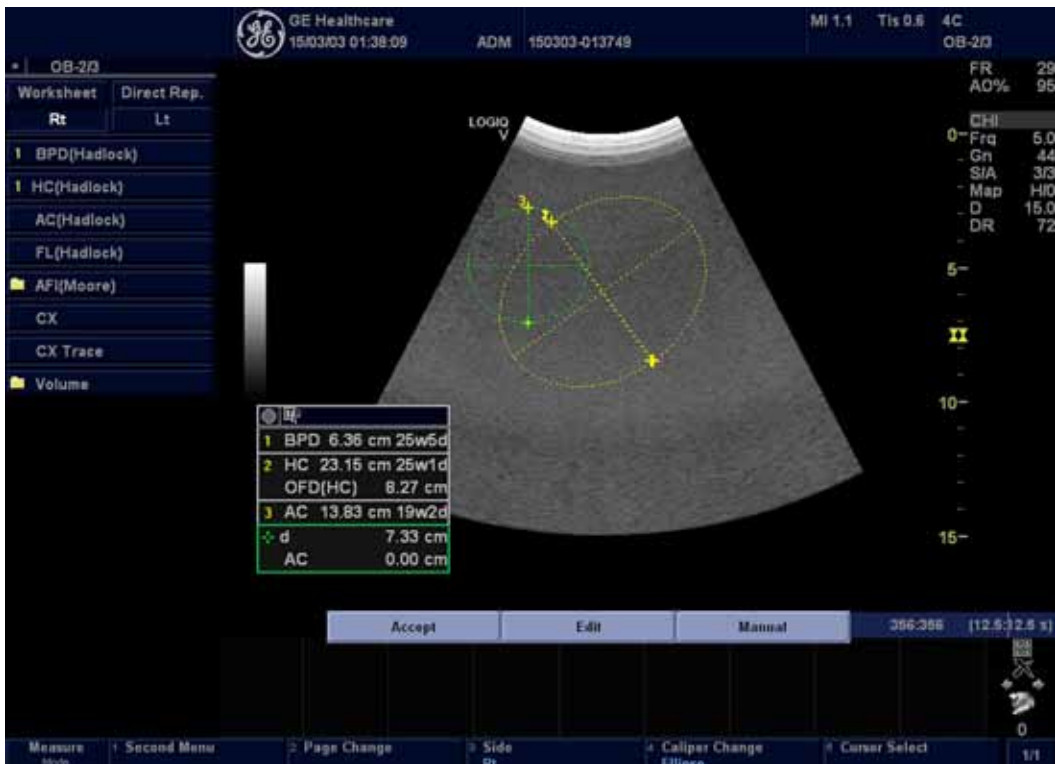


Figure 5-40. SonoBiometry option

NOTE: If a particular scanned image does not have valid fetus data, a warning message appears: “No valid ‘auto measurement’ found - proceed with a manual measurement!”.

NOTE: If a particular image is not supported for SonoBiometry measurement, a warning message appears: “Not able to proceed on the image supplied”.

NOTE: SonoBiometry measurements are supported on only recalled raw DICOM images and frozen images.

Chapter 6

Scanning/Display Functions

*Describes additional ways in which to adjust the image.
In addition, describes additional ways to get useful
information electronically.*

Zooming an Image

Introduction

Zoom is used to magnify a zoom region of interest (ROI). The system adjusts all imaging parameters accordingly. You can also zoom frozen images.

Reference Image is the small un-zoomed image displayed next to the zoomed image.

Bioeffect

Zooming an image changes the frame rate which tends to change thermal indices. The position of the focal zones may also change which may cause the peak intensity to occur at a different location in the acoustic field. As a result, the MI (TI) may change.



Acoustic
Output
Hazard

Observe the output display for possible effects.

Read vs. Write Zoom

Read Zoom

Read Zoom magnifies the display of the data without making any changes to the ultrasound image data that is acquired.

Available in a live, frozen, cine or recalled raw data image.

Write Zoom

With Write Zoom, the Ultrasound line density and/or sampling frequency increases, giving a better resolution.

Available only in pre-processing.

NOTE: Write Zoom is available only when CrossXBeam is off.

You can preset the write zoom window size (height and width) on Utility -> Imaging -> B-Mode.

NOTE: The difference between Read Zoom and Write Zoom can be described in relation to photography. With a photograph, Read Zoom manipulates the negative and enlarges the picture; whereas Write Zoom uses a telephoto lens to bring the image closer before taking the picture.

Using Read/Write Zoom

When CrossXBeam is on, write zoom can not activate:

To activate Read Zoom, press the **Depth/Zoom/Ellipse** knob once, the zoom status is indicated on the system status bar.

To zoom an image, rotate **Depth/Zoom/Ellipse** knob clockwise. A reference image appears in the down, left-hand section of the display.

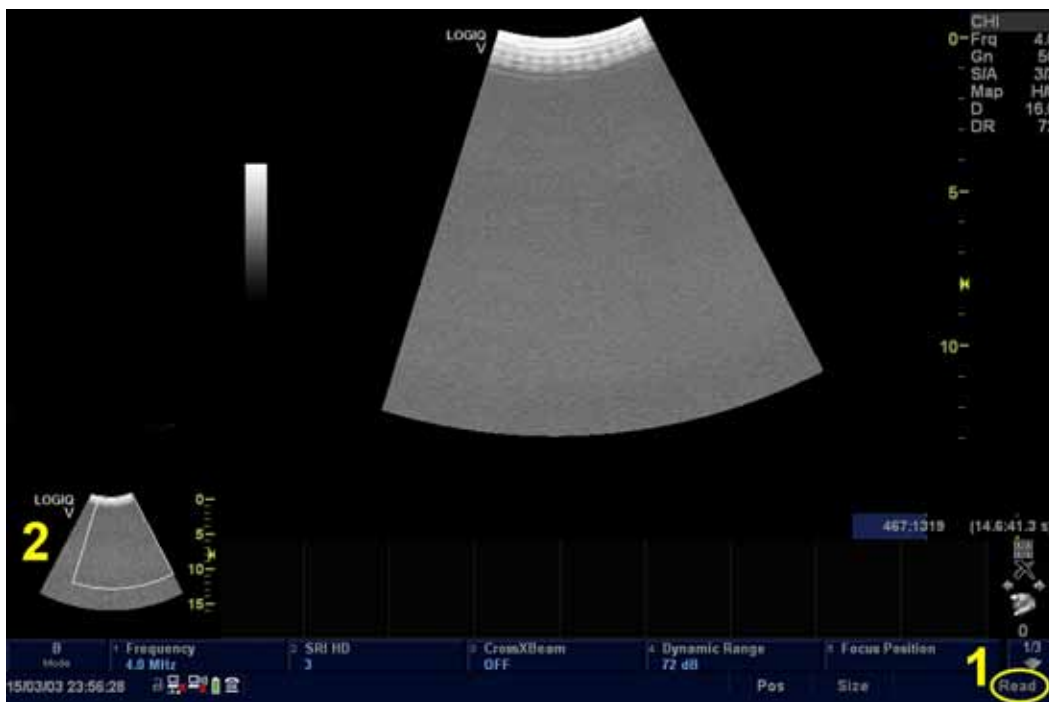


Figure 6-1. Read Zoom

1. Zoom status
2. Reference Image

To exit zoom, press **B-Mode** or press the **Depth/Zoom/Ellipse** knob again or rotate **Depth/Zoom/Ellipse** knob counterclockwise until the reference zoom image is removed.

Using Read/Write Zoom (continued)

When CrossXBeam is off, both read zoom and writer zoom can be activated:

To activate Read Zoom, press the **Depth/Zoom/Ellipse** knob once, the zoom status is indicated on the system status bar.

To activate write Zoom, press the **Depth/Zoom/Ellipse** knob again, the zoom status is indicated on the system status bar.

To zoom an image, rotate **Depth/Zoom/Ellipse** knob clockwise. A reference image appears in the down, left-hand section of the display.

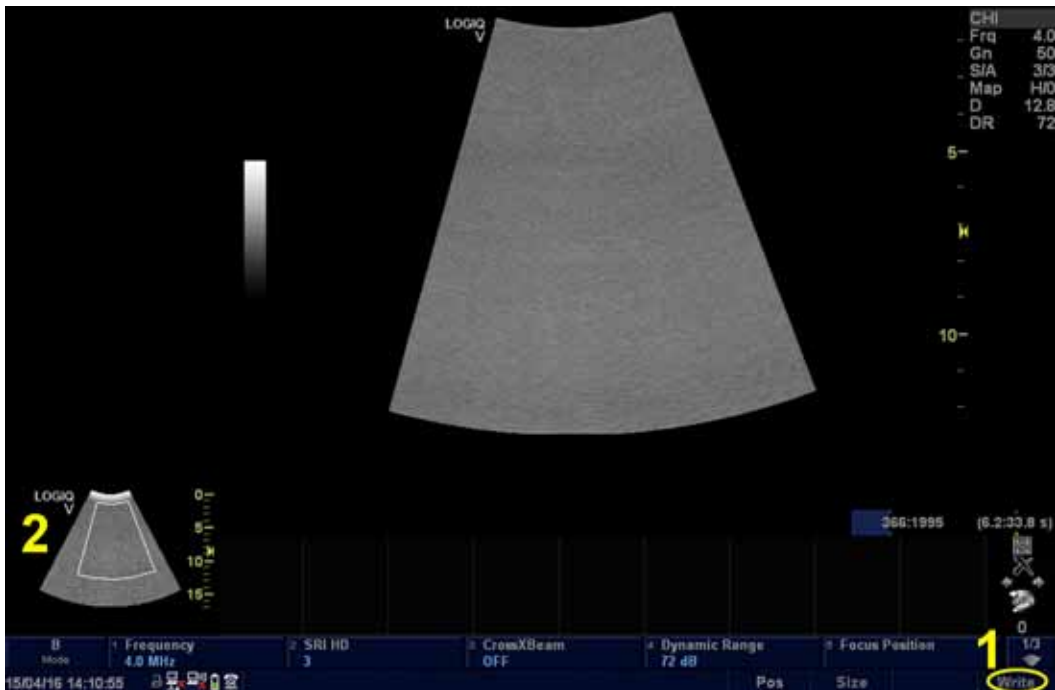


Figure 6-2. Write Zoom

1. Zoom status
2. Reference Image

To exit zoom, press **B-Mode** or press the **Depth/Zoom/Ellipse** knob the third time or rotate **Depth/Zoom/Ellipse** knob counterclockwise until the reference zoom image is removed.



HINTS

First use the Read Zoom (Press Zoom knob once) to get to the area of interest, then use Write Zoom (press Zoom knob again).

Split Screen

Overview

LOGIQ V2/LOGIQ V1 supports the following multiple image format:

- Dual (split the window area into 2 areas)
- Wide Dual (split the window area into 2 areas, but wider than the normal dual)
- Quad (split the window area into 4 small areas)
This is useful, for example, when measuring AFI.
- Simultaneous

Dual/Quad

To activate a dual split screen, press **L** or **R**. To activate a quad display, press and hold down **L**.

When you activate Split Screen by pressing **L**, the single image is placed on the left side; when you activate Split screen by pressing **R**, the single image is placed on the right side.

To switch between active images, press **L/R**.

To deactivate, press **R** until the screen changes.

NOTE: To put a copy of the image on the opposite side when entering dual split screen, use the "When Entering Dual Image..." preset via Utility --> Application --> Settings.

Simultaneous mode

While using CFM or PDI, press the **L** and **R** keys simultaneously to display B and B+CFM, or B and B+PDI in real-time on the left and right side.

It is useful to observe the ROI in B-Mode.

Freezing an Image

Introduction

Freezing a real-time image stops all movement and allows you to measure and print the image.

NOTE: While the image is frozen, all Power Output is suspended.

NOTE: Selecting a new probe unfreezes the image.

Freezing an image

To freeze an image,

1. Press **Freeze**. The Freeze key backlight turns green.

If you are in a mixed mode, both images freeze immediately. Deactivating Freeze restarts both modes.

To reactivate the image,

Press **Freeze** again. The Freeze key backlight becomes blue (unfreeze).

NOTE: Deactivating Freeze erases all measurements and calculations from the display (but not from the worksheet).

Use the Trackball to start CINE after pressing Freeze.

Post processing

You can use the following controls to process a frozen B-Mode image.

- Revert
- Zoom
- Rejection
- SRI HD
- Dynamic Range
- Colorize
- Gray Map
- Rotation
- Biopsy Kit
- Edge Enhance
- Gain
- TGC

You can use the following controls to process a frozen Color Flow image.

- Threshold
- Invert
- Map
- Transparency Map
- Biopsy Kit
- Baseline
- Map Compress

Post processing (continued)

You can use the following controls to process a frozen Doppler Mode image.

- Angle Correct
- Quick Angle
- Baseline
- Invert
- Sweep Speed
- Trace Sensitivity
- Trace Direction
- Colorize
- Trace Method
- Cycles to Average
- Display Format
- Compression
- Gray Map
- Auto Angle
- Modify Auto Calcs

Using CINE

Introduction

CINE images are constantly being stored by the system and are available for playback or manual review via CINE.

You can view CINE as a continuous loop via CINE Loop or manually review CINE images frame by frame via the Trackball.

Data in CINE is available until new data is acquired. CINE is stored on the system's memory and can be archived as well.

CINE is useful for focusing on images during a specific part of the heart cycle or to view short segments of a scan session.

Activating CINE

To activate CINE,

1. Press **Freeze**.
2. Move the Trackball.

Cine gauge and Monitor Display

The Cine gauge (located on the right-hand side of the monitor) indicates which frame you are viewing of the whole loop (62:123), as well as the time at which this frame occurs within the loop (1.6:3.2 s).

Using CINE

Table 6-1: Cine Mode Menu description

Parameter	Description
Select All	Select all frames of the cineloop.
Sync Mode	Phase synchronizes multiple CINE Loops.
First	Move to the first frame of cineloop.
Last	Move to the last frame of cineloop.
Run/Stop	Start/Stop the cineloop review.
Loop Speed	Adjust the CINE Loop playback speed.
Start Frame	Select the start frame.
End Frame	Select the last frame.
Frame by Frame	Review the CINE image frame by frame manually.
QAnalysis	Enter QAnalysis.
Cine Capture	Searches through all images between the start frame and end frame and displays each peak or the highest velocity/tissue power.
Enhancement	Execute the enhancement to the Cine capture image.

Cine Loop Start/Stop

1. Press **Freeze**.
2. Rotate the **Trackball** horizontally to display the CINE Loop.
3. Select **Run/Stop** to playback the loop.
4. Select **Run/Stop** again to stop the CINE Loop.

Select the start/end frame

1. Adjust **Start Frame** to select the start frame.
2. Adjust **End Frame** to select the end frame.

Storing / Recalling CINE Loops

To store a CINE Loop, press Run, then press the assigned **Store** or **Print** key. CINE Loops stored on the Clipboard are indicated with a movie strip icon.

To recall a CINE Loop, double click on the loop on the clipboard.

Synchronize CINE Loops

1. Recall stored cine loop to right side of dual screen.
2. Recall same cine loop to left side of dual screen.
3. Change visualization of left side image
4. Select **Sync mode** to start the synchronization.

Cine Mode Selection

If it is in Simultaneous mode before freeze:

To scroll both B-Mode CINE loop and Time CINE loop, press **Scan Area** to select the **Scroll** function for trackball, then move the trackball to select;

To scroll B-Mode CINE loop only, press **Scan Area** to select the **Scroll B** function for trackball, then move the trackball to select.

If it is not in Simultaneous mode before freeze:

To scroll B-Mode CINE loop only, press **Scan Area** to select the **Scroll B** function for trackball, then move the trackball to select.

To scroll the Timeline CINE Loop only, press **Scan Area** to select the **Scroll D** function for trackball, then move the trackball to select.

Velocity Scale with B-Mode Only

If you review the B-Mode CINE Loop while in Doppler Mode with the Timeline using Scroll B, the Velocity Scale displayed with the Timeline is for the time phase of the currently-displayed B-Mode image, NOT for the time phase of the acquired Doppler Spectrum.

Check the velocity value with the measurement function if you review the CINE Loop using Scroll B. Note that there may be a discrepancy between the velocity scale displayed and the velocity measured using the measurement function.

Preview

Loop Preview can now be enabled independently for Time-Based Store. This is useful for setting preview preferences based on the application.

Annotating an Image

Introduction

The comment function provides the capability to type the comments of free text and/or insert the pre-defined comments from the comment library. It also provides the user with arrow markers to point to parts of the image.

Pressing the **Comment** key or any keys on the alphanumeric keyboard initiates the comment mode. This assigns the trackball function to controlling the cursor and displays the comment library.

In comment mode, text can be added by using the comment library or by typing from the alphanumeric keyboard.

Comments can be erased by powering down, when you press **Clear** or **End Exam**, or when preset via Utility -> Comments.

Introduction (continued)

In addition, the display's home position can be changed (preferred comment area) for each display so that all subsequent comments begin in the same spot.

Pressing the **F7** key returns to the user specified position or factory default position.

A new cursor home position is established by placing the cursor in the desired position and pressing **Shift+F7**.

Comment Mode is activated by pressing the **Comment** key. Comment Mode can also be automatically activated by typing from the alphanumeric keyboard.

After activating the comment mode, a vertical bar type cursor appears on the screen. Use the **Trackball** to move the cursor.

The factory default color for comments is yellow. The color selection can be changed to any of the colors available on the system via Utility -> Comments -> Comments -> Text.

NOTE: The user cannot change the Font Family.

To indicate a specific comment or text group is selected, the color turns to green. Once the comment is set or fixed, the color returns to yellow or to the user selected color.

NOTE: If selected "Automatically Set Text" in Utility -> Comment -> Comment, the system sets the comment at the cursor position automatically when text entry is complete.

To delete comments by character, press the **Backspace** key.

To delete all comments, press the **Clear** key twice immediately after entering the comment mode.

To delete all comments and arrow marks, press and hold the **Clear** key until all comments and arrow marks disappear after entering the comment mode.

To exit the Comment/Library Comment function, press the next function you wish to do.

To move by words or by text group, press the **Tab** key.

Adding Comments to an Image

Comment Retention

Comments from the B-Mode images are retained and carried over when switching to multi-image format or Simultaneous mode.

The position of the comments is adjusted so that it is at the same relative position with respect to the display window in the new format as it was in the single image format.

NOTE: Comments may not be retained when the image is switched to M-Mode image format depending on the preset.

Arrow Pointers

Arrow pointers can be used by activating the **F2 (Arrow)** key on the keyboard. When the pointer comes up, it is a GREEN color, indicating it is active and can be moved.

- Move the pointer using the **Trackball** to any place on the screen. The pointer head direction can be controlled by movement of the Trackball or **Arrow Rotate** control.
- To readjust the length and thickness of the pointer, use the **Arrow Length** and **Arrow Width** control. The default for the pointer size can be preset.
- Press **Set** to fix the place of the pointer and direction of the pointer head. The GREEN color turns to YELLOW (or the default color if changed).
- To delete the arrow marks, press the **Clear** key right after pressing the **F2 (Arrow)** key.

*NOTE: To erase all comments as well as arrows, press and hold the **Clear** key.*

NOTE: To prevent the Trackball from changing the arrow angle, select the "Keep arrow angles" preset at Utility -> Comments -> Comments.

Text Overlays

There are 2 layers of the text in comments, which can be selected by toggling the **F8 (Text1/Text2)** key on the keyboard. Text1 is the default choice.

By using this function, users can perform a HIDE TEXT/SHOW TEXT, allowing the users to save or print an image without clearing the typed text.

You can specify to display text 1, text 2, or both. This allows you to have some comments that do not change during the exam while allowing you to change the other comment. Toggle the **F8** key to cycle through the three Text 1/Text 2 states:

1. Text 1 (Display and Edit) -- Only Text 1 displays and can be edited.
2. Text 2 (Display and Edit) -- Only Text 2 displays and can be edited.
3. Text 1 (Display) and Text 2 (Display and Edit)-- Both displayed; only Text 2 comments editable. Only Text 2 comments erased by Clear key. Word Delete only deletes Text 2 comment. Both Text 1 and Text 2 comments are erased with new patient, new exam, or probe change.

To preset the Text Overlay Sequence, go to **Utility -> Comment -> Comment** and select either **Text 1 and Both** or **Text 1 and Text 2 and Both**.

The font color for the Text1 and Text2 overlays can be set separately. Go to **Utility -> Comment -> Comment** and specify the text color for Text 1 Color and Text 2 Color.

NOTE: *If you check "Erase when image is unfrozen" in the Utility menu, only the editable text plane erases when you unfreeze the image.*

Annotating an image with typed words

- Press **Comment** and type the comments where the cursor is currently located (the display's home position) and use the **Trackball** to further place the comment cursor in the desired location.
- Press **Enter** to move to the next line.

NOTE: *Comments wrap to the next line when they are within one character of the right margin if Word Wrapping is selected in the Text Boundary preset via Utility -> Comments -> Comments.*

The word wrap starts one line below the start of that comment.

Comments appear on all prints, photos or CINE loops.

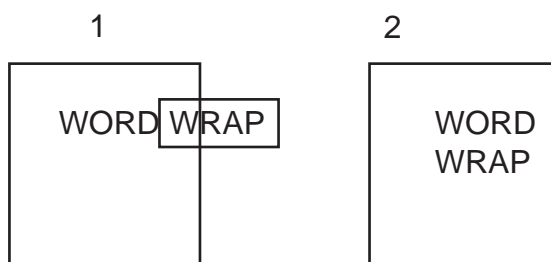


Figure 6-3. Next Line Word Wrap

1. Before

2. After

If the cursor appears at the right edge of the lowest line, or a word cannot be completed in the lower right corner, word wrap cannot be executed.

NOTE: *The same word wrap principles apply for library scripts as typed comments.*

Annotating an image using the library

To reduce the amount of time spent annotating an image, store frequently-used comments in the Comment Library. One of the selected libraries is designated as the default and its entries shall be displayed on the menu the comment mode is activated for that study.

Press **Comment** and move the comment cursor location using the **Trackball**.

Select the desired comments or select the

To program your system with specific comments, see 'Comments Libraries Presets' on *page 16-42* for more information.

Annotating an image using a Hot Key (Comments)

Before enter into comments mode, select the hot keys which are predefined for the frequently-used comments to enter into comments mode and add comments to the image.

NOTE: "Enable Alphabet Hot Key" in Utility -> System -> User Configurable Key should be selected before using the hot key.

There are ten alpha keys (A, S, D, F, G, H, J, K, L and ;) that are programmable as hot keys to store frequently-used comments. See 'Comments Libraries/Libraries Preset Menu' on *page 16-42 for more information.*

Moving Texts

You have the ability to move comments already on the screen and place them in different locations.

- Place the cursor on the desired text or text group and press **Set**.
- The selected text color turns to green.
- Use the **Trackball** to move the selected text and press **Set**.

Editing while annotating

Backspace over any error(s) made. Blank spaces take the place of the letter(s) that were there. Continue typing the comment after backspacing over all incorrect letters.

To delete previous character(s):

- Press **Backspace** as many times as necessary to make the deletion.
- Once all texts within the selected text group are deleted, then the cursor will find another text group to delete.
- If there is no more text to delete, the cursor will be located at home position.

To move through the text a word at a time:

- Press **Tab** or **Shift + Tab**.

To activate the last text group typed or selected from the Library:

1. Press **F9 (Grab Word)** key. The selected comment will be highlighted.
2. To increase/decrease the area of the highlighted selection, adjust HIGHLIGHT.

Once the text is highlighted, typing comments or choosing them from the library replaces the highlighted text.

To select all text groups, Press Shift + F9 (Grab Word) key.

To cancel the last action:

- Select **Undo**.

NOTE: Undo only can restore the last deleting step.

Body Patterns

An additional way to annotate the image display is with body patterns. Body patterns are a simple graphic of a portion of the anatomy that is frequently scanned. The body pattern and probe marker can serve as a reference for a patient and probe positioning when images are archived or scanned.

Press the **Body Pattern** key on the control panel to enter into body pattern mode.

The body pattern packages may be customized to accommodate user preference.



Figure 6-4. Displays of Body Pattern - example

Select the desired body pattern and the selected body pattern is displayed on the monitor.

- Select the **Move Pattern** control to reposition the body pattern with the **Trackball** and **Set** controls.

NOTE: *Body Pattern Position is updated when the display format is changed.*

NOTE: *Body Pattern Position is reset to factory default when patient is changed (i.e. End Exam).*

Body Patterns (continued)

- A probe mark is associated with the body patterns and illustrates the probe position on the body pattern. This marker can be placed with the **Trackball** and rotated with the **Probe Rotate** button.
- The probe mark type is selectable by adjusting the **Probe Type** menu.
- To select the active side in dual B-Mode, use the **Active Side** menu.
- To clear the body pattern, press the **Body Pattern** button to activate body patterns and then select the **Clear** key.
- Press **Set** key on the control panel or **Body Pattern** key on the control panel to exit without erasing the body pattern.

Annotating an image using a Hot Key (Body Patterns)

After enter into Body Pattern mode, select the hot keys which are predefined for the frequently-used body patterns to add Body Pattern to the image.

NOTE: "Enable Alphabet Hot Key" in Utility -> System -> User Configurable Key should be selected before using the hot key.

There are 10 alpha keys (Q, W, E, R, T, Y, U, I, O and P) that are programmable as hot keys to store frequently-used body patterns. See 'Body Pattern Libraries/Libraries Preset Menu' on page 16-47 for more information.

Notes for Body pattern (Probe mark)

- Probe Type is the type of probe mark displayed on the body pattern. It can be saved only for each body pattern while body pattern is activated, but not in the Utility preset menu. Therefore, Probe Type cannot be saved as an Application or System Preset.
To save the Probe Type,
 - a. Activate the **Body Pattern**.
 - b. Select a Body Pattern.
 - c. Select a type of probe mark with **Probe Type**.
 - d. Place the probe mark at the proper location.
 - e. Select **Set** on the control panel to save the body pattern.
- When a Body Pattern is selected and no Probe Mark has been saved on it, the latest used Probe Mark is carried over to the Body Pattern.

Body Patterns (continued)

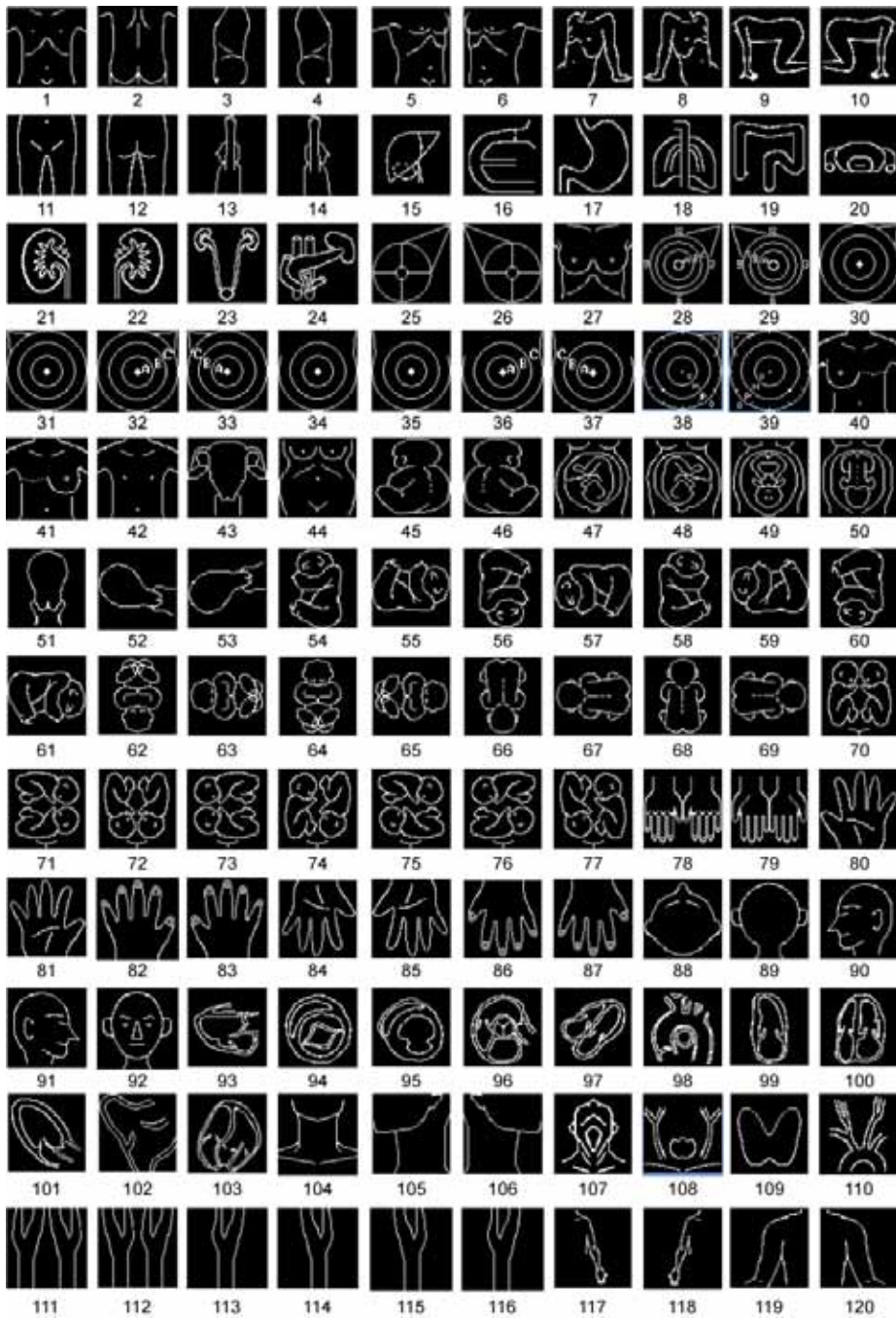


Figure 6-5. Body Patterns Available

Body Patterns (continued)

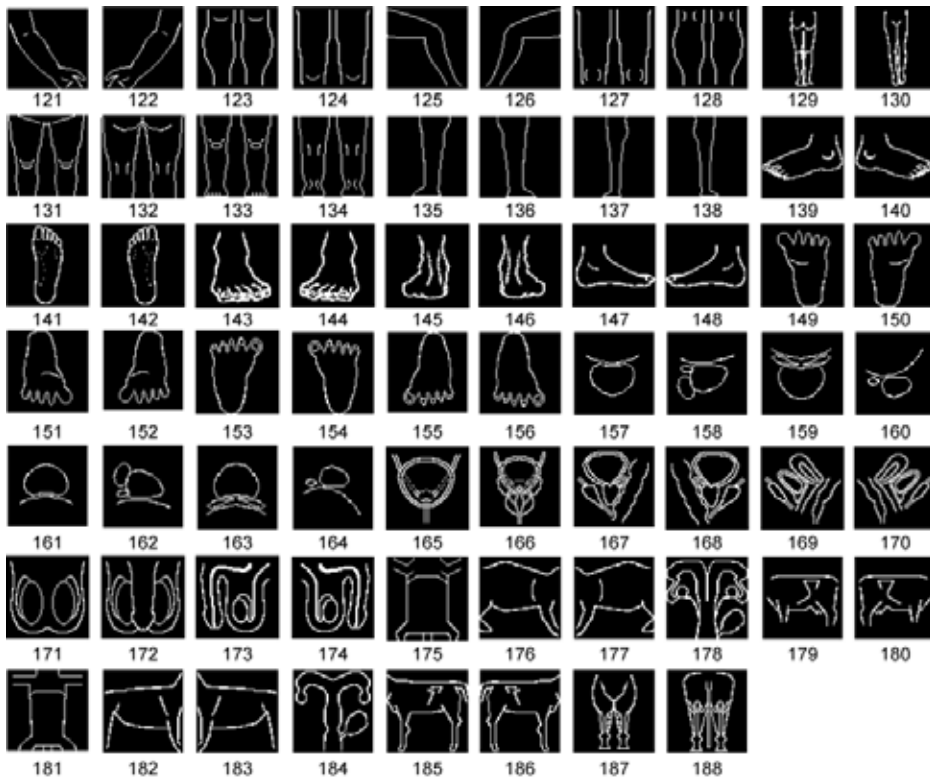


Figure 6-6. Body Patterns Available (continued)

Body Patterns (continued)

1. body1	51. uterus1	101. heart9	151. foot7-Lt
2. body2	52. uterus2	102. heart 10	152. foot7-Rt
3. body3	53. uterus3	103. heart 11	153. foot8-Lt
4. body4	54. fetus1	104. neck1	154. foot8-Rt
5. body5	55. fetus2	105. neck2	155. foot9-Lt
6. body6	56. fetus3	106. neck3	156. foot9-Rt
7. body7-Lt	57. fetus4	107. neck4	157. uro1
8. body7-Rt	58. fetus5	108. neck5	158. uro2
9. body8-Lt	59. fetus6	109. thyroid	159. uro3
10. body8-Rt	60. fetus7	110. carotid1	160. uro4
11. body9	61. fetus8	111. carotid2	161. uro5
12. body10	62. fetus9	112. New carotid2	162. uro6
13. body11-Lt	63. fetus10	113. carotid2-Lt	163. uro7
14. body11-Rt	64. fetus11	114. carotid2-Rt	164. uro8
15. liver	65. fetus12	115. Carotid3-Lt	165. uro9-female
16. organ1	66. fetus13	116. Carotid3-Rt	166. uro9-male
17. organ2	67. fetus14	117. arm1	167. uro10-female-Lt
18. organ3	68. fetus15	118. arm2	168. uro10-female-Rt
19. organ4	69. fetus16	119. arm3	169. uro10-male-Lt
20. organ5	70. twin1	120. arm4	170. uro10-male-Rt
21. organ6	71. twin2	121. arm5	171. uro11
22. organ7	72. twin3	122. arm6	172. uro12
23. organ8	73. twin4	123. leg1	173. uro13-Lt
24. organ9	74. twin5	124. leg2	174. uro13-Rt
25. breast1	75. twin6	125. leg3	175. vet-cat1
26. breast2	76. twin7	126. leg4	176. vet-cat2
27. breast3	77. twin8	127. leg5	177. vet-cat3
28. breast4-Lt	78. hand1	128. leg6	178. vet-cow1
29. breast4-Rt	79. hand2	129. leg7	179. vet-cow2
30. breast5-Lt	80. hand3-Lt	130. leg8	180. vet-cow3
31. breast5-Rt	81. hand3-Rt	131. leg 9	181. vet-dog1
32. breast6-Lt	82. hand4-Lt	132. leg 10	182. vet-dog2
33. breast6-Rt	83. hand4-Rt	133. leg 11	183. vet-dog3
34. breast7-Lt	84. hand5-Lt	134. leg 12	184. vet-horse1
35. breast7-Rt	85. hand5-Rt	135. legs13-a-Lt	185. vet-horse2
36. breast8-Lt	86. hand6-Lt	136. legs13-a-Rt	186. vet-horse3
37. breast8-Rt	87. hand6-Rt	137. legs13-Lt	187. vet-horse4
38. breast9-Lt	88. head1	138. legs13-Rt	188. vet-horse5
39. breast9-Rt	89. head2	139. foot1-Lt	
40. Post breast-Lt	90. head3	140. foot1-Rt	
41. Post breast-Rt	91. head4	141. foot2-Lt	
42. Post breast-bilateral	92. head5	142. foot2-Rt	
43. pelvis1	93. heart1	143. foot3-Lt	
44. pelvis2	94. heart2	144. foot3-Rt	
45. ob1	95. heart3	145. foot4-Lt	
46. ob2	96. heart4	146. foot4-Rt	
47. ob3	97. heart5	147. foot5-Lt	
48. ob4	98. heart6	148. foot5-Rt	
49. ob5	99. heart7	149. foot6-Lt	
50. ob6	100. heart8	150. foot6-Rt	

Using the Fast Key

Overview

A keyboard Fast Key is available to record and run a sequence of often-run keystrokes.

NOTE: *Ensure that you have a patient selected prior to running the Fast Key operation.*

Create a Fast Key

1. Press the **F5** key. The question dialog displays. Select OK to continue.
2. Select a key to assign a Fast Key to (a-z, 0-9).
If you select any key besides a-z or 0-9, a warning dialog displays and the procedure is cancelled.

NOTE: *Assign Fast Key Function to Key 0 - 9 in Utility -> System -> User Configurable Key before you create a Fast Key to a numeric key.*

NOTE: *“Enable Numeric Hot key” or “Enable Alphabet Hot Key” in Utility -> System -> User Configurable Key should be selected before you create a Fast Key.*

NOTE: *There is no distinction between capital and small letters.*

NOTE: *The key code is the same in Russian and Greek (a-z, 0-9).*

3. If the selected key is already assigned to a Fast Key, a warning dialog displays.
Select **Yes** to continue. The Fast Key macro file is overwritten.
Select **No** to cancel the Fast Key macro setup.

4. Input the key sequence to be assigned.

NOTE: *It is impossible to save a power cycle sequence or any input from outside of the system.*

NOTE: *The warning dialog displays due to the limitations of the number of key sequences. Press F5 to finish and retry.*

5. Press the **F5** key to complete a Fast Key macro setup. The information dialog displays. Select **OK**.

Start a Fast Key

1. Press the **F6** key to start a Fast Key. The message “Select the key which the Fast Key is assigned to” displays on the status bar.

NOTE: The F6 key is ignored if another dialog displays on the system.

NOTE: If you press F5 after F6, the F6 function cancels and the F5 function is enabled.

2. Press the key assigned to the Fast Key macro. The message “Fast Key playback is finished” displays on the status bar when the macro is finished.

To stop the Fast Key macro during the operation, press **F6**. The message “Fast Key playback is cancelled” displays on the status bar.

NOTE: Select the running speed in the Run Fast Key Speed preset on Utility -> System -> General.

Backup and Restore the Fast Key

You can backup/restore the Fast key via Utility -> System -> Backup/Restore.

To backup, select User Defined Configuration in the Backup section.

To restore, select User Defined Configuration in the Restore section.

Using InSite ExC

InSite ExC

InSite ExC is your direct link with a GE Online Service Engineer or Applications Support Engineer or a Request for Service via the InSite ExC link at the bottom of the display screen.



Figure 6-7. InSite ExC Icon

Types of InSite ExC Service

1. **Request For Service (Contact GE).** Opens a service dispatch with GE Service.
2. **Connect to GE.** Direct contact with GE Technical Support.
3. **Configure Agent.** Use to access InSite ExC Configuration window.
4. **Connect Clinical Lifeline.** Direct contact with GE Applications Support.

Configure Agent

To access InSite ExC Service configuration window,

1. Click InSite ExC Icon at the bottom of the display screen. Select **Configure Agent** from the list.

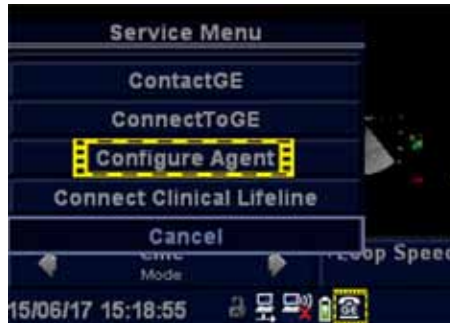


Figure 6-8. Service Menu

2. On configuration window, do the proxy configuration if **Proxy Configuration** is required. Select **Submit Changes**.

Figure 6-9. InSite ExC configuration

Initiating a Request for Service (RFS)

To initiate an RFS,

1. Position the Windows pointer on top of the GE InSite ExC icon at the bottom of the display.
2. Press **Set** Key, select **ContactGE**. This opens of the RFS screen which sends a service dispatch directly to GE Service after you fill in the following information:
 - Contact Information
 - Problem type
 - Problem area
 - Problem description
 - Send
3. After you have completed filling in all of this information, press **Send** to initiate the Request for Service.

The screenshot shows a software interface for initiating a Request for Service (RFS). The window title is "Contact GE". At the top, there are tabs for "Queue", "Machine Queue", and "Users". The main content area is divided into several sections, each marked with a red asterisk to indicate required fields:

- Contact Information:** Includes fields for Last Name (ALEX), First Name (JIANQ), Phone (12345678), Email (123@123.COM), and System ID (LLLTRAINING). There is also an "Other System ID" field.
- Problem Type:** Features two buttons: "Service" and "Applications".
- Problem Area:** Contains two dropdown menus labeled "Service" and "Applications". The "Service" dropdown shows options like "No Start", "No Image", "Error Message", and "Link Up". The "Applications" dropdown shows "Process", "Measurements", and "Probe Not Recognized".
- Problem Description:** A large text area containing the text "CANNOT OPEN REPORT". Below it, there is a "Date/Time of Problem" field set to "06/23/2013 15:22" and a "New" button. A character count shows "963 characters left".

At the bottom of the form, there are "Send" and "Cancel" buttons. A red asterisk at the bottom indicates that fields and sections marked with an asterisk are required. The status bar at the very bottom shows "Connection: Checked Out" and "Status: X".

Figure 6-10. Request for Service Contact Information

Initiating a Request for Service (RFS) (continued)

After you press Send, the following pop-up appears:

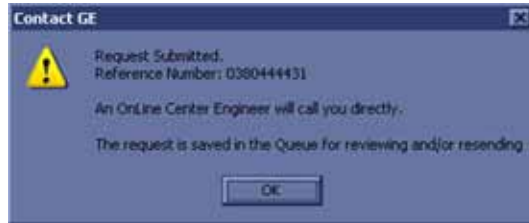


Figure 6-11. Request for Service Confirmation

All requests for service are listed on the Queue for your review.

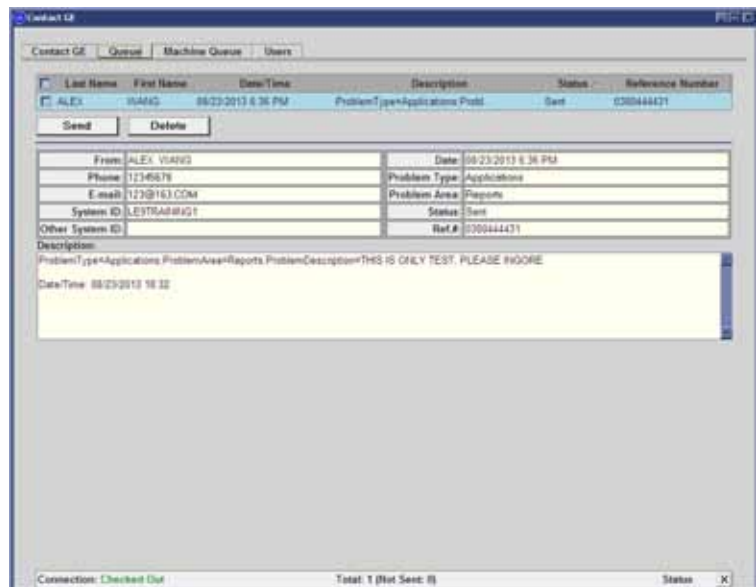


Figure 6-12. Request for Service Queue

Initiating a Request for Service (RFS) (continued)

You can monitor your RFS as well as RFS's automatically sent by the system. The LOGIQ V2/LOGIQ V1 can automatically submit a Request for Service. These are displayed on the Machine Queue.

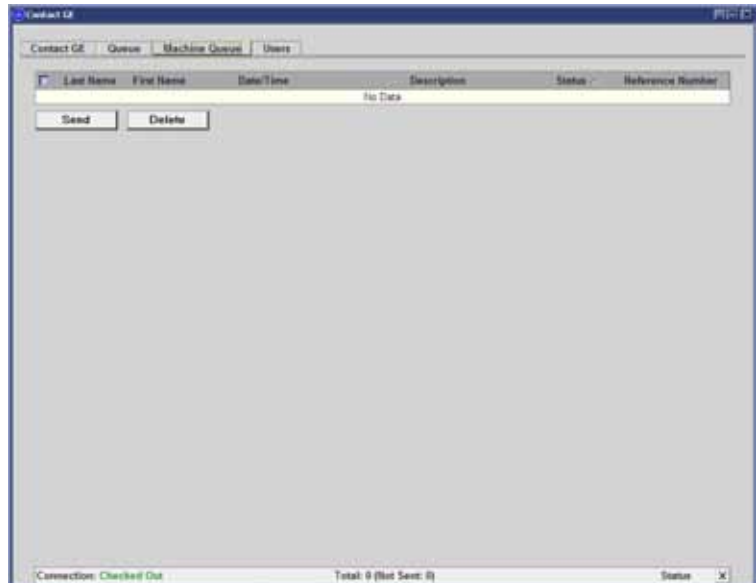


Figure 6-13. Machine Queue

Initiating a Request for Service (RFS) (continued)

In addition, you can use the Users screen to identify your institution's point of contact for service dispatches.



Figure 6-14. Users

Initiating a Technical or Clinical Support Request

To initiate Technical or Clinical Support,

1. Position the Windows pointer on top of the GE InSite ExC icon at the bottom of the display.
2. Press the Set Key. This opens the following pop-up:
 - ContactGE
 - Connect to GE,
 - Configure Agent
 - Connect Clinical Lifeline
 - Cancel

NOTE: *When you have contacted Applications or the Online Center/Field Engineer (OLC/FE), you may be asked to click on “**Connect to GE**”: to increase the polling rate so that the OLC/FE can connect more quickly. Or, you may be asked to “**Connect to Clinical Lifeline**” so applications can connect to the system.*

3. Select **Connect to GE** for Technical Support; select **Configure Agent** to fill and send ultrasound system/server information to GE Service; select **Connect Clinical Lifeline** for Clinical Applications Support; or press Cancel to exit.
4. If you’ve requested GE Service to perform remote service on the LOGIQ V2/LOGIQ V1, answer Yes to the Insite Notification pop-up.







Figure 6-15. InSite Notification

NOTE: *In addition to contacting a technical/clinical support person, selecting this also changes the polling time from 15 minutes to 15 seconds so that your call can be answered as quickly as possible, as well as allowing disruptive mode.*

Initiating a Technical or Clinical Support Request (continued)

InSite ExC icons appear differently, depending on their state:

Table 6-2: InSite ExC Icons

Online Center	Non Disruptive	Disruptive
Not Connected	Black and White Icon - InSite ExC activated but system not open for Technical Support access. 	Red Icon with Clock - InSite ExC activated and open for Technical Support, but currently not active. 
Connected	Yellow Icon - InSite ExC activated and Technical Support can look around on your system, but cannot perform any service-related functions. 	Red Icon with GE Logo - InSite ExC activated and Technical Support can look around on your system, run diagnostics, gather logs, and initiate VCO. 

InSite ExC Definitions

Here are definitions for the different InSite ExC states:

Virtual Console Observation (VCO). Allows Technical Support to control LOGIQ V2/LOGIQ V1 functionality remotely.

Disruptive. Allows GE's Technical Support person to connect to your system via VCO, to run diagnostics directly on your LOGIQ V2/LOGIQ V1 system, and to collect system logs. When the system is in Disruptive Mode, the icons are red. There are two disruptive states. If you see a telephone with a clock, then the system is in Disruptive, Not Connected Mode. If you see a telephone with GE, then the system is in Disruptive, Connected Mode.

Non-Disruptive. Allows GE's Technical support person to look around on your system, but cannot perform any service-related functions, depending on whether InSite has connected or not connected. There are two Non-Disruptive states. If you see a black and white icon, InSite ExC is activated, but not open for Technical Support access. If you see a yellow icon, InSite ExC is activated and the Technical Support person can look around on your system, but cannot perform any service-related functions.

Connected. InSite ExC is connected.

Not Connected. InSite ExC is not connected.

NOTE: When Disruptive mode has been activated or a diagnostic has been run, the message, "Due to Service testing reboot required," appears in red at the bottom of the display. It is recommended that you reboot the system before use. Make sure you disable disruptive mode before rebooting or the message will not be cleared.

Exiting InSite ExC

To exit InSite ExC,

1. Position the Windows pointer on top of the GE InSite ExC icon at the bottom of the display.
2. Select Connect Clinical Lifeline again to exit Disruptive Mode and VCO.
3. Reboot your LOGIQ V2/LOGIQ V1 system.

Electronic Documentation

Documentation Distribution

Documentation is being provided via:

- Hardcopy (Optional)
 - User Guide (translated)
 - Release Notes (translated)
 - AIUM Acoustic Output Booklet (USA only)
- Electronic media. You can view user documentation (all languages) on a PC or on the Ultrasound Scanner via the Customer Documentation media, which includes:
 - Basic User Manual (English only)
 - Advanced Reference Manual (English only)
 - User Guide (translated)
 - Release Notes and Workarounds (translated)
 - Basic Service Manual (English only)
- Online Help (on the Ultrasound Scanner via help)

Using Online Help Via F1

Online Help is available via the F1 key. After pressing F1, Help appears. The Help screen is divided into three sections: navigational tools on the top, left portion of the screen (Hide, Back, Forward), help book navigational tools on the left portion of the screen (Contents, Index, Search, Favorites), and the content portion on the right side of the screen where help topics are displayed.

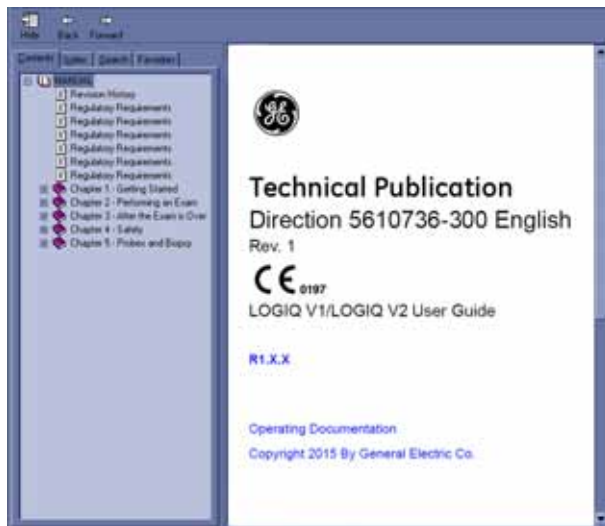


Figure 6-16. Opening Help Screen

Navigating through the Help Book

Online Help is organized like a manual, with individual chapters, sections, and pages. Click on the plus (+) sign next to MANUAL to open up the book. Click on the plus sign next to the chapter you want to view to open up that chapter. Click on the plus sign next to the chapter you want to view to open up that section. Open up the page to view that page's information.

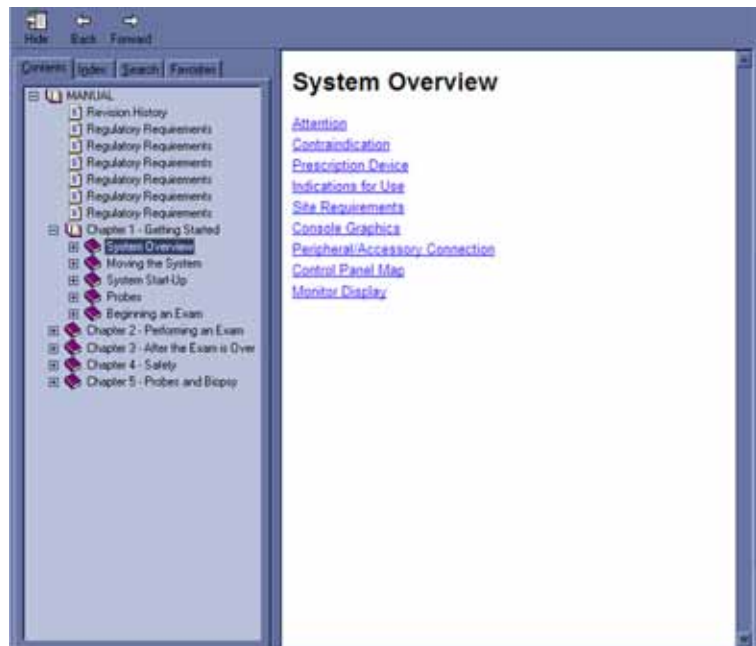


Figure 6-17. Sample Help Topic

The blue, underlined text links you to related topics. Click on the link to move to the new topic.

Links

After you click on a blue, underlined portion of text, the screen updates with this link's content. To go back to the previous screen, press Back. To return to the link, press Forward.

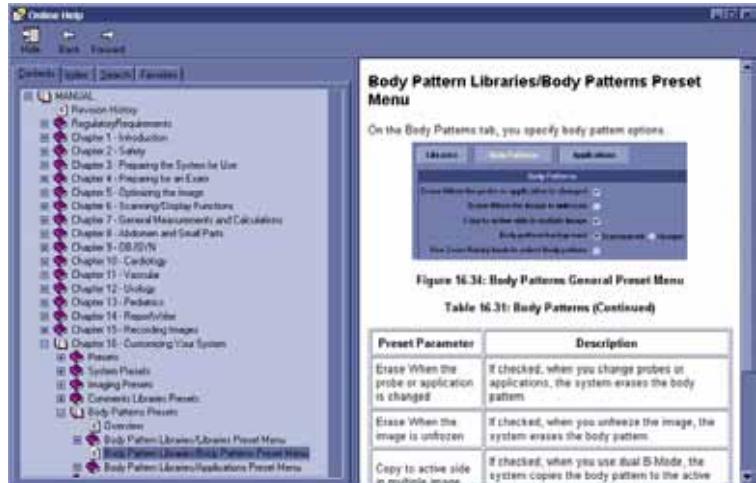


Figure 6-18. Topic Link

Searching for a Topic

To search for a specific topic, click on the Search tab in the left portion of the screen. Type in the topic name in the *Type in the keyword to find* field. Topics with the word or phrase you typed appear in the *Select Topic to display area*. Either double click on the topic you want to view or highlight the topic and press the Display button to view this topics.



Figure 6-19. Search Results

Saving Favorite Topics

You may find that there are topics you need to refer to often. In this case, it's a good idea to save these topics as Favorites. To save a topic as a favorite, press the Favorites tab, highlight the topic in the Topics window, and press the Add button. You can now view this topic quickly by going to the Favorites help tab.



Figure 6-20. Adding Favorites

Using the Index

Or, you can look for topics by using the Index. Press the Index tab, then use the scroll bar to look up a topic.



Figure 6-21. Index

Other Help Features

To hide the left side of the screen, press the Hide icon at the upper, left-hand portion of the screen. To view the left side of the screen again, press the Show icon at the upper, left-hand portion of the screen.

To size the Help window, position and hold down the cursor at the corner of the screen while moving the Trackball.

To move the Help window, position and hold down the cursor at the very top of the Help window while moving the Trackball on the control panel.

Exiting Online Help

To exit Online Help, press the 'X' in the upper, right-hand corner of the Online Help window.

Electronic media

Accessing Documentation Via a PC

To view user documentation on a PC,

1. Insert the media into the media drive.
2. Open the media drive on your desktop.
3. Select and open the item you want to view.

To close the window, click on the 'X' in the upper, right-hand corner of the browser window.

NOTE: If your PC does not have Adobe Reader, a free download is available on the Adobe web site at <http://www.adobe.com>.

Chapter 7

General Measurements and Calculations

Describes how to perform general measurements and calculations.

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by system accuracy, but also by the use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.



WARNING

The system provides calculations (e.g. estimated fetal weight) and charts based on published scientific literature. The selection of the appropriate chart and clinical interpretation of calculations and charts is the sole responsibility of the user. The user should consider contraindications for the use of a calculation or chart as described in the scientific literature. The diagnosis, decision for further examination, and medical treatment must be performed by qualified personnel following good clinical practice.

Overview

This section provides information about taking measurements and describes calculations available in each mode. It includes the following topics:

- Exam workflow
- Location of measurement controls
- Description of calipers
- List of generic measurements
- General information about taking measurements
- Mode Measurements: Step-by-step instructions for taking specific measurements, organized by mode
- Basic steps to view and edit worksheets

Exam workflow

For each patient, the system organizes information by exam category, study, and measurement. The definitions of these terms are as follows:

- **Exam Category** – categories include the following:
 - Abdomen
 - Obstetrics
 - Gynecology
 - Cardiology
 - Vascular
 - Urology
 - Small Parts
 - Pediatrics
- **Study/Preset** – after you choose an exam category, the system allows you to select a study. For example, when you choose the Obstetrics exam category, you can choose one of the following studies:
 - Generic
 - OB-1
 - OB-2/3
 - OB-General
 - Fetal Heart
 - OB/GYN Vessel
- **Measurement** – the measurements and calculations needed to analyze an item of anatomy. For example, a femur length is a measurement. A measurement can include several pieces of measurement data. For example, to calculate the area of a gestational sac, you need to measure width, length, and depth.

For details on how to start a new patient, see 'Beginning an Exam' on *page 4-2 for more information*.

Location of Measurement Controls



Figure 7-1. Locating Measurement Controls

1. **Clear.** During a measurement sequence, erases the measuring caliper and measurement data from the display. When not performing a measurement sequence, clears all calipers and measurements from the display.
2. **Measure.** Activates a measurement caliper and the calculation package associated with the currently selected preset.
3. **Set/B Pause.** **Set** fixes the caliper for measurements and completes the measurement sequence.
4. **Trackball.** Moves the measurement calipers, selects the measurement on the Summary Window.
5. **Depth/Zoom/Ellipse.** **Ellipse** activates the area/ellipse measurement function. During the ellipse adjustment, use the **Trackball** to increase or decrease the size of the ellipse. Select **Cursor Select** to adjust the measurement calipers.

Description of calipers

While you are making a measurement, the measurement caliper is either active (open plus sign) or fixed (closed plus sign). An active caliper is green and a fixed caliper is yellow.

The system allows you to identify measurements by number or by unique symbol. If you choose Number as the Cursor Type, after you complete a measurement, it is assigned a number. If you choose Symbol as the Cursor Type, after you complete a measurement, the caliper symbol changes to one of the nine shown below. The symbols are used in sequence as listed. The first symbol is used for the first measurement, the second symbol for the second measurement, and so on. The numbers or symbols also identify measurements in the Results Window.



Figure 7-2. Fixed Caliper Symbols

For information about how to choose Cursor Type of Number or Symbol, see 'System/System Measure Preset Menu' on *page 16-13 for more information.*

Measurement line display

While you are making a measurement, the system displays a dotted line to show the measurement. After you press **Set** to complete the measurement, the dotted line remains on the display if the Cursor Line Display, found on the System -> System Measure screen, is selected. If Cursor Line Display is not selected, the system erases the dotted line and only the measurement calipers with a number or symbol are displayed.

List of general measurements

The following types of general measurements are available when you press **Measure** but do not choose a specific calculation. The type of measurement depends on the current scan mode.

After pressing Measure, rotate between various measurement types with the adjusting of **Caliper Change** menu.

B and CF Modes

- Dist (Caliper)
- Trace
- Spline
- Intensity
- Open Trace
- Open Spline

NOTE: You can preset the sequence of B and CF area measurements in the Measure Key Sequence (B/CF) preset in the Utility -> Measure -> Advanced screen. See the "M&A Advanced Preset" section for more information.

Doppler Mode

- Velocity
- Trace
- Slope
- Time

M-Mode

- Distance
- Time
- Slope

General Instructions

You can take measurements in all modes and image formats, including real-time, frozen, CINE. After you select an exam category, the available calculations are displayed.

Measurement and calculation results

As you take measurements, each measurement is given a sequential number on the display and in the Results Window. The system can display nine measurements on the screen at one time.

While you are taking a measurement, the value in the Results Window updates until you complete the measurement.

Once the Results Window has nine measurements, if you make any further measurements, the system erases the first measurement and adds the new measurement (“first in, first out”).

Measurement graphics are kept while in cine scroll. The measurement graphic is redisplayed on the frame where it is taken, if preset “keep graphics with cine scroll” via utility -> Measure ->Advanced.

Selecting a calculation

When you take measurements, you can select the calculation before you take the measurement or after you take it. For example, in Obstetrics, if you select the calculation before you take the measurement, the estimated fetal age is displayed as you take the measurement. If you select the calculation after you take the measurement, the estimated fetal age is displayed after you complete the measurement.

NOTE: After you take a measurement, if you select a calculation and the measurement is not applicable for the calculation, then the system assumes you want to start the calculation. The system then uses the calculation for the next measurement.

If there is a measurement listed in the Results Window that has not been assigned a calculation, to assign the measurement:

1. Press **Measure**.
2. To select the measurement in the Results Window, move the **Trackball** to the measurement.
The measurement is highlighted.
3. Press **Set**.
The system displays a list of applicable calculations. For example, if it is a distance measurement, the list includes all distance calculations for the current study.
4. To select an item in the list, move the **Trackball** to highlight the item and press **Set**.
The system assigns the calculation to the measurement.

Selecting a measurement in a different application

While scanning a patient, you may find that you want to measure an item that is not in the current application. To select a calculation from a different application:

1. Press **Measure**.
2. Press the **Second Menu** button, the exam category menu is displayed.
3. Select the exam category that has the calculation you want to make.
The system displays the study of the selected exam category.
4. Select the study and the desired measurement.
5. After you complete the measurement, to return to the original application, repeat steps 1–4.

NOTE: *This measurement **DOES NOT** appear on the original application worksheet.*

Post-assignment for Side/Location

1. Move the cursor to the result box (with the green frame) and press **Set**. The post-assignment menu appears.
2. Select Side and Location as needed.



Figure 7-3. Post-assignment menu

NOTE: *This feature is only available in manual calcs.*

Minimize/Maximize the Results Window

Move the arrow pointer by Trackball to the top-left icon in the Result Window and press **Set**. The Window is minimized and displays only the icons. Press **Set** again to maximize the display.

Erasing measurements

The following actions erase measurements from the system's memory:



HINTS

- If you unfreeze the image, or press **Clear**, the system erases all completed measurements and calculations on the display. Measurements and calculations, however, remain on the worksheets.
- If you select **End Exam**, the system erases all measurements and calculations on the display and clears the worksheets.
- If you make a new measurement that exceeds the maximum number of allowable measurements, the system erases the first (oldest) measurement and adds the new measurement.
- If the second caliper is active, to erase the second caliper and activate the first caliper, press **Clear**.

The following are actions you can take while performing measurements.



HINTS

- Before making measurements, to stop the acquisition of image data, press **Freeze**.
- For measurements such as distance, to make fine adjustments before completing the measurements, adjust **Cursor Select** to toggle between active calipers.
- Before completing the measurement sequence, to erase the active measuring caliper and the current data measured, press **Clear**.
- After the sequence is complete, to erase all data that has been measured to this point, but not data entered on worksheet pages, press **Clear**.
- When there are several measurements on the display, to rotate through and activate previously fixed calipers, adjust **Cursor Select**. After a cursor is activated, you can change the measurement.
NOTE: If you want to change a trace measurement, you must erase it and trace again.
- To repeat any measurement, select that measurement again.

Calculation formulas are available in the *Advanced Reference Manual*.

Measurement and Calculation Setup

Measurements and studies are organized for typical work flows. If you want, you can change this set up. You can specify which studies are in each exam category, and which measurements and calculations are in each study. You can change the measurements that are available. The LOGIQ V2/LOGIQ V1 allows you to quickly and easily set up your system so that you can work most efficiently.

This section describes how to:

- Change a study to include different measurements
- Add a new study or measurement
- Remove a study from an exam category
- Change measurement parameters
- Create a measurement formula to correctly handle unit conversions
- Edit user-defined calculations
- Define application-specific measurement parameters
- Specify the default manual calc measurements for a selected study or folder

Starting Study and Measurement SetUp

You can make changes to studies and measurements in the Measurement & Analysis screen. To open the screen:

1. Enter **Utility-> Measure**.
2. On the monitor display, select **M&A** tab.

The system displays the Measurement & Analysis screen on the monitor display.

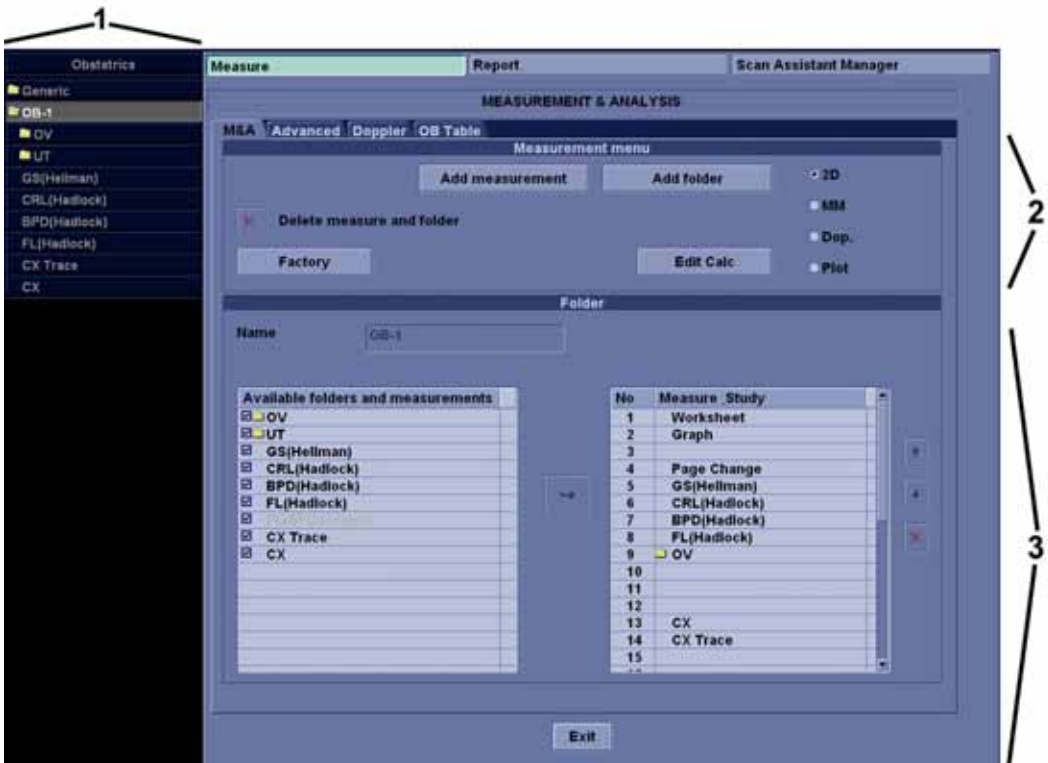


Figure 7-4. Measurement & Analysis screen

1. **Selection menu:** select exam category, study, or measurement.
2. **Measurement menu:** add and delete studies (folders) and measurements; select mode.
3. **Folder or measurement:** define studies and measurements. This section changes between Folder and Measurement, depending on what you select in the Selection menu.

NOTE: In the Measure menu, the navigational tabs across the top may differ from system to system but the functionality is the same.

Selecting an exam category

When you open the Measurement & Analysis screen, it displays the exam category that was last used on the system. To select the exam category you want to work with:

1. Move the **Trackball** to highlight the exam category at the top of the Selection menu.
2. Press **Set**.
The system displays a list of exam categories.
3. Move the **Trackball** to highlight the exam category you want.
4. Press **Set**.

The Selection menu lists studies and measurements for the selected exam category.



Figure 7-5. Select Exam Category

Selecting the measurement mode

In the Measurement menu section of the Measurement & Analysis screen, select one of the following:

- 2D (B-Mode)
- MM (M-Mode)
- Dop. (Doppler Mode)
- Plot (Plot Mode—The measurement on the plot graph of the QAnalysis)

The Selection menu lists studies and measurements for the selected mode.



Figure 7-6. Select Mode

Selecting a study or measurement

To work with a folder or measurement, you must first select it in the Selection menu. The Selection menu lists the studies and measurements for an exam category. The studies and measurements are organized in a hierarchy. The following example shows the highest level of the Obstetrics exam category, with the OB studies listed.



Figure 7-7. Selection Menu: Exam Studies

Selecting a study or measurement (continued)

After you select a study, the Selection menu shows all folders and measurements in the study. The Folder section of the Measurement & Analysis screen changes, and lists the measurements. The Selection menu shows all measurements for the OB-1 exam category.



Figure 7-8. Selection Menu: OB-1 Exam Category

Selecting a study or measurement (continued)

The following example shows the Selection menu after the BPD measurement is selected. The Measurement section is now displayed, with information about the BPD measurement.



Figure 7-9. Selection Menu: BPD Measurement

Selecting a study or measurement (continued)

To select a folder or measurement:

1. Move the **Trackball** to the Selection menu and highlight the folder or measurement.
2. Press **Set**.
 - If you selected a folder, the system displays the folder in the Folder section of the Measurement & Analysis screen.
 - If you selected a measurement, the system displays the measurement in the Measurement section of the Measurement & Analysis screen.

*NOTE: Items must be selected in the Available folders and measurements list to be in the Selection menu. To move or change an item that is in the Available folders and measurements list but not in the Selection menu, move the **Trackball** to the check box for the item, and press **Set**. The item is now listed in the Selection menu.*

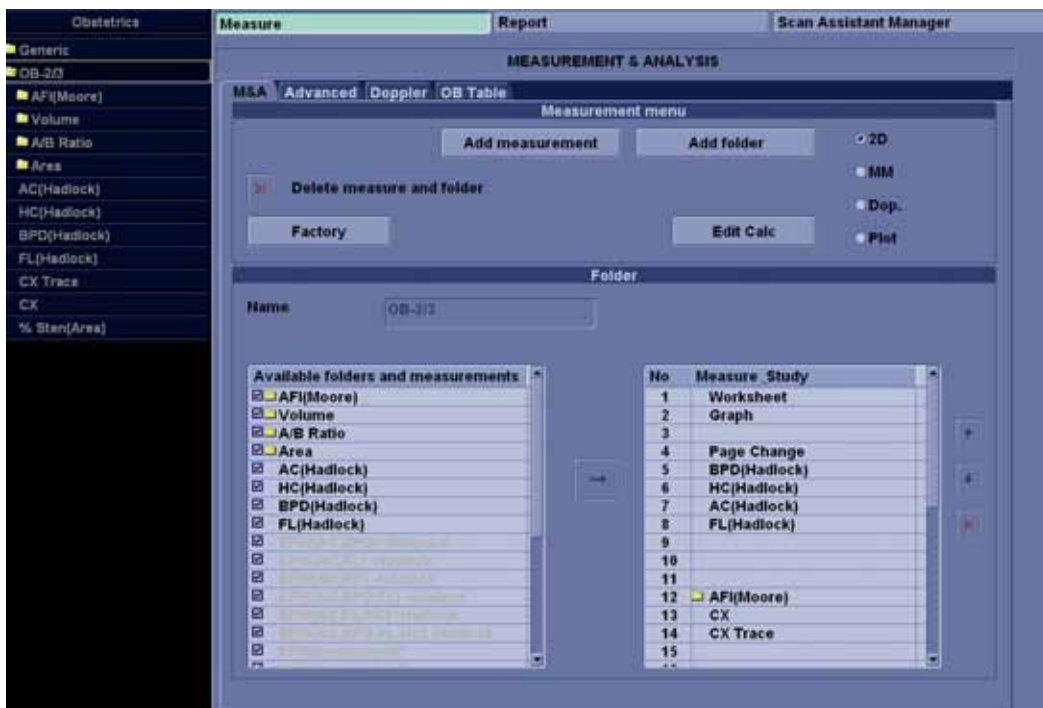


Figure 7-10. Available folders and measurements check boxes

Defining Hot Keys

There are 10 alphanumeric keys that are programmable as hot keys to store frequently-used measurements.

1. In the *Hot Key* field, select the desired hot key (Z, X, C, V, B, N, M, , , . or /) for the appropriate Measure Study by pressing the up/down arrow key on the monitor display.
2. Ensure that the “Enable Alphabet Hot Key” preset has been selected in the Keyboard Key portion of the Utility -> System -> User Configurable Key page.

NOTE: *Defined hot keys are listed on the Measurement Window.*

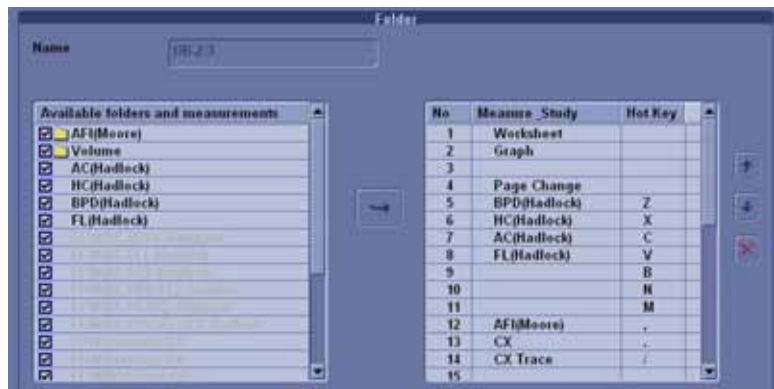


Figure 7-11. Hot keys for measurements

Using folders

When you select a folder in the Selection menu, the system displays all folders and measurements that are in the folder. A folder can indicate a study, or can indicate a measurement group that contains related measurements. For example, a calculation such as OB Amniotic Fluid Index (AFI) requires four measurements, one of each quadrant. The AFI folder contains four measurements.

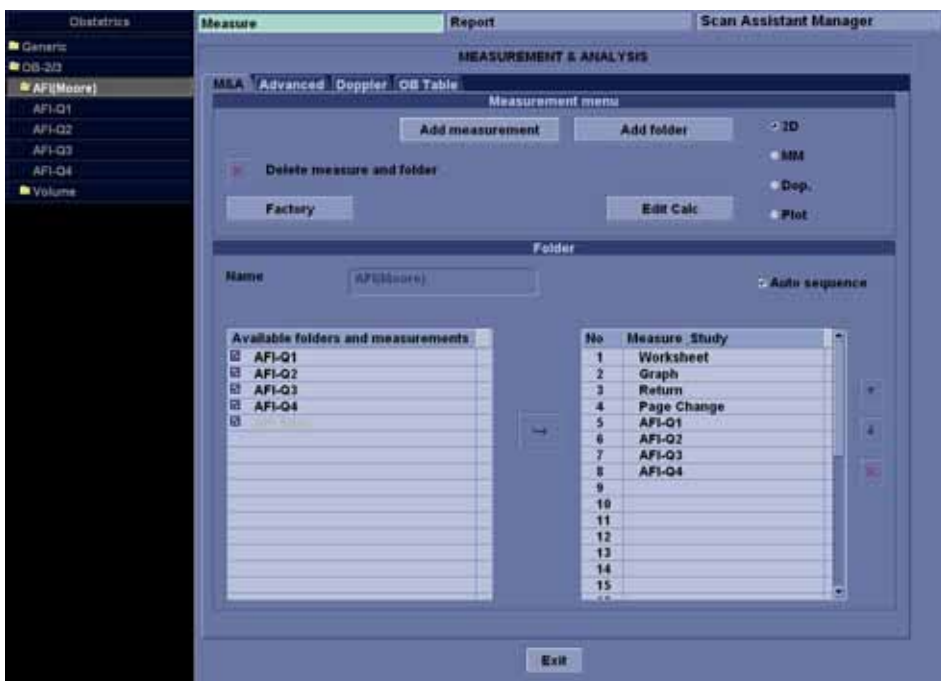


Figure 7-12. AFI Folder

Specifying Which Measurements Go in a Study or Folder

The Folder section of the Measurement & Analysis screen has two lists of folders and measurements. This is where you specify which items go in a study or folder.

- **Available folders and measurements.** The left list contains all possible folders and measurements for the selected study or folder.
- **Measure & Study.** The right list has all folders and measurements currently selected for the study or folder. These are selected from the Available folders and measurements list. These are the folders and measurements you see when you are scanning and choose an exam category. This also defines the order of the folder or measurement is located, based on the number in this list.

To add an item to the Measure & Study list:

1. In the Measure & Study list, move the **Trackball** to highlight which folder you want to put the item in, and press **Set**.

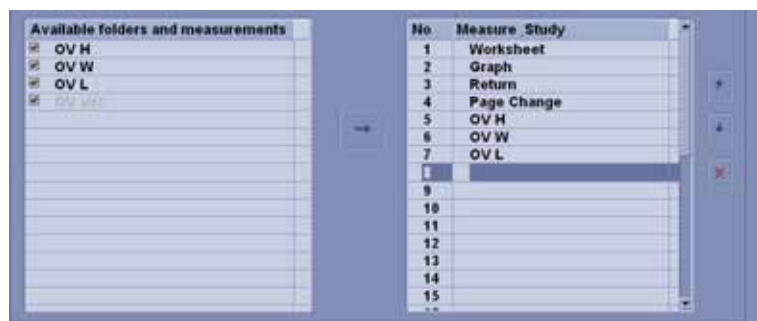


Figure 7-13. Measure & Study list: Selecting item and position

2. Move the **Trackball** to highlight an item in the Available folders and measurements list, and press **Set**.

Specifying Which Measurements Go in a Study or Folder

(continued)

3. Select the arrow between the lists. The item is copied to the Measure & Study list.

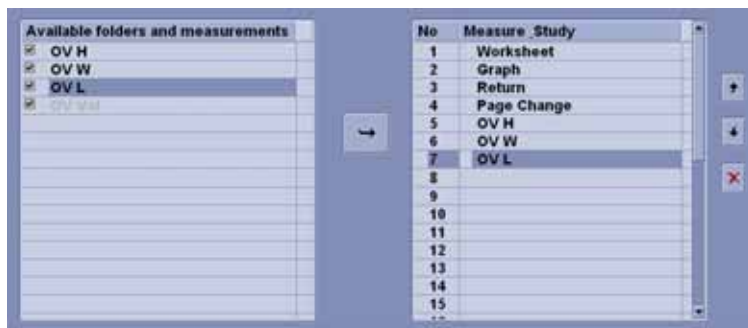


Figure 7-14. Measure & Study list: New item added

The selected item is now displayed in the Measurement Summary Window.

NOTE: *If an item is already in the Measure & Study list, the system does not allow you to add it again. To move an item within the Measure & Study list, see 'Moving items in the Measurement Summary Window' on page 7-22 for more information.*

Measurement Summary Window

The figure below shows the OB menu area and a portion of the Measurement and Analysis screen for OB.

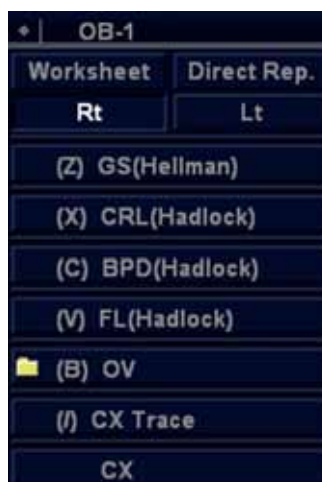


Figure 7-15. Measurement Summary Window

Moving items in the Measurement Summary Window

To move items that are displayed in the system menu, you move them in the Measure & Study list in Utility -> Measure -> Measure.

1. Move the **Trackball** to highlight an item in the Measure & Study list.
2. Select the up or down arrow.

The item is displayed at the selected position in the system menu.

Removing items from the System Menu

To remove an item from the Selection menu:

1. Move the **Trackball** to the item in the Available folders and measurements list.
2. To clear the check box for the item, move the **Trackball** to the check box and press **Set**.

The system removes the item from the Selection menu, the Measure & Study list, and from the System Menu. It is also not listed in the Summary Window.

Setting up an automatic measurement flow

In some cases, related measurements are put in a measurement folder. This allows you to logically organize measurements. It also allows you to specify that the system automatically start each measurement in a folder, one after the other. This is the automatic sequence feature. To use this feature:

1. In the Selection menu, select the folder that contains the measurements you want.
The system displays the folder and lists the measurements.
2. In the Folder section of the Measurement & Analysis screen, select Auto sequence. For OB-1 measurements, Uterine Volume measurements are put in the Uterine folder.

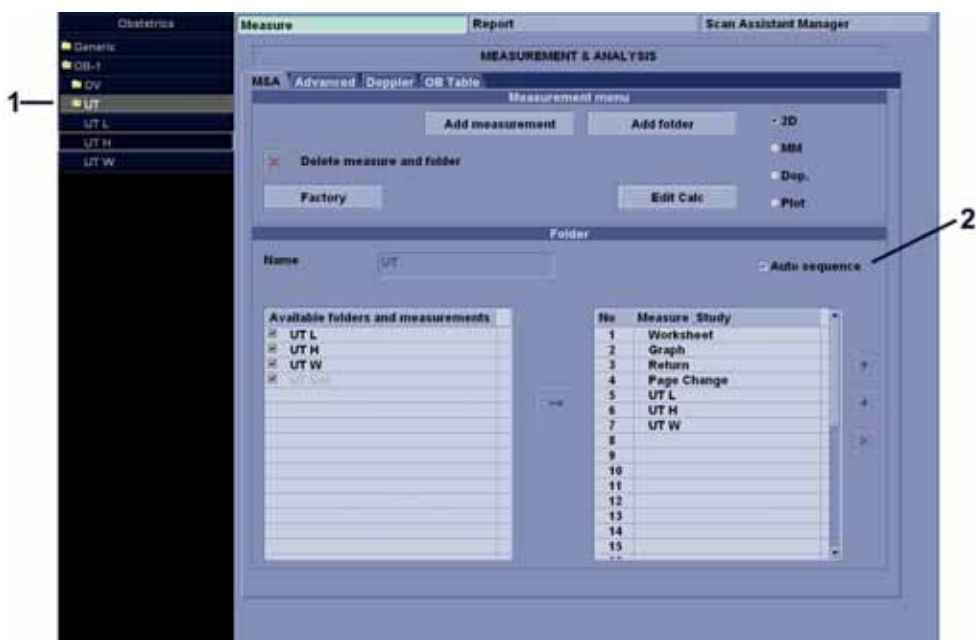


Figure 7-16. Measurement & Analysis screen: Auto sequence

1. Selection Menu

2. Auto Sequence

Changing Measurements

You can make changes to some of the measurements. For example, Head Circumference can be measured with an ellipse, a trace, or two distances. You can specify which measurement type you want the system to use as the default. You specify the measurement type by selecting the tool to use to make the measurement.

- To change the tool used to make a measurement:

In the Measurement section of the Measurement & Analysis screen, select the desired tool from the Tool list. Select the arrow to display the drop-down list.

NOTE: *If the Tool field is gray, it cannot be changed.*

After you choose the tool, this is what the system expects when you scan and choose this measurement.

NOTE: *The diagram to the right of the Tool list shows the measurement type. In the following example, ellipse is selected and the diagram shows an ellipse.*

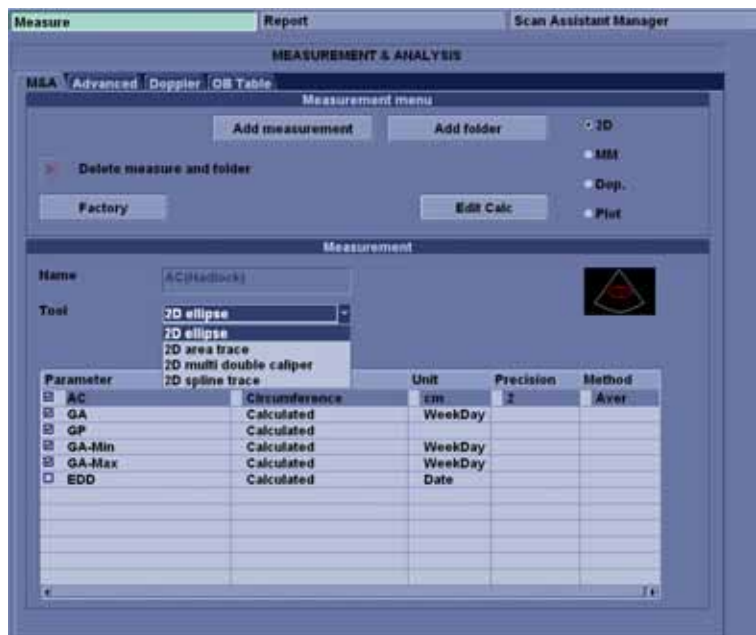


Figure 7-17. Measurement & Analysis screen: Change measurements

Adding Folders and Measurements

Adding a folder

When you add a folder, it can be a study, or a measurement folder that includes related measurements.

1. In the Selection menu, select the study or folder where you want to add the folder.
2. In the Measurement menu section, select Add folder.
 - If you select Blank, the system adds a folder with a name such as USERDEFS1. It is listed in the Selection menu.
 - If you want to use an existing folder, select Insert, and then select a folder from the list. The list includes all folders defined for the current exam category and selected mode. You cannot edit this folder.

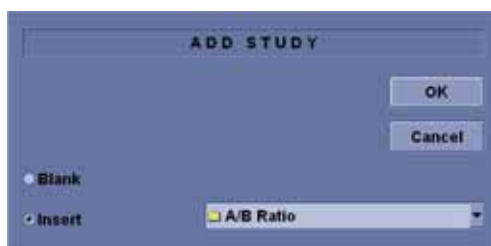


Figure 7-18. Add folder Window

3. Select the user-defined folder in the Selection menu. The system displays the new folder in the Folder section of the Measurement & Analysis screen.
4. To name the folder, move the **Trackball** to highlight the Name field, press **Set** twice, and type the name.

NOTE: *DO NOT use "single quotes" for a parameter name, a measurement name, a folder name or an author name.*

5. To add measurements to the folder, see 'Adding a user-defined measurement' on page 7-27 for more information.

Adding a folder (continued)

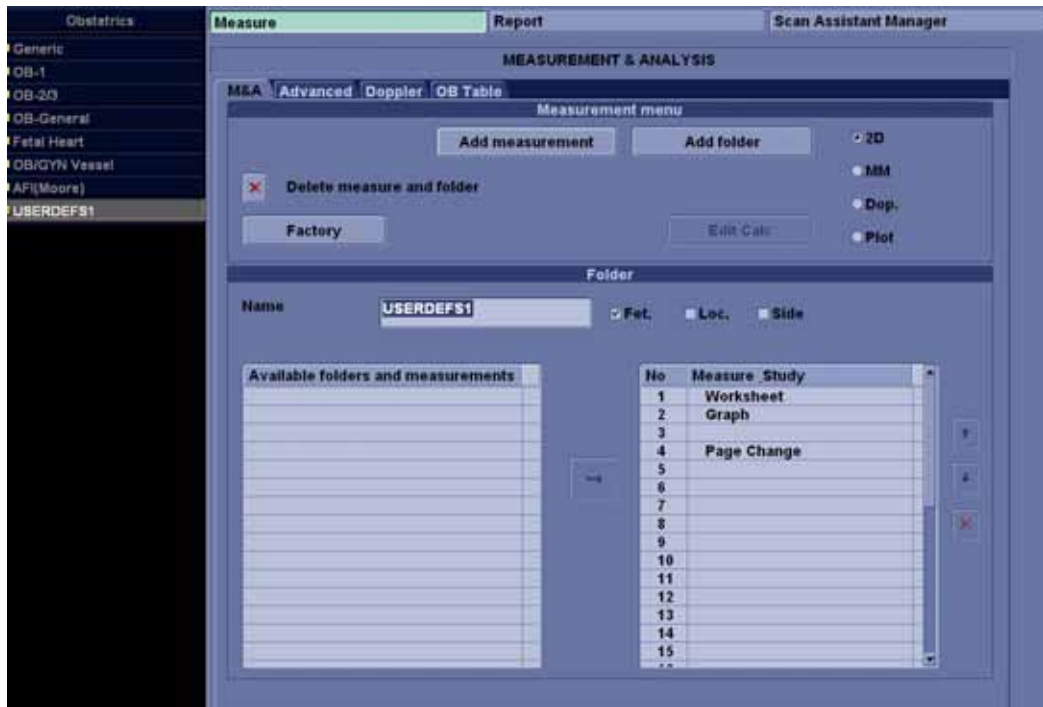


Figure 7-19. Measurement & Analysis: Add folder

Adding a user-defined measurement



WARNING

Please remember that you are responsible for confirming the correctness and accuracy of the user input formula that you add.

You can create a user-defined measurement in a system-defined folder or in a folder you created.

NOTE: *DO NOT use “single quotes” for a parameter name, a measurement name, a folder name or an author name.*

1. In the Selection menu, select the study or folder where you want to add the measurement.
2. In the Measurement menu section, select **Add Measurement**.

The system displays the Add Measurement window.

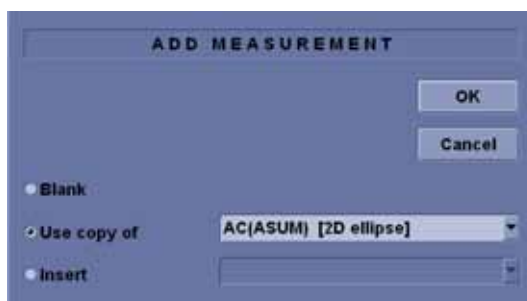


Figure 7-20. Add Measurement window

3. Do one of the following:
 - If you want to create this measurement from a copy of an existing measurement, select **Use copy of**, and then select a measurement from the list. The list includes all measurements defined for the current exam category and selected mode.

NOTE: *This only applies to OB and Cardiac.*

- If you want to use an existing formula, select **Insert**, and then select a measurement from the list. The list includes all measurements defined for the current exam category and selected mode. You cannot edit this formula.
- If you want to create a blank new measurement, select **Blank**.

Adding a user-defined measurement (continued)

4. Select **OK**.
 - If you created a blank measurement, the system adds a measurement with a name such as USERDEFM3.
 - If you created a measurement from a copy of an existing measurement, the system lists the measurement and its parameters in the Measurement section.
5. When you create a new measurement, the measurement name is automatically highlighted. Type a name for the new measurement. You can change the name of a measurement you created from a copy.



Figure 7-21. Measurement & Analysis: Add measurement

NOTE: 2D Dual Caliper, 2D Dual Area, 2D Dual Ellipse, and 2D Dual Spline Trace are not available through the factory default. To enable these measurements, add a new measurement using “2D Dual Caliper”, “2D Dual Area”, “2D Dual Ellipse”, or “2D Dual Spline Trace” tool.

Defining measurement parameters

After you add a measurement, you can add parameters. You may also want to change parameters if you copied an existing measurement. See 'Changing or adding measurement parameters' on page 7-29 for more information.

Changing or adding measurement parameters

You can make changes to measurement parameters and you can add measurement parameters.

Changing measurement parameters

To change a measurement parameter:

1. In the Selection menu, select the measurement.
2. To change the name of the Parameter, move the **Trackball** to the parameter name and press **Set** twice. Type a name for the parameter.

For a description of other measurement changes, see 'Changing Measurements' on page 7-24 for more information.

Adding measurement parameters

To add a measurement parameter:

1. In the Selection menu, select the measurement.
2. To change the tool used to make a measurement:

In the Measurement section of the Measurement & Analysis screen, select the desired tool from the Tool list. Select the arrow to display the drop-down list.

NOTE: *If the Tool field is gray, it cannot be changed.*

3. If necessary, check Fetus (OB only), Location (Loc), or Side:
 - Fetus: If this is an OB measurement, check this box. (Default ON).
 - Location: If this measurement includes a Prox, Mid, or Dist location, check this box.
 - Side: If this measurement includes a Left or Right side, check this box.
4. In the Measurement section, move the **Trackball** to an empty line at the bottom of the Parameter list. Press **Set**.
The system adds a parameter with a name of (Name).

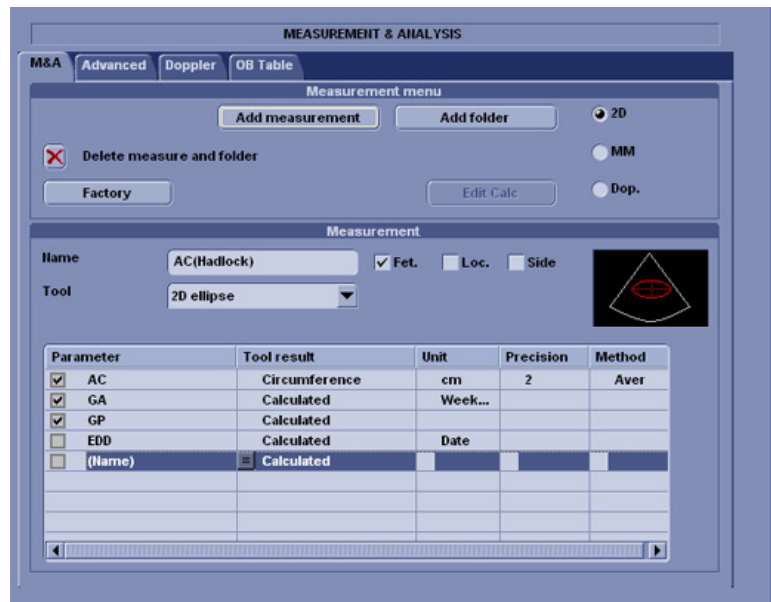


Figure 7-22. Adding a Parameter

Editing Calculations

To modify user-defined calculations:

1. Select **Add Measurement** from the Measurement menu. The system displays the Add Measurement window.
2. Select **Blank** and **OK**.
3. Type the appropriate name and select “Calculation” from the Tool pull-down menu.

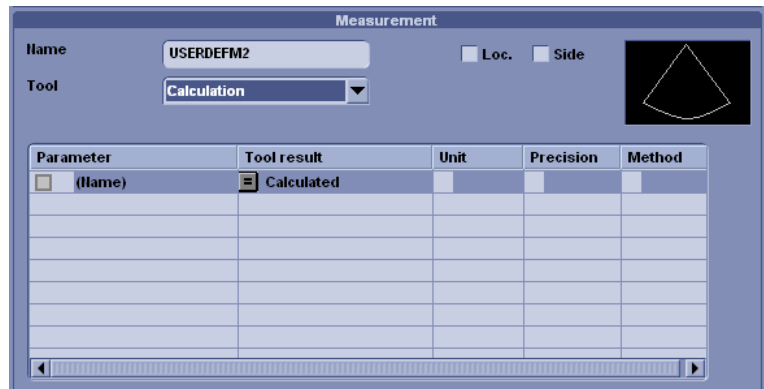


Figure 7-23. Measurement window

4. Type the parameter name.
5. Select **OK**.
6. In the Measurement menu section, select **Edit calc.**

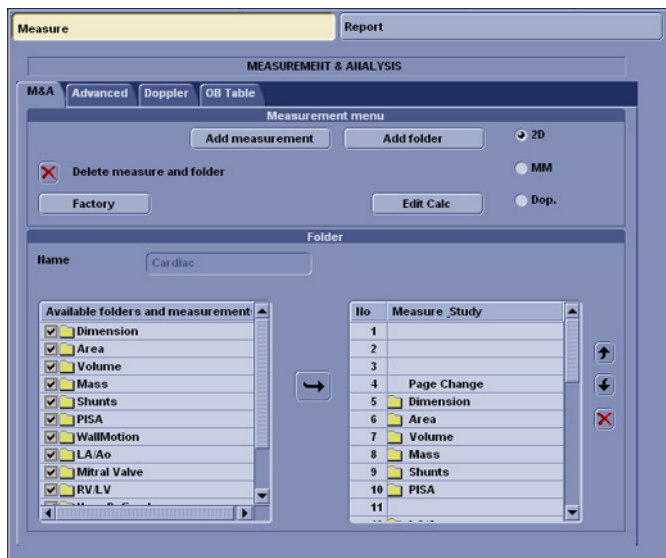


Figure 7-24. Edit Calc

The Modify User CALC window displays.

Editing Calculations (continued)

- 7. In the User Defined list, select the calculation that you want modified, then select **OK**.

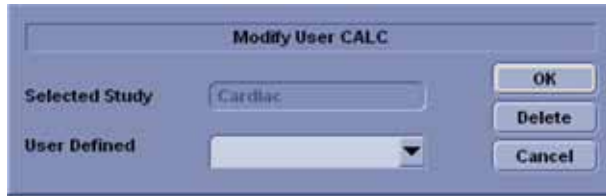


Figure 7-25. Modify User CALC window

- 8. The Measure tab for user-defined calculations displays. Double click on the equals sign symbol under Tool Result for the desired parameter.

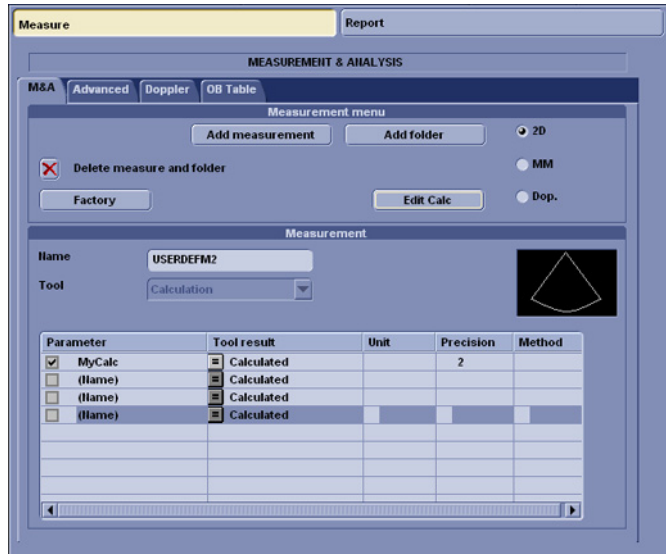


Figure 7-26. Measurement & Analysis M&A tab

- 9. Edit the formula as needed and select **OK**.

Deleting a Folder or Measurement

NOTE: You can only delete user-defined folders or measurements. You cannot delete default system folders or measurements.

1. Select the folder or measurement in the Selection menu.
2. In the Measurement menu section, select the X next to Delete measure and study.

M&A Advanced Preset

The system allows you to specify application-specific values for certain parameters. You specify the parameter values on the Advanced tab of the Measurement & Analysis screen.

1. Enter **Utility->Measure**.
2. On the monitor display, select the Advanced tab.



Figure 7-27. M&A Advanced Preset Menu

M&A Category: Display and select current exam category.

Parameter: Lists application specific parameters.

Value: Select the value for a parameter.

3. To select an exam category, select it from the M&A category list.

The Parameters list displays parameters for the selected category.

M&A Advanced Preset (continued)

4. To select a value for a parameter, select it from the Value list.

NOTE: The parameters that appear are category dependent.

Table 7-1: M&A Advanced

Preset Parameter	Description
Absolute Value	Displays the absolute value of the Doppler Velocity measurement (On or Off)
Display Angle Correct Value	On or Off
Display Summary Window	On or Minimize
Doppler Default Method	Avg, Max, Min or Last
Heart Rate Cycle	1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 <i>NOTE: For Cardiac, you can select only "1".</i>
Keep Graphics with Cine Scroll	If you select "On", the measurement graphics remain while in CINE scroll. The measurement graphic redisplay on the frame where the measurement was taken in B-Mode.
Start M&A on a Freeze (B)	Off: Select measurement manually on Freeze On: Measurement menu appears automatically on Freeze.
Start M&A on a Freeze (M)	Caliper: Measurement menu and caliper appear automatically on Freeze.
Start M&A on a Freeze (D)	
Measure Key Sequence (B/CF)	2 Sequences: Dist, Trace; Dist, Spline 2 Sequences: Dist, Open Trace; Dist, Open Spline 3 Sequences: Dist, Trace, Spline; Dist, Spline, Trace; Dist, Spline, Intensity; Dist, Trace, Intensity; Dist, Trace, Open Trace; Dist, Spline, Open Trace 4 Sequences: Dist, Trace, Spline, Intensity; Dist, Spline, Trace, Intensity; Dist, Spline, Trace, Open Trace; Dist, Trace, Open Trace, Spline
Show Result Parameters	Preview or After Set cursor: Preview: Displays while taking the measurement. After Set Cursor: Displays after completing the measurement.
Default Location	Off, Prox, Mid or Dist
Default Side	Left or Right
RI Calc Bidirectional Flow	On or Off
RI Calc Method	MD or ED
Show Location Select Button	Both on B and Doppler, Doppler only or No Display <i>NOTE1: Only Abdominal, Vascular, Obstetrics and Gynecology have this preset.</i> <i>NOTE2: For Obstetrics and Gynecology, you can select only Doppler only or No Display.</i>

Table 7-1: M&A Advanced (continued)

Preset Parameter	Description
Show BM Folder Name on Worksheet	On or Off
Show Measure Name on Worksheet	On or Off
Show Point Velocity	On or Off
Show Tissue Depth	On or Off
Keep Result Window	Auto, On or Off
Trace	Auto or manual
Vol Flow Method	TAMEAN or TAMAX
Vol Flow Compensation with TAMAX	If you select TAMAX as the volume flow method, then you MUST specify the coefficient to use. Select from 0.5 to 1.0.
Worksheet Default Display	Mode/Expand (Abdominal, Small Parts, Obstetrics, Gynecology, Urology and Pediatrics) or Worksheet Summary (Vascular)
Doppler AutoCalc Velocity Unit	Velocity, Hz, Both or Auto
WMS Freeze Loop at ES	On or Off
WMS Segment Model	16 segments or 18 segments
WMS Initial Scoring	Undefined or Normal
WMS Scoring Legend	ASE, European or Asian
Show area value while tracing	On or Off

Manual Calcs Presets

The system allows you to preset the parameters for manual calculations. You specify the parameter values on the Doppler tab of the Measurement & Analysis screen.

1. On the keyboard, select **Utility**.
2. On the touch panel, select **Measure**.
3. On the monitor display, select the Doppler tab.

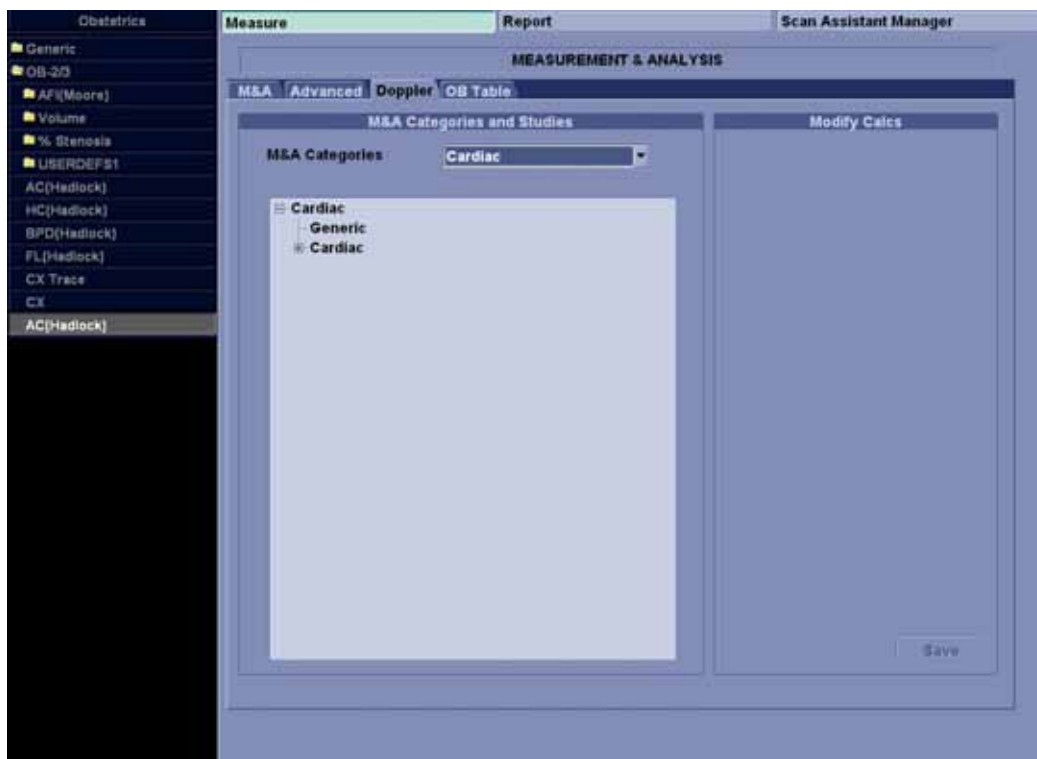


Figure 7-28. M&A Doppler Preset Menu

M&A Category: Display and select current exam category.

4. To select an exam category, select it from the M&A category list.
The system displays a hierarchical view of the exam category and the studies and folders in the category.
5. In the hierarchical view, select a study or folder.
6. In the Modify Calcs column, select the measurements that you want the system to show for manual calcs for the selected study or folder.
7. To save the changes, select the Save button.

Application Measurement Preset

The Application Measurement presets allow different calculation packages to be available under different application presets.

The presets allow you to configure the Measurement Categories and Measurement Exam Calcs. These presets are found on the Utility -> Application -> Measurements screen.



Figure 7-29. Application Measurement

Mode Measurements

B-Mode Measurements

Two basic measurements can be made in B-Mode.

- Distance
- Circumference and Area
 - Ellipse Method
 - Trace Method
 - Spline Method
 - Intensity (Echo level) Method

*NOTE: The following instructions assume that you first scan the patient and then press **Freeze**.*

Distance measurement

To make a distance measurement:

1. Press **Measure** key to enter into measure mode, if necessary.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.

*NOTE: The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*

3. To position the active caliper at the start point, move the **Trackball**.
4. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
5. To position the second active caliper at the end point, move the **Trackball**.

A dotted line connects the measurement points, if preset accordingly.

6. To complete the measurement, press **Set**.

The system displays the distance value in the Results Window.



HINTS

- **Before** you complete a measurement:
 - To toggle between active calipers, adjust **Cursor Select**.
 - To erase the second caliper and the current data measured and start the measurement again, press **Clear** once.
- **After** you complete the measurement:
 - To rotate through and activate previously fixed calipers, adjust **Cursor Select**.
 - To erase all data that has been measured to this point, but not data entered onto worksheets, press **Clear**.

Circumference and area (ellipse) measurement

You can use an ellipse to measure circumference and area. To measure with an ellipse:

1. Press **Measure** key to enter into measure mode, if necessary.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
*NOTE: The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset.*
3. To position the active caliper, move the **Trackball**.
4. To fix the start point, press **Set**. The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper, move the **Trackball**.
6. Rotate **Ellipse** control on the control panel; an ellipse with an initial circle shape displays.
7. To position the ellipse and to size the measured axes (move the calipers), move the **Trackball**.
8. To increase or decrease the **Ellipse**, rotate the ellipse control.
9. To toggle between active calipers, adjust **Cursor Select**.
10. To complete the measurement, press **Set**. The system displays the circumference and area in the Results Window.



HINTS

Before you complete the ellipse measurement:

- To erase the ellipse and the current data measured, press **Clear** once. The original caliper is displayed to restart the measurement.
- To exit the measurement function without completing the measurement, press **Clear** a second time.

Circumference and area (trace) measurement

Trace

To trace the circumference of a portion of the anatomy and calculate its area:

1. Press **Measure** key to enter into measure mode, if necessary.
2. Adjust **Caliper Change** in the Primary Menu to **Trace**.
3. To position the caliper at the start point, move the **Trackball**.
4. To fix the trace start point, press **Set**. The caliper changes to an active caliper.
5. To trace the measurement area, move the **Trackball** around the anatomy. A dotted line shows the traced area.
6. To complete the measurement, press **Set**. The system displays the circumference and the area in the Results Window.

NOTE:

*The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*

Open Trace

To trace the circumference of a portion of the anatomy and calculate its length:

1. Press **Measure** key to enter into measure mode, if necessary.
2. Adjust **Caliper Change** in the Primary Menu to **Open Trace**.
3. To position the caliper at the start point, move the **Trackball**.
4. To fix the trace start point, press **Set**. The caliper changes to an active caliper.
5. To trace the measurement area, move the **Trackball** around the anatomy. A dotted line shows the traced area.
6. To complete the measurement, press **Set**. The system displays the circumference in the Results Window.

NOTE:

*The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*



HINTS

Before you complete the trace measurement:

- To erase the line (bit by bit) back from its current point, move the **Trackball** or adjust the **Ellipse** control counterclockwise.
- To erase the dotted line but not the caliper, press **Clear** once.
- To clear the caliper and the current data measured, press **Clear** twice.

Circumference and area (spline trace) measurement

To trace the circumference of a portion of the anatomy and calculate its area:

1. Press **Measure** key to enter into measure mode, if necessary.

NOTE: Adjust **Caliper Change** in the Primary Menu to **Spline**.

NOTE: The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.

2. To position the first caliper at the start point, move the **Trackball**.
3. To fix the trace start point, press **Set**. The first caliper turns yellow. The second caliper appears at the same position as the first caliper and is green.

NOTE: When pressing the **Clear** key once, the second caliper disappears and the first caliper is activated.

*If **Clear** is pressed again, the first caliper disappears and the Spline trace is cancelled.*

4. To position the second caliper, move the **Trackball** and press **Set**. The third caliper appears at the same position.

NOTE: The **Clear** key functionality is the same as noted in the previous step.

The spline trace requires at least three points to draw the trace. Continue setting the points of the trace until the desired points are set.

5. Press **Set** again after the last caliper is fixed to finalize the spline trace. All points are removed from the line and the spline trace turns yellow.

NOTE: Pressing **Set** twice finishes the trace measurement.

If **Clear** is pressed twice when more than 3 points exist on the trace, all points are removed and the first caliper again displays.

Circumference and area (spline trace) measurement (continued)

Edit the spline trace

1. Select **Cursor Select**. The spline trace changes to green and all points appear on the trace as yellow.

A pick-caliper appears on the center of the image and the message "Edit spline trace" displays at the bottom of the screen.

NOTE: *The pick-caliper is used to select and move the trace points.*

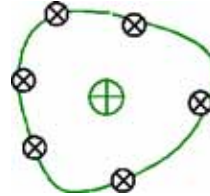


Figure 7-30. Edit spline trace

Select **Cursor Select** again. The trace is deactivated (changes to yellow) and all points, including the pick-caliper, are removed.

If the previous/next fixed caliper exists on the image, it is activated.

NOTE: *Pressing **Clear** at this time removes all points and the trace graphic.*

2. Move the pick-caliper to the desired point and press **Set**. The point is activated and turns green.
3. Move the point to the desired position and press **Set**. The point is fixed and turns yellow. The pick-caliper appears on the center of the image.

NOTE: *The spline trace is updated at run time.*

NOTE: *To remove a point, press **Clear** while moving the point. The trace turns green and the remaining points continue to be shown as yellow. If there are less than three points, the spline trace is removed.*

4. Press **Set** again. All points are removed from the trace and the trace is shown as yellow.

Intensity (Echo level) measurement

To make an echo level measurement:

1. Press **Measure** key to enter into measure mode, if necessary.
2. Adjust **Caliper Change** in the Primary Menu to **Intensity**.
*NOTE: The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*
3. To position the first caliper at the start point, move the **Trackball**.
4. To fix the trace start point, press **Set**. The caliper changes to an active caliper.
5. To trace the measurement area, move the **Trackball** around the anatomy. A dotted line shows the traced area.
6. To complete the measurement, press **Set**. The system displays the echo level, as EL __ dB, in the Results Window.

NOTE: The echo level measurement is only available on a frozen image, not on a B-paused image.

2D Dual caliper

NOTE: *2D dual caliper / 2D dual area / 2D dual ellipse / 2D dual spline trace / 2D dual circle are not available through the factory default. To enable these measurements, add new measurement using "2D dual caliper", "2D dual area", "2D dual ellipse", "2D dual splinetrace" or "2D dual circle" tool in the Utility -> Measure -> M&A preset menu.*

You can take a measurement on dual images with B and B mode, on dual images with B and CF mode, with simultaneous mode or on dual images with live image with 2D dual measurements.

1. Select an added measurement from the menu area to enable the appropriate measurement. A caliper displays.

NOTE: *When the measurement is selected without dual B images or with different probe images, warning message is displayed on the status bar, and the selected measurement is canceled.*

2. To position the caliper at the start point, move the **Trackball**. You can use both images as an original image.

NOTE: *If the first point of the original graphic is out of the shadow image area, then the warning message displays on the status bar and the shadow graphic is not drawn.*

3. To fix the start point, press **Set**. The caliper changes to an active caliper.

NOTE: *Only original graphic has graphic numbering to distinguish between original image and shadow image.*

NOTE: *The trackball move area is limited to the narrow area of both images.*

NOTE: *Only the original graphic can be edited. When the original graphic is edited, the shadow graphic is also updated*

4. To complete the measurement, press **Set**. The system displays the measurement result in the Results Window.

NOTE: *It's impossible to take a measurement across dual images.*

NOTE: *2D Dual measurement tool can not be copied.*

NOTE: *When one of them (original and shadow) is deleted, then both graphic are deleted.*

Doppler Mode Measurements

Basic measurements can be made in Doppler Mode.

- Velocity
- TAMAX and TAMEAN (Manual or Auto Trace)
- Two Velocities with the Time Interval and Acceleration between them
- Time Interval
- Volume Flow

NOTE: The following instructions assume that you do the following:

1. In the B-Mode part of the display, scan the anatomy you want to measure.
2. Go to the Doppler Mode part of the display.
3. Press **Freeze**.

Velocity

To measure velocity:

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **Velocity**.
An active caliper with a vertical and horizontal dotted line displays.
2. To position the caliper at the desired measurement point, move the **Trackball**.
3. To complete the measurement, press **Set**. The system displays the velocity measurement in the Results Window.

Slope (Velocity, Time Interval and Acceleration)

To measure two velocity values, the time interval (ms), and acceleration (m/s^2):

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **S/D Slope**.
An active caliper with a vertical and horizontal dotted line displays.
2. To position the caliper at the start point, move the Trackball.
3. To fix the start point, press **Set**. The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the Trackball.
5. To complete the measurement, press **Set**. The system displays the two peak end point velocities, the time interval, and the acceleration in the Results Window.

Time interval

To measure a horizontal time interval:

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **S/D Time**.
An active caliper with a vertical and horizontal dotted line displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**. The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the **Trackball**.
5. To complete the measurement, press **Set**. The system displays the time interval between the two calipers in the Results Window.

TAMAX and TAMEAN

Manual Trace

The value measured depends upon the Vol Flow Method preset. The two selections available are: Peak (TAMAX) and Mean (TAMEAN).

To do a manual trace of TAMAX or TAMEAN:

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **S/D Trace**.
In the Utility -> Measure - Advanced preset menu set **Trace** preset to **Manual**.
2. To position the caliper at the trace start point, move the **Trackball**.
3. To fix the start point, press **Set**.
4. To trace the maximum values of the desired portion of the spectrum, move the **Trackball**.
NOTE: To edit the trace line, move the Trackball.
5. To complete the measurement, press **Set**. The system displays the measurement values in the Results Window.

Auto Trace

The value measured depends upon the Vol Flow Method preset. The two selections available are: Peak (TAMAX) and Mean (TAMEAN).

To auto trace TAMAX:

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **S/D Trace**.
In the Utility -> Measure - Advanced preset menu set **Trace** preset to **Auto**.
2. To position the caliper at the trace start point in the Doppler spectrum, move the **Trackball**.
3. To fix the start point, press **Set**.
4. To position the vertical caliper at the end point, move the **Trackball**.
5. To complete the measurement, press **Set**. The system automatically fixes both calipers and traces the maximum value between the two points. The system displays this value in the Results Window.

Edit Trace

Auto Trace can be edited after taking an Auto Trace measurement.

1. After taking an Auto Trace measurement, select the measurement result on the result window. The Edit Trace (Edit Peak or Edit Mean) menu window appears.

NOTE: If the system cannot take the trace data correctly from the image, Edit Trace does not work.

2. Select **Edit Trace**. The first caliper (manual trace caliper) appears on the center of the image. Use the **Trackball** to move the caliper on the trace line to the start point.

*NOTE: To cancel Edit Trace at this time, press **Clear**, **Scan**, or **Freeze**.*

3. Press **Set** to fix the first caliper. The second caliper appears. Edit the trace manually using the second caliper.

The Ellipse control is used to edit the trace.

*NOTE: When pressing the **Clear** key once at this time, the second caliper disappears and the first caliper appears in the center of the image.*

*NOTE: If you press **Scan** or **Freeze** at this time, the caliper is automatically fixed and the result window updates.*

4. Press **Set** to fix the second caliper. The trace and the result window update. The trace data (TAMAX and TAMEAN) are updated, though the other points (e.g. PS, ED) are not updated by trace. The points can be edited with **Cursor Select**.

NOTE: While in Edit Trace, Cursor Select is disabled.

5. Repeat Edit Trace as needed.

Doppler Auto Calc Average Cycle

When using Auto Calc, a selection is available to average a number of cycles automatically. There is also a preset selection in the Utility Imaging PW page for this feature. When using average cycle:

- Selected cardiac cycle lines display on the image. Point calipers are not displayed.
- When changing the number of cycles from 1 to >1, all the data is reacquired from the image, recalculated and updated.
- When multiple cycles are selected in AutoCalc, the average values calculate and display automatically.
- When selecting Peak Value (PV), average cycle is not available.

NOTE: You cannot edit the lines while in Average Cycle. Cursor Select is not available at that time.

NOTE: Average Cycle data is acquired from the display image area only, for both live and frozen. The average cycle data fails if the setting for the number of cycles is larger than the number of image cycles.

Volume Flow - Manual Calc

You perform a manual Volume Flow measurement using the TAMAX plus a Volume Flow coefficient compensation.

1. To perform the Volume Flow measurement using the TAMAX plus a Volume Flow coefficient compensation, in Utility-->Measure-->Advanced, select the following:
 - Trace = Manual
 - Vol Flow Method = TAMAX [you MUST also select a Volume Flow coefficient for use with TAMAX.]
 - Vol Flow Compensation with TAMAX = [select value from 0.5 to 1.0]
2. Set Auto Calcs to **Off** via Doppler Mode-->Modify Auto Calcs-->Off.
3. Select a folder in Doppler Mode-->select a calculation folder-->select Show All.
4. Select Volume Flow. You'll notice that TAMAX is automatically selected.

NOTE: Ensure that you have placed the caliper in the spectral window when selecting the Volume Flow measurement.

5. Trace the TAMAX. The system prompts you to "Mark the first point on the spectral doppler." Press **Set**.
6. The system prompts you to "Trace the velocity spectrum boundary." Press **Set**.

NOTE: You can back up while tracing the TAMAX by using the Trackball.

7. Trace the vessel diameter. The system prompts you to "Mark first point of vessel diameter for volume flow calculation." Press **Set**.
8. The system prompts you to "Mark last point of vessel diameter for volume flow calculation." Press **Set**.
9. The Volume Flow is calculated in ml/min.

Volume Flow - Auto Calc

You can perform an automatic Volume Flow measurement using TAMEAN or using the TAMAX and a Volume Flow coefficient.

1. To perform the Volume Flow measurement using the TAMEAN, in Utility-->Measure-->Advanced, select the following:

- Trace = Auto
- Vol Flow Method = TAMEAN

OR, to perform the Volume Flow measurement using the TAMAX plus a Volume Flow coefficient compensation, select the following:

- Trace = Auto
- Vol Flow Method = TAMAX [if you use TAMAX, you MUST also select a Volume Flow coefficient for use with TAMAX.]
- Vol Flow Compensation with TAMAX = [select value from 0.5 to 1.0]

2. Set Auto Calcs to **Live** via Doppler Mode-->Modify Auto Calcs-->Live.
3. Perform the scan.
4. Select Volume Flow via Doppler Mode-->Modify Auto Calcs-->VOLUME FLOW. The system prompts you through the measurement.
5. Take vessel diameter for volume flow calculation. Set the first cursor.
6. Mark last point of vessel diameter for volume flow calculation. Press **Set**.
7. The calculation automatically completes the Volume Flow measurements as ml/min.

NOTE: *If you change the TAMAX coefficient, the Volume Flow is automatically adjusted when in Auto Calcs (but not in Manual Calcs).*

M-Mode Measurements

Basic measurements that can be taken in the M-Mode portion of the display are:

- Tissue Depth (Distance)
- Time Interval
- Time Interval and Velocity

NOTE: The following instructions assume that you do the following:

1. In the B-Mode part of the display, scan the anatomy you want to measure.
2. Activate M-Mode.
3. Press **Freeze**.

Tissue depth

Tissue depth measurement in M-Mode functions the same as distance measurement in B-Mode. It measures the vertical distance between calipers.

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **MM Distance**.
An active caliper with a vertical and horizontal dotted line displays.
2. To position the active caliper at the most anterior point you want to measure, move the Trackball.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the most posterior point you want to measure, move the Trackball.
5. To complete the measurement, press **Set**.
The system displays the vertical distance between the two points in the Results Window.

Time interval

To measure a horizontal time interval and velocity:

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **MM Time**.
An active caliper with vertical and horizontal dotted lines displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the first caliper, press **Set**. The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the **Trackball**.
5. To complete the measurement, press **Set**. The system displays the time interval between the two calipers in the Results Window.

Slope (Time interval and Velocity)

To measure time and velocity between two points:

1. Press **Measure** key to enter into measure mode, if necessary.
Adjust **Caliper Change** in the Primary Menu to **MM Slope**.
An active caliper with vertical and horizontal dotted lines displays.
2. To position the active caliper at the start point, move the Trackball.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the Trackball.
5. To complete the measurement, press **Set**.
The system displays time(s) and slope between the two points in the Results Window.

Viewing and Editing Worksheets

NOTE: Worksheets are not saved if the system crashes.

As you complete measurements, the system puts measurement data in the appropriate worksheets.

To view a worksheet

To view a worksheet, select **Worksheet**.

The system displays the worksheet for the current study.

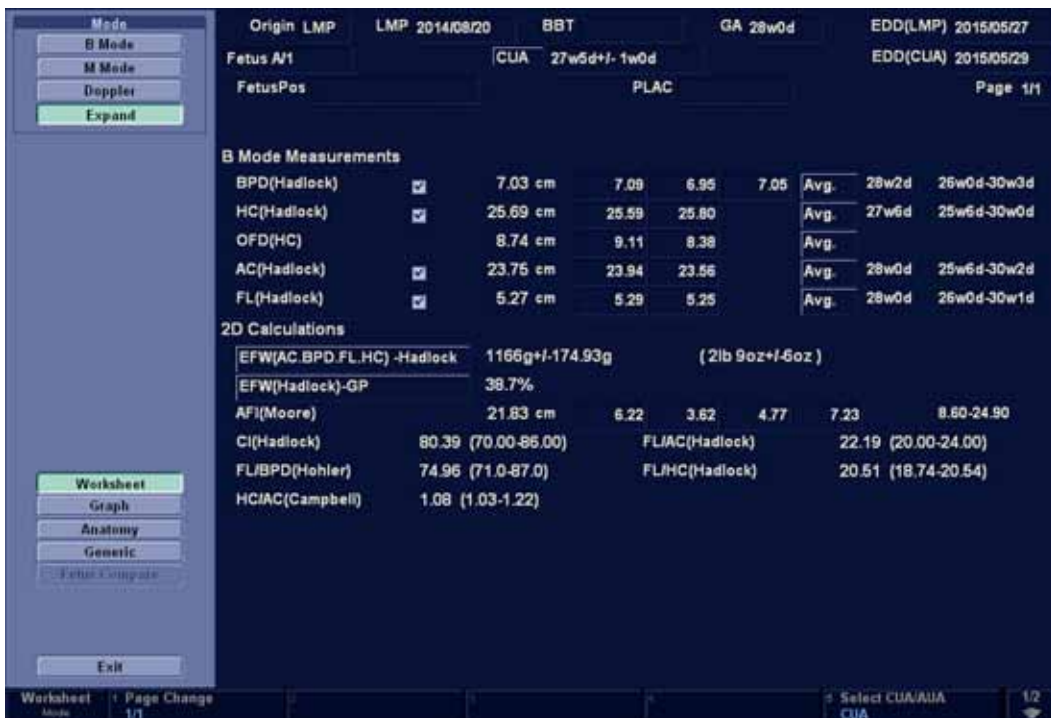


Figure 7-31. Worksheet Display Primary Menu

To return to scanning, do one of the following:

- Select **Worksheet** again.
- Press **Esc**.
- Select the **Exit**.

To view a worksheet (continued)

To view a different worksheet, select the worksheet key for the desired worksheet.

To view worksheet data for a particular mode, select that mode. To view a worksheet with data for more than one mode, select **Expand**. When Expand is selected, it defaults to view all measurements, noted by mode, on the worksheet.

If a worksheet has more data on a second page, to view the next page, adjust the **Page Change** control.

To edit a worksheet

To change data on a worksheet:

1. To position the cursor at the field you want to change, move the **Trackball**. The field is highlighted.
2. Press **Set**.
3. Type the new data in the field. The new data is displayed in blue to indicate that it was manually entered.

To delete or exclude data on a worksheet:

1. To position the cursor at the field you want to delete or exclude, move the **Trackball**. The field is highlighted.
2. Do one of the following:
 - To delete the field, select **Delete Value**.
 - To exclude the field, select **Exclude Value**.
The data in the field is not visible and is not included in worksheet calculations.
 - To include a value that you previously excluded, select **Exclude Value**.

To type a comment on a worksheet:

1. Select **Examiner's Comments**. The Examiner's Comments window opens.
2. Type comments about the exam.
3. To close the Examiner's Comments window, select **Examiner's Comments** again.

To turn the volume measurement value off:

- Select the method type **Off**.



HINTS

Some fields on the worksheet are view only, and others you can change or select. To easily see which fields you can change or select, move the **Trackball**. As the cursor moves over a field that you can change or select, the field is highlighted.

Delete All Worksheet Values

You can delete all worksheet values on a worksheet.

1. When the Worksheet is displayed on the monitor, press the **Clear** key; the following warning message appears:

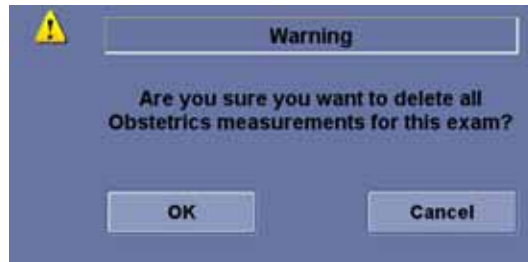


Figure 7-32. Delete All Warning Message

2. Select **OK** to delete all.
Select **Cancel** to cancel the deletion.

Generic Measurements

Overview

Each exam category has a Generic study. The Generic studies provide you quick access to measurements such as volume, angle, A/B ratio, and % stenosis. The particular measurements available in each Generic study vary, depending on the exam category and the mode. This section describes generic measurements, organized by mode.

To access Generic studies:

1. On the Control Panel, press **Measure**.
2. Select the **Second Menu**, the exam category menu is displayed.
3. Select the **Generic** folder.

Calculation formulas are available in the *Advanced Reference Manual*.

Assign a name to the generic measurement

NOTE: Available for any linear and circumference measurement.

1. Move the cursor over the measurement result window and press **Set**.

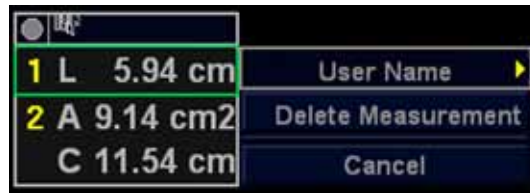


Figure 7-33. User Name

2. Select User Name from the menu. The dialogue window displays.



Figure 7-34. Enter new parameter

3. Enter the appropriate name and select OK.

B-Mode Measurements

In B-Mode, the Generic study includes the following measurements:

- % Stenosis
- Volume
- Angle
- A/B Ratio

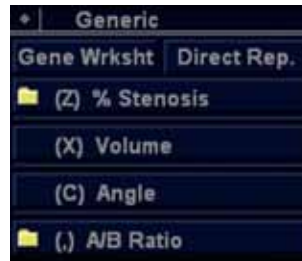


Figure 7-35. B-Mode Generic Study

NOTE: *The following instructions assume that you first scan the patient and then press **Freeze**.*

% Stenosis

You can calculate % Stenosis by diameter or by area, depending on the mode.

NOTE: *The LOGIQ V2/LOGIQ V1 automatically activates the % Stenosis with the default selection. If another method is preferred, select it from the screen.*

Diameter

NOTE: *When you use diameter to calculate the % stenosis, always take the measurement from a cross-sectional view of the vessel.*

To calculate percent stenosis by diameter:

1. From Generic, select **% Stenosis**.
2. Select **%sten(Diam)**.
The system displays an active caliper.
3. Make a distance measurement of the inner area of the blood vessel.
The system displays an active caliper for the second distance measurement.
4. Make a distance measurement of the outer area of the blood vessel.
The system displays each distance measurement and the % Stenosis in the Results Window.

For details on how to make a distance measurement, see 'Distance measurement' on *page 7-39 for more information*.

NOTE: *For the diameter calculation, do NOT take a distance measurement from a longitudinal view. This may lead to an inaccurate assessment of % stenosis.*

Area

To calculate percent stenosis by area:

1. From Generic, select **% Stenosis**.
2. Select **%sten(Area)**.
The system displays a caliper.
3. Make a trace measurement of the inner area of the blood vessel.

NOTE: *To erase an open trace, move the **Trackball**.*

4. Press **Set**.
The system displays a second caliper.
5. Make a trace measurement of the outer area of the blood vessel.
The system displays the two area measurements and percent stenosis in the Results Window.

See 'Circumference and area (trace) measurement' on *page 7-41 for more information*.

Volume

The volume calculation can be made from any of the following measurements:

- One distance
- Two distances
- Three distances
- One ellipse
- One distance and one ellipse

For details on how to make a distance measurement, see 'Distance measurement' on *page 7-39 for more information*.

For details on how to make an ellipse measurement, see 'Circumference and area (ellipse) measurement' on *page 7-40 for more information*.

NOTE: *IMPORTANT!! If you want to make a volume calculation using one or two distances, you must select **Volume** BEFORE you make the measurements.*

NOTE: *If you select Fix Caliper by Print Key on the Utility --> System --> System Measure, the print key does not function like the Set key, but instead ends the measurement sequence and initiates the volume calculation based on the number of measurements taken so far.*

To make a volume calculation using one or two distances:

1. Select **Volume**.
2. Make one or two distance measurements.
3. Select **Volume**.

The system displays the distances and the volume in the Results Window.

NOTE: *Use the **Clear** key to erase the green caliper.*

To make a volume calculation using three distances:

1. Make three distance measurements.

NOTE: *Three distances can be done in the dual format mode (side by side images). One measurement is usually made in the sagittal plane and two measurements in the axial plane. To use the dual format mode, press the **L** or **R** key on front panel.*

2. Select **Volume**.

The system displays the distances and the volume in the Results Window.

Volume (continued)

To make a volume calculation using one ellipse:

1. Make one ellipse measurement.
2. Select **Volume**.

The system displays the ellipse measurement and the volume in the Results Window.

To make a volume calculation using one ellipse and one distance:

1. Make one distance measurement and one ellipse measurement.
2. Select **Volume**.

The system displays the distance and ellipse measurement and the volume in the Results Window.



HINTS

- Volumes are most accurate when measurements are taken in the sagittal and axial scan planes.
- To display sagittal and axial plane images simultaneously, use the side-by-side dual format option.

NOTE: *If you change the parameters or category during the volume measurement, please follow the procedure below before you restart the measurement.*

1. *Check the number of each measurement in the summary window.*
2. *If the numbers are not all the same, it shows that you have the calculation which is not completed. Open the Worksheet and clear that calculation.*

Volume (continued)

Table 7-2: Volume Calculations

Calc Name	Input Measurements
Volume (spherical)	One distance
Volume (prolate spheroidal)	Two distances, $d_1 > d_2$
Volume (spheroidal)	Three distances
Volume (prolate spheroidal)	One ellipse: (d1 major axis, d2 minor axis)
Volume (spheroidal)	One distance d1, and one ellipse (d2 major axis, d3 minor axis)

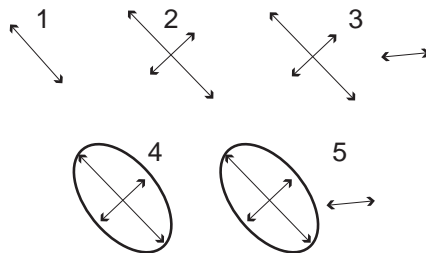


Figure 7-36. Volume Calculation Examples

1. One distance
2. Two distances
3. Three distances
4. One ellipse
5. One distance and one ellipse

Calculation formulas are available in the *Advanced Reference Manual*.

Volume (continued)

Post-assignment for General Volume

You can input a unique name for the general volume measurement. You can group the general volume measurements for each application.

1. Complete the volume measurement.
2. Move the caliper to the measurement result box (with green frame) and select **Set**.
3. The volume name menu appears. Select Name Volume.



Figure 7-37. Volume Name menu

4. The dialog box displays. Enter a new name or choose the existing name.



Figure 7-38. Volume Name Dialog box

NOTE: *The factory default volume name cannot be changed (for example, Renal Volume).*

Angle

This function measures the angle between two intersecting planes.

1. From the Generic, select **Angle**.
The system displays an active caliper.
2. To position the caliper, move the **Trackball**.
3. To fix the position of the first caliper, press **Set**.
The system displays a second active caliper.
4. To position the second caliper at the apex of the angle, move the **Trackball**.
5. To fix the position of the second caliper, press **Set**.
The system displays a third active caliper.
6. To position the third caliper, move the **Trackball**.
7. To complete the angle measurement, press **Set**.
The system displays the angle in the Results Window.

*NOTE: To rotate through and activate previously fixed calipers, adjust the **Cursor Select** control.*

A/B Ratio

In B-Mode, you can calculate A/B ratio by diameter or by area.

NOTE: *The LOGIQ V2/LOGIQ V1 automatically activates the A/B Ratio with the default selection. If another method is preferred, select it from the screen.*

Diameter

To calculate A/B ratio by diameter:

1. From Generic, select **A/B Ratio**.
2. Select **Ratio(Diam)**.

The system displays an active caliper.

3. Make a distance measurement of the first diameter.

The system displays an active caliper for the second distance measurement.

4. Make a distance measurement of the second diameter.

The system displays each distance measurement and the A/B ratio in the Results Window.

NOTE: *The first distance is the A diameter. The second distance is the B diameter.*

For details on how to make a distance measurement, see 'Distance measurement' on page 7-39 for more information.

Area

To calculate A/B ratio by area:

1. From Generic, select **A/B Ratio**.
2. Select **Ratio(Area)**.

The system displays a caliper.

3. Make a trace measurement of the A area.

NOTE: *To erase an open trace, move the **Trackball**.*

The system displays a second caliper.

4. Make a trace measurement of the B area.

The system displays the two area measurements and the A/B ratio in the Results Window.

For details on how to make a trace measurement, see 'Circumference and area (trace) measurement' on page 7-41 for more information.

M-Mode Measurements

In M-Mode, the Generic study includes the following measurements:

- % Stenosis
- A/B Ratio
- HR (Heart Rate)

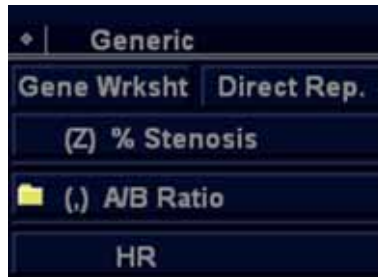


Figure 7-39. M-Mode Generic Study

% Stenosis

See '[% Stenosis](#)' on [page 7-61](#) for more information.

A/B Ratio

In M-Mode you can measure A/B ratio by diameter, time, or velocity.

NOTE: *The LOGIQ V2/LOGIQ V1 automatically activates the A/B Ratio with the default selection. If another method is preferred, select it from the screen.*

Diameter

See 'Diameter' on page 7-68 for more information.

Time

To calculate A/B ratio by time:

1. Select **A/B**.
2. Select **Ratio(Time)**.
The system displays an active caliper.
3. Make the first time interval measurement.
The system displays an active caliper for the second time interval measurement.
4. Make the second time interval measurement.
The system displays the two time measurements and A/B ratio in the Results Window.

Velocity

To calculate AB ratio by velocity:

1. Select **A/B**.
2. Select **Ratio(Velocity)**.
The system displays an active caliper with vertical and horizontal dotted lines.
3. To position the caliper at the A velocity, move the **Trackball**.
4. To fix the measure point, press **Set**.
The system displays a second active caliper.
5. To position the second caliper at the B velocity, move the **Trackball**.
6. To complete the measurement, press **Set**.
The system displays the two velocity measurements and the A/B ratio in the Results Window.

Heart Rate

To calculate the heart rate from M-Mode:

1. Obtain an image and press Measure. Select **HR**.
The system displays an active caliper.
2. To position the caliper at a recognizable point in the first cycle, move the **Trackball**.
3. To fix the first caliper, press **Set**.
The system displays a second active caliper.
4. To position the caliper at the identical point in the next cycle (depending on preset), you need to move the **Trackball**.

NOTE: *In the message bar at the bottom of the display, the system indicates the number of cycles you should measure.*

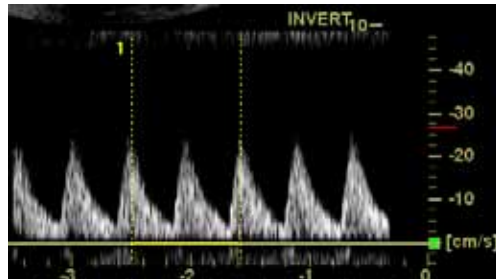


Figure 7-40. Two Heart Beat Reference (example in Doppler mode)

5. To complete the measurement and transfer the calculation to the worksheet, press **Set**.

Doppler Mode Measurements

In Doppler Mode, the Generic study includes the following measurements:

- PI (Pulsatility Index)
- RI (Resistive Index)
- PS/ED Ratio or ED/PS Ratio
- A/B Ratio
- FV-D (Mean)/FV-D (Max)
- FV-A (Mean)/FV-A (Max)
- HR (Heart Rate)

NOTE: Only when presetting in Utility -> Measure ->M&A will FV-D and FV-A display on the screen.



Figure 7-41. Doppler Mode Generic Study

NOTE: The following instructions assume that you do the following:

1. In the B-Mode part of the display, scan the anatomy you want to measure.
2. Go to the Doppler Mode part of the display.
3. Press **Freeze**.

Pulsatility Index (PI)

For auto trace:

1. From the Doppler Generic, select **PI**.
The system displays a caliper and a vertical dotted line.
2. Position the caliper at the beginning of the waveform.
3. To fix the start point, press **Set**.
The system displays a second active caliper.
4. Position the caliper at the end of the waveform.
5. To complete the measurement, press **Set**.
The system displays Vmax (peak systole), Vmin (minimum diastole), Vd (end diastole), TAMAX, PI, RI, S/D and D/S in the Results Window.

For manual trace:

1. Select **PI**.
The system displays a caliper and a vertical dotted line.
2. Position the caliper at the beginning of the waveform.
3. To fix the start point, press **Set**.
The system displays a second active caliper.
4. Manually trace the entire waveform.
5. To complete the measurement, press **Set**.
The system displays Vmax (peak systole), Vmin (minimum diastole), Vd (end diastole), TAMAX, PI, RI, S/D and D/S in the Results Window.

Resistive Index (RI)

1. From the Doppler Generic, select **RI**.
The system displays an active caliper with vertical and horizontal dotted lines.
2. To position the caliper at the peak systolic velocity, move the **Trackball**.
3. To fix the measure point, press **Set**.
The system displays a second active caliper.
4. To position the second caliper at the end diastolic velocity, move the **Trackball**.
5. To complete the measurement, press **Set**.
The system displays Vs (PS), Vd (ED), RI, S/D and D/S in the Results Window.

PS/ED or ED/PS Ratio

To calculate the Peak Systole/End Diastole ratio or End Diastole/Peak Systole ratio:

1. Select **S/D Ratio** or **D/S Ratio**
The system displays an active caliper with vertical and horizontal dotted lines.
2. To position the caliper at peak systole (PS) or end diastole (ED), move the **Trackball**.
3. To fix the measure point, press **Set**.
The system displays a second active caliper.
4. To position the second caliper at end diastole (ED) or peak systole (PS), move the **Trackball**.
5. To complete the measurement, press **Set**.
The system displays the peak systole, end diastole, and PS/ED or ED/PS ratio in the Results Window.

Heart Rate

To measure heart rate, see 'Heart Rate' on *page 7-71 for more information*. or select any of the following measurements.

A/B Ratio

In Doppler Mode you can measure A/B ratio by velocity, time, or acceleration.

NOTE: The LOGIQ V2/LOGIQ V1 automatically activates the A/B Ratio with the default selection. If another method is preferred, select it from the touch panel.

Velocity

See 'Velocity' on page 7-70 for more information.

Time

See 'Time' on page 7-70 for more information.

Acceleration

To measure A/B ratio by acceleration:

1. Select **A/B Ratio**.
2. Select **Ratio(Acc)**.

The system displays an active caliper.
3. Make a distance measurement of the A acceleration point.
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.

The system fixes the first caliper and displays a second active caliper.
 - c. To position the second active caliper at the end point, move the **Trackball**.

A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.

The system displays the distance value in the Results Window and displays an active caliper for the second distance measurement.
4. To make a distance measurement of the B acceleration point, repeat steps a–d.

The system displays the two acceleration measurements and the A/B ratio in the Results Window.

Flow Volume (FV)

Flow Volume estimates the volume of blood that flows through a vessel per unit time. It is derived from a vessel's cross-sectional diameter obtained from the B-Mode portion of the image and the mean velocity of flow in the vessel obtained from the Doppler portion of the image. It is measured in milliliters. When the FV measurement is made, FVO is automatically calculated.

To measure flow volume:

1. Select **FV-D or FV-A**.
2. Place the dotted horizontal line caliper at each of the time base on the Doppler spectrum.
 - If Trace Auto is selected, the waveform is automatically traced.
 - If Trace Auto is not selected, manually trace the desired portion of the waveform.

The caliper moves to the B-Mode area.

3. If Select FV-D, measure the diameter of the vessel.

If select FV-A, use the Ellipse or Trace method to measure the circumference and area of the vessel.

The FV Diameter/FV Area, TAMAX [if FV-D(Max) or FV-A(Max) selected], Volume and Volume Flow (FV) are calculated and displayed in the result window.

Modify Auto Calcs

When you select **Second Menu**, the Modify Calculation menu is displayed as below. In this menu, you select parameters to display in the Auto Vascular Calculation window. Only parameters that can be used by the calculation are displayed.

Select **Save as Default** to save the selected parameters as the default calculations for this application.

Select **Return** to return to the previous scan screen.

If you select **PV**, all selected parameters are turned off. When you deselect **PV**, the system returns to the previously selected calculation.

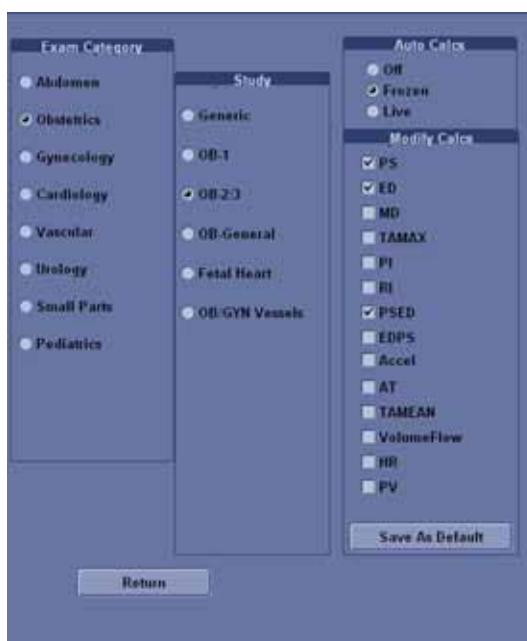


Figure 7-42. Modify Auto Calculation Menu

Auto vs. Manual Calculations

The same calculations can be performed using either manual or auto calcs.

Manual Calcs

To perform manual calcs:

1. To turn Auto Calcs off and perform manual measurements, choose **Auto Calcs -> OFF** in the second menu.
2. After obtaining a waveform, press **Measure**. Choose the appropriate vessel folder or calculation. The system walks you through the measurement.

NOTE: To program which calculations are done under manual calcs when using measurement folders for measuring specific vessels, press the Utility key. Select Measure -> Doppler and program your manual calcs (Auto Calcs OFF). Each vessel must be programmed individually and saved after each change.

Auto Calcs

To perform auto calcs:

1. Ensure that the auto calcs function is on by choosing **Auto Calcs -> Frozen** or **Live** in the **Second Menu**.
 - Live: Auto calculation activates when the system is in alive state.
 - Freeze: Auto calculation activates when you press Freeze.
 - Off
2. After obtaining a waveform, press **Measure**. Choose the appropriate vessel folder, side and location. The measurements that are pre-programmed are performed automatically and entered in the worksheet.

To modify auto calcs:

1. Choose the measurements to be performed with this preset in the **Second Menu -> Modify Calcs**.
2. To save these measurements:
 - If this is a temporary change, press **Return**.
 - If this is a permanent change, select **Save as default**.

The measurements are saved and can be performed with the auto calcs function.

Auto vs. Manual Calculations (continued)

Edit Auto Calcs

Auto Calcs can be edited after taking an Auto Trace measurement.

1. After taking an Auto Calc with a trace, select the measurement result on the result window. The Edit Trace menu window appears.

NOTE: *If the system cannot take the trace data correctly from the image, Edit Trace does not work.*

2. Select Edit Trace. The first caliper (manual trace caliper) appears on the center of the image. Use the **Trackball** to move the caliper on the trace line to the start point.

NOTE: *To cancel Edit Trace at this time, press **Clear**.*

3. Press **Set** to fix the first caliper. The second caliper appears. Edit the trace manually using the second caliper. The Ellipse control is used to edit the trace.

NOTE: *When pressing the **Clear** key once at this time, the second caliper disappears and the first caliper appears in the center of the image.*

NOTE: *If you press **Scan** or **Freeze** at this time, the caliper is automatically fixed and the result window updates.*

4. Press **Set** to fix the second caliper. The trace and the result window are updated. The data is retaken from the trace and updated.

NOTE: *While in Edit Trace, **Cursor Select** is disabled.*

The trace data (TAMAX and TAMEAN) is updated, but the other selections (e.g. PS, ED) are not updated by trace. The points can be edited using **Cursor Select** if needed.

5. Repeat Edit Trace as needed.

Performing Measurements on Saved Images

You can perform measurements on recalled images. Select the image, then perform the measurement. If the image was not saved as a raw DICOM image, you need to calibrate the image prior to performing the measurement.

To calibrate the image,

1. Recall the image.
2. Press **Measure**. The Measurement Calibration second menu appears.
3. Select the mode you need to be in to perform the measurement.
4. Select the **Second Menu** and select the appropriate mode key, **2D calib** for B-Mode, **M calib** for M-Mode, or **Doppler calib** for Doppler mode. The specified mode calibration pop-up appears.
5. The system prompts you, depending on the mode.

B-Mode:

- a. Place the first point of the caliper on the ruler. Press **Set**.
- b. Position the cursor at the 5 cm point on the ruler. Press **Set**.
- c. Type "5" into the 2D-Mode Calibration pop-up window. Press OK.



Figure 7-43. 2D-Mode Calibration

Performing Measurements on Saved Images (continued)

M-Mode or Doppler Mode:

- a. Place the cross on zero depth and minimum or zero time.
- b. Place the cross on maximum depth and time.
- c. Type the time (in seconds) and velocity (cm/sec) in the M-Mode/Doppler Mode calibration pop-up window.

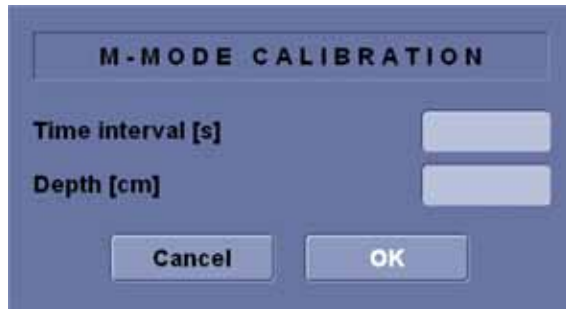


Figure 7-44. M-Mode Calibration



Figure 7-45. Doppler Mode Calibration

Helpful hints



HINTS

The following hints can help when making a measurement

- Prior to making measurements, use the Cine function, if necessary, to display the best image.
- As you take measurements, each measurement is given a sequential number on the display and in the Results Window. Nine measurements can be displayed in the Results Window at one time.
- Once the Results Window has nine measurements, if you make any further measurements, the system erases the top (first) measurement and adds the new measurement last (“first in, first out”).
- While you are taking a measurement, the value in the Results Window updates until you complete the measurement.

Chapter 8

Abdomen and Small Parts

Describes how to perform Abdomen and Small Parts measurements and calculations.

Abdomen/Small Parts Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

Calculation formulas are available in the *Advanced Reference Manual*.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Beginning an Exam' on *page 4-2 for more information*.

Any measurement can be repeated by selecting that measurement again from the Screen.

Abdomen

Overview

Abdominal measurements offer a few different types of measurement studies:



Figure 8-1. Abdomen Exam Category

- Generic—Common to all applications. See 'Generic Measurements' on *page 7-59 for more information*.
- Abdomen
- Renal
- BPG
- Aorta Iliac
- Vascular Renal
- Mesenteric
- Abdomen Vein

To change a study:

1. Press **Measure**.
2. Rotate the **Second Menu** button, the exam category menu is displayed.
3. To choose another study, select that desired study.

Small Parts

Overview

The Small Parts exam category includes the following two folders:

- Generic - Common to all applications. See 'Generic Measurements' on *page 7-59 for more information.*
- Small Parts, which includes the thyroid and scrotal measurements described in this section



Figure 8-2. Small Parts Exam Category

Thyroid

Thyroid Left/Right

Each of these is a standard distance measurement. Length and height are typically measured in the sagittal plane. Width is measured in the transverse/axial plane.

To measure thyroid length, width, or height:

1. On the second menu, select **Small Parts** and then select **Thyroid**.
2. Select **Lt or Rt Thyroid**. Change the orientation (side), if necessary.
3. Select **Thyroid L**, **Thyroid W**, or **Thyroid H**.
An active caliper displays.
4. Perform a standard distance measurement:
The system displays the distance value in the Results Window.
5. The system automatically prompts to make the second and third distance measurements.
6. Perform another 2 standard distance measurements for the second and third distance measurements.

After you complete the third distance measurement, the system displays the thyroid volume in the Results Window.

Isthmus AP

To measure the anterior/posterior isthmus tissue, perform a distance measurement.

Scrotal

Testicle Left/Right

Each of these is a standard distance measurement. Length and height are typically measured in the sagittal plane. Width is measured in the transverse/axial plane.

To measure scrotal length, width, or height:

1. On the second menu, select **Small Parts** and then select **Scrotal**.
2. Select **Lt or Rt Testicle**. Change the orientation (side), if necessary.
3. Select **Testicle L**, **Testicle W**, or **Testicle H**.
4. An active caliper displays.
5. Perform a standard distance measurement:
The system displays the distance value in the Results Window.
6. The system automatically prompts to make the second and third distance measurements.
7. Perform another 2 standard distance measurements for the second and third distance measurements.

After you complete the third distance measurement, the system displays the thyroid volume in the Results Window.

Epididymis

To measure the epididymis structure, perform a distance measurement.

Chapter 9

OB/GYN

Describes how to perform obstetric and gynecology measurements and calculations, and how to use OB graphs and worksheets.

Exam Preparation

Prior to an ultrasound examination, the patient should be informed of the clinical indication, specific benefits, potential risks, and alternatives, if any. In addition, if the patient requests information about the exposure time and intensity, it should be provided. Patient access to educational materials regarding ultrasound is strongly encouraged to supplement the information communicated directly to the patient. Furthermore, these examinations should be conducted in a manner and take place in a setting which assures patient dignity and privacy.

- Prior material knowledge and approval of the presence of nonessential personnel with the number of such personnel kept to a minimum.
- An intent to share with the parents per the physician's judgement, either during the examination or shortly thereafter, the information derived.

Acoustic Output Considerations

General warning

The LOGIQ V2/LOGIQ V1 system is a multi-use device which is capable of exceeding FDA Pre-enactment acoustic output (spatial peak-temporal average) intensity limits for fetal applications.



CAUTION

It is prudent to conduct an exam with the minimum amount and duration of acoustic output necessary to optimize the image's diagnostic value.

Concerns surrounding fetal exposure

Always be aware of the acoustic output level by observing the Acoustic Output Display. In addition, become thoroughly familiar with the Acoustic Output Display and equipment controls affecting output.

Training

It is recommended that all users receive proper training in fetal Doppler applications before performing them in a clinical setting. Please contact a local sales representative for training assistance.

To Start an Obstetrics Exam

NOTE: Calculation formulas are listed in the *Advanced Reference Manual*.

To begin an Obstetrics exam, you enter patient data by pressing **Patient** on the control panel or, if the patient data from a previous exam is saved in the system, find the patient information in **Archive** Screen.

If the patient data is not stored in the system, enter the data. To enter data in a field, move the **Trackball** to highlight the field and then press **Set**. Use the **Tab** key to move between fields. Obstetric patient fields are listed in the following table.

Table 9-1: Obstetric fields

Field	Description
LMP	Last Menstrual Period; enter the date that the patient started her last menstrual period. You must enter 4 digits for the year. When you type the month and day, the system fills in the /. The Date Format preset chosen in Utility -> System -> General determines the required format.
BBT	Basal Body Temperature.
EDD by LMP	Estimated Delivery Date by LMP; the system fills in the date after you enter the LMP.
GA by LMP	Gestational Age by LMP; the system fills in the age after you enter the LMP.
Fetus #	Number of fetuses; default is 1. Can be 1-4.

After you complete the patient information, select **OB** category and related exam, then you can begin the scan.

- To change from the Patient Data Entry screen to the Scan screen, do one of the following:
 - Select **Scan** on the **Patient** screen.
 - On the Control Panel, select **Freeze**.
 - On the Control Panel, press the **B-Mode** key.

The system displays the scan screen.

- Scan the patient.
 - On the Control Panel, press **Measure**.
- The default Obstetrics study is displayed.

OB Type change

The LOGIQ V2/LOGIQ V1 system includes measurements for the following studies: USA, Europe, Osaka, Tokyo, and ASUM. Select OB Type in Utility -> System -> System Measure.

NOTE: ASUM studies include the following measurements:

- ASUM: AC, BPD, CRL and AFI
- ASUM 2001: AC, BPD, CRL, FL, HC, HL, OFD and AFI

OB Measurements and Calculations

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

When you make measurements, you can select the calculation before you make the measurement or after you make it. If you select the calculation before you make the measurement, the Results Window shows the estimated fetal age as you make the measurement. If you select the calculation after you make the measurement, the estimated fetal age is displayed after you complete the measurement. The measurements steps in this section tell you to select the calculation before you make the measurement.

The following pages describe how to make OB measurements and calculations. The measurements are organized by mode, and within mode are listed in alphabetical order.

Out of Range – If the system indicates that a measurement is out of range (OOR), it means one of the following:

- The measurement is out of the normal range based on the gestational age that is calculated from the LMP. The system determines OOR from the ultrasound age compared to the gestational age. The gestational age is calculated from the last menstrual period or the estimated delivery date.
- The measurement is outside of the range for the data used in the calculation. That means that the measurement is either less than or more than the range of measurements used to determine fetal age based on the measurement.

NOTE: *Calculation formulas are listed in the Advanced Reference Manual.*

B-Mode Measurements

This section describes all B-Mode measurements that you typically find in OB studies. Additional OB measurements follow the typical ones.

Abdominal Circumference (AC)



To calculate abdominal circumference, you make an ellipse, trace, spline trace or two distance measurements.

Ellipse

1. Select **AC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
3. Make an ellipse measurement.

The system displays the circumference in the Results Window.

Trace

1. Select **AC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Trace**.
3. Make a trace measurement.

The system displays the circumference in the Results Window.

Spline Trace

1. Select **AC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Spline**.
3. Make a spline trace measurement.

The system displays the circumference in the Results Window.

Two distances

1. Select **AC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
3. Make 2 distance measurement.

The system displays the abdominal circumference in the Results Window.

NOTE: *The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*

Biparietal Diameter



To measure biparietal diameter, make one distance measurement:

1. Select **BPD**; an active caliper displays.
2. Make one distance measurement.

The system displays the biparietal diameter in the Results Window.

Crown Rump Length



To measure crown rump length, make one distance measurement:

1. Select **CRL**; an active caliper displays.
2. Make one distance measurement.

The system displays the crown rump length in the Results Window.

Femur Length



To measure femur length, make one distance measurement:

1. Select **FL**; an active caliper displays.
2. Make one distance measurement.

The system displays the femur length in the Results Window.

Gestational Sac



To calculate the gestational sac, you make three distance measurements in two scan planes. To display two scan planes, press the **L** or **R** key. Get an image in each scan plane and press **Freeze**.

1. Select **GS**; an active caliper displays.
2. Make three distance measurements.

After you complete the third distance measurement, the system displays the gestational sac measurement in the Results Window.

You can calculate the gestational sac by one distance measurement.



1. Select **GS**; an active caliper displays.
2. Make one distance measurement.

After you complete the measurement, the system displays the gestational sac measurement in the Results Window.

Head Circumference (HC)



To calculate head circumference, you make an ellipse, trace, spline trace or two distance measurements.

Ellipse

1. Select **HC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
3. Make an ellipse measurement.

The system displays the circumference in the Results Window.

Trace

1. Select **HC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Trace**.
3. Make a trace measurement.

The system displays the circumference in the Results Window.

Spline Trace

1. Select **HC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Spline**.
3. Make a spline trace measurement.

The system displays the circumference in the Results Window.

Two distances

1. Select **HC**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
3. Make 2 distance measurement:

The system displays the abdominal circumference in the Results Window.

NOTE: *The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*

Amniotic Fluid Index (AFI)



To calculate the amniotic fluid index, you make measurements of the four quadrants of the uterine cavity. The system adds these four measurements together to calculate the Amniotic Fluid Index.

NOTE: *The four quadrants can be measured with distance (caliper) or circumference (circle) measurements. Select the appropriate AFI quadrant to show the popup menu to select caliper or circle.*

1. Select **AFI**.
The first distance measurement, AFI-Q1, is already selected.
2. Make a standard distance measurement for the first quadrant:
3. When the measurement of the first quadrant is completed, unfreeze and move to the second quadrant.
4. After you obtain the image, press **Freeze** and then **Measure**.
The system prompts you to continue with the AFI measurements. Make sure that the next quadrant has been selected.
5. Perform a standard distance measurement for the second, third, and fourth quadrants.

When all four quadrants have been measured, the system calculates the AFI total and displays it in the Results Window.



- If you unfreeze the image after doing an AFI measurement, the system does not delete the previous measurements. Unfreeze and change scan planes as necessary.
- To specify that an unassigned distance measurement be used for an AFI measurement:
 - Select **AFI**.
 - Move the **Trackball** to highlight the unassigned distance measurement in the Results Window, press **Set** and select the AFI measurement from the pop-up menu.
- If the fluid in a pocket is zero, set the second caliper on top of the first one to give it a zero value.
- You can measure an AFI quadrant that is zero (0) by pressing **Set** twice.

A/B Ratio

In B-Mode you can calculate A/B ratio by diameter or by area. See 'A/B Ratio' on page 7-68 for more information.

Angle

See 'Angle' on page 7-67 for more information.

Antero-Postero Trunk Diameter & Transverse Trunk Diameter (APTD-TTD)



Make two distance measurements, one of the antero-postero trunk diameter and one of the transverse trunk diameter.

1. Select **APTD_TTD**; an active caliper displays.
2. Make a distance measurement of the antero-postero trunk diameter.
3. To make a distance measurement of the transverse trunk diameter.

The system displays the antero-postero trunk diameter and the transverse trunk diameter in the Results Window.

Antero-Postero Trunk Diameter by Transverse Trunk Diameter (AxT)



Make two distance measurements, one of the antero-postero trunk diameter and one of the transverse trunk diameter.

1. Select **AxT**; an active caliper displays.
2. Make a distance measurement of the antero-postero trunk diameter.
3. To make a distance measurement of the transverse trunk diameter.

The system displays the antero-postero trunk diameter, the transverse trunk diameter, and AxT in the Results Window.

Cardio-Thoracic Area Ratio (CTAR)



To calculate cardio-thoracic area ratio, you make two ellipse measurements.

1. Select **CTAR**; an active caliper displays.
2. Make an ellipse measurement of the cardiac area.
3. Make an ellipse measurement of the thoracic area.

The system displays the cardio-thoracic area ratio in the Results Window.

Estimated Fetal Weight (EFW)



To measure estimated fetal weight, you make several OB measurements. These measurements can vary, based on how your system is set up. Measurements can include biparietal diameter, fetal trunk area, femur length, antero-postero trunk diameter and transverse trunk diameter, abdominal circumference, head circumference and spinal length.

1. Select **EFW**.

The system displays the required measurements.

2. Make each measurement.

The system displays each measurement in the Results Window. The estimated fetal weight is displayed in the Results Window only with Tokyo or Osaka OB type.

NOTE: *For a description of any of the required measurements, refer to that measurement.*

Fetal Trunk Area (FTA)



To measure fetal trunk area, you make an ellipse, trace, spline trace or two distance measurements.

Ellipse

1. Select **FTA**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
3. Make an ellipse measurement.

The system displays the circumference in the Results Window.

Trace

1. Select **FTA**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Trace**.
3. Make a trace measurement.

The system displays the circumference in the Results Window.

Spline Trace

1. Select **FTA**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Spline**.
3. Make a spline trace measurement.

The system displays the circumference in the Results Window.

Two distances

1. Select **FTA**; an active caliper displays.
2. Adjust **Caliper Change** in the Primary Menu to **Distance**.
3. Make 2 distance measurements.

The system displays the abdominal circumference in the Results Window.

NOTE: *The available values for **Caliper Change** menu can be set in Utility -> Measure -> Advanced preset -> Measure Key Sequence.*

Foot Length



To measure foot length, make one distance measurement:

1. Select **Ft**; an active caliper displays.
2. Make one distance measurement.

The system displays the foot length in the Results Window.

Humerus Length



To measure humerus length, make one distance measurement:

1. Select **HL**; an active caliper displays.
2. Make one distance measurement.

The system displays the humerus length in the Results Window.

Nuchal Translucency (NT)

To measure nuchal translucency, make one distance measurement:

1. Select **NT**; an active caliper displays.
2. Make one distance measurement.

The system displays the nuchal translucency in the Results Window.

NOTE: *Nuchal Translucency is not available through the factory default. To enable Nuchal Translucency, add NT to the measurement folder in Utility -> Measure -> M&A -> Add measurement (Insert).*

Occipitofrontal Diameter



To measure occipitofrontal diameter, make one distance measurement:

1. Select **OFD**; an active caliper displays.
2. Make one distance measurement.

The system displays the occipitofrontal diameter in the Results Window.

% Stenosis

In B-Mode, you can calculate % Stenosis by diameter or by area. See ' % Stenosis' on page 7-61 for more information.

Spinal Length (SL)



To measure spinal length, make one distance measurement:

1. Select **SL**; an active caliper displays.
2. Make one distance measurement.

The system displays the spinal length in the Results Window.

Transverse Abdominal Diameter



To measure transverse abdominal diameter, make one distance measurement:

1. Select **TAD**; an active caliper displays.
2. Make one distance measurement.

The system displays the transverse abdominal diameter in the Results Window.

Transverse Cerebellar Diameter



To measure transverse cerebellar diameter, make one distance measurement:

1. Select **TCD**; an active caliper displays.
2. Make one distance measurement.

The system displays the transverse cerebellar diameter in the Results Window.

Thorax Transverse Diameter



To measure thorax transverse diameter, make one distance measurement:

1. Select **ThD**; an active caliper displays.
2. Make one distance measurement.

The system displays the thorax transverse diameter in the Results Window.

Tibia Length



To measure tibia length, make one distance measurement:

1. Select **Tibia**; an active caliper displays.
2. Make one distance measurement.

The system displays the tibia length in the Results Window.

Ulna Length



To measure ulna length, make one distance measurement:

1. Select **Ulna**; an active caliper displays.
2. Make one distance measurement.

The system displays the ulna length in the Results Window.

Volume

See 'Volume' on page 7-63 for more information.

M-Mode Measurements

In M-Mode you can measure % stenosis, A/B ratio, and heart rate.

% Stenosis

In M-Mode, you measure % Stenosis by diameter. See ‘% Stenosis’ on *page 7-69 for more information.*

A/B Ratio

In M-Mode you can measure A/B ratio by diameter, time, or velocity. See ‘A/B Ratio’ on *page 7-70 for more information.*

Heart Rate

See ‘Heart Rate’ on *page 7-71 for more information.*

Doppler Mode Measurements

You can use Doppler mode to study fetal blood flow in the heart, umbilical cord, placenta, and middle cerebral arteries. OB/GYN Doppler mode also allows you to study uterine and ovarian blood flow.

The OB/GYN vessel study includes the following vessels:

- Aorta (Ao)
- Desc. Aorta
- Middle Cerebral Artery (MCA) (right and left)
- Ovarian (right and left)
- Placenta
- Umbilical
- Uterine (right and left)



Figure 9-1. OB/GYN Vessels

Doppler Mode Measurements (continued)

For each of these studies, you can make any of the following measurements. See 'Doppler Mode Measurements' on page 7-72 for more information.:

- Peak Systole (PS)
- End Diastole (ED)
- Minimum Diastole (MD)
- Heart Rate
- TAMAX
- Pulsatility Index (PI)
- Resistive Index (RI)
- PS/ED Ratio
- ED/PS Ratio
- Acceleration
- AT
- TAMEAN
- Volume Flow
- PV

To select OB/GYN vessel measurements

OB/GYN Vessel measurements use the auto sequence feature. With this feature, when you select a folder for the vessel you want to measure, the system automatically starts the first measurement. It then continues with each of the other measurements in that study.

1. Select the folder for the vessel you want to measure.
The system shows all the measurements for that vessel. The caliper for the first measurement is automatically displayed.

2. Make the measurement.

After you complete each measurement, the system starts the next measurement. After the last measurement is complete, the system returns to the OB/GYN Vessel.

Your system is set up to show the measurements that you usually make for each vessel. To make a measurement that is not shown for the selected vessel:

1. Go to Utility -> Measure -> Measure -> Doppler tab
2. Select Obstetrics in M&A Categories.
3. Click on the plus sign (+) before OB/GYN Vessel to show all the folders.
4. Select the folder for the vessel you want to show the measurement.
5. Select the desired measurement.
6. Select Exit to exit the Utility screen

When you do the measurements and select the folder, the system displays all selected measurements.

OB Worksheet

The OB Worksheet lists patient information, and all measurement and calculation data.

To view the OB Worksheet:

1. Press **Measure**.
2. Select **Worksheet**.

The screenshot shows the GE Healthcare OB Worksheet interface. It is divided into three main sections, indicated by large arrows on the right side of the screen:

- Section 1 (Patient Data):** Includes fields for Origin (LMP), LMP (2014/12/13), BBT (CUA 24w2d+/- 1w5d), GA (25w4d), EDD (LMP) (2015/09/19), and EDD (CUA) (2015/09/28). It also shows Fetus A1, FetusPos, and PLAC.
- Section 2 (B Mode Measurements):** Lists various fetal measurements with checkboxes, values in cm, and corresponding gestational age ranges.

Measurement	Value	GA	Range
BPD(Osaka)	5.39 cm	5.39	Last 21w5d - 19w6d-23w5d
OFD(Hansmann)	4.80 cm	4.80	Avg. 17w1d - 16w0d-18w2d
TAD(Eriksen)	5.61 cm	5.61	Avg. 22w2d
AC(ASUM01)	19.87 cm	18.41, 21.33	Avg. 23w6d - 22w3d-25w2d
ULNA(Jeanty)	4.78 cm	4.78	Avg. 30w3d - 27w2d-33w3d
FTA(Osaka)	15.49 cm ²	15.49	Last 18w6d - 18w0d-19w5d
FL(Osaka)	5.02 cm	5.02	Last 28w1d - 26w6d-29w2d
TTD(Hansmann)	8.05 cm	8.05	Avg. 31w6d
NT	6.49 cm	6.49	Avg.
- Section 3 (2D Calculations):** Shows various weight and index calculations.

EFW(Hansmann)	OORg	(0oz)
EFW(Hadlock)-GP	<3%	
EFW(IUGR)	406.30g	(14oz)
CI(Hadlock)	-> 112.33 (70.00-86.00)	FL/AC(Hadlock) -> 25.27 (20.00-24.00)
FL/BPD(Hohler)	-> 93.13 (71.0-87.0)	

Figure 9-2. OB Worksheet

The OB Worksheet has three sections of information:

1. Patient data
2. Measurement information
3. Calculation information

Patient data

The Patient data section, at the top of the worksheet, lists information from the Patient Data Entry screen.

You can select the following fields:

- FetusNo – if this is a multi-gestational patient, you can select the fetus in this field. You can also adjust the **Fetus** selection to change the fetus.
- CUA/AUA – select the ultrasound age calculation method
 - Composite Ultrasound Age (CUA) – regression calculation
 - Average Ultrasound Age (AUA) – an arithmetic average

You can select the method in this field, or adjust the **Select CUA/AUA** control.

NOTE: CUA/AUA is only available when you select USA OB Type in Utility -> System -> System Measure menu.

You can enter information in the following fields:

- FetusPos – type information about the fetus position.
- PLAC – type information about the placenta.

Measurement information

This section lists the results of all measurements.

- CUA or AUA – If this field is checked, the system uses the measurement to calculate the ultrasound age.
- Value – The measured value. If more than one measurement was made for an item, the system uses the specified method (average, maximum, minimum, or last) to determine this value.
- m1–m3 – Up to three measurement values for each item. If you make more than three measurements, the worksheet uses the last three.
- Method – When there is more than one measurement for an item, this specifies the method used to calculate the measurement value listed in the Value column. Choices are average, maximum, minimum, last, or off. To change the method:
 - a. Move the **Trackball** to the Method field.
 - b. Press **Set**.
 - c. Move the **Trackball** to select from the list.
 - d. Press **Set**.
- AGE – The fetal age for this measurement.
- Range – The typical range of fetal age for this measurement.

Calculation information

This section of the worksheet provides calculation choices and lists calculation results.

- EFW – lists the parameters used to calculate EFW. This is followed by the calculation result.

To change which parameters are used:

- a. Select this field or press **Select EFW**.
- b. Select the desired parameters.

- EFW GP – lists the source used to calculate EFW–GP (growth percentile). This is followed by the growth percentile.

To change the source:

- a. Select this field or press **Select GP**.
- b. Select the desired source.

The remaining calculation information shows ratios for several measurements, and the Cephalic Index (CI).

The worksheet shows if any of the ratios are out of range (OOR). Out of range indicates one of the following:

- The measurement is out of the normal range based on the gestational age that is calculated from the LMP. The system determines OOR from the ultrasound age compared to the gestational age. The gestational age is calculated from the last menstrual period or the estimated delivery date.
- The measurement is outside of the range for the data used in the calculation. That means that the measurement is either less than or more than the range of measurements used to determine fetal age based on the measurement.

For more information about how to use the worksheet, see 'Viewing and Editing Worksheets' on page 7-55 for more information.

Anatomical Survey

Overview

The Anatomical Survey page provides a checklist that indicates which anatomy was imaged and its appearance.



Figure 9-3. Anatomical Survey

Editing

- To activate the Anatomical Survey, select **Anatomy** on the OB Worksheet screen.
- Fill the required field.

Table 9-2: Anatomical Survey

Field	Description
Fetus Pos	Indicate the fetal position within the uterus.
PLAC	Identify the location of the placenta.
ANATOMY	<p>Enter the following information for each part of the anatomy imaged:</p> <ol style="list-style-type: none"> 1. Imaged?: Check the box that you did image this part of the anatomy. 2. Appearance: If you checked the Imaged? box, indicate whether the appearance was normal or abnormal. <p>You can add the required anatomy up to 9 additional anatomy.</p> <p>Move the Trackball to the blank field.</p> <p>Enter the anatomy name.</p>
BIOPHYSICAL	The score is _ of 10 possible total points, depending upon the number of parameters entered. Enter the following information to assess the fetus's biophysical well-being.
Movement	Type 0, 1 or 2
Tone	Type 0, 1 or 2
Breathing	Type 0, 1 or 2
Fluid	Type 0, 1 or 2
Reactive NST (Reactive non-stress test)	Type 0, 1 or 2
COMMENTS	Free text

Select **Exit** to return to the Scan screen.

Select **Worksheet** to return to the Worksheet or **Graph** to enter the OB Graph screen.

NOTE: *The patient specific contents input on the Anatomical Survey page are returned to the factory default settings after starting a new patient.*

OB Graphs

Overview

OB Graphs allow you to assess fetal growth compared to a normal growth curve. When a patient has completed two or more ultrasound exams, you can also use the graphs to look at fetal trending. For multi-gestational patients you can plot all fetuses and compare the growth on the graphs.

The LOGIQ V2/LOGIQ V1 provides the following two basic types of graphs:

- **Fetal Growth Curve graphs** – show one measurement per graph. These graphs show the normal growth curve, positive and negative standard deviations or applicable percentiles, and ultrasound age of the fetus using the current measurement. For multi-gestational pregnancies, you can view all fetuses. If previous exam data is available, the graph can show fetal trending.
- **Fetal Growth Bar graph** – shows the ultrasound age and the gestational age based on patient data. Plots all measurements on one graph.

To View OB Graphs

To view OB graphs:

1. Press **Measure**.
2. Select **Worksheet**.
3. Select **Graph**.

After you select **Graph**, the system displays the OB Graph keys.

Fetal Growth Curve Graph

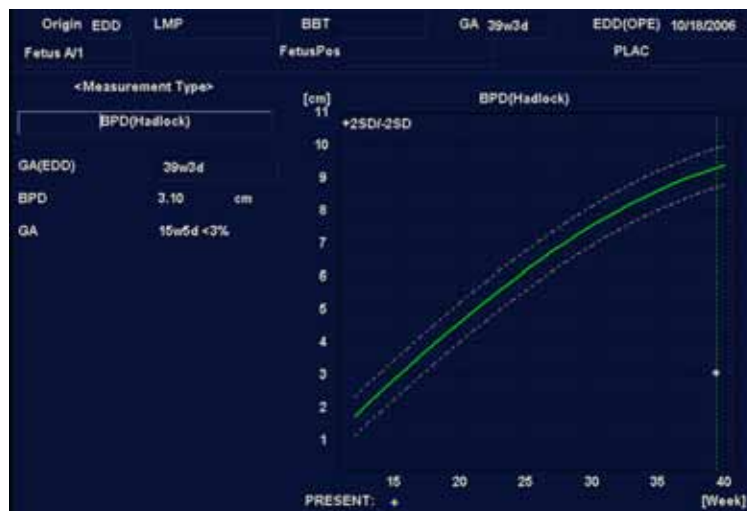


Figure 9-4. Fetal Growth Curve Graph

The horizontal axis shows the fetal age in weeks. The system determines this age from the data on the Patient Data Entry screen. The vertical axis shows one of the following:

- For measurements, mm or cm
- For ratios, percent
- For fetal weight, grams

The Fetal Growth Curve Graph shows the following information for the selected measurement:

- The normal growth curve
- The standard deviations or relevant percentiles
- The gestational age of the fetus, using patient data (vertical dotted line)
- Using the current ultrasound measurement data, where the fetus is on the growth curve

The legend at the bottom of the graph shows the symbols and colors that indicate data for fetal trending (Past and Present) and multiple gestation (Fetus).

Fetal Growth Curve Graph (continued)

To select the measurement

To select which measurement you want to display on the Fetal Growth Curve Graph, do one of the following:

- To select a specific measurement:
 - a. On the graph display, move the **Trackball** to the Measurement Type field and press **Set**.
The system displays a list of measurements.
 - b. Move the **Trackball** to select the desired measurement and press **Set**.
The system displays the Fetal Growth Curve Graph for the selected measurement.
- To scroll through all Fetal Growth Curve Graphs, adjust the **Graph Change** control.

To select the age to use

To plot the fetus age, the system allows you to use the gestational age (GA) from the LMP, or to use the composite ultrasound age (CUA). To select, adjust the **Select GA** control. The information in the left column changes between CUA and GA(EDD), and the data may change.

To view a single or four graphs

You can view either a single Fetal Growth Curve Graph or you can view four graphs at the same time. To select each view, press **Single** or **Quad**.

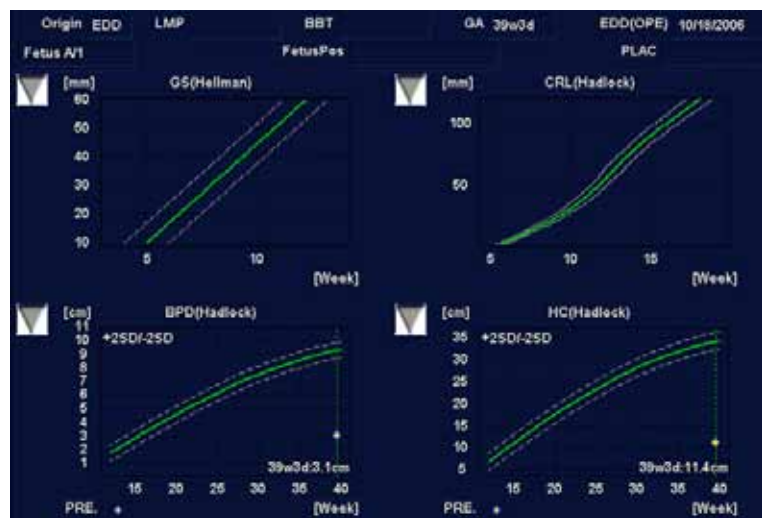


Figure 9-5. Fetal Growth Curve Graph: Quad View

The measurement values are displayed at the bottom of the graph.

Fetal Growth Curve Graph (continued)

To change measurements in quad view

When you view four graphs simultaneously, you can select which four you want to see. To change each graph in quad view:

1. On the graph display, use the **Trackball** to move the cursor to the small box that is upper left of each graph, then press **Set**.

The system displays a list of measurements.

2. Move the **Trackball** to select the desired measurement and press **Set**.

The system displays the Fetal Growth Curve Graph for the selected measurement.

To scroll through all Fetal Growth Curve Graphs, adjust the **Graph Change** control.

The order of a quad graph view can be saved by selecting **Save**.

Fetal Trending

When you have ultrasound data for more than one exam for a patient, you can use the data to look at fetal trending on the Fetal Growth Curve Graphs.

1. Select **Graph** and select the desired Fetal Growth Curve Graph.
2. Select **Plot Both**.

The system automatically finds the data from previous ultrasound exams, and displays it on the graph with the present data.

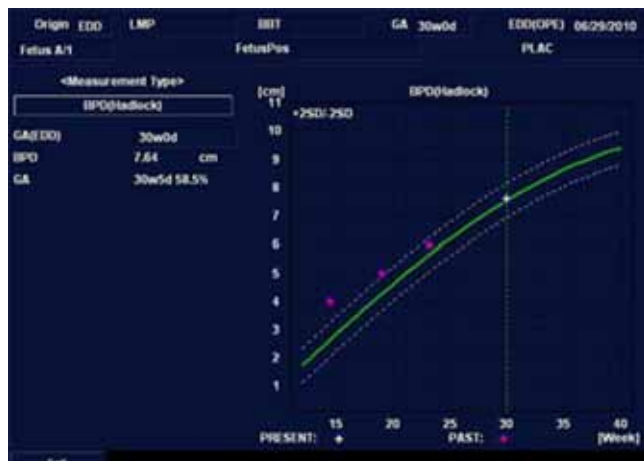


Figure 9-6. Fetal Trending on Fetal Growth Curve Graph: FL
The legend at the bottom of the graph shows the symbols and colors that indicate Past and Present data.

To edit patient data

When you are working with graphs, you can change or enter the following patient data.

- GA(LMP) – this field is computed using the LMP date on the Patient Data Entry screen. To change this field:

NOTE:

You can only change this field on the Fetal Growth Curve Graph in single view.

- a. Move the **Trackball** to the field, which is left of the graph. To select the field, press **Set**.
The system displays a window with the GA weeks and days.
- b. To select each field, move the **Trackball** to move to the field and press **Set**.
- c. Type the correct weeks or days.
- d. Select OK.

The system makes the following changes:

- GA (LMP) is now GA (GA) and shows the age you entered.
- In the Patient Data section, the GA changes.
- In the Patient Data section, The EDD (LMP) changes to EDD(GA) and shows an updated date, using the GA you entered.
- FetusPos – type information about the fetus position.
- PLAC – type information about the placenta.

To return from a graph to the scan display

After viewing graphs, to return to the scan display, do one of the following:

- On the graph display, select Exit.
- Select **Graph** on the graph display.

Fetal Growth Bar Graph

The fetal growth bar graph shows current exam measurements and the normal growth range based on the gestational age. It shows all measurements on one graph.

To view the Fetal Growth Bar Graph:

1. Press **Measure**.
2. Select **Worksheet**.
3. Select **Graph**.
4. Select **Bar**.



Figure 9-7. Fetal Growth Bar Graph

- The horizontal axis shows the gestational weeks.
- The red vertical line shows the gestational age using the patient data.
- The blue dotted vertical line shows the ultrasound age using the current measurements.
- The yellow x shows the ultrasound age for each measurement.
- The green rectangle shows the normal age range for the measurement.

You cannot do fetal trending or view multiple gestation data on the bar graph.

OB-Multigestational

Multiple Fetus

LOGIQ V2/LOGIQ V1 allows you to measure and report multiple fetus development. The system can report a maximum of four fetuses.

To enter the number of fetuses

If more than one fetus is imaged during the exam, enter the number of fetuses in the Patient Data Entry Menu.



Figure 9-8. Fetus Number

When you start an OB exam, the system automatically fills in the Fetus # field with 1. To change the number:

1. Move the cursor to the fetus number and press **Set** twice.
The number is highlighted.
2. Type the correct number and press **Set**.
The system displays a message to confirm that you want to change the fetus number.
3. Select **Yes**.

To identify each fetus

For measurements, calculations, and worksheet displays, the system labels each fetus A, B, C, or D. Each fetus is identified by a letter and the total number of fetuses. For example, fetus A/3 is fetus A from a total of 3.

When scanning, you can enter information about the fetus position and placenta location. You can enter the information in the Patient Data section of the worksheets and the graphs. You can type up to 18 characters in the FetusPos field and 12 characters in the PLAC fields.



Figure 9-9. Patient Data section of the OB Worksheet

To select a fetus

During measurements and calculations, to change between fetuses, do one of the following:

- Adjust the **Fetus** selection.
- Move the **Trackball** to move to the Summary Window and select the fetus.

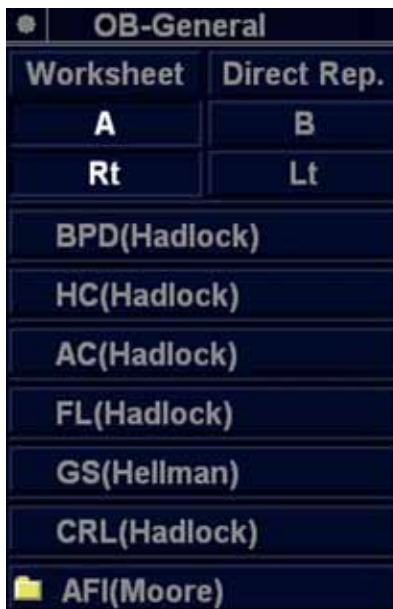


Figure 9-10. Summary Window: Multiple fetus

You can change between fetuses at any time during the exam.

NOTE: *After you change to the next fetus, any measurements you make are recorded and reported to that fetus. If you have any active measurement or calculation that is not completed when you change the fetus, the system cancels the measurement or calculation.*

To view multiple fetuses data on graphs

You can view multiple gestation data on fetal growth curve graphs. After you have made measurements for each fetus, select **Graph**.

- To view the graph for each fetus, do one of the following:
 - Adjust the **Fetus** selection.
 - In the Patient Data section, move the **Trackball** to highlight the FetusNo field. In the list of fetuses, move the **Trackball** to select the fetus you want, and press **Set**.
- To display data for multiple fetuses on the same graph, select **Fetus Compare**.

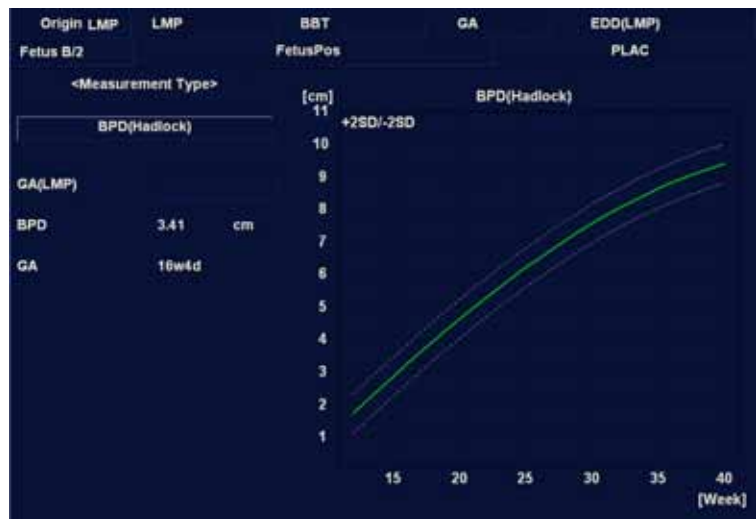


Figure 9-11. Fetal Growth Curve Graph: Fetus Compare

The legend at the bottom of the graph shows the symbols and colors that represent each fetus.

To compare multiple fetus data on a worksheet

With multiple fetuses, you can list and compare measurements of the fetuses on the worksheet.

Select **Worksheet**, then select **Fetus Compare**.

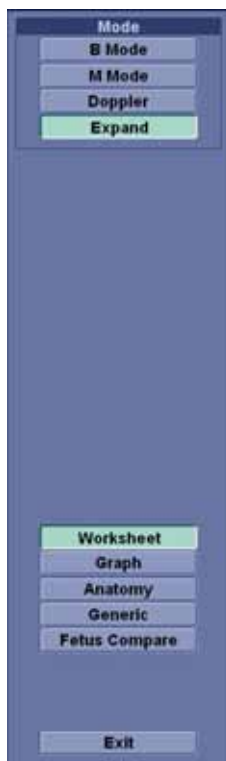


Figure 9-12. OB Worksheet Display

When you select **Fetus Compare**, the system lists the measurement results for each fetus on the Worksheet.

Origin LMP	LMP	BBT	GA	EDD(GA)
Page 1/1				
Fetus Compare		A	B	
CUA	16w4d+- 1w4d	16w4d+- 1w4d		
EDD(CUA)	2014/02/13	2014/02/13		
EPW				
BPD(Headlock)	3.42 cm	3.41 cm		
GA	16w4d	16w4d		

Figure 9-13. Worksheet Display with Fetus Compare

To Show Fetal Trending for Multiple Fetuses

When you have data for more than one exam, you can show fetal trending and compare fetuses on one graph.

To view fetal trending for multiple fetuses:

1. Select **Graph**.
2. Select **Fetus Compare**.
3. Select **Plot Both**.

NOTE: You can only view fetal trending for multiple fetuses in single graph display.

The symbol key for fetal trending and multiple fetuses is shown at the bottom of the graph.

OB Table Editor

You can add user programmable OB tables to the system.

OB Table Settings Menu

You add OB Tables in the Measurement & Analysis menu. To open the menu:

1. Enter **Utility** -> **Measure**, then select **M&A**.
2. Check the Exam Category on the far left of the monitor screen. Make sure that Obstetrics is selected.

If it is not selected, select Obstetrics and continue selecting the folders until the appropriate area is selected as to where this new OB Table will be entered. For example, select Obstetrics, then select OB-2/3. If there are further folders within OB-2/3, select that appropriate folder.

3. On the monitor display, select the OB Table tab.
The system displays the OB Table settings menu.

The screenshot shows the 'OB Table Settings' window within the 'MEASUREMENT & ANALYSIS' menu. The window has a dark blue header with tabs for 'M&A', 'Advanced', 'Doppler', and 'OB Table'. The 'OB Table' tab is selected. The settings are as follows:

Study	OB-2/3
New/Edit	<input type="radio"/> New Table <input checked="" type="radio"/> Edit Table
OB Table Template	Template1
Tool Type	<input checked="" type="radio"/> Dist <input type="radio"/> Circumference <input type="radio"/> Weight
Measure Name	
Author Name	
Table Type	<input checked="" type="radio"/> Fetal Age <input type="radio"/> Fetal Growth
Measure Type	
Table Format	MEAS:MEAN:SD
Table Unit	mm:Week:Week
SD:GP Range	1SD
Graph Range	1SD

An 'Edit Table' button is located at the bottom right of the window.

Figure 9-14. OB Table settings

OB Table Settings Menu (continued)

4. The OB Table settings menu lists OB Table parameters. Specify the following parameter values as appropriate:
 - **Study:** Shows the study to which this measurement table belongs.
 - **New/Edit:** To create a new OB table, select New Table. To edit an existing user-programmable OB table, select Edit Table.

NOTE: You cannot edit the system's OB Tables.

- **OB Table Template:** To create a new OB table, select the Template (1 - 7) which you want to use as the basis of the user programmable OB Table. See 'OB Table Templates' on page 9-38 for more information. To edit an existing user OB table, select the desired OB table to edit.
- **Tool Type:** Select the type of measurement: Distance, Circumference or weight.
- **Measure Name:** Type the name of measurement that will display on the menu.
- **Author Name:** Type the author's name.
- **Table Type:** If necessary, select the Table Type: Fetal Age or Fetal Growth.
- **Measure Type:** Select a measurement type that can be used to calculate EFW, for example BPD.

NOTE: Measure Type is used only when calculating EFW.

NOTE: The following items are display only: Table Format, Table Unit, SD/GP Range, and Graph Range. The system determines these values automatically, based on the type of OB table you are creating.

5. After specifying all parameter values, move the **Trackball** to *Edit Table* and press **Set**.

The system displays the Edit Menu.

NOTE: If any of the OB table parameters are not correct, the Edit Menu is not displayed.

OB Table Templates

Tool Type:

- Distance: 2D Caliper
- Circumference: 2D Ellipse, 2D Trace, 2D Caliper
- Weight

Template 1

Table 9-3: Template 1 (based on Hadlock)

Template 1: SD Range Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	Week	Week
	Table Range	1SD		
	Graph Range	1SD		
Measurement Result	Value [cm]			
	GA [#w#d]			
	Min [#w#d]			
	Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	Week	mm	Week
	Others are same as above			

Template 2

Table 9-4: Template 2 (based on Tokyo)

Template 2: SD Range Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	Day	Day
	Table Range	1SD		
	Graph Range	1SD		
Measurement Result	Value [cm]			
	GA [#w#d]			
	SD: day(+/-)			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	Day	mm	Day
	Others are same as above			

Template 3

Table 9-5: Template 3 (based on Osaka)

Template 3: SD Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	Day	mm
	Table Range	1SD		
	Graph Range	1SD		
Measurement Result	Value [cm]			
	GA [#w#d]			
	SD: $sd=(mv-pv)/sd$			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	Day	mm	mm
	Others are same as above			

Template 4

Table 9-6: Template 4 (based on several European tables)

Template 4: 5%-95% Table					
Fetal Age Table	Table Format	MEAS	MIN	MEAN	MAX
	Table Unit	mm	WeekDay	WeekDay	WeekDay
	Table Range	5%:95%			
	Graph Range	5%:95%			
Measurement Result	Value [cm]				
	GA [#w#d]				
	GP [%] GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,				
	EDD (Date)				
	GA-Min [#w#d]				
	GA-Max [#w#d]				
Fetal Growth Table	Table Format	AGE	MIN	MEAN	MAX
	Table Unit	WeekDay	mm	mm	mm
	Table Range	5%:95%			
	Graph Range	5%:95%			

Template 5

Table 9-7: Template 5 (based on several European tables)

Template 5: 5% - 95% Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	WeekDay	mm
	Table Range	1SD		
	Graph Range	5%:95%		
Measurement Result	Value [cm]			
	GA [#w#d]			
	GP [%] GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	WeekDay	mm	mm
	Table Range	1SD		
	Graph Range	5%:95%		

Template 6

Table 9-8: Template 6 (based on several European tables)

Template 6: 10% - 90% Table					
Fetal Age Table	Table Format	MEAS	MIN	MEAN	MAX
	Table Unit	mm	WeekDay	WeekDay	WeekDay
	Table Range	10%-90%			
	Graph Range	10%-90%			
Measurement Result	Value [cm]				
	GA [#w#d]				
	GP [%] GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,				
	EDD (Date)				
	GA-Min [#w#d]				
	GA-Max [#w#d]				
Fetal Growth Table	Table Format	AGE	MIN	MEAN	MAX
	Table Unit	WeekDay	mm	mm	mm
	Table Range	10%-90%			
	Graph Range	10%-90%			

Template 7

Table 9-9: Template 7 (Based on several european tables)

Template 7: 10% - 90% Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	WeekDay	mm
	Table Range	1SD		
	Graph Range	10%:90%		
Measurement Result	Value [cm]			
	GA [#w#d]			
	GP [%] GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	WeekDay	mm	mm
	Table Range	1SD		
	Graph Range	10%:90%		

OB Table Edit Menu

The data you enter in the OB Table Edit Menu depends on whether the table type is Fetal Age or Fetal Growth.

Fetal Age Table

If you are creating or editing a Fetal Age table, the OB Table Edit Menu is as follows:

	MEAS	MEAN	SD
	mm	Week	Week
1	5.00		
2	7.00		
3	9.00		
4	11.00		
5	13.00		
6	15.00		
7	17.00		
8	19.00		
9	21.00		
10	23.00		
11	25.00		
12	27.00		
13	29.00		
14	31.00		

Figure 9-15. OB Table Edit Menu: Fetal Age Table

Complete the field

1. Input value to Min, Max and Interval of the Parameters field. The system automatically fills in the MEAS column. Input value to the columns of MEAN and SD.

NOTE: To move between the fields in the table, use the up, down, left, and right arrow keys.

NOTE: You must enter a minimum of two rows of data. Any lines with a blank cell are not saved.

To save the Table Data, move the **Trackball** to Exit to Save and press **Set**. If you want cancel this table, move the **Trackball** to move to Cancel and press **Set**.

Fetal Growth Table

If you are creating or editing a Fetal Growth table, the OB Table Edit Menu is as follows:

AGE Day	MEAN mm	SD mm
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Figure 9-16. OB Table Edit Menu: Fetal Growth Table

Complete the field

1. Input value to the required columns.

NOTE: To move between the fields in the table, use the up, down, left, and right arrow keys.

NOTE: You must enter a minimum of two rows of data. Any lines with a blank cell are not saved.

2. To save the Table Data, move the **Trackball** to Exit to Save and press **Set**. If you want to cancel this table, move the **Trackball** to Cancel and press **Set**.

After you complete the OB table, it is now available for the selected study. To use the measurement, you must assign it to a menu. See 'Measurement and Calculation Setup' on page 7-11 for more information.

EFW for OB User Table/Formula Editor

EFW Table Editor

You can edit an EFW Formula at the OB Table Editor.

1. Select Utility -> Measure -> OB Table.
2. Select the appropriate parameters and press **Edit Table**.
 - New/Edit: Select “New Table”
 - OB Table Template: Select appropriate template.
 - Tool Type: Select “Weight”
 - Measure Name: Enter measurement name.
 - Author Name: Enter author’s name.
 - Table Type: Select “Fetal Age”



Figure 9-17. OB Table Tab Screen

EFW Table Editor (continued)

3. Edit the table data and press **Exit To Save**.

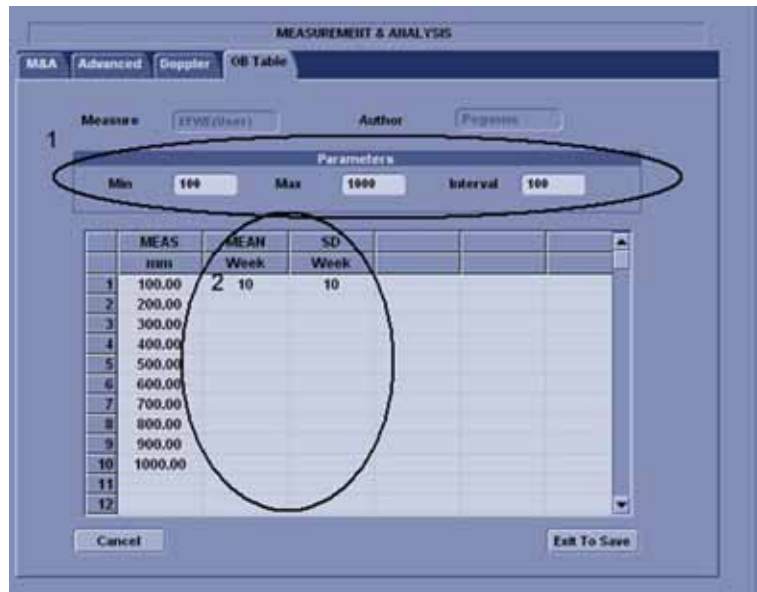


Figure 9-18. OB Table Editor Screen

EFW Formula Editor

1. Select the M&A tab and select **Edit Calc**. The Modify User CALC window displays.
 Select the user table previously added from the User Defined pull-down menu and press **OK**.

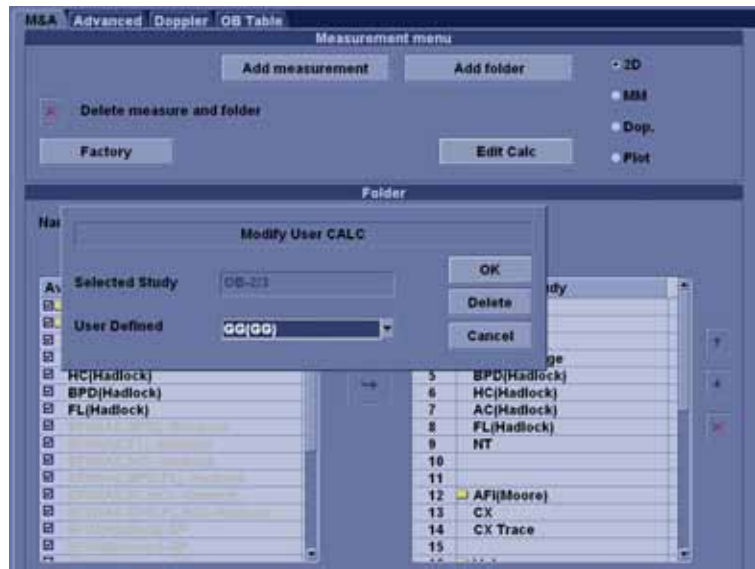


Figure 9-19. Modify User CALC window

2. Double click the Calculated button for the EFW parameter.

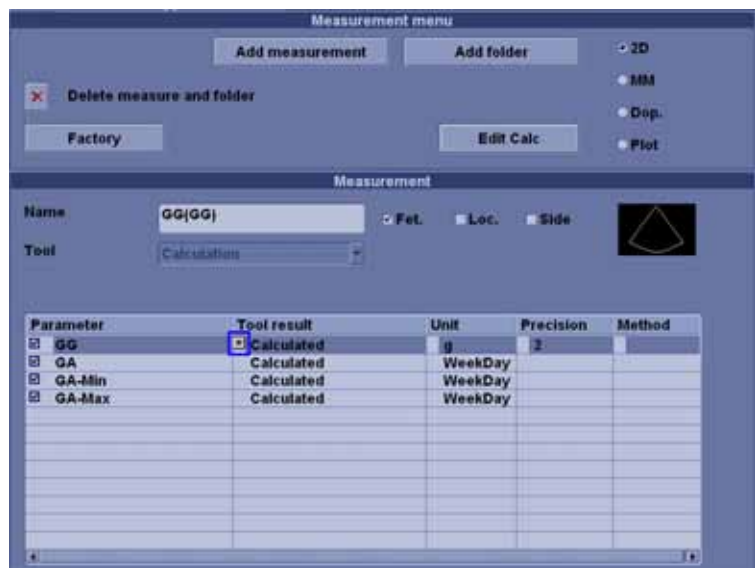


Figure 9-20. M&A Tab Screen

EFW Formula Editor (continued)

- The EDIT FORMULA window displays. Edit the formula and select **OK**.



Figure 9-21. EDIT FORMULA window

NOTE: When you edit a formula, be careful of the following points.

- If you want to calculate EFW by centimeter, add “*100” to the {parameter}.
- If EFW is calculated in grams, add “/1000” to the formula.

or example,

$10^{(1.56\{AC[\text{Hadlock}]\} * 100 + 0.08\{FL[\text{Hadlock}]\} * 100) / 1000}$

GYN Measurements

Introduction

The Gynecology exam category includes the following three studies:

- Generic. This study is common to all exam categories. See 'Generic Measurements' on *page 7-59 for more information*.
- General Gynecology. This study includes uterine, ovarian, ovarian follicle, and endometrium measurements.
- OB/GYN Vessel. This study includes the following vessels: uterine, ovarian, umbilical, middle cerebral artery, aorta, placenta, and descending aorta.

NOTE: *The calculation formulas are listed in the Advanced Reference Manual.*

To Start a Gynecology Exam

To begin a gynecology exam, you enter patient data or, if the patient data from a previous exam is saved in the system, find the patient information.

For details about how to start an exam, See 'Beginning an Exam' on page 4-2 for more information.

Table 9-10: Obstetric fields

Field	Description
LMP	Last Menstrual Period; enter the date that the patient started her last menstrual period. You must enter 4 digits for the year. When you type the month and day, the system fills in the /. The Date Format preset chosen in Utility -> System -> General determines the required format.
Gravida	Number of pregnancies.
Para	Number of births.
AB	Number of abortions.
Ectopic	Number of ectopic pregnancies.

After you complete the patient information, select **GYN** category and related exam, you can begin the scan.

- To change from the Patient screen to the Scan screen, do one of the following:
 - Select **Scan**.
 - On the Control Panel, select **Freeze**.
 - On the Control Panel, press the B-Mode key.

The system displays the Scan screen.

- On the Control Panel, press **Measure**.

The default Gynecology study is displayed on the menu.

B-Mode Measurements

In B-Mode, you make the measurements in the General Gynecology study. These measurements include:

- Uterine length, width, and height
- Ovarian length, width, and height
- Ovarian follicle
- Cervix
- Endometrium thickness



Figure 9-22. General Gynecology study

Follicle measurements

You can make left and right ovary follicle measurements from one, two, or three distances.

One distance

1. To select the left or right, adjust the **Side** selection.
2. Select **Follicle**; an active caliper displays.
3. Make one distance measurement.

The system displays the ovary follicle measurement in the Results Window.

Two distances

1. To select the left or right, adjust the **Side** selection.
2. Select **Follicle**; an active caliper displays.
3. Make two distance measurements.

The system displays the ovary follicle measurement in the Results Window.

Three distances

1. To select the left or right, adjust the **Side** selection.
2. Select **Follicle**; an active caliper displays.
3. Make three distance measurements.

After the third measurement, the system displays the ovary follicle measurement in the Results Window.

Endometrium thickness

To measure the endometrium thickness, make one distance measurement.

1. Select **Endometrium**; an active caliper displays.
2. Make one distance measurement.

The system displays the endometrium thickness in the Results Window.

Ovary length, width, and height

You can measure the length, width, and height of the left and right ovaries. Each measurement is a typical distance measurement made in the appropriate scan plane.

Typically, length and height are measured on the sagittal plane while the width is measured on the axial/transverse plane.

To measure ovarian length, width, or height:

1. Scan the patient's right or left ovary in the appropriate plane.
2. To select left or right, adjust the **Side** selection.
3. Select the **OV** folder, then select **OVL**, **OVW**, or **OVH**.
4. Perform a standard distance measurement:
5. Make the second and third distance measurements.

After you complete the length, width, and height measurements, the system displays the ovarian volume in the Results Window.

Uterus length, width, and height

Each of these is a standard distance measurement. Typically, length and height are measured on the sagittal plane while the width is measured on the axial/transverse plane.

To measure uterus length, width, or height:

1. Scan the patient in the appropriate scan plane.
2. Select the **UT** folder, then select **UTL**, **UTW**, or **UTH**.
An active caliper displays.
3. Perform a standard distance measurement:
4. Make the second and third distance measurements.

After you complete the third distance measurement, the system displays the uterine volume in the Results Window.

Cervix measurements

You can make cervix measurements from one distance or spline trace.

One Distance

1. Select **CX**; an active caliper displays.
2. Make one distance measurement.
3. The system displays the cervix measurement in the Result Window.

Spline Trace

1. Select **CX Trace**; an active caliper displays.
2. Make a spline trace measurement.
3. The system displays the cervix measurement in the Result Window.

M-Mode Measurements

M-Mode measurements for the Gynecology exam are identical to M-Mode measurements for the Obstetrics exam. These measurements include % stenosis, A/B ratio, and heart rate.

For details regarding these measurements, See 'M-Mode Measurements' on *page 9-15 for more information.*

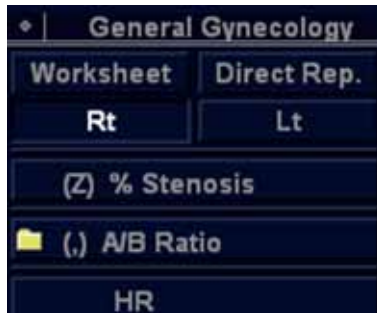


Figure 9-23. M-Mode Generic study

Doppler Mode Measurements

Doppler measurements for the Gynecology exam are identical to Doppler measurements for the Obstetrics exam. These measurements include the following vessels: uterine, ovarian, umbilical, middle cerebral artery, aorta, placenta, and descending aorta. For each vessel, you can make any of the following measurements: peak systole, minimum diastole, end diastole, heart rate, TAMAX, pulsatility index, resistive index, acceleration, PS/ED, ED/PS, and acceleration time.

For details regarding these measurements, See 'Doppler Mode Measurements' on *page 9-16 for more information.*



Figure 9-24. Doppler Mode General Gynecology study

Chapter 10

Cardiology

Describes how to perform cardiac measurements and calculations.

Cardiology Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Scanning a New Patient' on *page 4-9 for more information*.

Any measurement can be repeated by selecting that measurement again from the menu.

Cardiology Measurements

Overview

Cardiology measurements offer two different types of measurement studies, Generic and Cardiac.

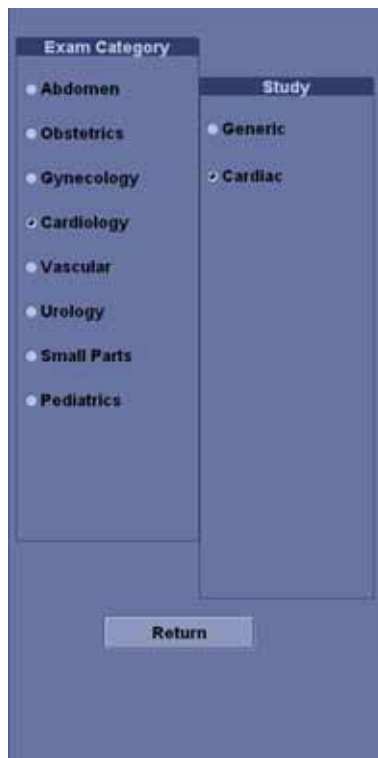


Figure 10-1. Cardiac Exam Calc

- Generic – Each exam category has a Generic study. The Generic studies provide you quick access to measurements.
- Cardiac – This study includes all cardiac measurements.

Naming Format for Cardiac Measurements

When you make a measurement, you select the abbreviation for the measurement on the menu. Most abbreviations are made using acronyms. The following table lists acronyms used for naming cardiac measurements.

Table 10-1: Cardiology Abbreviations

Acronym	Name
% STIVS	% Interventricular Shortening
A	Area
Acc	Acceleration
AccT	Flow Acceleration Time
ALS	Aortic Leaflet Separation
Ann	Annulus
Ao	Aorta
AR	Aortic Regurg
Asc	Ascending
ASD	Atrial Septal Defect
AV	Aortic Valve
AV Cusp	Aortic Valve Cusp Separation
AVA	Aortic Valve Area
AV-A	Aortic Valve Area by Continuity Equation
BSA	Body Surface Area
CI	Cardiac Index
CO	Cardiac Output
d	Diastolic
D	Diameter
Dec	Deceleration
DecT	Deceleration Time
Desc	Descending
Dur	Duration
EdV	End Diastolic Volume
EF	Ejection Fraction
EPSS	E-Point-to-Septum Separation

Table 10-1: Cardiology Abbreviations

Acronym	Name
EsV	End Systolic Volume
ET	Ejection Time
FS	Fractional Shortening
FV	Flow Volume
FVI	Flow Velocity Integral
HR	Heart Rate
IVRT	IsoVolumetric Relaxation Time
IVS	Interventricular Septum
L	Length
LA	Left Atrium
LAA	Left Atrium Area
LAD	Left Atrium Diameter
LPA	Left Pulmonary Artery
LV	Left Ventricle
LVA	Left Ventricular Area
LVID	Left Ventricle Internal Diameter
LVL	Left Ventricle Length
LVM	Left Ventricular Mass
LVPW	Left Ventricle Posterior Wall
ML	Medial to Lateral
MPA	Main Pulmonary Artery
MR	Mitral Regurgitation
MV	Mitral Valve
MVcf	Mean Velocity Circumferential Fiber Shortening
MVO	Mitral Valve Orifice
OT	Outflow Tract
P	Papillary Muscles
PA	Pulmonary Artery
PAP	Pulmonary Artery Pressure
PDA	Patent Ductus Arteriosis

Table 10-1: Cardiology Abbreviations

Acronym	Name
PEP	Pre-Ejection Period
PFO	Patent Foramen Ovale
PG	Pressure Gradient
PHT	Pressure Half Time
PI	Pulmonary Insufficiency
PISA	Proximal Isovelocity Surface Area
PR	Pulmonic Regurgitation
PV	Pulmonic Valve
PV-A	Pulmonic Valve Area by Continuity Equation
PVein	Pulmonary Vein
PW	Posterior Wall
Qp	Pulmonic Flow or CO
Qs	Systemic Flow or CO
RA	Right Atrium
RAA	Right Atrium Area
Rad	Radius
RAD	Right Atrium Diameter
RPA	Right Pulmonary Artery
RV	Right Ventricle
RVA	Right Ventricle Area
RVAW	Right Ventricle Anterior Wall
RVD	Right Ventricle Diameter
RVID	Right Ventricle Internal Diameter
RVL	Right Ventricle Length
RVOT	Right Ventricle Outflow Tract
s	Systolic
SI	Stroke Index
ST	Shortening
SV	Stroke Volume
SVI	Stroke Volume Index

Table 10-1: Cardiology Abbreviations

Acronym	Name
T	Time
TA	Tricuspid Annulus
TAML	Tricuspid Annulus Medial to Lateral
TR	Tricuspid Regurgitation
TV	Tricuspid Valve
TVA	Tricuspid Valve Area
Vcf	Velocity Circumferential Fiber Shortening
Vel	Velocity
VET	Valve Ejection Time
Vmax	Maximum Velocity
Vmean	Mean Velocity
VSD	Ventricular Septal Defect
VTI	Velocity Time Integral

In this manual, the abbreviation for each measurement is listed in parenthesis after the measurement, as follows:

- Aortic Root Diameter (***Ao Diam***)
- Left Ventricle Posterior Wall Thickness, Diastolic (***LVPWd***)

For example, to measure the Aortic Root Diameter, you select ***Ao Diam***.

Cardiac Measurements

This section lists cardiac measurements and the steps to perform them. The measurement information in this section is organized by mode, then by region of interest, and then by type of measurement. The organization is as follows:

- Mode; there is a section for B-Mode, M-Mode, Color Flow Mode, and Doppler Mode. There is also a Combination Mode section, which includes calculations that are a result of measurements made in more than one mode.
- Within each mode section, there are sections for region of interest, such as aorta or mitral valve.
- Within each region of interest section, there are sections for type of measurement, such as one distance, two distance, trace, or velocity flow trace. Each measurement type section lists all cardiac measurements that are that type, and then describes the steps to perform that type of measurement.

Some measurements, such as Aortic Root Diameter or Aortic Valve Cusp Separation, can be made in B-Mode or M-Mode. The information for these measurements is included in both B-Mode and M-Mode sections.

NOTE: You can select the diastole frame/systole frame (ED/ES or ES/ED) with the assigned control.

Steps to perform a measurement

Making a one distance measurement

1. Select the measurement; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the measurement in the Results Window.

Making two distance measurements

1. Select the measurement; an active caliper displays.
2. Make the first distance measurement:
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
 - c. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.
The system displays the distance value in the Results Window. After the first measurement, the system displays an active caliper.
3. To make the second distance measurement, repeat steps a–d above.
The system displays the measurements and ratio in the Results Window.

Steps to perform a measurement (continued)

Making a trace measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the trace start point, press **Set**.
The system displays a vertical dotted line.
4. To trace the measurement area, move the **Trackball**.
A line shows the traced area.
5. To complete the measurement, press **Set**.
The system displays the measurement in the Results Window.

Making a slope measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the **Trackball**.
A dotted line shows the slope.
5. To complete the measurement, press **Set**.
The system displays the slope measurement in the Results Window.

Making a time interval measurement

1. Select the measurement.
The system displays an active caliper and a vertical dotted line.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the first caliper, press **Set**.
The system displays a second active caliper.
4. To position the caliper at the end point, move the **Trackball**.
5. To complete the measurement, press **Set**.
The system displays the time interval in the Results Window.

Steps to perform a measurement (continued)

Making a velocity flow trace measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the trace start point, press **Set**.
The system displays a vertical dotted line.
4. To trace the envelope, move the **Trackball**.
A line shows the traced area.
5. To complete the trace, press **Set**.
The system displays a second vertical dotted line.
6. To position the second dotted line at the start of the next envelope, move the **Trackball**.
7. To complete the measurement, press **Set**.
The system displays the measurement in the Results Window.

Making a peak velocity measurement

1. Select the measurement; an active caliper with a vertical dotted line displays.
2. To position the caliper at the desired measurement point, move the **Trackball**.
3. To complete the measurement, press **Set**.
The system displays the velocity measurement in the Results Window.

Making a time interval/slope measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the **Trackball**.
A dotted line shows the slope.
5. To complete the measurement, press **Set**.
The system displays the time interval and slope measurements in the Results Window.

B-Mode Measurements

Aorta

One distance measurement

- Aortic Root Diameter (**AO Diam**)
- Aortic Arch Diameter (**AO Arch Diam**)
- Ascending Aortic Diameter (**Ao Asc Diam**)
- Ascending Aortic Diameter (**Ao Asc Diam**)
- Aorta Annulus Diameter (**Ao Annulus Diam**)
- Aorta Isthmus (**Ao Isthmus**)
- Aorta ST Junction (**Ao st junct**)

Aortic Valve

One distance measurement

- Aortic Diameter (**Ao Diam**)
- Aortic Valve Cusp Separation (**AV Cusp**)
- Aortic Valve Diameter (**AV Diam**)

One trace measurement

- Aortic Valve Area Planimetry (**AVA Planimetry**)
- Transverse Aortic Valve Area (**Trans AVA (d), Trans AVA (s)**)

Left Atrium

Two distance measurements

- Left Atrium Diameter to AO Root Diameter Ratio (**LA/AO Ratio**)

One distance measurement

- Left Atrium Diameter (**LA Diam**)
- Left Atrium Length (**LA Major**)
- Left Atrium Width (**LA Minor**)

One trace measurement

- Left Atrium Area
 - Diastolic (**LAA (d)**)
 - Systolic (**LAA (s)**)

One trace measurement and one distance measurement

- Left Atrium Volume, Single Plane, Method of Disk
 - Diastolic (**LAEDV A2C**) (**LAEDV A4C**)
 - Systolic (**LAESV A2C**) (**LAESV A4C**)

Left Ventricle

NOTE: The user can select the Straight/Line (polygonal line) with the LV study tool. Adjust the appropriate control on the touch panel to make the selection.

One distance measurements

- Left Ventricle Mass Index
 - Diastolic (**LVPWd**)
 - Systolic (**LVPWs**)
- Left Ventricle Volume, Teichholz
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Volume, Cubic
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Internal Diameter
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Length
 - Diastolic (**LVLd**)
 - Systolic (**LVLs**)
- Left Ventricle Outflow Tract Diameter (**LVOT Diam**)
- Left Ventricle Posterior Wall Thickness
 - Diastolic (**LVPWd**)
 - Systolic (**LVPWs**)
- Left Ventricle Length (**LV Major**)
- Left Ventricle Width (**LV Minor**)

Left Ventricle (continued)

One trace measurements

- Left Ventricle Outflow Tract Area (**LVOT Diam**)
- Left Ventricle Area, Two Chamber
 - Diastolic (**LVA (d)**)
 - Systolic (**LVA (s)**)
- Left Ventricle Area, Four Chamber
 - Diastolic (**LVA (d)**)
 - Systolic (**LVA (s)**)
- Left Ventricle Area, Short Axis
 - Diastolic (**LVA (d)**)
 - Systolic (**LVA (s)**)
- Left Ventricle Endocardial Area, Width (**LVA (d)**)
- Left Ventricle Epicardial Area, Length
 - Diastolic (**LVAepi (d)**)
 - Systolic (**LVAepi (s)**)

One time interval measurements

- Heart Rate, Teichholz
- Heart Rate for Two Chamber study
- Heart Rate for Four Chamber study
- Heart Rate for Two Chamber Area-Length study
- Heart Rate for Two Chamber Method of Disk study
- Heart Rate for Four Chamber Area-Length study
- Heart Rate for Four Chamber Method of Disk study
- Heart Rate for Bi-Plane Method of Disk study

Left Ventricle (continued)

Two distance measurements

- Ejection Fraction, Teichholz (**LVIDs**)
- Ejection Fraction, Cubic (**LVIDs**)
- Left Ventricle Posterior Wall Fractional Shortening (**LVPWs**)
- Left Ventricle Stroke Index, Teichholz (**LVIDs**, and Body Surface Area)
- Left Ventricle Fractional Shortening (**LVIDs**)
- Left Ventricle Stroke Volume, Teichholz (**LVIDs**)
- Left Ventricle Stroke Volume, Cubic (**LVIDs**)

Body surface area and stroke volume measurements

- Left Ventricle Stroke Index, Single Plane, Two Chamber, Method of Disk (**LVIDd**, **LVIDs**)
- Left Ventricle Stroke Index, Single Plane, Four Chamber, Method of Disk (**LVIDd**, **LVIDs**)
- Left Ventricle Stroke Index, Bi-Plane, Bullet
- Left Ventricle Stroke Index, Bi-Plane, Method of Disk (**LVAAd**, **LVAAs**)

The system calculates body surface area from the patient's height and weight.

Left Ventricle Study

- Diastolic (**LVd**)
- Systolic (**LVs**)

The Left Ventricle study automatically sequences the following measurements:

- Interventricular Septum (**IVSd**, **IVSs**)
- Left Ventricle Internal Diameter (**LVIDs**, **LVIDd**)
- Left Ventricle Posterior Wall Thickness (**LVPWs**, **LVPWd**)

Mitral Valve

One distance measurements

- Mitral Valve Annulus Diameter (***MV Ann Diam***)
- E-Point-to-Septum Separation (***EPSS***)

One trace measurement

- Mitral Valve Area by Pressure Half Time (***MVA By PHT***)
- Mitral Valve Area Planimetry (***MVA Planimetry***)

Pulmonic Valve

One distance measurement

- Pulmonic Valve Annulus Diameter (***PV Ann Diam***)
- Pulmonic Diameter (***Pulmonic Diam***)

Right Atrium

One distance measurement

- Right Atrium Diameter, Length (***RA Major***)
- Right Atrium Diameter, Width (***RA Minor***)

One trace measurements

- Right Atrium Area (***RA Area***)
- Right Atrium Volume, Single Plane, Method of Disk (***RAAd***)
- Right Atrium Volume, Systolic, Single Plane, Method of Disk (***RAAs***)

Right Ventricle

One trace measurement

- Left Pulmonary Artery Area (**LPA Area**)
- Right Pulmonary Artery Area (**RPA Area**)

One distance measurements

- Right Ventricle Internal Diameter
 - Diastolic (**RVIDd**)
 - Systolic (**RVIDs**)
- Right Ventricle Diameter, Length (**RV Major**)
- Right Ventricle Diameter, Width (**RV Minor**)
- Right Ventricle Wall Thickness
 - Diastolic (**RVAWd**)
 - Systolic (**RVAWs**)
- Right Ventricle Outflow Tract Diameter (**RVOT Diam**)
- Left Pulmonary Artery (**LPA**)
- Main Pulmonary Artery (**MPA**)
- Right Pulmonary Artery (**RPA**)

System

One distance measurements

- Interventricular Septum Thickness
 - Diastolic (**IVSd**)
 - Systolic (**IVSs**)
- Inferior Vena Cava (**IVC**)
- Main Pulmonary Artery Diameter (**MPA Diam**)
- Systemic Vein Diameter (**Systemic Diam**)
- Patent Ductus Arteriosis Diameter (**PDA Diam**)
- Patent Foramen Ovale Diameter (**PFO Diam**)
- Pericardial Effusion Diastole (**PEd**)
- Ventricular Septal Defect Diameter (**VSD Diam**)
- Atrial Septal Defect Diameter (**ASD Diam**)

Body surface area and stroke volume measurements

- Interventricular Septum (IVS) Fractional Shortening (**IVSs**)
The system calculates body surface area from the patient's height and weight.

Tricuspid Valve

One distance measurements

- Tricuspid Valve Annulus Diameter (**TV Ann Diam**)
- Tricuspid Valve Area (**TV Area**)

M-Mode Measurements

Aorta

One distance measurement

- Aortic Root Diameter (**AO Root Diam**)

Aortic Valve

One distance measurements

- Aortic Valve Cusp Separation (**AV Cusp**)

Left Atrium

One distance measurement

- Left Atrium Diameter (**LA Diam**)

Two distance measurement (ratio)

- Left Atrium Diameter to AO Root Diameter Ratio (**LA/AO**)

Left Ventricle

One distance measurements

- Left Ventricle Volume, Teichholz
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Volume, Cubic
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Internal Diameter
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Posterior Wall Thickness
 - Diastolic (**LVPWd**)
 - Systolic (**LVPWs**)

One time interval measurement

- Heart Rate, (R-R)
- Left Ventricle Ejection Time (**LVET**)
- Left Ventricle Pre-Ejection Period (**LVPEP**)
- Velocity Circumferential Fiber Shortening (**Vcf**)

Left Ventricle Study

The Left Ventricle study (**LV Study**) automatically sequences the following measurements:

- Interventricular Septum (**IVSd, IVSs**)
- Left Ventricle Internal Diameter (**LVIDd, LVIDs**)
- Left Ventricle Posterior Wall Thickness (**LVPWd, LVPWs**)

Mitral Valve

One distance measurements

- E-Point-to-Septum Separation (**EPSS**)

One slope measurements

- Mitral Valve Anterior Leaflet Excursion (**D-E Excursion**)
- Mitral Valve D-E Slope (**D-E Slope**)
- Mitral Valve E-F Slope (**E-F Slope**)

Right Ventricle

One distance measurements

- Right Ventricle Internal Diameter
 - Diastolic (**RVIDd**)
 - Systolic (**RVIDs**)
- Right Ventricle Wall Thickness
 - Diastolic (**RVAWd**)
 - Systolic (**RVAWs**)

One time interval measurements

- Right Ventricle Ejection Time (**RVET**)
- Right Ventricle Pre-Ejection Period (**RVPEP**)

Right Ventricle Study

The Right Ventricle study (**RV study**) automatically sequences the following measurements:

- Right Ventricle Internal Diameter (RVIDd, RVIDs)

Pulmonic Valve

One time interval measurements

- QRS complex to end of envelope (***Q-to-PV close***)

System

One distance measurements

- Interventricular Septum
 - Diastolic (***IVSd***)
 - Systolic (***IVSs***)

Two distance measurement:

- Interventricular Septum (IVS) Fractional Shortening (***LVD - LVS / LVD x 100***)

Tricuspid Valve

One time interval measurements

- QRS complex to end of envelope (***Q-to-TV close***)

Doppler Mode Measurements

Aortic Valve

Velocity flow trace measurements

- Aortic Insufficiency Mean Pressure Gradient (**AI Trace**)
- Aortic Insufficiency Peak Pressure Gradient (**AI Vmax**)
- Aortic Insufficiency Mean Velocity (**AI Trace**)
- Aortic Insufficiency Mean Square Root Velocity (**AI Trace**)
- Aortic Insufficiency Velocity Time Integral (**AI Trace**)
- Aortic Valve Mean Velocity (**AV Trace**)
- Aortic Valve Mean Square Root Velocity (**AV Trace**)
- Aortic Valve Velocity Time Integral (**AV Trace**)
- Aortic Valve Mean Pressure Gradient (**AV Trace**)

One peak velocity measurements

- Aortic Valve Peak Pressure Gradient (**AR Vmax**)
- Aortic Insufficiency Peak Velocity (**AR Vmax/AI Vmax**)
- Aortic Insufficiency End-Diastolic Velocity (**ARend Vmax/Alend Vmax**)
- Aortic Valve Peak Velocity (**AV Vmax**)
- Aortic Valve Peak Velocity at Point E (**AV Vmax**)
- Aorta Proximal Coarctation (**Coarc Pre-Duct**)
- Aorta Distal Coarctation (**Coarc Post-Duct**)

One slope measurements

- Aortic Valve Insufficiency Pressure Half Time (**AR PHT**)
- Aortic Valve Flow Acceleration (**AV Trace**)
- Aortic Valve Pressure Half Time (**AV Trace**)

Aortic Valve (continued)

One time interval measurements

- Aortic Valve Acceleration Time (**AV AccT**)
- Aortic Valve Deceleration Time (**AI PHT**)
- Aortic Valve Ejection Time (**AVET**)
- Aortic Valve Heart Rate
- Time

Two time interval measurement

Slope through aortic valve trace:

- Aortic Valve Acceleration to Ejection Time Ratio (**AVET**)
- Aortic Valve Area according to PHT

Left Ventricle

One peak velocity measurements

- Left Ventricle Outflow Tract Peak Pressure Gradient (***LVOT maxPG***)
- Left Ventricle Outflow Tract Peak Velocity (***LVOT Vmax***)

One velocity flow trace measurements

- Left Ventricle Outflow Tract Mean Pressure Gradient (***LVOT Trace***)
- Left Ventricle Outflow Tract Mean Velocity (***LVOT Trace***)
- Left Ventricle Outflow Tract Mean Square Root Velocity (***LVOT Trace***)
- Left Ventricle Outflow Tract Velocity Time Integral (***LVOT Trace***)

One time interval measurements

- Left Ventricle Heart Rate (***LVOT Trace***)
- Left Ventricle Ejection Time (***LVET***)

Mitral Valve

NOTE: When measuring the MV E/A velocity, Auto/Manual trace can be modified with the appropriate touch panel control.

One velocity flow trace measurements

- Mitral Valve Regurgitant Flow Acceleration (**MV Trace**)
- Mitral Valve Regurgitant Mean Velocity (**MV Trace**)
- Mitral Regurgitant Mean Square Root Velocity (**MR Trace**)
- Mitral Regurgitant Mean Pressure Gradient (**MR Trace**)
- Mitral Regurgitant Velocity Time Integral (**MR Trace**)
- Mitral Valve Mean Velocity (**MV Trace**)
- Mitral Valve Mean Square Root Velocity (**MV Trace**)
- Mitral Valve Velocity Time Integral (**MV Trace**)
- Mitral Valve Mean Pressure Gradient (**MV Trace**)

One peak velocity measurements

- Mitral Regurgitant Peak Pressure Gradient (**MR Vmax**)
- Mitral Valve Peak Pressure Gradient (**MV Vmax**)
- Mitral Regurgitant Peak Velocity (**MR Vmax**)
- Mitral Valve Peak Velocity (**MV Vmax**)
- Mitral Valve Velocity Peak A (**MV A Velocity**)
- Mitral Valve Velocity Peak E (**MV E Velocity**)

One slope measurements

- Mitral Valve Area according to PHT (**MV PHT**)
- Mitral Valve Flow Deceleration (**MV DecT**)
- Mitral Valve Pressure Half Time (**MV PHT**)
- Mitral Valve Flow Acceleration (**MV AccT**)

Two distance measurement

- Mitral Valve E-Peak to A-Peak Ratio (A-C and D-E) (**MV E/A Ratio**)

One time interval/slope measurements

- Mitral Valve Acceleration Time (**MV AccT**)
- Mitral Valve Deceleration Time (**MV DecT**)

One time interval measurement

- Mitral Valve Ejection Time (**M VET**)
- Mitral Valve A-Wave Duration (**MV A Dur**)
- Mitral Valve Time to Peak (**MV TTP**)
- Time

Two time interval measurement

Body surface area and stroke volume measurements:

- Stroke Volume Index by Mitral Flow (**MV Trace**)
The system calculates body surface area from the patient's height and weight.

One distance and two velocity measurement:

- Mitral Valve Area from Continuity Equation (**MV Vmax**)

Pulmonic Valve

One peak velocity measurements

- Pulmonic Insufficiency Peak Pressure Gradient (**PI Vmax**)
- Pulmonic Insufficiency End-Diastolic Pressure Gradient (**PR Trace**)
- Pulmonic Valve Peak Pressure Gradient (**PV Vmax**)
- Pulmonic End-Diastolic Pressure Gradient (**PR Trace**)
- Pulmonic Insufficiency Peak Velocity (**PR Vmax**)
- Pulmonic Insufficiency End-Diastolic Velocity (**PRend Vmax**)
- Pulmonic Valve Peak Velocity (**PV Vmax**)
- Pulmonic End-Diastolic Velocity (**PV Trace**)

One velocity flow trace measurements

- Pulmonary Artery Diastolic Pressure (**PV Trace**)
- Pulmonic Insufficiency Mean Pressure Gradient (**PR Trace**)
- Pulmonic Valve Mean Pressure Gradient (**PV Trace**)
- Pulmonic Insufficiency Mean Velocity (**PR Trace**)
- Pulmonic Insufficiency Mean Square Root Velocity (**PR Trace**)
- Pulmonic Insufficiency Velocity Time Integral (**PR Trace**)
- Pulmonic Valve Mean Velocity (**PV Trace**)
- Pulmonic Valve Mean Square Root Velocity (**PV Trace**)
- Pulmonic Valve Velocity Time Integral (**PV Trace**)

One slope measurements

- Pulmonic Insufficiency Pressure Half Time (**PR PHT**)
- Pulmonic Valve Flow Acceleration (**PV AccT**)

One time interval measurements

- Pulmonic Valve Acceleration Time (**PV AccT**)
- Pulmonic Valve Ejection Time (**PVET**)
- Pulmonic Valve Pre-Ejection Period (**PVPEP**)
- QRS complex to end of envelope (**Q-to-PV close**)
- Time

Two time intervals measurements

- Pulmonic Valve Acceleration to Ejection Time Ratio (**PV AccT, PVET**)
- Pulmonic Valve Pre-Ejection to Ejection Time Ratio (**PVPEP, PVET**)

Right Ventricle

One peak velocity measurements

- Right Ventricle Outflow Tract Peak Pressure Gradient (***RVOT Vmax***)
- Right Ventricle Systolic Pressure (***RVOT Vmax***)
- Right Ventricle Outflow Tract Peak Velocity (***RVOT Vmax***)

One velocity flow trace measurement

- Right Ventricle Diastolic Pressure (***RVOT Trace***)
- Right Ventricle Outflow Tract Velocity Time Integral (***RVOT Trace***)

One time interval measurement

- Right Ventricle Ejection Time (***PVET***)

System

One peak velocity measurements

- Pulmonary Artery Peak Velocity (***PV Vmax***)
- Pulmonary Vein Velocity Peak A (reverse) (***P Vein A***)
- Pulmonary Vein Peak Velocity
 - End-Diastolic (***P Vein D***)
 - Systolic (***P Vein S***)
- Systemic Vein Peak Velocity
 - End-Diastolic (***PDA Diastolic***)
 - Systolic (***PDA Systolic***)
- Ventricular Septal Defect Peak Velocity (***VSD Vmax***)
- Atrial Septal Defect Peak Velocity (***ASD Vmax***)

One velocity flow trace measurements

- Pulmonary Artery Velocity Time Integral (***Pulmonic VTI***)
- Systemic Vein Velocity Time Integral (***Systemic VTI***)

One time interval measurements

- Pulmonary Vein A-Wave Duration (***P Vein A Dur***)
- Time
- IsoVolumetric Relaxation Time (***IVRT***)
- IsoVolumetric Contraction Time (***IVCT***)

Two peak velocity measurements

- Pulmonary Vein S/D Ratio (***P Vein D, P Vein S***)
- Ventricular Septal Defect Peak Pressure Gradient (***VSD maxPG***)

Two velocity flow trace measurements:

- Pulmonic-to-Systemic Flow Ratio (***Qp/Qs***)

Tricuspid Valve

One peak velocity measurements

- Tricuspid Regurgitant Peak Pressure Gradient (**TR Vmax**)
- Tricuspid Valve Peak Pressure Gradient (**TV Vmax**)
- Tricuspid Regurgitant Peak Velocity (**TR Vmax**)
- Tricuspid Valve Peak Velocity (**TV Vmax**)
- Tricuspid Valve Velocity Peak A (**TV A Velocity**)
- Tricuspid Valve Velocity Peak E (**TV E Velocity**)

One velocity flow trace measurements

- Tricuspid Regurgitant Mean Pressure Gradient (**TR Trace**)
- Tricuspid Regurgitant Mean Velocity (**TR Trace**)
- Tricuspid Regurgitant Mean Square Root Velocity (**TR Trace**)
- Tricuspid Regurgitant Velocity Time Integral (**TR Trace**)
- Tricuspid Valve Mean Pressure Gradient (**TV Trace**)
- Tricuspid Valve Mean Velocity (**TV Trace**)
- Tricuspid Valve Mean Square Root Velocity (**TV Trace**)
- Tricuspid Valve Velocity Time Integral (**TV Trace**)

One time interval measurements

- Tricuspid Valve Time to Peak (**TV TTP**)
- Tricuspid Valve Closure to Opening (**TCO**)
- Tricuspid Valve A-Wave Duration (**TV A Dur**)
- QRS complex to end of envelope (**Q-to-TV close**)

One slope measurements

- Tricuspid Valve Pressure Half Time (**TV PHT**)

One velocity flow trace and one area measurement

- Stroke Volume by Tricuspid Flow (**TV SV**)

Two peak velocity measurement

- Tricuspid Valve E-Peak to A-Peak Ratio (**TV E/A Velocity**)

Color Flow Mode

Aortic Valve

One distance measurements

- Proximal Isovelocity Surface Area: Regurgitant Orifice Area (**PISA AR**)
- Proximal Isovelocity Surface Area: Radius of Aliased Point (**PISA AR**)

One velocity flow trace measurements

- Proximal Isovelocity Surface Area: Regurgitant Flow (**PISA AR**)
- Proximal Isovelocity Surface Area: Regurgitant Volume Flow (**PISA AR**)

One peak velocity measurement

- Proximal Isovelocity Surface Area: Aliased Velocity (**PISA AR**)

Mitral Valve

One distance measurements

- Proximal Isovelocity Surface Area: Regurgitant Orifice Area (**PISA MR**)
- Proximal Isovelocity Surface Area: Radius of Aliased Point (**PISA MR**)

One velocity flow trace measurements

- Proximal Isovelocity Surface Area: Regurgitant Flow (**PISA MR**)

One peak velocity measurement

- Proximal Isovelocity Surface Area: Aliased Velocity (**PISA MR**)

Cardiac Worksheet

After you make cardiac measurements, you can review all the data on the cardiac worksheet. To view the worksheet, select the **Worksheet** on the control panel.

The cardiac worksheet has a heading for each mode, and for each folder.

Height	Weight	BBA			Page 1/6	
Parameter	Value	Metho	m1	m2	m3	m4 m5
3D Dimension						
IVId	2.58cm	Avg.	2.38			
LVIDd						
LVIDd	2.13cm	Avg.	2.13			
EDV(Teich)	14.92ml		14.92			
LVPWd	1.80cm	Avg.	1.80			
IVSs						
IVSs	1.55cm	Avg.	1.55			
%IVS Thck	-40.13%		-40.13			
LVIDs						
LVIDs	2.03cm	Avg.	2.03			
ESV(Teich)	13.17ml		13.17			
EF(Teich)	11.78%		11.78			
ESV(Cube)	8.33ml		8.33			
EF(Cube)	13.78%		13.78			
%FB	4.82%		4.82			
SV(Teich)	1.76ml		1.76			
SV(Cube)	1.33ml		1.33			
LVPWs						
LVPWs	2.80cm	Avg.	2.80			
%LVPW Thck	55.05%		55.05			

Figure 10-2. Cardiac Worksheet: Page 1

If a worksheet has more data on a second page, to view the next page, select **Page Change**.

To return to scanning, select the **Worksheet** or select **Exit** or press **Esc** on the keyboard.

Worksheet information

The information on the cardiac worksheet is as follows:

- **Parameter** – This column lists the mode, the measurement folder, and the specific measurement.
- **Value** – The measured value. If more than one measurement was made for an item, the system uses the specified method (average, maximum, minimum, or last) to determine this value.
- **m1-mN** - All measurement values for each item. If you make more than six measurements, the worksheet has a scroll bar to show all values (cardiac worksheet only).
- **Method** – When there is more than one measurement for an item, this specifies the method used to calculate the measurement value listed in the Value column. Choices are average, maximum, minimum, or last. To change the method:
 - a. Move the **Trackball** to the Method field.
 - b. Press **Set**.
 - c. Move the **Trackball** to select from the list.
 - d. Press **Set**.

For more information about working with worksheets, see 'Viewing and Editing Worksheets' on page 7-55 for more information.

Setting up and Organizing Measurements and Calculations

When you receive your LOGIQ V2/LOGIQ V1 system, the studies and measurements are organized for typical work flows. If you want, you can change this set up. You can change studies, create studies, and specify which measurements and calculations are in each study. You can change the measurements that are available on the measurement summary window. The LOGIQ V2/LOGIQ V1 allows you to quickly and easily set up your system so that you can work most efficiently.

For information about how to customize studies and measurements, see 'Measurement and Calculation Setup' on page 7-11 for more information.

When you make cardiac measurements, the results you see in the Results Window and the Worksheet can vary, depending on what you have set up in the Utility screens.

Generic Study

The Cardiology B Mode Generic exam category includes the following measurements:

- Area (Trace)
- Volume
- Volume (d)
- Volume (s)
- Dist (Distance) Ratio
- Area Ratio
- R-R

The Cardiology M Mode Generic exam category includes the following measurements:

- LV Study
- LA/Ao
- RV Study
- D-E Excursion
- Slope Caliper
- Caliper
- Time
- HR
- Dd/Ds Study

The Cardiology Doppler Mode Generic exam category includes the following measurements:

- Point
- Manual Trace
- MV E/A Ratio
- PHT
- Time
- HR
- Tei Index

Cardiac Doppler Measurements

Cardiac Output (CO)

To measure CO (Cardiac Output), make a velocity measurement in the Doppler Spectrum. A FCA (Flow Cross-Sectional Area) is measured on the vessel in B-Mode. These two measurements are used to calculate SV (Stroke Volume). Finally, a HR (Heart Rate) measurement is taken in the Doppler Spectrum. SV and HR are then used to calculate cardiac output. Below take LVOT CO measurement for example.

1. Measure LVOT Diam in B Mode.
2. Measure LVOT Trace and the Heart Rate in doppler mode.

CO (Cardiac Output) is computed from the SV and HR values and is displayed.

E/e' Ratio

The ratio of early transmitral velocity to early diastolic velocity of the mitral annulus (E/e') is measured in Doppler Mode and TVD mode.

1. First, measure MV E/A Velocity to get "E".
2. Measure e'.

NOTE: The system displays "e" in place of "e'" on the menu.

3. The system calculates E/e' ratio automatically.

Tei Index

The Tei Index, $(ICT + IRT)/ET$, is calculated as $(A-B)/B$.

To calculate the Tei Index:

1. Select **Tei Index** on measurement summary window when Generic study is select in Second Menu
2. Measure A, $A = ICT + IRT + ET$
3. Measure B, $B = ET$
4. The system calculates Tei Index automatically.

The system displays A, B and Tei Index in the Result Window.

Chapter 11

Vascular

Describes how to perform Vascular measurements and calculations.

Vascular Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

Patient information must be entered before beginning an exam. See 'Scanning a New Patient' on *page 4-9 for more information*.

Any measurement can be repeated by selecting that measurement again from the menu.

Vascular Measurements

Introduction

Vascular measurements offer several different types of measurement studies:



Figure 11-1. Vascular Exam Category

- Generic – Common to all applications. See ‘Generic Measurements’ on *page 7-59 for more information.*
- Carotid
- LEA (Lower Extremity Artery)
- LEV (Lower Extremity Vein)
- TCD (Trans Cranial Doppler)
- UEA (Upper Extremity Artery)
- UEV (Upper Extremity Vein)
- Renal
- BPG (Bypass Graft)
- UEV (Upper Extremity Vein) Map
- LEV (Lower Extremity Vein) Map

Introduction (continued)

To change an exam calc:

1. Select the **Second Menu** button, the exam category menu is displayed.
2. To select another exam study, select the desired exam study folder.

A vascular study is a group of particular vessels. You can customize the vessel exam calcs in the configuration menu. See 'Measurement and Calculation Setup' on *page 7-11 for more information*.

When you use Auto Vascular calculation, you use the vessel keys to post-assign vascular calculations. When you are not using Auto Vascular calculation, the vessel key is used for manual measurement.

Naming format for vessels

When you want to measure a vessel, on the measurement window, you select the folder for the vessel. Many vessel folders are labeled with an abbreviation. The following table lists abbreviations used for naming vascular vessels.

Table 11-1: Vascular Vessel Abbreviations

Acronym	Name
ACA	Anterior Cerebral Artery
Acc RA	Accessory Renal Artery
AComA	Anterior Communicating Artery
Anast	Anastomosis
ArcA	Arcuate Artery
ATA	Anterior Tibial Artery
ATV	Anterior Tibial Vein
AVF	Arteriovenous Fistula
Axill	Axillary Artery
Axill V	Axillary Vein
BA	Basilar Artery or Brachial Artery
Bas V	Basilic Vein
BasV Antecub	Basilic Vein Antecubital Fossa
BIF IMT F/N	Bifurcation Intima Media Thickness Far/Near
Brac V	Brachial Vein
CA	Celiac Artery
CCA	Common Carotid Artery
Ceph V	Cephalic Vein
Ceph V Antecub	Cephalic Vein Antecubital
CFA	Common Femoral Artery
CFV	Common Femoral Vein
CHA	Common Hepatic Artery
Com Femoral	Common Femoral Artery
CIA	Common Iliac Artery
CIV	Common Iliac Vein

Table 11-1: Vascular Vessel Abbreviations (continued)

Acronym	Name
Com Iliac A	Common Iliac Artery
DFA	Deep Femoral Artery
DFV	Deep Femoral Vein
Dors Pedis	Dorsalis Pedis
DPA	Dorsalis Pedis Artery
ECA	External Carotid Artery
EIA	External Iliac Artery
EIV	External Iliac Vein
Fr. Branch	Frontal Branch
FV	Femoral Vein
GBWall	Gall Bladder Wall
GDA	Gastro duodenal Artery
GR	Graft
GSV	Greater Saphenous Vein
HA	Hepatic Artery
Hilar A	Hilar Artery
HV	Hepatic Vein
IIA	Internal Iliac Artery
IIV	Internal Iliac Vein
ICA	Internal Carotid Artery (Transcranial Doppler)
ICA	Interior Carotid Artery (Carotid Artery)
IJV	Internal Jugular Vein
IMA	Inferior Mesenteric Artery
IMT	Intima Media Thickness
IMV	Inferior Mesenteric Vein
Inn	Innominate
Int. Lobular A	Interlobular Artery
IVC	Inferior Vena Cava
LSV	Lesser Saphenous Vein
MCA	Middle Cerebral Artery

Table 11-1: Vascular Vessel Abbreviations (continued)

Acronym	Name
Mcub V	Median Cubital Vein
Mid Hep V	Middle Hepatic Vein
MPV	Main Portal Vein
MRA	Main Renal Artery
Par. Branch	Parietal Branch
PCA	Posterior Cerebral Artery
PComA	Posterior Communicating Artery
Peron	Peroneal
POP	Popliteal
Pseudo	False Artery (aneurysm)
PTA	Posterior Tibial Artery
PTV	Posterior Tibial Vein
PV	Portal Vein
RA	Renal or Radial Artery
RV	Renal or Radial Vein
SA	Splenic Artery
Sap Fem Junc	Sapheno-Femoral Junction
Seg. A	Segmental Artery
SFA	Superficial-Femoral Artery
SFJV	Sapheno-Femoral Junction Vein
SMA	Superior Mesenteric Artery
SMV	Superior Mesenteric Vein
SSV	Small Saphenous Vein
STA	Superficial Temporal Artery
SUBC	Subclavian Artery
SUBC V	Subclavian Vein
SV	Splenic Vein
SV Pop Junc	Small Saphenopopliteal Junction
TCD	Transcranial Doppler
TIPS	Transjugular Intrahepatic PortalSystemic Shunt

Table 11-1: Vascular Vessel Abbreviations (continued)

Acronym	Name
UA	Ulnar Artery
UV	Ulnar Vein
VERT	Vertebral Artery
VES	Vessel

B-Mode Measurements

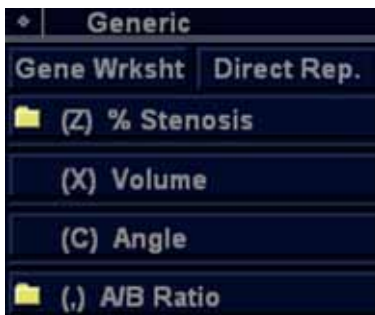


Figure 11-2. B-Mode generic measurements

NOTE: *The following instructions assume that you first scan the patient and then press **Freeze**.*

% Stenosis

See ‘% Stenosis’ on page 7-61 for more information.

Volume

See ‘Volume’ on page 7-63 for more information.

A/B Ratio

See ‘A/B Ratio’ on page 7-68 for more information.

Angle

See ‘Angle’ on page 7-67 for more information.

IMT Measurement

You can measure the average of the intima media thickness for use as the index of arterial sclerosis.

IMT can be measured both on the posterior and the anterior walls of the vessel.

NOTE: *Due to the physical properties of ultrasound imaging, the posterior IMT measurement is generally more accurate than the anterior IMT measurement.*

NOTE: *Auto IMT is optional in LOGIQ V2/LOGIQ V1.*

IMT Measurement - Auto

Auto IMT automatically measures the thickness of the Intima Media on the far and near vessel walls. Near Wall IMT is the distance between the trailing edges of the adventitia and intima; the Far Wall IMT is the distance between the leading edges of the adventitia and intima.

Set up the parameters you want to record on the worksheet on the Utility -> Measure -> M&A page while are in the Carotid application. Select Carotid -> CCA/ICA/BIF -> AutoIMT Far/ Near -> Parameter (Average, Max, Min, Standard Deviation (SD), Points, or Distance) or select Carotid -> AutoIMT Far/ Near -> Parameter (Average, Max, Min, Standard Deviation (SD), Points, or Distance).

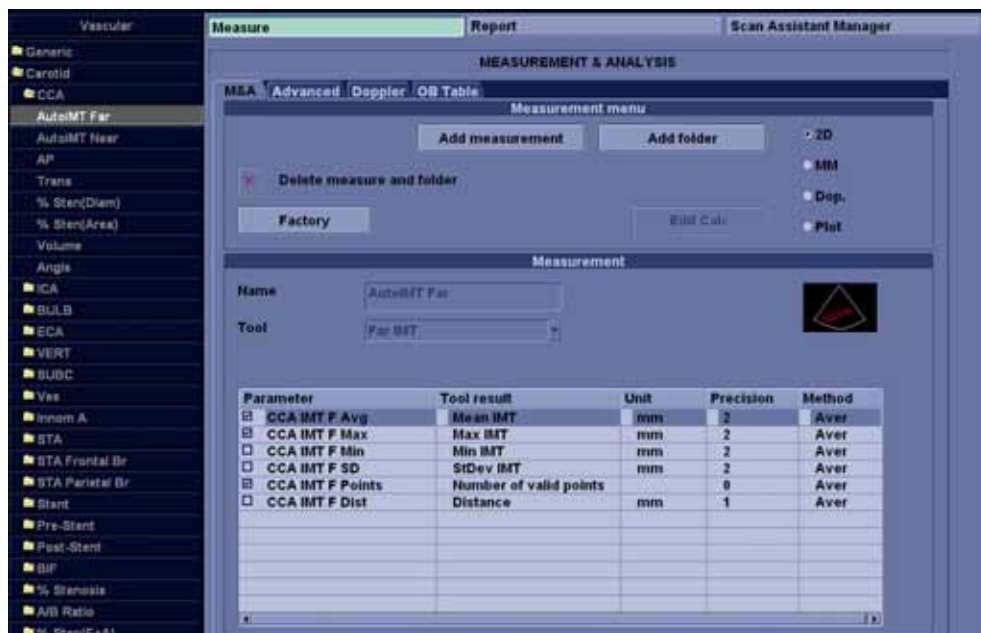


Figure 11-3. Configuring Auto IMT

IMT Measurement - Auto (continued)

In the Vascular Carotid application, the Auto IMT measurement is available.



Figure 11-4. Auto IMT menu

The following controls are available.

Table 11-2: Auto IMT description

Parameter	Description
Worksheet	Select to view the Worksheet
IMT Far	Select to begin the Far Field IMT measurement.
IMT Near	Select to begin the Near Field IMT measurement.
Length/Offset Menu	Push to save Length/Offset as a preset.
IMT Overall / IMT Intima	Adjusts (re-measures) the IMT automatically measured by the system.
Rt / Lt Side	Select Left / Right Side.
Cursor Select	Allows you to update cursor placement.

IMT Measurement - Auto (continued)

To measure the IMT,

1. In the Carotid application, press **Freeze**, press **Measure**.
2. Select the appropriate IMT measurement. For example, if measuring the IMT of the far wall of the right common carotid artery, select Rt CCA folder, and then **AutoIMT Far**.
3. Use the **Trackball** to set the length. Or use the **IMT Length / IMT Offset** control to set the length and offset distance. The Offset key controls how far away from the vertical line the measurement starts. Length is the length of the tool itself. If set to zero, you can adjust it anywhere on the image.
4. Press **Set**.

You can either adjust the trace prior to pressing the Store key or press the Store key to store the image which also saves the measurement to the Worksheet.

To adjust the trace, use the **IMT Overall/IMT Intima** control.

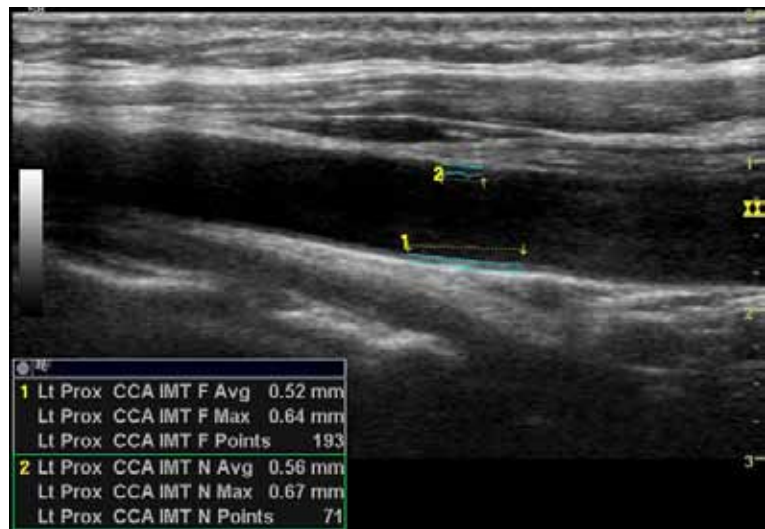


Figure 11-5. Example of Auto IMT Far Measurement

IMT Measurement - Auto (continued)

5. Position the cursor, then select **AutoIMT Near**.
6. Use the **Trackball** to set the length. Or use the **IMT Length / IMT Offset** menu to set the length and offset distance.
7. Press **Set**. “Store image to accept IMT measurement” displays in the message area. If the traces fit both layers of the wall, approve the measurement by press the Store button to store the image.

To adjust the trace prior to pressing the Store key, use the **IMT Overall/IMT Intima** menu. The measurement is saved to the Worksheet.

NOTE: *Since the IMT measurements are done semi-automatically, the operator has to approve the detection by visual inspection before storing the results in worksheet and report.*

M-Mode Measurements

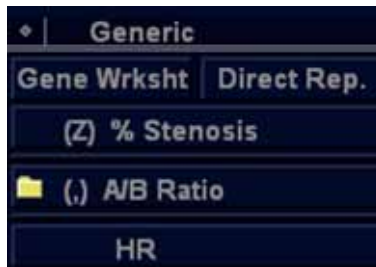


Figure 11-6. M-Mode generic measurements

NOTE: *The following instructions assume that you first scan the patient and then press **Freeze**.*

% Stenosis

See '% Stenosis' on page 7-69 for more information.

A/B Ratio

See 'A/B Ratio' on page 7-70 for more information.

Heart Rate

See 'Heart Rate' on page 7-71 for more information.

Doppler Mode Measurements

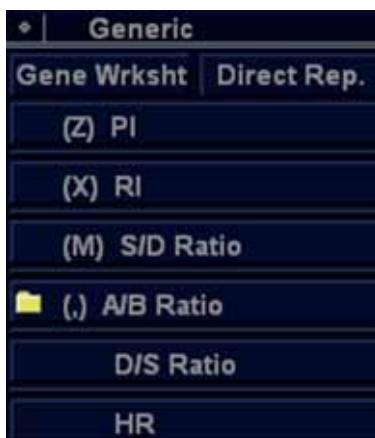


Figure 11-7. Doppler Mode generic measurements

NOTE: *The following instructions assume that you first scan the patient and then press **Freeze**.*

PI

See 'Pulsatility Index (PI)' on *page 7-73 for more information.*

RI

See 'Resistive Index (RI)' on *page 7-73 for more information.*

S/D Ratio or D/S Ratio

See 'PS/ED or ED/PS Ratio' on *page 7-74 for more information.*

A/B Ratio

See 'A/B Ratio' on *page 7-75 for more information.*

Heart Rate

See 'Heart Rate' on *page 7-74 for more information.*

Auto Vascular Calculation

Auto Vascular Calculation Overview

Auto Vascular Calculation enables the LOGIQ V2/LOGIQ V1 to detect and identify a cardiac cycle. It allows you to assign measurements and calculations during live timeline imaging, while the image is frozen, or in CINE. Peak values are detected for venous flow.

During cardiac cycle detection, the system identifies the cardiac cycle using calipers, vertical bars, and/or highlighting of timeline data. Use of identifiers is based on measurements and calculations selected by an operator for the current application. The system may place calipers at early systolic peak, peak systole, minimum diastole and end diastole. Vertical bars may also be placed to indicate the beginning and end of the cardiac cycle. The peak and/or mean trace may be highlighted. You can edit the cardiac cycle identified by the system or select a different cardiac cycle.

You can select the calculations to be displayed in the M&A Result window during live scanning or on a frozen image. These calculations are displayed at the top of M&A Result Window located adjacent to the image. These calculations are presettable by application which means you can set up the default calculations to be displayed for each application.

Auto Vascular Calculation

Activating Auto Vascular Calculation

To activate Auto Vascular Calculation, select **Live** (calculations displayed on the real-time image) or **Freeze** (calculations displayed on the frozen image) under **Auto Calc** in Second Menu.

To deactivate Auto Vascular calculation, select **Off**.

Setting up Auto Vascular Calculation Parameters

- **Selecting Auto Trace**

You can select to have a continuous auto trace of the max or mean velocities.

- Select **Max** or **Mean** from **Trace Method** on the menu area.

- **Selecting Trace Detection**

Trace Detection lets you use peak timeline data above, below, or composite (above and below) the baseline.

- Select Above, Below, or Both to set the peak timeline data.

- **Modify Calculation**

- a. Select **Second Menu** in measurement screen.
The Modify Calculation menu is displayed.
- b. Select which measurements and calculations are to be displayed in the Auto Vascular calculation window.

You can select the following parameter: PS, ED, MD, HR, TAMAX, TAMEAN, PI, RI, Accel, PS/ED, ED/PS, AT, Volume Flow, PV.

Auto Vascular Calculation (continued)

Auto Vascular Calculation Exam

1. Preset the system.
2. Perform the scan and press **Freeze**.
3. Activate Auto Vascular Calculation.

The system performs a calculation automatically.

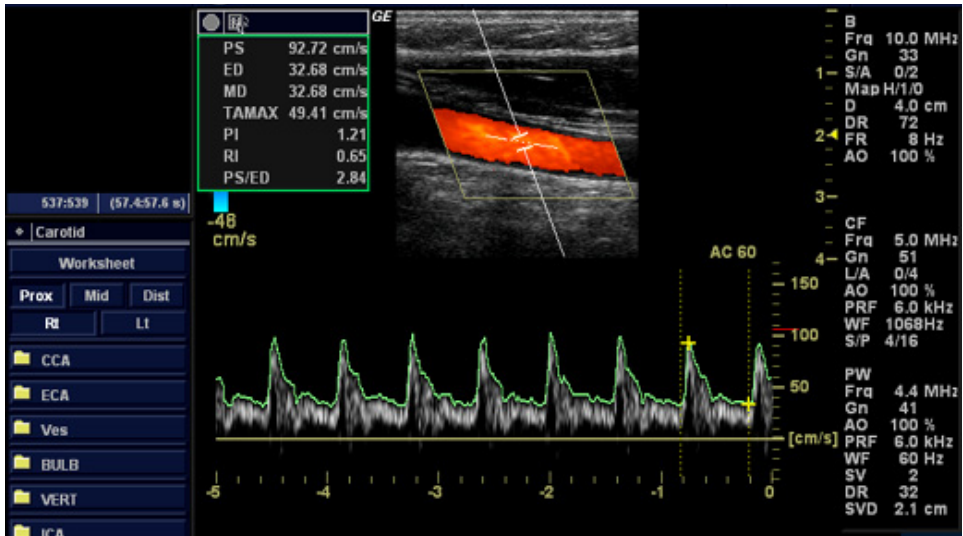


Figure 11-8. Auto Vascular Calculation

Auto Vascular Calculation Exam (continued)

The Auto Vascular calculation is assigned to particular vessel measurements.

1. Press **Measure** to display the Measurement menu.
2. Select the location of the vessel (Prox, Mid, or Dist) and Side (Right or Left).
3. Select the desired vessel name from the menu.

Selected vessel measurements are automatically assigned with the Auto Vascular calculation. The results are then displayed in the Results Window.

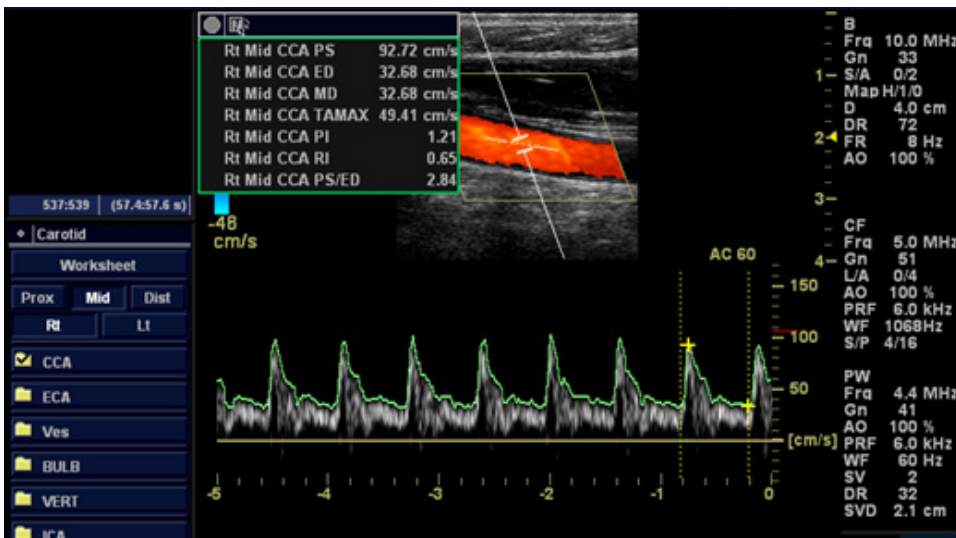


Figure 11-9. Assigned Vessel

NOTE: When you want to cancel the assignment, you can use the **Cancel Transfer**.

Auto Vascular Calculation (continued)

During the course of an exam, the cardiac cycle may be indicated between two yellow bars; the peak trace and the mean trace may appear in green; calculation indicators appear on the spectral trace as a caliper identifier (these vary, depending on the selected calculation in the Results Window).

The right-most, most complete cycle is typically chosen to be the selected cardiac cycle. You can select a different cardiac cycle.

To select a different cardiac cycle:

- Move through CINE memory with the Trackball until the desired cardiac cycle is selected by the system.

NOTE: You need several good cycles in front of the new cardiac cycle for this to be successful. Oftentimes, this is problematic near a freeze bar.

NOTE: You need several good cycles in front of the new cardiac cycle for this to be successful. Oftentimes, this is problematic near a freeze bar.

To move the systole or diastole position:

- Use the **Cursor Select** control to move the start systole position or the end diastole position.

Manual Vascular Calculation

You can perform the following calculations manually when Auto Doppler Calculation is not activated.

1. Press **Measure**.
If necessary, you can select another Exam Calc and then select parameters from Modify Calculation.
2. Select the location of the vessel (Prox, Mid, or Dist) and Side (Right or Left).
3. Select the desired vessel folder.
The Measurement menu is displayed.
4. Make the required measurements according to the system, or select your preferred measurements.

For each vessel in Doppler mode, you can make any of the following measurements. See 'Doppler Mode Measurements' on *page 7-72 for more information.*:

- Peak Systole (PS)
- End Diastole (ED)
- Minimum Diastole (MD)
- Heart Rate
- TAMAX
- TAMEAN
- Pulsatility Index (PI)
- Resistive Index (RI)
- S/D Ratio
- D/S Ratio
- Acceleration (Accel)
- Acceleration Time (AT)
- Volume Flow
- Peak Value (PV)

Vascular Worksheet

The vascular worksheet is structured to automatically display vascular measurements made at specific anatomical sites. The worksheet can also display an average, last, maximum, or minimum value of the latest three measurements. Calculated ratios are automatically summarized and displayed.

To view the Vascular Worksheet

1. Press **Measure**.
2. Select **Worksheet**.

The system displays the worksheet.

	Right			Left				
	1	2	3	Method	1	2	3	Method
Prox CCA								
CCA AP (cm)	0.04	0.48		*				
CCA Angle (deg)	48.75			Max.				
Prox Ves								
Ves dv1 (cm)	0.42	0.53		*				
Ves dv2 (cm)		0.44		*				
Ves dv3 (cm)				*				
Ves Vol (ml)	0.04	0.05		*				
Ves Angle (deg)	33.09			Max.				
Ves								
PS (cm/s)		8.7	8.1	Max.				
ED (cm/s)		4.8		*				
AC (deg)	8	0	0	*				

Figure 11-10. Vascular Worksheet - Example

Only measured parameters are displayed. Location information is labeled with vessel name first. Measured parameters of the vessel are grouped under the vessel label.

Selected value by method is highlighted, however, when the average method is selected, the highlighted cursor is removed. When an entire vessel measurement does not have sides (left or right), the side label is not displayed in that vessel study worksheet.



HINTS

Some fields on the worksheet are view only, and others you can change or select. To easily see which fields you can change or select, move the **Trackball**. As the cursor moves over a field that you can change or select, the field is highlighted.

Worksheet Display

1. **Vessel Worksheet:** Select this key to display the Vessel Worksheet when the Vessel Summary is displayed.
2. **Vessel Summary:** Select this key to display the Vessel Summary when the Vessel Worksheet is displayed.
3. **Examiner's Comment:** Select this key to display the Examiner's comment window. See 'To edit a worksheet' on *page 7-57 for more information*.
4. **Generic:** Select this key to display the Generic Worksheet. Generic study measurements/calculations, such as volume and velocity, are displayed on this worksheet.
5. **Delete Value:** Use to delete a value (each measurement value). See 'To edit a worksheet' on *page 11-24 for more information*.
6. **Exclude Value:** Use to exclude a value from the result line. See 'To edit a worksheet' on *page 11-24 for more information*.
7. **Intravessel Ratio:** Select this key to display the Intravessel Ratio Calculation window. See 'Intravessel ratio' on *page 11-28 for more information*.
8. **Page Change:** If a worksheet has more data, to view the next page, adjust the Page Change.

To edit a worksheet

To change data on a worksheet:

1. Select **Worksheet** from any page of the Vascular Calculation.
2. To position the cursor at the field you want to change, move the **Trackball**.

The field is highlighted. Press **Set**.

3. Type the new data in the field and move the cursor to another place. Press **Set**. The new data is displayed in blue and asterisk are appended to value and resultant value to indicate that it was manually entered.

The average measurements, calculations and ratios are automatically updated to reflect the edited values.

Prox CCA	Right			Method	Left	
	1	2	3		1	2
PS (cm/s)	51.92	40.00*	42.36	^	39.18	
ED (cm/s)	13.70	10.51	9.87	^	9.24	
TAMAX (cm/s)	23.96	19.92	19.39	^	17.35	
PI	1.60	1.48*	1.68	^	1.73	
RI	0.74	0.74*	0.77	^	0.76	
AC (deg)	0	0*	0	^	0	

Figure 11-11. Display of the edited value

NOTE: *If the user moves the cursor to the edited value and presses the **Set** key once, the value returns to the original value before the edit.*

To edit a worksheet (continued)

To delete data:

1. Select **Worksheet** from any page of the Vascular Calculation menu.
2. To position the cursor at the field you want to delete, move the **Trackball**.
The field is highlighted.
3. Select **Delete Value**.

For Example:

1. If the user measured RI 4 times, however, latest 3 sets of measurements were displayed in the worksheet.

Table 11-3: Example of Latest Measurements in Worksheet

Result Number	#2	#3	#4
PS	0.500	0.600	0.700
ED	0.100	0.200	0.300
RI	0.800	0.667	0.571

1. Then, the user deleted PS value of #3 from the worksheet.
2. The whole set of #3 measurements is deleted from the worksheet and #1 set of measurements is shifted and displayed as below.

Table 11-4: Example of Worksheet after Value Deleted

Result Number	#1	#2	#4
PS	0.400	0.500	0.700
ED	0.000	0.100	0.300
RI	1.000	0.800	0.571

To edit a worksheet (continued)

To exclude data:

When the user selects a particular value on the Worksheet and selects **Exclude Value**, this value is excluded from result line and resultant value is re-calculated without this value and also calculation values using this value is 'blank'.

1. Select **Worksheet** from any page of the Vascular Calculation menu.
2. To position the cursor at the field you want to exclude, move the **Trackball**.

The field is highlighted.

3. Select **Exclude Value**.
4. The data in the field is not visible and is not included in worksheet calculations as below.
5. To include a value that you previously excluded, select **Exclude Value** again.

Prox CCA	Right			Method	Left	
	1	2	3		1	2
PS (cm/s)	51.92	45.55	42.36	Max.	39.18	
ED (cm/s)	13.70	10.51	9.87	*	9.24	
TAMAX (cm/s)	23.96	19.92	19.39	*	17.35	
PI	1.60	1.76	1.68	*	1.73	
RI	0.74	0.77	0.77	*	0.76	
AC (deg)	0	0	0	*	0	

Figure 11-12. Display of the excluded value

The user can select the method for calculating the cumulative value.

This value is only calculated by using displaying values. If the user takes parameters more than 3 times, the last 3 values are used for this calculation.

To select the method:

1. Move cursor to method column and press **Set**.
2. The pull-down menu is displayed. Move to cursor any one of methods and press **Set**. The selected method is displayed in the column.

Prox CCA	Right			Method	1
	1	2	3		
PS (cm/s)	51.92	45.55	42.36	*	39.18
ED (cm/s)	13.70	10.51	9.87	Avg.	9.24
TAMAX (cm/s)	23.96	19.92	19.39	Max.	17.35
PI	1.60	1.76	1.68	Min.	1.73
RI	0.74	0.77	0.77	Last	0.76
AC (deg)	0	0	0	*	0

Figure 11-13. Pop-up menu of methods

Examiner's Comments

To type a comment on a worksheet:

1. Select **Exam's Comments**.
The Examiner's Comments window opens.
2. Type comments about the exam.
3. To close the Examiner's Comments window, select **Exam's Comments**. The comments appear on the report.

Prox CCA	Right				Left			
	1	2	3	Method	1	2	3	Method
PS (cm/s)	51.92	45.55	42.36	Last	39.18			*
ED (cm/s)	13.70	10.51	9.87	*	9.24			Last
TAMAX (cm/s)	23.96	19.02	19.39	*	17.35			*
PI	1.60	1.76	1.68	*	1.73			*
Ri	0.74	0.77	0.77	*	0.76			*
AC (deg)	0	0	0	*	0			*

Examiner's Comments

Figure 11-14. Examiner's comments field

Intravessel ratio

To calculate Intravessel ratio, you need a measurement of assessing pressure and stenotic velocities.

1. Select **Intrav. Ratio** to display the pop-up window in the header section of the worksheet.

Intravessel Ratio:		Save result: 51.92 / 13.70 = 3.79		Clear	Save	Cancel		
Prox CCA	1	2	3	Method	1	2	3	Method
PS (cm/s)	51.92	45.55	42.36	Last	39.18			*
ED (cm/s)	13.70	18.51	9.87	*	9.24			Last
TAMAX (cm/s)	23.96	19.92	19.39	*	17.35			*
PI	1.80	1.76	1.68	*	1.73			*
RI	0.74	0.77	0.77	*	0.76			*
AC (deg)	0	0	0	*	0			*

Figure 11-15. Intravessel Pop-up Window

2. Select the first velocity.
The value is displayed in the window.

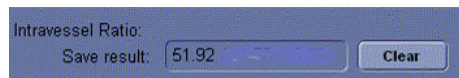


Figure 11-16. Intravessel ratio one

3. Select the second velocity.
The second value and Result value are displayed in the window.

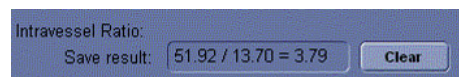


Figure 11-17. Intravessel ratio two

- To save the Intravessel ratio to the Vessel Summary, move the cursor to **Save** and press **Set**.
- To clear values, move the cursor to **Clear** and press **Set**.
- To cancel and exit Intravessel ratio, move the cursor to **Cancel** and press **Set**.

NOTE: *Intravessel Ratio is only displayed and saved in the Vessel Summary as Intra-Ratio.*

Vessel Summary

The Vessel Summary is designed to automatically display measurements made at specific anatomical sites. Calculated ratios are automatically summarized and displayed.

The Vessel Summary can be displayed at any time during the exam by selecting **Vessel Summary** from the Vascular Worksheet menu.

The screenshot shows a dark blue interface. On the left, a vertical menu lists options: Carotid, LEA, LEV, TCD, UEA, UEV, Ranaid, Bypass Graft, UEV Map, and LEV Map. The 'Carotid' option is highlighted. To the right, a table displays flow measurements for three vessels: Prox CCA, Dist CCA, and Prox ECA. The table has columns for PS, Right ED, AC, Left PS, ED, and AC.

	PS	Right ED	AC	Left PS	ED	AC
Prox CCA	23.6cm/s	12.3cm/s	9deg			
Dist CCA	8.9cm/s	39.4cm/s	9deg			
Prox ECA	2.8cm/s		9deg			

Figure 11-18. Vessel Summary - Example

Vessel Summary (continued)

1. The first row, indicating Right or Left, is not displayed when the side is not defined in the vessel. In the third column on the second line, you select the calculations. Move the cursor to the third column, and the pop-up menu is displayed. The selected parameter is displayed in every third column.

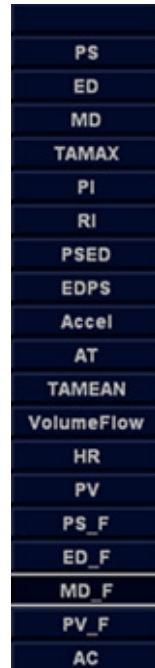


Figure 11-19. Pop-up menu

2. Vessel Name with location information.
3. Check Box. Use to select the vessel velocity for calculating the vessel ratio (ex. ICA/CCA). You can only select one location (position) in a vessel.
4. Result value column. This value cannot be changed or excluded from this page.
5. Calculation name and result. ICA/CCA: The ICA/CCA ratio selects the highest systolic ICA and CCA velocities when calculating this ratio, and displays the velocities.

Carotid Study

In the configuration page for ICA/CCA ratio, you can specify which portion of the CCA vessel (Prox, mid, distal) is chosen. You can override the selections on the Vessel summary.

The ICA/CCA ratio is able to be configured for either systole or diastole.

The vertebral vessel also has systole and diastole selections. In the summary page, there is a box to select flow reversal for vertebral flows. The choices are Ante (Antegrade), Retr (Retrograde), and Abs (Absent).

To select the method:

Move cursor to the box and press **Set**. After the pop-up menu (Blank, Ante, Retr, Abs) is displayed, select from a menu of choices. The selected choice is displayed in the column.

The box is independent of Left and Right.

Renal Artery Study

For renal arteries, you can calculate RENAL/AORTIC ratio (RAR) based on peak systolic velocities.

You can combine the two renal summary pages, and have a heading to separate the different measurements (main renal, intra renal). You can scroll between the measurements. The most commonly used, the main renal artery, is the default.

Lower Extremity Artery Study

For the lower extremity artery, you need an intra vessel ratio (assessing pre vs. stenotic velocities). You can specify which (ratio is stenotic/pre).

The intra-vessel ratio needs to be available for all vascular measurements. This appears on the worksheet only if used.

Recording Worksheet

The worksheet can be saved as you would any ultrasound image. Once it is displayed on the screen, it can be recorded on the DVR, printed on the B/W printer, stored on media with the Image Archive option.

Chapter 12

Urology

Describes how to perform Urology measurements and calculations.

Urology Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Beginning an Exam' on *page 4-2 for more information*.

Any measurement can be repeated by selecting that measurement again.

The system retains all measurements, but the worksheet retains only the last six measurements of each type.

Urology Calculations

Introduction

Urology measurements offer three different types of measurement studies:

- Generic—Common to all applications. See ‘Generic Measurements’ on *page 7-59 for more information.*
- Urology
 - This chapter describes Urology B-Mode measurements.
 - The Urology M-Mode measurements are common to other applications. See ‘M-Mode Measurements’ on *page 7-69 for more information.*
 - The Urology Doppler measurements are common to other applications. See ‘Doppler Mode Measurements’ on *page 7-72 for more information.*
- Pelvic Floor. See ‘Pelvic Floor Measurements’ on *page 12-10 for more information.*

To change a study:

1. Select the **Second Menu**, the Urology exam category menu is displayed.
2. To select another study, select the desired study.

Urology B-Mode Measurements

In B-Mode, the Generic Exam Calcs for Urology includes the following measurements:

- % Stenosis
- Volume
- Angle
- A/B Ratio

See 'B-Mode Measurements' on page 7-61 for more information.

The following measurements are located specifically in the Urology Exam Calcs. Those specific measurements (Bladder Volume, Prostate Volume and Renal Volume) are listed on the following pages.

Select **Second Menu**. The following category is displayed.



Figure 12-1. Urology Exam Calcs B-Mode

NOTE: *Bladder(0.7) Vol, Bladder Vol, Post Void Vol, Prostate Vol, Renal Vol, Renal (0.49) Vol and Volume can be displayed if preset at the Utility -> Measure screen.*

Bladder Volume

This calculation uses a standard distance measurement. Length is typically measured in the sagittal plane. Width and height are measured in the axial plane.

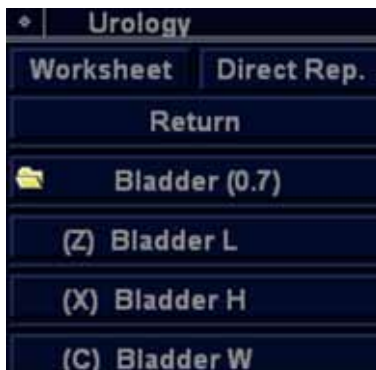


Figure 12-2. Bladder Volume

To measure Bladder Volume:

1. Scan the patient in the appropriate scan plane.
2. Select the **Bladder** folder, an active caliper displays.
3. Perform a standard distance measurement.
The system displays the distance value in the Results Window.
4. Perform the second and third distance measurements.
After you complete the third distance measurement, the system displays the bladder volume in the Results Window.

Prostate Volume

This calculation uses a standard distance measurement. Length is typically measured in the sagittal plane. Width and height are measured in the axial plane.

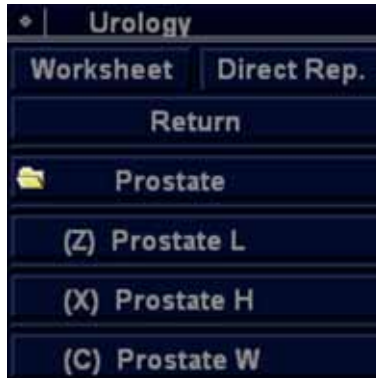


Figure 12-3. Prostate Volume

To measure Prostate Volume:

1. Scan the patient in the appropriate scan plane.
2. Select the **Prostate** folder, an active caliper displays.
3. Perform a standard distance measurement.
The system displays the distance value in the Results Window.
4. Perform the second and third distance measurements.
After you complete the third distance measurement, the system displays the prostate volume in the Results Window.

Prostate Volume (continued)

PSA Measurement

If you enter the value of PSA (Prostatic Specific Antigen) and PPSA Coefficient at the Urology Patient screen, PSAD and PPSA are automatically calculated.

The values are displayed on the Worksheet and Report (if set appropriately on the Report Designer page).

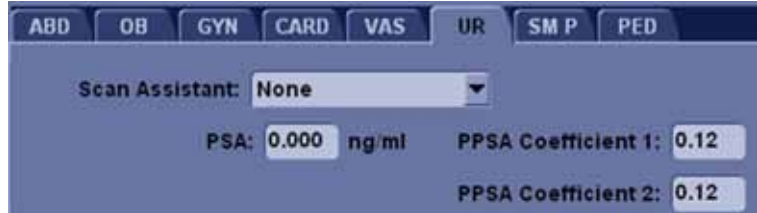


Figure 12-4. Urology Patient Screen

1	Prostate L	1.16 cm
2	Prostate H	1.01 cm
3	Prostate W	2.48 cm
	Prostate Vol	1.52 ml
	PSAD	0.00
	PPSA(1)	0.18
	PPSA(2)	0.18

Figure 12-5. Measurement result window

PSAD: Prostatic Specific Antigen (PSA) Density – defined as:
 $PSAD = PSA/Volume$

PPSA: Predicted Prostate Specific Antigen – defined as: $PPSA = Volume \times PPSA \text{ Coefficient}$

Prostate Volume (continued)

Worksheet

- For the prostate volume calculation, you can select the method “m1, m2...” in addition to Avg., Max., Min. and Last.
- The value of PSA and PPSA are displayed.

PSA 0.000ng/ml	PPSA Coef(1) 0.12	PPSA Coef(2) 0.12	Page 1/1					
Parameter	Value	m1	m2	m3	m4	m5	m6	Method
B Mode Measurements								
Prostate L	1.45 cm	1.16	1.58	1.61				Avg.
Prostate H	1.30 cm	1.01	1.16	1.74				Avg.
Prostate W	1.54 cm	2.48	1.07	1.08				Avg.
Prostate Vol	1.53 ml	1.52	1.02	1.55				
PSAD	0.00	0.00	0.00	0.00				
PPSA(1)	0.18	0.18	0.12	0.19				
PPSA(2)	0.18	0.18	0.12	0.19				

Figure 12-6. Urology Worksheet

Renal Volume

This calculation uses a standard distance measurement. Length is typically measured in the sagittal plane. Width and height are measured in the axial plane.

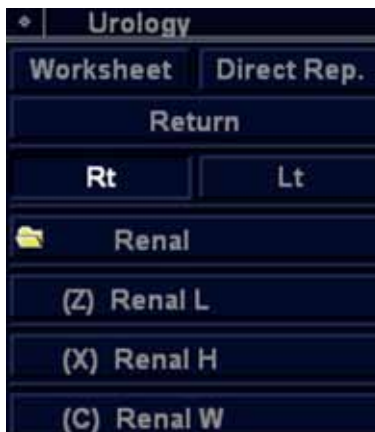


Figure 12-7. Renal Volume

To measure Renal Volume:

1. Scan the patient in the appropriate scan plane.
2. Select **Side**.
3. Select the **Renal** folder, an active caliper displays.
4. Perform a standard distance measurement:
The system displays the distance value in the Results Window.
5. Perform the second and third distance measurements.
After you complete the third distance measurement, the system displays the renal volume in the Results Window.

Pelvic Floor Measurements

Pelvic floor measurements can be performed in the Pelvic Floor study. The measurements are located in the Exam Calc folder in the Urology preset.



Figure 12-8. Pelvic Floor Measurements

BN (Bladder Neck) Rest

Obtain an image with the patient at rest (relaxed).

1. Create a straight line (zero or baseline) to line up with the inferior/posterior of symphysis pubis bone.
2. Once the baseline is positioned, a caliper appears. Position the caliper at the anterior margin of the bladder neck. A positive number displays since the caliper is placed below the baseline.
3. A distance is calculated in millimeters.

Pelvic Floor Measurements (continued)

BN (Bladder Neck) Stress

Obtain an image after the patient performs the Valsalva maneuver.

1. Create a straight line (zero or baseline) to line up with the inferior/posterior of symphysis pubis bone.
2. Once the baseline is positioned, a caliper appears. Position the caliper at the anterior margin of the bladder neck.

If the bladder neck is below the baseline, the Bladder Neck Stress is a positive number. If the bladder neck is above the baseline (closer to the transducer face), the number is negative.

Bladder Neck Descent (BND)

The Bladder Neck Descent is a calculation that should be calculated after measuring the Bladder Neck Rest and Bladder Neck Stress.

$BND = \text{Bladder Neck Rest} - \text{Bladder Neck Stress}$

NOTE: If the Bladder Neck Stress is a negative number, it becomes positive and is added to the bladder neck rest measurement.

DWT (Detrusor Wall Thickening)

Three distance measurements of the bladder wall dome are calculated into a mean dimension and displayed in millimeters.

UT (Uterine) Descent Max

1. Create a straight line (zero or baseline) to line up with the inferior/posterior margin of symphysis pubis bone.
2. Measure using a 2-caliper dimension to the inferior position of the uterus in a stress image and display in millimeters

Pelvic Floor Measurements (continued)

Rect Amp Des Max (Rectal Ampulla Descent Max)

1. Create a straight line (zero or baseline) to line up with the inferior/posterior margin of symphysis pubis bone.
2. Measure using a 2-caliper dimension to the inferior position of the rectal ampulla in a stress image and displayed in millimeters

Rectocele (Depth and Width)

Two 2-caliper diameter measurements to measure depth and width of the rectocele. Displayed in millimeters.

Lev Hiat Stress (Levator Hiatus Stress)

Two 2-caliper diameter measurements and calculate an area displayed as cm squared.

Residual Urine

Two 2-caliper diameter measurements calculate as:

(x) times (y) times 5.9 minus 14.9 equals Residual Volume displayed in ml.

Chapter 13

Pediatrics

Describes how to perform Pediatrics measurements and calculations.

Pediatrics Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Beginning an Exam' on *page 4-2 for more information*.

Any measurement can be repeated by selecting that measurement again.

The system retains all measurements, but the worksheet retains only the last six measurements of each type.

The six worksheet measurements can be averaged and the average used in other calculations.

Pediatrics Calculations

Overview

Pediatrics measurements offer two different types of measurement studies:

- Generic. The Generic Calculations study is common to all applications. See 'Generic Measurements' on *page 7-59 for more information*.
- Pediatric Hip (PedHip).
 - This chapter describes Pediatrics B-Mode measurements.
 - The Pediatrics M-Mode measurements are common to other applications. See 'M-Mode Measurements' on *page 7-69 for more information*.
 - The Pediatrics Doppler measurements are common to other applications. See 'Doppler Mode Measurements' on *page 7-72 for more information*.



Figure 13-1. Pediatrics Exam Category

Ped Hip

B-Mode Measurements



Figure 13-2. Pediatrics B-Mode Measurement

The following generic measurements are common to other exam applications:

- %Stenosis
- Volume
- Angle
- A/B Ratio

See 'B-Mode Measurements' on *page 7-61* for more information.

Hip Dysplasia Measurement

The HIP calculation assists in assessing the development of the infant hip. In this calculation, three straight lines are superimposed on the image and aligned with the anatomical features. The two angles are computed, displayed, and can be used by the physician in making a diagnosis.

The three lines are:¹

1. The baseline connects the osseous acetabulum convexity to the point where the joint capsule and the perichondrium unite with the iliac bone.
2. The inclination line connects the osseous convexity to labrum acetabulare.
3. The Acetabulum roof line connects the lower edge of the osilium to the osseous convexity.

The α (Alpha) angle is the supplement of the angle between 1 and 3. It characterizes the osseous convexity. The β (Beta) angle is the angle between lines 1 and 2. It characterizes the bone supplementing additional roofing by the cartilaginous convexity.

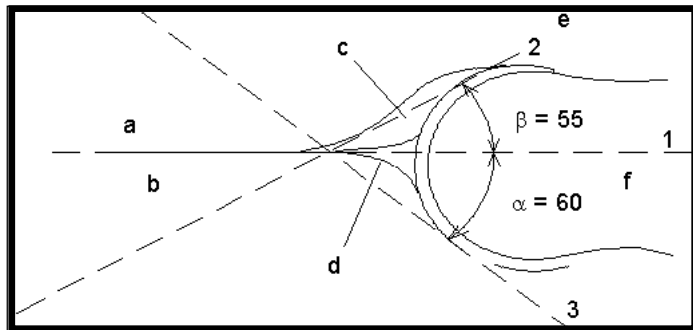


Figure 13-3. Hip Dysplasia

Anatomical Landmarks	
a. Ilium	d. Bony Roof
b. Iliac Bone	e. Cartilaginous acetabular roof
c. Labrum	f. Femoral Head

¹Source: R GRAF, journal of Pediatric Orthopedics, 4: 735-740(1984)

HIP (BA)

To make a Hip Dysplasia measurement:

1. Select either the **right** or **left side** (orientation) and then select **HIP (BA)**.

A horizontal dotted line displays.

2. To place the baseline, move the **Trackball**. Position the crosshairs edge at the osseous convexity of the ilium.
3. To rotate or change inclination, adjust the **Ellipse** control.
4. To fix the baseline, press **Set**.

The system displays a second dotted line at an angle.

5. To place the line along the inclination line of the osseous convexity to labrum acetabulare, move the **Trackball**.
6. To rotate or change inclination, adjust the **Ellipse** control.
7. To fix the second measurement line, press **Set**.

The system displays a third dotted line at an angle.

8. To place the caliper along the acetabular roof line, move the **Trackball**.
9. To rotate or change inclination, adjust the **Ellipse** control.
10. To fix the third measurement line and complete measurement, press **Set**.

The system displays the hip measurements (α and β) in the Results Window.

HIP (A) (Alpha HIP)

The Alpha HIP measurement measures the angle between the iliac baseline and the bony roof line. To make an Alpha HIP measurement:

1. Select either the **right** or **left side** (orientation) and then select **HIP (A)**.

A horizontal dotted line displays.

2. To place the baseline, move the **Trackball**. Position the crosshairs edge at the osseous convexity of the ilium.
3. To rotate or change inclination, adjust the **Ellipse** control.
4. To fix the baseline, press **Set**.

The system displays a second dotted line at an angle.

5. To place the caliper along the acetabular roof line, move the **Trackball**.
6. To rotate or change inclination, adjust the **Ellipse** control.
7. To fix the second measurement line, press **Set**.

The system displays the alpha hip measurement (α) in the Results Window.

d:D Ratio Measurement

The d:D Ratio measurement measures the percentage of the femoral head coverage under the bony roof. To make this measurement:

1. Select either the **right** or **left side** (orientation) and then select **d:D Ratio**.
A horizontal dotted line displays.
2. Use the **Trackball** to place the baseline along the ilium. Position the crosshairs edge at the osseous convexity of the ilium.
3. Use the **Ellipse** control to adjust or change inclination.
4. Press **Set** to fix the baseline.
5. The system displays a circle representing the femoral head. Use the **Trackball** to position the circle.
6. Use the **Ellipse** control to size the femoral head circumference.
7. Press **Set** to fix the femoral head circumference.

The system displays the d:D ratio for the femoral head in the Results Window.

Chapter 14

ReportWriter

Describes how to generate reports.

Standard Report Pages

Introduction

The LOGIQ V2/LOGIQ V1 enables the generation of patient reports based on the examination performed and the analyses that were made during the exam. The reports are generated using the data stored in the system with pre-selected templates.

You may edit a report while performing the exam; customize, delete, or add measurements; and save changes until you use the Store command. Once Stored, the reports are read-only.

It is recommended that the data be saved often, and then carefully reviewed before the report is Stored. Use the worksheet to facilitate the review and adjust data before storing a report. The final report can be printed on a standard printer.

Creating a report

Reports summarize the data obtained in the examination. They can contain data, images, and cine loops.

Once generated, the report can be viewed, images can be added, and the patient's personal data can be modified. The examination data itself CANNOT be changed.

Activating the Report

1. Select **Report** on the keyboard.
2. The system displays the default report for the current application on the monitor.

The information entered during the examination is automatically filled in the appropriate fields (e.g. demographic, diagnosis, comments).

The preview image appears when the cursor is over the clipboard image.

NOTE: *The template is the skeleton of your report. It is composed of different objects that can be customized by the user.*

3. Adjust the **Page Change** control to move down the page.

The screenshot shows a software interface for a medical report. The top left features the GE Medical Systems logo. The top right contains fields for hospital information: Hospital name, Address, City, State Zip code, and Phone. The main section is titled 'Patient Information' and includes fields for Name, Birthdate, Operator: ADM, Patient ID: 150616-104029, Ref.Physician, Date: 2015/05/16, and Perf.Physician. Below this are fields for Indications: and Comments:. The next section is 'Measurements', which includes a 'Doppler' section. The Doppler section contains a table with columns 'Right' and 'Left', and rows 'PS' and 'ED'. At the bottom of the interface is a navigation bar with buttons for 'Report', 'Page Change', 'Save As', 'Designer', 'Template', 'Store', and a '1/3' indicator.

Figure 14-1. Report Page Example

Activating the Report (continued)

Table 14-1: Report Button Controls

Button	Description
Save As	Exports the report page to storage media as CHM or PDF format.
Designer	Accesses template editor screen.
Template	Selects template from the list of selected applications.
Store	Stores the report page into Archive as CHM* file.
Retrieve	Retrieves the report page from Archive. Stored Date/Time is appended to the name of stored report.
Print	Prints out the report to the default printer.
Delete	Deletes the report page from Archive.
Worksheet	Accesses Worksheet Page.
Graph	Accesses OB Graph page (applies only to OB).
Anatomical Page	Accesses Anatomical Survey page (applies only to OB).
*CHM is a compressed HTML help file.	

Selecting another template

You can select another template for the current patient:

1. Select **TEMPLATE** at the bottom of the monitor display.
2. A list of available templates and exam categories displays.

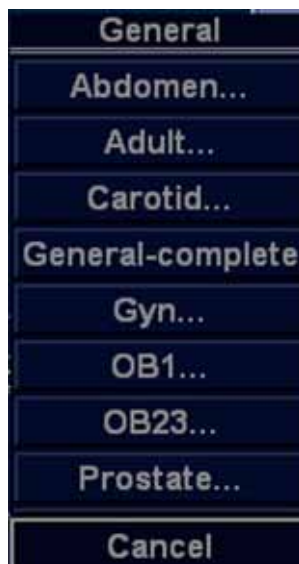


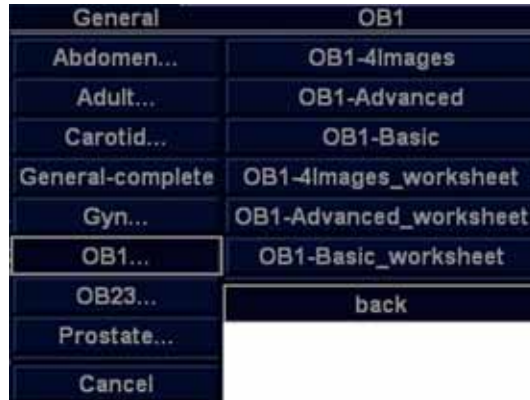
Figure 14-2. Application List Example

Selecting another template (continued)

3. Select the desired template using the **Trackball** and press **Set**.

The selected template displays on the monitor.

NOTE: If you select another exam category, the template list of the selected category displays. Select the desired template.



General	OB1
Abdomen...	OB1-4Images
Adult...	OB1-Advanced
Carotid...	OB1-Basic
General-complete	OB1-4Images_worksheet
Gyn...	OB1-Advanced_worksheet
OB1...	OB1-Basic_worksheet
OB23...	back
Prostate...	
Cancel	

Figure 14-3. Available Template list

4. Select the desired template name and press **Set**.
5. The report changes to the selected template.

Factory Templates

The system has factory templates for each application. You can modify these templates or create user-defined templates. You need to save revised/new templates with unique names.

A template may include one or more of the following:

- Measurements
- Worksheet or Vessel Summary Images
- Anatomical Surveys or Biophysical Profiles
- Anatomical Graphics
- Graphs
- Images areas
- Score Boxes

NOTE: Additional factory templates can be added from the Utility-->Reports menu (OB for multiple gestation, Renal, etc.).

Editing a Report

Entering the hospital address

When using a factory template, the area for the hospital information is usually placed in the upper portion of the report.

To make a new area, See 'Fixed Text' on *page 14-45 for more information.*

To modify the factory template:

1. Select **Report** on the keyboard.
2. Select **Designer**.
3. Double-click on the area for the hospital information in the template. The Fixed Text dialogue box displays.



Figure 14-4. Fixed Text Dialogue Box

4. Make changes as necessary.
 - a. Enter the hospital address in the text area.
 - b. Modify Box Properties (box width, box border line width, text align, box height, box left margin, and font).
5. Select **OK**.

Entering the hospital address (continued)

6. Save the template.

To keep the same template name:

- Select Save from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and appends “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select Save As from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and appends “[user]”. For example, NewReport[user].

7. Exit the Report Designer. The report with the hospital address displays.

Inserting the hospital logo

When using a factory template, the area for the logo is usually placed in the upper left portion of the report.

To make a new area, See 'Fixed Text' on *page 14-45 for more information*.

To modify the factory template:

1. Save the preferred hospital logo in either a jpeg or bmp format on the removable media.

NOTE: *Label the logo with a unique name (e.g. HospitalNameLogo.bmp). If the different logo is printed on the report, rename the logo image you want to use and insert it into the report template again.*

2. Insert the removable media.
3. Select **Report** on the keyboard.
4. Select **Designer**.
5. Double-click logo box at the left top so that the frame is highlighted. The logo box displays.

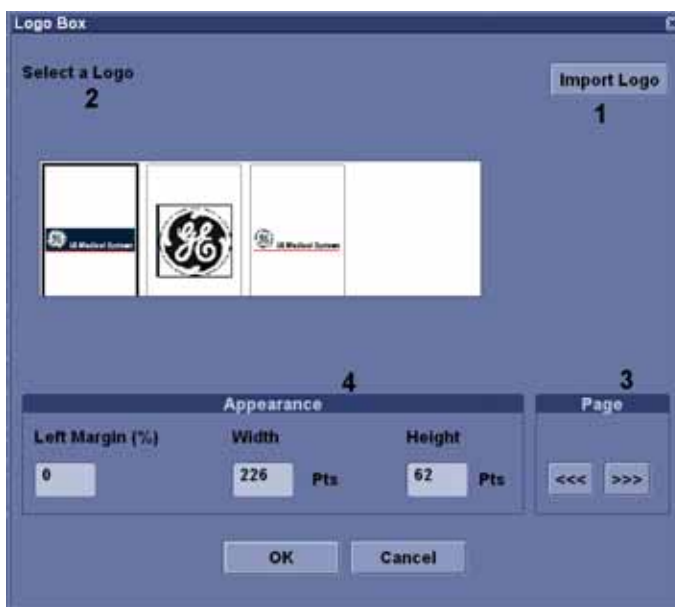


Figure 14-5. Logo Box

Inserting the hospital logo (continued)

6. Select Import Logo (1). Select the removable media first and then the hospital logo.
7. Select **OK**. The hospital logo displays in the logo list (2). Click the logo to select.

NOTE: Scroll the logo list using the left/right arrow key (3).

8. Modify Appearance (4).
9. Select **OK**.
10. Save the template.

To keep the same template name:

- Select **Save** from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select **Save As** from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and adds “[user]”. For example, NewReport[user].

11. Exit the Report Designer. The template with the hospital logo displays.

NOTE: If a different logo prints on the report, rename the logo image which you want on the report and insert it into the report template again.

Changing the Archive Information

When using a factory template, the Archive Information is usually placed below the hospital name and logo.

The contents of the Archive Information is inserted through the related page automatically. If you want to change the description, such as Information or Comments that was entered in the patient menu:

1. Double-click the yellow text to be changed, e.g. Information or Comments.

The area where the description was entered (e.g. Patient menu) displays.

2. Change the existing data as necessary.
3. Select **Scan** then select **Report** to return to the report.



Patient Information		
Name:	Patient Id: 150616-104029	Date: 2015/06/16
Birthdate:	Ref.Physician:	Perf.Physician:
Operator: ADM		
Indications:	Comments:	

Figure 14-6. Patient Information Area (Example)

Modifying the displayed objects of Archive Information

1. Select **Designer**.
2. Double click on the area for the Archive Information in the template. The Archive Information Box displays.

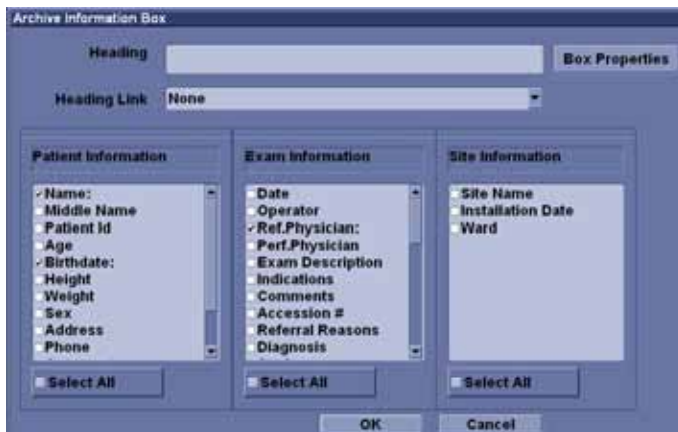


Figure 14-7. Archive Information Box

3. Click the checkboxes to select and deselect the objects. Objects with checkmarks will appear in the report template.
4. Select Box Properties to change the font, font size, font color, or box size, and select **OK**.
5. Select **OK** to return to the Report Designer.
6. Save the template.

To keep the same template name:

- Select **Save** from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select **Save As** from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and adds “[user]”. For example, NewReport[user].

7. Select **File** -> **Exit** to leave the Report Designer.

Entering free text

You can enter free text to the report using the alphanumeric keyboard.

The factory template terms their text area as “Summary or Comments”.

1. Move the cursor to the text field and press **Set**.

NOTE: You can enter the text only to the field set as free text in the Report Designer.

NOTE: DO NOT enter “%s” in a free text field and then try to edit/save the template in the Report Designer.

2. Type the text.

Inserting Text

1. Select **Designer**.
2. Move the cursor where the text is to be inserted and press **Set**.
3. Select the **Text Field** from the **Insert** menu. The Text Field dialog box displays.



Figure 14-8. Text Field Dialogue Box

4. Select the appropriate display items:
 - Ref. Reasons: Retrieves this information from the Direct Report
 - Comments: Retrieves this information from the Comment field of the patient screen and the Exam Comment field of the worksheet.
 - Diagnosis: Retrieves this information from the Direct Report
 - Free Text 1 - 8

Inserting Text (continued)

5. Type the heading Text.
6. Modify box properties, the heading text and font, and data.
7. Select **OK** or **Cancel**.
8. Save the template.

To keep the same template name:

- Select **Save** from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select **Save As** from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and adds “[user]”. For example, NewReport[user].

Inserting an image to the report

Some factory templates include an image area. If you want to insert or modify the image area, See 'Insert Image' on page 14-37 for more information.

To insert images from clipboard into the image field of the report:

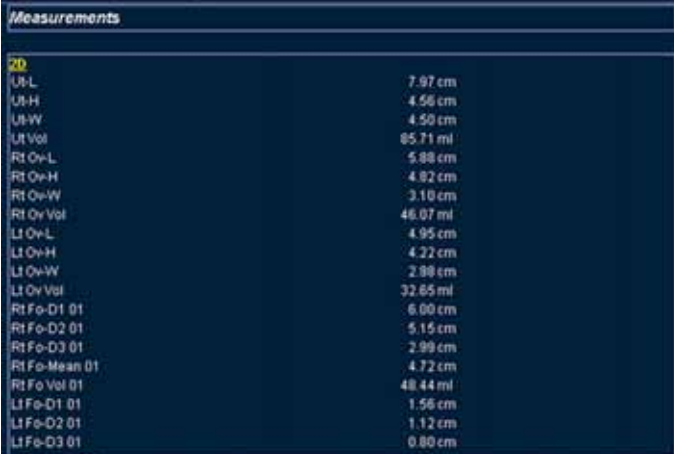
1. Move the cursor to the desired image on the clipboard.
NOTE: The preview image appears when the cursor is over a clipboard image.
2. Press and hold down the **Set** key and drag the selected image to the report by using the **Trackball** or double click the **Set** key on the desired image.
3. To move images between image areas, press and hold down the **Set** key and using the **Trackball**, drag the selected image to the new location.

To remove an image from the report, press and hold down the **Set** key and using the **Trackball**, drag the select image back to the clipboard.

Measurement result section

Measurement results for the current patient display automatically if you have the measurement section in the report template.

The factory template has an appropriate measurement result area. If you want to insert or modify the measurement area, See 'Measurements' on *page 14-43 for more information.*



Measurements	
2D	
Ul-L	7.97 cm
Ul-H	4.56 cm
Ul-W	4.50 cm
UlVol	85.71 ml
Rl Ov-L	5.88 cm
Rl Ov-H	4.82 cm
Rl Ov-W	3.10 cm
Rl Ov Vol	46.07 ml
Ll Ov-L	4.95 cm
Ll Ov-H	4.22 cm
Ll Ov-W	2.88 cm
Ll Ov Vol	32.65 ml
Rl Fo-D1 01	6.00 cm
Rl Fo-D2 01	5.15 cm
Rl Fo-D3 01	2.99 cm
Rl Fo-Mean 01	4.72 cm
Rl Fo Vol 01	48.44 ml
Ll Fo-D1 01	1.56 cm
Ll Fo-D2 01	1.12 cm
Ll Fo-D3 01	0.80 cm

Figure 14-9. Measurement section

Inserting the worksheet

You can insert the worksheet (like you can insert an image) to the image display field. To set a image display field in the report template, See 'Insert Image' on *page 14-37 for more information.*

1. Display the worksheet on the monitor display.
2. Save the worksheet using the **Store** key.
3. Select **Report** on the keyboard.
4. Drag the worksheet into the report.
 - a. Move the cursor to the desired worksheet on the clipboard.
 - b. Press and hold down the **Set** key. Use the **Trackball** to drag the selected worksheet into the Image Display Field.
 - c. Release **Set**.

NOTE: You can also move the cursor to the desired worksheet on the clipboard, double-click the worksheet.

5. The worksheet displays on the report.

NOTE: You can double-click the worksheet in the report to change the background color to white to save ink during printing. Double-click the worksheet again to return the worksheet to the original color.

Placing objects side-by-side

If you want to place images, the image and comment, anatomical graphic and comment, etc. side-by-side, you must first place a table, which has two (or more) columns, into the report template.

1. Press **Report** on the keyboard
2. Select **Designer** to display the Report Designer.
3. Place the cursor where you want to insert the object.
4. Select **Table** from the Insert menu. Insert Table box displays.



Figure 14-10. Insert Table Box

5. Set the number of columns to 2 (or more, as required) and change the table parameters, if needed. Select OK.
- NOTE:** *If you do not need a table border, set the Border to 0. Add additional rows if required.*
6. Place the cursor in the column and select the desired items from the Insert menu (e.g. logo, image, free text). Specify those items.
 7. Repeat step 6 for each column as required.
 8. Save the template.

To keep the same template name:

- Select **Save** from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select **Save As** from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and adds “[user]”. For example, NewReport[user].

You can insert the images in the order preferred, by row or column, on the factory templates. See ‘Inserting the Table’ on page 14-30 for more information.

Accessing Worksheet, OB Graph and Anatomical Survey Pages

If the Worksheet, OB Graph, and/or Anatomical Survey pages have been saved for the current patient, you can access these pages from the report page.

NOTE: *OB Graph and Anatomical Survey pages apply only to OB.*

1. Select either **Worksheet**, **Graph** or **Anatomical Page**.
There is also Fixed Text set up as hyper links for these pages. Cursor to the fixed text and press **Set**.
2. The system displays the appropriate page (Worksheet, OB Graph or Anatomical Survey).
3. Select **Report** to return to the Report page.

Storing the Report

1. Select **Store**.
The Report is saved as a CHM file to Archive.

NOTE: *The archived report cannot be edited; therefore, it is recommended that the data is carefully reviewed before the report is saved.*

Retrieving an Archived Report

1. Select **Retrieve**. The Retrieve menu displays.



Figure 14-11. Retrieve Menu (Prefix "User1\" may not appear)

2. Select the desired report and press **Set**.

NOTE: *The retrieved report cannot be edited.*

Deleting a Report from Archive

1. Select **Delete**. The Retrieve menu appears on the screen.



Figure 14-12. Delete Reports Menu (Prefix "User1\" may not appear)

2. Select the report to delete and press **Set**.

Printing the Report

1. Select **Print** to print out the report.

The Report is printed on the default printer.

NOTE: To preview the Print Layout before printing, See 'Preview the Print Layout' on page 14-28 for more information.

NOTE: Double-click the worksheet and/or image in the report to change the background color to white. A white background will save ink during printing. Double-click the worksheet or image again to return to the original color.

Exporting the Report to Media

Reports can also be saved in a user-defined locations in the following formats:

- Compiled HTML (.CHM) files: readable from any web browser.
- Portable Document Format (.PDF) files: readable with Adobe Acrobat reader.

1. Select **Save As**.

The Save As dialog box appears on the screen.



Figure 14-13. Save as dialog box

2. Enter the Report title in the File Name field.
3. Select the media to export the Report. The system supplies a name (numeric DICOM UID, unique identifier).
4. Select PDF or CHM from the Save as type pull down menu.
5. Select **Save**.

Exiting the report

1. Select **Store** to save the report.

NOTE: *If the user is working on a report and leaves the report screen for any reason, all information added to the report is automatically saved without loss of data.*

2. Select **Esc** key or **Report** key to exit the report page.

Designing Your Own Template

Template Designer

You can design and create your own customized template from a blank template page, or you can use an existing template (factory or user-defined) and save the changes.

Display the desired template and select **Designer** to open the Template Designer page.

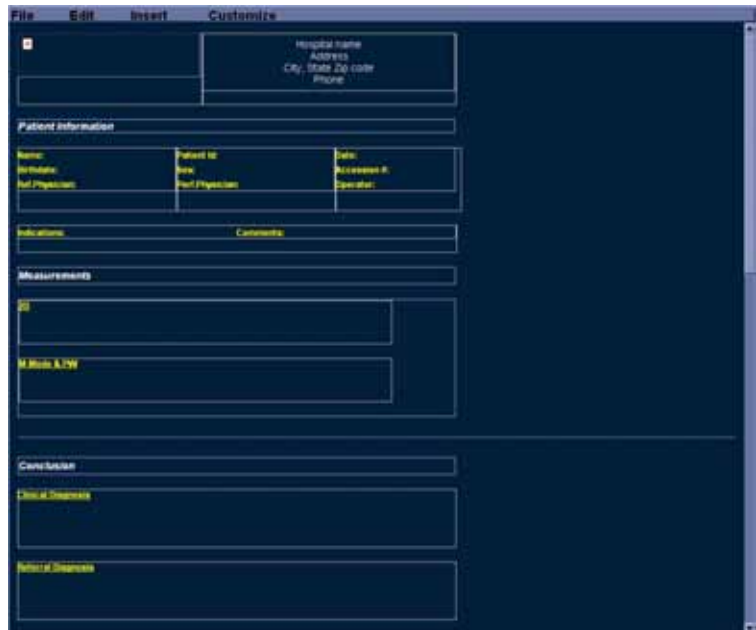


Figure 14-14. Report Designer

File Menu

Table 14-2: File Menu

	Description
New	Creates a new template. A blank template appears.
Save	Overwrites the existing template.
Save As	Saves as a new name.
Page Setup	Enters Print Layout screen.
Print Preview	Executes print preview.
Exit	Exits Report Designer page.

Create a new template

To design a new template without using a pre-existing factory template:

1. Select **Designer** to open the Report Designer.
2. Select **New** from the File menu, and press **Set**.
The blank template displays.
3. Create the report template as needed.
4. Select **Save** from the File menu, and press **Set**.
The Save Template As dialogue box displays.
5. Enter a template name and click OK.
6. To exit Report Designer, select **Exit** from the File menu, and press **Set**.
 - Yes: Saves changes and exits Report Designer.
 - No: Does not save changes and exits Report Designer.
 - Cancel: Returns to Report Designer.

Create a new template and save as a factory template name

To design a new template by modifying an existing factory template and keeping the same name of the factory template:

1. Select and display the existing factory template.
2. Select **Designer** to open the Report Designer.
3. Modify the report template as needed.
4. To save changes, select **Save** from the File menu, and press **Set**.

The Save Template dialog box displays.

- Yes: Saves changes.
- No: Does not save changes.
- Cancel: Returns to Report Designer.

NOTE: *The template name displays in the template list, retains the same name, and adds “[user]”. For example, “OB23-Basic[user]”. You do not lose the original factory template.*

5. To exit Report Designer, select **Exit** from the File menu, and press **Set**.
 - Yes: Saves changes and exits Report Designer.
 - No: Does not save changes and exits Report Designer.
 - Cancel: Returns to Report Designer.



HINTS

Save changes frequently as you modify your template. Saving often reduces the risk of losing all your changes.

Create a new template and save with a new name

To design a new template by modifying or copying an existing factory template and saving it with a new name:

1. Select and display the existing factory template.
2. Select **Designer** to open the Report Designer.
3. Modify the report template as needed.
4. Select **Save as** from File menu and press **Set**.

The Save Template As dialog box displays.
5. Type the new template name and click OK.
6. Select Exit from the File menu and **Set**.
7. The Report Designer closes and returns to the Report Page.

NOTE: *The template receives the new name and adds “[user]”. For example, NewReport[user].*

Page Setup

1. Modify the factory template as necessary in **Designer**.
2. Select **Page Setup** from File menu and press **Set**.
3. Change the paper size or orientation to fit the print layout, as necessary.

To define the header and footer for the printed report, type text and enter the required variables listed in the table below. Select “Different for first page” and enter a specific header/footer for that page.



Figure 14-15. Page Setup Dialog

Table 14-3: Variable and Definition

Variable	Definition	Variable	Definition
{pid}	Patient ID	{prt}	Current time (printing time)
{pnm}	Patient name	{cp}	Current page
{pbd}	Patient date of birth	{tp}	Page count
{exd}	Examination date	{c}	Subsequent text is centered
{prd}	Current date (printing date)	{r}	Subsequent text is right aligned.
{inm}	Institution name		

NOTE: *Default is left aligned. Report will appear as black ink on white background.*

4. Select **OK** or **Cancel**.

Preview the Print Layout

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Select **Print Preview** from File menu, and press **Set**.
4. The Print Preview screen displays.

If changes need to be made, select **Close** to exit the Preview page. Modify the template or return to the Report and modify the contents.

Edit Menu

Table 14-4: Edit Menu

	Description
Delete	Deletes the selected object from the report template.
Undo	Restores the previous state(s) of the report template.

Deleting a template object

1. Select the object to be deleted.
2. Select **Delete** from the Edit menu, and press **Set**. The object is deleted from the template.

Undoing the operation

1. Select Undo from the Edit menu, and press **Set**.
2. Repeat as required.

Insert Menu

Table 14-5: Insert Menu

	Description
Page Break	Inserts a Page Break.
Table	Inserts a Table.
Logo	Inserts a Logo Bitmap File.
Archive Info	Inserts Archive Information.
Anatomical Graphics	Selects anatomical graphics by category to be inserted into a field.
Image	Inserts the image display field to the template.
Wall Motion Analysis	Selects Cut Planes, Bull's Eye, or Score Table Box.
OB/GYN	Selects OB Graph, Bar Graph or Anatomy.
Measurements	Inserts the measurement display field in the template.
Text Field	Edits text field.
Fixed Text	Enters any comments as Fixed Text.
Dropdown Text	Insert a Dropdown text

Inserting the Page Break

1. Place the cursor where the Page Break is to be inserted and press **Set**.
2. Select Page Break from the Insert menu and press **Set**. The page break line displays on the template.

Inserting the Table

1. Place the cursor where the table is to be inserted and press **Set**.
2. Select Table from the Insert menu and press **Set**. The Insert Table dialog box displays.



Figure 14-16. Insert Table Dialog

3. Specify each parameter as required.

NOTE: To set the table border as not visible, set "Border" parameter to 0 (zero)

4. Select **OK** to insert the table or Cancel.

NOTE: To insert/delete a row/column from the table or access table properties, double click the **Set** key in any empty area inside the table. A table menu appears with those options.

Inserting Images in a Table

You can choose the order in which images are inserted into tables: by row (default) or by column.

Image Order by Row

The system default inserts images in the cells of the first row, then to the next row.

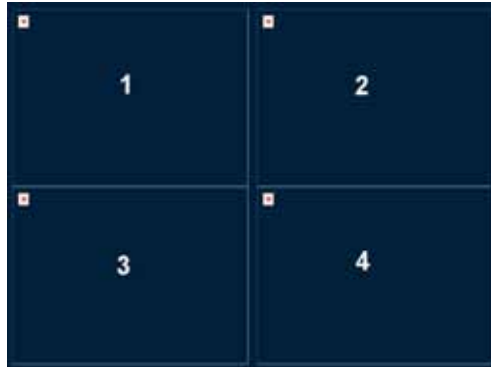


Figure 14-17. Image Order—Row Preference (System Default)

1. Follow the instruction for inserting a table. When specifying parameters, specify:
No. of Columns=2; No. of Rows=2
2. After inserting the table, insert an image box in each cell of the table.
 - a. Move the cursor to the first cell and select Insert -> Image.
 - b. Repeat this step for each cell in the table.

After the template is saved and you are working in the Report Writer, when you select images to be inserted in the table, they are placed in the default order.

Inserting Images in a Table (continued)

Image Order by Column

If you prefer to have the image placement by column, images are inserted in each cell of the first column, then the next column.

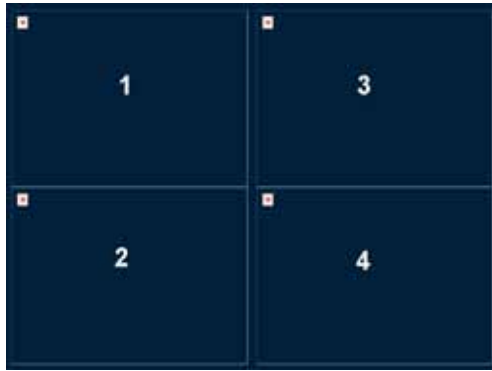


Figure 14-18. Image Order—Column preference

In order to achieve the column preference, you need to create a table with 2 columns and 1 row. In each cell of this table, you need to insert another table.

1. Follow the instructions for inserting a table. When specifying parameters, specify:
No. of Columns=2; No. of Rows=2
2. After inserting the table, create a table inside each of the existing table's cells.
 - a. Move the cursor to the left column's cell and press **Set**.
 - b. Select Table from the Insert menu and press **Set**.
 - c. When specifying parameters, specify:
No. of Columns=1; No. of Rows=2; Width=290 pixels, height=500 pixels.
Select **OK**.
 - d. Repeat steps a-c for the next column.
3. Insert an image box to each table cell.
 - a. Move the cursor to the first cell and select Insert -> Image.
 - b. Repeat this step for each cell in the 2 tables.

After the template is saved and you are working in the Report Writer, when you select images to be inserted in the table, they are placed with your column preference.

Inserting Logos

1. Place the cursor where you want to insert the logo and press **Set**.
2. Select Logo from the Insert menu and press **Set**. The Logo Box displays.
3. Select a logo that you want to insert (1) or import a bmp or jpg file from the removable media (2). Scroll the images using the arrow key (3). Specify the appearance (4).

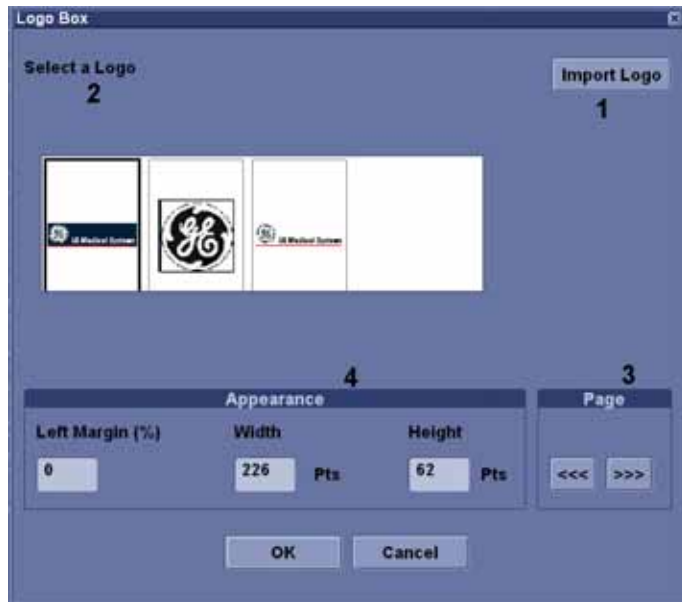


Figure 14-19. Logo box

4. Select **OK** to insert the logo or Cancel.

Changing a logo:

1. Place the cursor on the logo to be changed and press **Set** twice. The Logo Box displays.
2. Select a different logo. If the desired logo is not shown, select Import Logo to import a different logo.
3. Specify the appearance.
4. Select **OK** or Cancel.

Inserting Archive Information

Archive information contains all the objects from the different information menus (Patient, Exam, and Site Information). This box accumulates different information menu selections that can be grouped together and displayed in one table.

1. Place the cursor where you want to enter the archive information and press **Set**.
If you use a factory template, double click on the current archive information area to display the Archive Information Box.
2. Select **Archive Info** from the Insert menu and press **Set**. The Archive Info Box displays.



Figure 14-20. Archive Information Box

3. Type the Heading, select a heading link from the pull-down menu, and select the parameters you want to display in the report.

Inserting Archive Information (continued)

4. Select Box Properties to change the Font, Alignment, Appearance, etc.

NOTE: To set the same font to all fields, select *Set All fields*.



Figure 14-21. Table Properties

5. Select **OK** or Cancel. The contents of the Archive Information is inserted to the related page automatically.

Editing displayed Archive Information:

1. Select **Designer**.
2. Move the cursor to Archive Information field to be edited.
3. Press **Set** twice. The Archive Information Box displays.
4. Edit the heading, the Heading Link and Information parameters, as necessary.
5. Select **OK** to save or Cancel.

Anatomical graphics

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the Anatomical Graphics and press **Set**.
4. Select Anatomical Graphics from the Insert menu.



Figure 14-22. Anatomical Graphics Menu Example

5. Select the desired category and press **Set**. The graphic box displays.

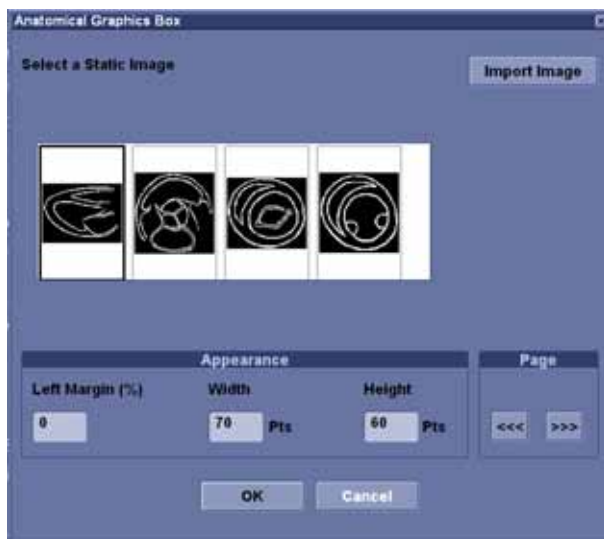


Figure 14-23. Anatomical Graphics Box Example

6. Select the graphic to be inserted to the template or import a bmp or jpg file from the removable media. Scroll the images using the arrow key.
7. Select Appearance.
8. Select **OK** or Cancel.

Insert Image

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the image.
4. Select image from the Insert menu and press **Set**. The Ultrasound Image Box displays.



Figure 14-24. Ultrasound Image Box

5. Type the Heading text, modify the box properties, and change the heading text font, as necessary.

NOTE:

For no heading, type a Space in the Heading text.

To keep the monitor image appearance, the ratio of width to height (W:H) should be 4:3. So, basically 640:480 for large images and 300:225 for two side-by-side images.

6. Select **OK** or Cancel.

Cardiac Studies Wall Motion Analysis

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the wall motion analysis and press **Set**.
4. Select Wall Motion Analysis from the Insert menu.
5. Select and set up the desired parameter.
 - Bull's Eye

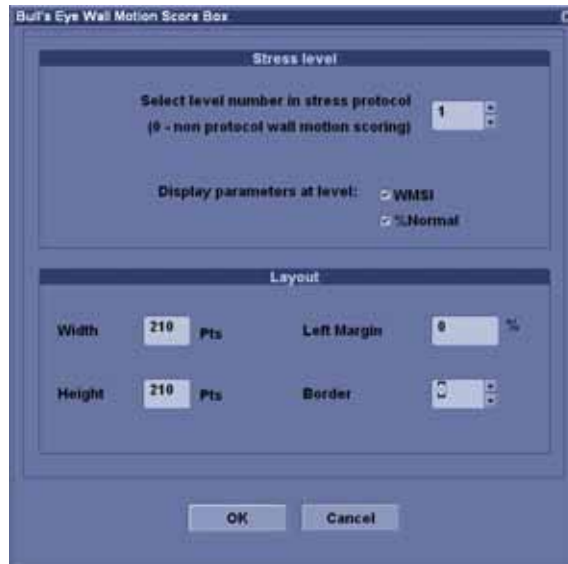


Figure 14-25. Bull's Eye Dialog Box

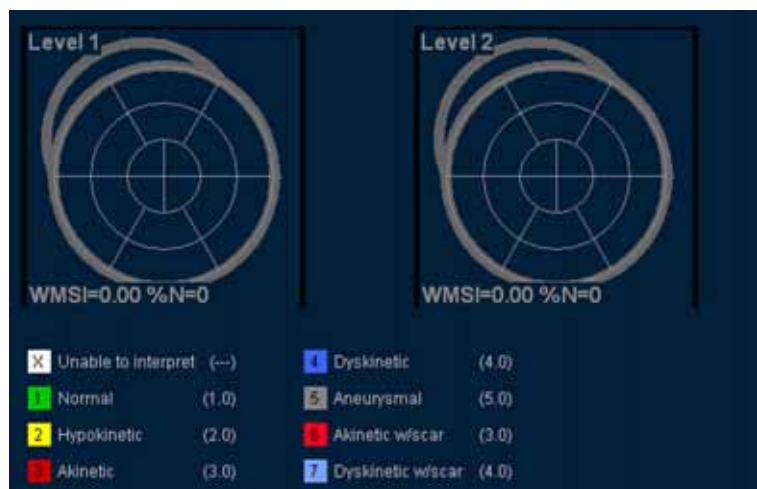


Figure 14-26. Bull's Eye Report Example

Cardiac Studies Wall Motion Analysis (continued)

- Cut Planes
- NOTE: The Cut Planes dialog box parameters are similar to the Bull's Eye Dialog Box shown previously.*

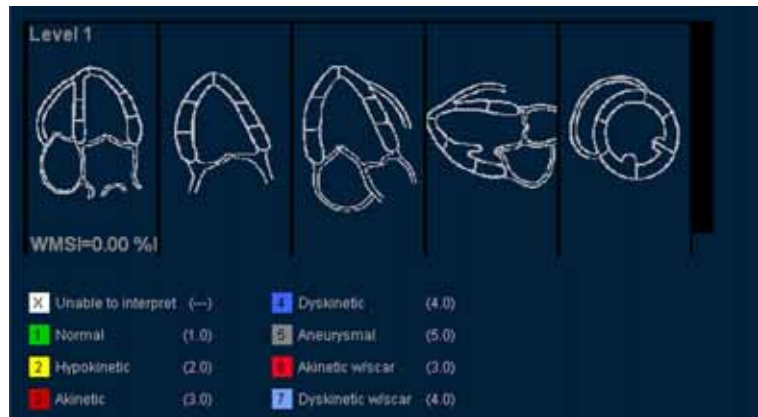


Figure 14-27. Cut Planes Report Example

- Score Table Box



Figure 14-28. Score Table Box Dialog Box

6. After you finish the setup, select OK or Cancel.

OB/GYN (OB and GYN Only)

The OB Graph, Bar Graph and Anatomy can be entered into the Report.

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the graph or anatomy and press **Set**.
4. From the Insert menu, select OB/GYN. The selection menu displays.
5. Select the appropriate item as necessary. A dialog box displays.

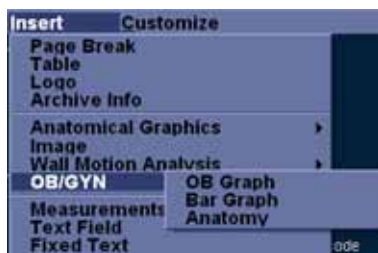


Figure 14-29. Selection Menu

- OB Graph



Figure 14-30. OB Graph Dialog Box

- a. Select the Measurement and Fetus Number.
- b. Check Fetus Trending and Fetus Compare, if appropriate.
- c. Modify the Layout, if necessary.
- d. Select OK.

OB/GYN (OB and GYN Only) (continued)

- Bar Graph



Figure 14-31. Bar Graph Dialog Box

- a. Select the exam and fetus number.
- b. Modify the Layout, if necessary.
- c. Select OK.

NOTE: *The Bar Graph already contains default application measurements.*

OB/GYN (OB and GYN Only) (continued)

- Anatomy

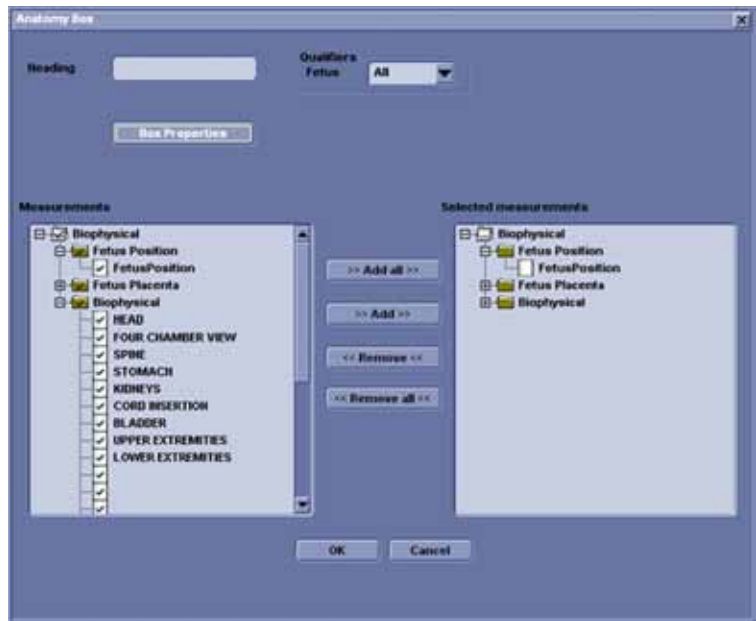


Figure 14-32. Anatomy Dialog Box

- Type the Heading.
- Select qualifiers from the pull-down menu.
- Select "Add all" to copy all measurements to the right column
- Check the box in front of the measurement you need in the left column and select "Add". The select measurements copy to the right column.
- To remove measurements you do not need, check the boxes in front of those measurements in the right column, and select "Remove" or "Remove all".
- If you want to modify the properties, select Box Properties and set required parameters.

Measurements

Insert a field to display the measurements. The measured parameters displayed in the measurement display field are configured.

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the measurement and press **Set**.
4. Select Measurements from the Insert menu and press **Set**. The Measurements Box displays.



Figure 14-33. Measurement Box

5. Type the Heading text, select the Filter Criteria and measurements from the tree, as necessary.
6. Select OK or Cancel.

Text Fields

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the text and press **Set**.
4. Select Text Field from the Insert menu and press **Set**. The Text Field dialog box displays.



Figure 14-34. Text Field Dialog Box

5. Type the Heading Text. If you do not need the heading, type a space.
6. Select Display item.
 - Ref.Reason: Reason for Referral.
 - Comments: Gets information from the Comment field of the Patient screen and the Exam Comment field of the Worksheet.
 - Diagnosis.
 - Free Text: 1 - 8
7. Specify the border of the Text Field and Font as necessary.
8. Select OK or Cancel.

The text is saved automatically into the corresponding area selected on this dialog box.

Editing an existing text field:

1. Move the cursor to the Text Field to be edited.
2. Press **Set** twice. The Text Field dialog box displays.
3. Edit the heading, the settings, or font, as necessary.
4. Select OK or Cancel.

Fixed Text

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the fixed text and press **Set**.
4. Select Text Field from the Insert menu and press **Set**. The Fixed Text dialog box displays.



Figure 14-35. Fixed Text Dialog Box

5. Type the text (e.g. hospital information, report title, or table title) and specify the border and font.
6. Select OK or Cancel.

Editing existing Fixed Text:

1. Move the cursor to the Fixed Text to be edited.
2. Press **Set** twice. The Fixed Text dialog box displays.
3. Edit the text, the border or font, as necessary.
4. Select OK or Cancel.

Dropdown Text

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Place the cursor where you want to insert the Dropdown text and press **Set**.
4. Select **Dropdown text** from the Insert menu and press **Set**. The Dropdown Text dialog box displays.

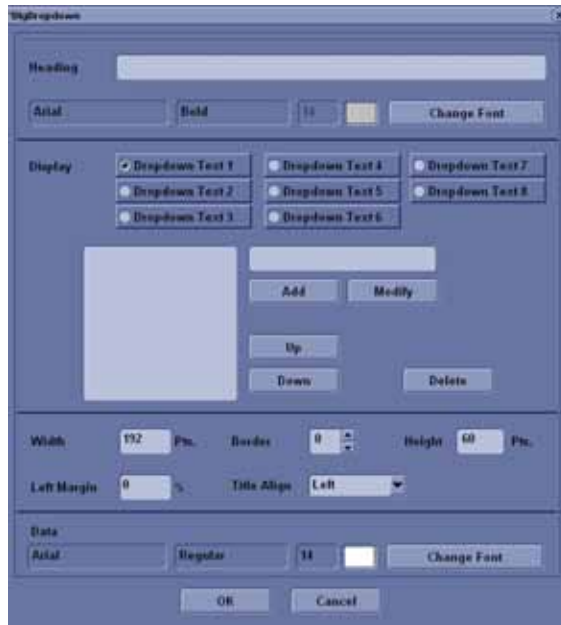


Figure 14-36. Fixed Text Dialog Box

5. Type the Heading Text. If you do not need the heading, type a space.
6. Select Display item and input the dropdown list: input one item, select **Add**, then input another item.
7. Specify the border of the Text Field and Font as necessary.
8. Select OK or Cancel.

Editing existing Dropdown Text:

1. Move the cursor to the Dropdown text to be edited.
2. Press **Set** twice. The dropdown text dialog box displays.
3. Edit the heading, dropdown list, the border or font, as necessary.
4. Select OK or Cancel.

Customize Menu

Table 14-6: Customize Menu

	Description
Page Color	Changes the template color.
Preference	The Preference menu for Archive Information field displays.

Page Color

1. To change the page color, select Page Color from the Customize Menu and press **Set**. The Color dialog box displays.

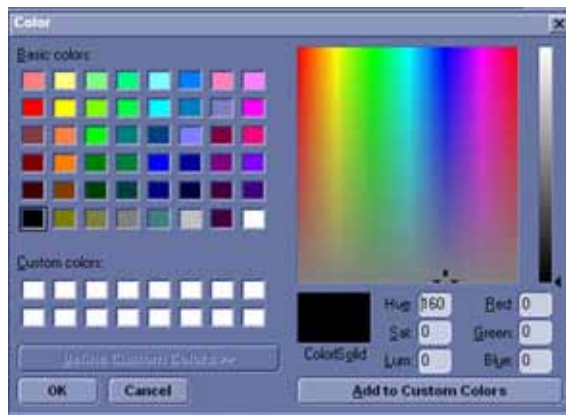


Figure 14-37. Color Dialog

2. Choose the desired color or create a new color.
3. Select **OK** or **Cancel**.

Setting Preferences

To set preferences for the Archive Information:

1. Select Preferences from the Customize menu and press **Set**. The Preference Box displays.

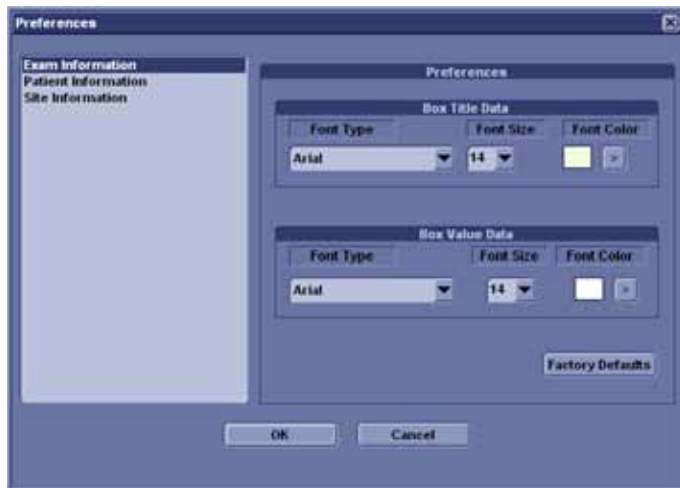


Figure 14-38. Preferences Box

2. Select the information to be modified and set the desired preferences.
3. Select **OK** or **Cancel**.
4. Save the template.

Direct Report

Direct Report

You can use Direct Report to enter Comments, Diagnosis, and Referral Reasons at any time during the examination that will be part of the final report. The comments are reflected on the Report if the Report is configured for those parameters.

1. Select **Direct Rep.** on the measurement Summary window.

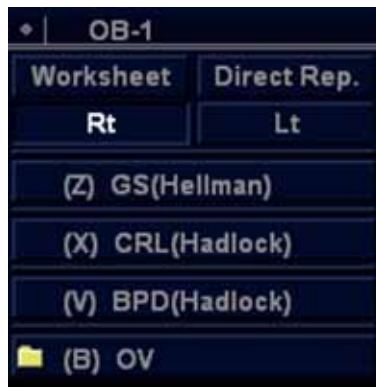


Figure 14-39. Measurement Window

Direct Report (continued)

- The Direct Report displays on the left side of the screen.



Figure 14-40. Direct Report

NOTE:

- Select the type of information
*Comments entered under Diagnosis appear in the Clinical Diagnosis section of the final report.
Comments entered under Referral Reasons appear in the Referral Diagnosis section of the final report.*
- Create/insert pre-defined text
- Text field
- List of measurements completed
The measurement results display on the Measurement Overview field.
Double Click: inserts value only for selected line,
e.g. 1.66 cm
Shift + Double Click: inserts whole line for selected line,
e.g. Renal L 1.66 cm
- Exits the Direct report

Direct Report (continued)

3. Select the appropriate parameter and type the free text with the alphanumeric keyboard or use Insert Text.

NOTE: You can configure the pre-defined text at the Utility Report screen.

- a. Select **Insert Text** to display the Insert Text Window.
- b. Use the **Trackball** and press **Set** to select the text to be inserted.
- c. Double click the **Set** key. The selected text displays on the Direct Report.

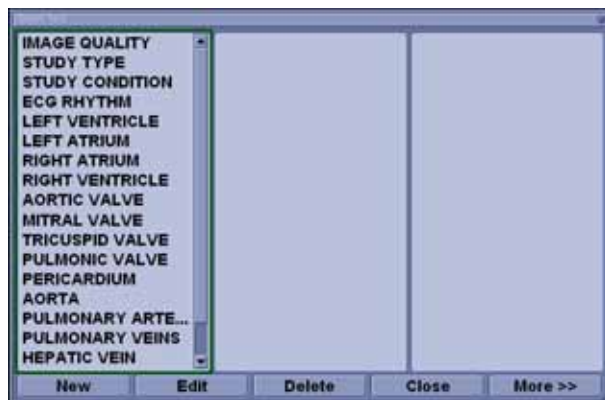


Figure 14-41. Full Insert Text Window

- New: Enters the new text
 - Edit: Edits the existing text
 - Delete: Deletes the existing text
 - More: Displays the Full Insert Text Window
 - Close: Closes the insert text window
4. Move the cursor over the measurement result displayed in the overview window, and double click the **Set** key or Shift + Double Click **Set** key to insert the measurement.
 5. Select **Done** at the bottom of Direct Report to exit.

If you configure the field of comment, diagnosis, referral reasons or Measurement on the Report, the text and/or measurement results entered in the Direct Report are automatically displayed on the Report.

Report Presets

Utility Report Page

You can edit the report template and text on the Utility Reports page.

Templates

Left Column: The list of all templates (Factory Default, User defined, etc.)

Right Column: The list of templates displayed on the template list.



Figure 14-42. Report Template Tab

Templates (continued)

- To insert the template on the template list:
 - a. Select the application which you want to insert into the template from the pull-down menu above the right column.
 - b. Select the category (categories) and/or the template(s) in the left column by the check the box.
 - c. Select the right arrow to copy the template to the right column.
- To remove the template from the template list but not from the system):
 - a. Select the template in the right column.
 - b. Use the left arrow to remove the template from the right column.
- To edit the template or to make a new template:
 - a. Enter Utility -> Reports -> Templates tab.
 - b. Select the appropriate template in the left column.
 - c. Select **Edit Template**. The Template Designer page displays.
 - d. Edit the template and save or save as with a new name.

If you use Save As with a new name, the new template is added to the left column. See 'Designing Your Own Template' on page 14-24 for more information.
- To delete the template:
 - a. Select the template to be deleted.
 - b. Press **Delete**.

NOTE: *The Predefined templates can not be deleted.*

Templates (continued)

- To export the template:



HINTS

Export templates to removable media (CDs, DVDs, USBs) so, at a later time, you can import those templates to a system. Export only works on templates, not data.

- a. Insert the removable media in the drive.
- b. Move the cursor to “Export Templates” and press **Set**. The available user-defined templates display in the Export Templates window.



Figure 14-43. Export Templates

- c. Select the template(s) to be exported.
NOTE: To select multiple templates, use the **Ctrl** or **Shift** keys.
- d. Select the desired removable media under the Select Target Device field.
- e. Select **OK**.
- f. Press **F3** to eject the media.

Templates (continued)

- To import the template:

NOTE: *Import only works on templates, not data.*

 - a. Insert the removable media with the report template(s) to be imported.
 - b. Select **Import Template**. The Import Template window displays.



Figure 14-44. Import Templates

- c. Select the Source Device from the pull-down menu. Select **OK**.
 - d. Press **F3** to eject the media.
- NOTE:* *Imported templates are stored in the User defined templates\General directory.*
- To move the template from the left column to the right, or from the right to the left:
 - a. Select the template to be moved.
 - b. Select the Right Arrow or Left Arrow button.
 - To move the template up or down in the right column:
 - a. Select the template to be moved.
 - b. Press the Up Arrow or Down Arrow button.

Comment Texts

You can edit the comment text on the Comment Texts tab.



Figure 14-45. Comment Texts Tab

- New: Enters the new comment.
- Edit: Edits the existing comment.
- Delete: Deletes the existing comment.
- Move up/Move down: Moves the comment up or down.

Backup/Restore Report Templates

NOTE: Only backup and restore User defined templates. For system predefined templates, import /export templates via Utility --> Reports.

Backup moves user defined templates to removable media (CDs, DVDs, USBs).

Restore moves user defined templates, that were backed up onto media, to the LOGIQ V2/LOGIQ V1 with the same software version.

NOTE: To move reports with patient data, use Backup/Restore Report Archive and Patient Archive.

To backup the report template:

1. Insert the media.
2. Select **Utility** on the keyboard.
3. Select **System** and select the Backup/Restore tab.
4. Select the media.
5. Check User Defined configuration box of the Backup field.
6. Select **Backup**.
7. After Backup complete, press **F3** to eject the media.

To restore the report template:

1. Insert the media.
2. Select **Utility** on the keyboard.
3. Select **System** and select Backup/Restore tab.
4. Check Report Template box of the Detailed Restore of User Defined.
5. Select **Restore**.
6. After the system reboot, select **Utility** and **Reports**.
7. Select the Template tab.
8. Select the appropriate template (See 'Templates' on page 14-52 for more information.)

For preset specifics, see Chapter 16.

Chapter 15

Recording Images

Describes how to record images.

Introduction

Overview

A typical workflow for connectivity might be as follows (this setup varies by each user setup):

1. Select the dataflow, worklist for example.
2. Start a new exam. Select the patient.
3. Perform the patient scan.
4. Store images as single image or multi-frame CINE Loops and Raw DICOM data via the assigned key.
5. Check the DICOM Job Spooler via **F4** to verify delivery.
6. End the exam.
7. Permanently store images via the Patient menu.

Overview (continued)

During an examination, the operator stores data, images and cineloops for immediate purposes. The LOGIQ V2/LOGIQ V1 includes an integrated patient archiving system for data and image storage.

The LOGIQ V2/LOGIQ V1 enables also storing of data and images to external databases (Network Server, removable media).

Dataflow combines archive, data, DICOM, and onboard records into one coherent workflow. Destination devices are configured and assigned to the print keys. You select the appropriate dataflow (Portable, etc.) according to your requirements. You manage the patient database (local, shared, or via a worklist broker).

- DO NOT use the internal hard drive for long-term image storage. Daily backup is recommended. External storage media is recommended for image archive.

NOTE:

DICOM images are stored to external media storage devices separately from patient data, which also needs to be backed up to a dedicated database-formatted external storage media.

- If working off-line with a dataflow pointing to a DICOM server, the images stored during the examination may have to be manually resent in the DICOM spooler when reconnecting the unit. Resend all jobs that failed or are on hold.

In addition, stored images and cineloops can be saved to a removable media in the standard formats JPEG, MPEG, AVI and DICOM.

- You need to set up a protocol for locating images stored to external storage media for easy recall.
- GE IS NOT responsible for lost data if you do not follow suggested back-up procedures. GE WILL NOT aid in the recovery of lost data.

Refer to Customizing your system chapters for instructions on setting up your system's connectivity.

Adding Devices

To add a destination device (printer, worklist server, etc.) to this system, see 'Device' on *page 16-71*.

To verify a DICOM device, see 'Device' on *page 16-71*.

Adding a Dataflow

To add a new dataflow to this system, see 'Dataflow' on *page 16-89*.

Adding Devices to a Print Button

To add devices/dataflows to a print button, see 'Button' on *page 16-90*.

Formatting Removable Media

To format removable media, see 'Formatting removable media' on *page 16-92*.

Image/Data Management

Reviewing Patient Images

Please refer to Chapter 4 for the detailed information on the following:

- Retrieving and editing archived information
 - Searching for a patient
 - Reviewing a patient exam
 - Reviewing an image
 - Deleting a patient, exam, or image

Backup/Restore Images

Please refer to 'Backup and Restore' on *page 16-21* and 'EZBackup and EZMove' on *page 16-24* for detailed information.

Clipboard

The clipboard displays thumbnail images of the acquired data for the current exam. Images from other exams are not displayed on the current patient's clipboard.

All of the images can be viewed in the Active Images screen, available from the display or from the Archive menu.



Figure 15-1. Clipboard

Saving the image /cine to the Clipboard

The active image/cine is stored and placed on the clipboard when you press the **Store** key (this assumes that you have already set up the **Store** key to do this). The clipboard contains preview images with enough resolution to clearly indicate the contents of the image. CINE Loops are indicated by a movie clip icon.

The clipboard fills from left to right, starting in the left-hand corner. Once the row is full, the next image stored starts to fill a 'second' row (the first row disappears from the clipboard display, with the second row now becoming the first row).

Previewing Clipboard Images

1. Select the **Cursor** key to obtain a cursor arrow.
2. Move the **Trackball** to position the pointer over the clipboard image you want to recall.
3. An enlarged preview of the image is displayed on the left-hand side of the monitor.

Recalling Images from the Clipboard

To recall images from the clipboard,

1. Select the **Cursor** key to obtain a cursor arrow.
2. Move the **Trackball** to position the pointer over the clipboard image you want to recall.
3. Press **Set** to recall the image.

To delete an image from the clipboard

1. Select the **Cursor** key to obtain a cursor arrow.
2. Place the cursor on the clipboard image you want to delete, then press **Set** to select the image.
3. Place the cursor on the Delete icon and press **Set**.
A warning message is displayed asking the user to confirm the action to perform.
4. Select **Yes**.

Storing Images and Cineloops

Images and cineloops that are stored during a current examination are displayed as thumbnails on the clipboard.

When an image is stored, all the additional information that is displayed is saved with it (i.e. probe and application selected, image setting, annotations or measurements).

See 'Print Control' on *page 16-55* for detailed settings related storing image/Cine.

The image archive is set by the dataflow selected (See 'Dataflow' on *page 16-89* for more information.)

Storing an image

To store an image,

1. While scanning, press **Freeze**.
2. Scroll through the CINE Loop and select the desired image.
3. Press the Store key.

The selected image is stored (per your preset instructions) and a thumbnail is displayed on the clipboard.

Storing a CINE Loop

A CINE Loop is a sequence of images recorded over a certain time frame. The stored CINE Loops are displayed chronologically on the clipboard.

CINE Loops can be stored at any time during scanning. You can choose to preview the CINE Loop before storage and save the CINE Loop directly, as described below.

Refer to 'Print Control' on *page 16-55* about the setting.

Previewing and Storing a CINE Loop

1. While scanning, press **Freeze**.
2. Determine the best CINE Loop to store.
3. Play the CINE Loop to review it.
4. Press the Store key.

Depending on whether the system has been configured to enable or disable “Preview Loop before store” (see ‘Print Control’ on *page 16-55*), the following procedures enable the CINE Loop to be stored directly.

Storing a CINE Loop Without Preview

If “Preview clip before store” is disabled,

1. While scanning, press the Store key.
2. The last valid CINE Loop is stored in the archive and a thumbnail is displayed on the clipboard.
3. Scanning resumes immediately.

Storing a CINE Loop With Preview

If “Preview clip before store” is enabled,

1. While scanning, press the Store key.
2. The last valid CINE Loop is previewed.
3. Adjust the CINE Loop, as necessary.
4. Press the Store key.

The movie clip thumbnail is displayed on the clipboard.

Save As

Images and cineloops can be saved to a removable media or Network storage to View on a **Windows PC** in the following standard formats:

- Still images: JPEG, DICOM and RawDICOM (Raw data + DICOM)
- Cineloops: WMV, AVI, DICOM and RawDICOM (Raw data + DICOM)

Images can also be stored as MPEG format as described on 'MPEGvue' on *page 15-22*

To save images:

1. Insert the media into the drive or connect the USB drive to the system.

NOTE: If you have not formatted the media, the media will be formatted when you select Save As.

2. On the scan screen, press the **Cursor** key. The arrow cursor displays.
3. Place the cursor on the image or CINE Loop in the clipboard to be saved and press **Set/ B Pause**. The image displays on the screen.

Save As (continued)

4. Select save as icon in the lower, right-hand corner of the screen. The SAVE AS menu appears.

NOTE: *If you save the image as an .avi file or .wmv file, run the CINE Loop before you select Menu.*

NOTE: *You can not save 2D cine loop image as a .jpeg file.*



Figure 15-2. Save As Menu

5. Select the media from the Save in archive pull-down menu.
6. Folder name: You can create the folder for the saved file.
 - Default is blank (The folder is not created)

NOTE: *You can not edit the folder name when the folder is opened.*

7. File name: The name of the file is automatically filled in, but you can change the file name in the File name field.

NOTE: *DO NOT use the following special characters when saving images: !, @, #, \$, %, ^, &, *, (,), |, :, ;, <, >, ?, /, ~, [,], {, }.*

8. Store: Select Image only or Secondary capture.
 - Image only: Saves only the ultrasound image area.
 - Secondary capture: Saves the ultrasound image area, title bar, and scan information area. Not available for DICOM or RawDICOM images.

NOTE: *If you select "WMV" for Save as type, Secondary capture is disabled.*

Save As (continued)

9. Compression: Specify Compression.

- None
- Rle
- Jpeg
- Jpeg2000

NOTE: If you select "WMV" for Save as type, Compression is disabled.

10. Quality: Specify image quality (between 10-100). A high quality setting gives a lower compression.

NOTE: If you select "WMV" for Save as type, Quality is disabled.

11. Save as type: Select one of the following.

- RawDICOM: saves the still image or CINE Loop in both GE raw format and DICOM format.
- DICOM: saves the still image or CINE Loop in pure DICOM format.
- AVI: Saves the CINE Loop in avi format.

NOTE: Store "Image Only" is available if you select AVI for Type.

- JPEG: Saves the still image in jpeg format.
- JPEG2000: Saves the still image in JPEG2000 format.
- WMV: Saves the CINE Loop in wmv format

NOTE: WMV type is only available with CINE loop image.

If you want to see all data saved onto the HDD, select "AllFiles(*)". All the data names display in the window.

NOTE: The Save button is disabled when you select "AllFiles". Select each Save as type when you want to save data.

12. Press **Save**.

The images are saved directly to the media whenever you press Save.

If you select "Transfer to CD/DVD", the images are saved to the HDD buffer.

- If free space of the destination is not enough to save all selected images, then warning dialog appears.
- If the same file name is existed in the destination, the warning dialog displays.

OK: Overwrite file and continue to save selected images.

Cancel: Do not save images.

Save As (continued)

13. Repeat this step for as many images/clips to be saved.
14. After you have added all of the images/loops you want to save and are ready to write to the CD/DVD, transfer all the images at the same time. Press **Save As** --> Transfer To CD/DVD.
 A progress bar lets you know that the “Media transfer is in progress.”
 If total transfer size is bigger than CD/DVD free space size, then only the files that can be copied to CD/DVD are transferred. After the copy is finished, the warning dialog displays. Warning dialog shows total required file size and transferred file size. Press **OK** and you need to change CD/DVD and press **Transfer to CD/DVD** again.
15. If you do not want to save the image to CD/DVD, select “**Delete Files for Transfer**” All images are deleted.
16. Press **F3** to eject the media. Select CD/DVD Recordable or USB drive.

NOTE: The Report Save As feature is somewhat different. As soon as you select to save a report, the report is saved. (CD/DVD)

Table 15-1: Save As Formats

	.avi format	.wmv format	MPEGvue in Data Transfer
B, B+CF	Multi frames	Multi frames	Multi frames
B+Doppler	Single frame	Multi frames	Single frame
B+M	Single frame	Multi frames	Single frame
3D	Multi frames	N/A	Single frame

NOTE: Verify the saved image works correctly on the Windows PC. If the image does not work, please save it again on the LOGIQ V2/LOGIQ V1.

'SaveAs' Images

You can select the images at one time which you want store by SaveAs in the Active Image screen.

Features are almost same as usual SaveAs. See 'Save As' on page 15-9 for more information.

- NOTE:** We suggest that you save the images page by page with "SaveAs" Images in Active Images. It takes time if you have many images or raw data.
- NOTE:** If the image has a filmstrip icon, this indicates a CINE Loop, which gets saved as a .wmv file; single images are saved as a jpeg file.
- NOTE:** 'SaveAs' Images function doesn't support images which are query/retrieved.
1. In the Active Image screen, place the cursor on the image or CINE Loop to be saved and press **Set**. You can select multi images with multi pages.



Figure 15-3. Active Screen

'SaveAs' Images (continued)

2. Press '**SaveAs**' *Images* on the monitor display. The SaveAs menu appears.

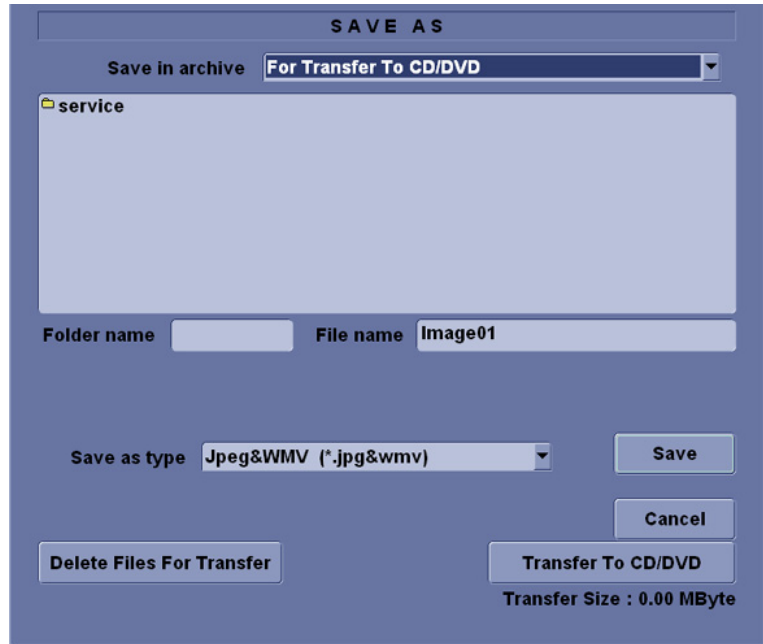


Figure 15-4. 'SaveAs' Images Menu

3. Ensure that Jpeg&WMV is selected, then press **Save**.

If you are saving to USB, images are transferred as soon as you press Save; if you are saving via Transfer to CD/DVD, you need to save images to the hard drive, then images are transferred when you select Transfer to CD/DVD.

Storing Images with More Resolution

To store images with more resolution than is available with the JPEG selection, select Save As and select AVI as the Save As Type. You can save single images as .avi files.

Table 15-2: Store Options

Image Type	Store as Image Only	Store as Secondary Capture
CINE Loop	Gives you a loop of just the image (no title bar and scan information).	Gives you a single image of the video area. DO NOT DO THIS BECAUSE YOU DO NOT KNOW WHICH IMAGE FROM THE LOOP THAT YOU ARE GETTING.
Still Image	Gives you a single image (no title bar and scan information).	Gives you a single image of the video area.

Data Transfer

The user can select and access the Exam Transfer services from the Exam Data Transfer screen.

- Import
- Export
- Worklist
- MPEGVue
- Q/R (Query/Retrieve)

NOTE: *Ensure that all patients are exported or backed up BEFORE deleting them.*

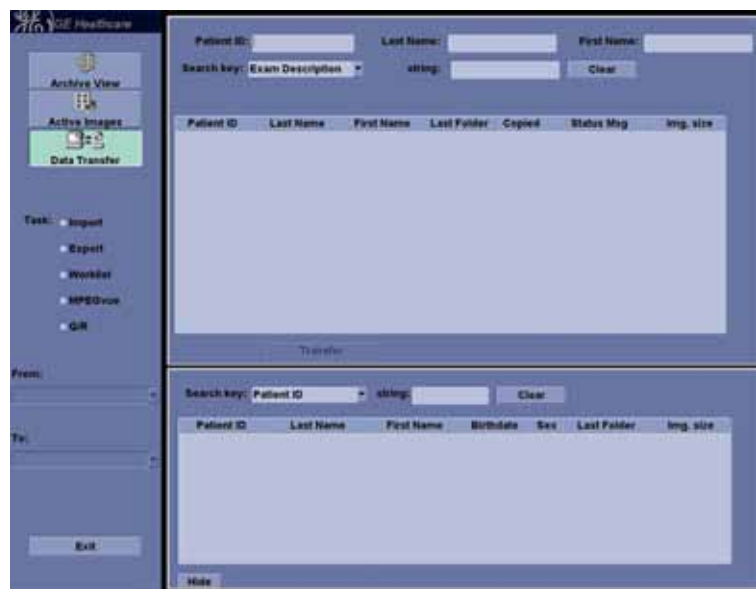


Figure 15-5. Exam Data Transfer Screen

Export/Import

To move exams from one Ultrasound system to another system or to back up/retrieve exam information, you need to export/import exam information.

NOTE: *Both database information and images are exported. No data is deleted from the local archive when exporting data.*

NOTE: *Export/Import patient records may take more than ten (10) minutes. Please allow sufficient time to export/import patients.*

NOTE: *You MUST verify the media you use BEFORE performing Export/Import. You must do this once each session. If you encounter problems, eject the media and then re-insert the media; then try the Export/Import again.*

NOTE: *We STRONGLY recommend that you verify files on Eject when using Export.*

Exporting Data

To export an exam(s) to a compatible Ultrasound system:

1. Format and label the removable media. Answer Yes/OK to the messages.

NOTE: *The system formats the unformatted CD-R/DVD-R automatically when you select Export on the data transfer screen.*

2. Press **Archive** and select **Data Transfer**.
3. The Data Transfer screen is displayed. Select Export.
4. "Local Archive-Int.HD" displays on the Transfer From pull-down menu and the patient list included in the Local Archive displays.

Exporting Data (continued)

5. Select the destination at the Transfer To pull-down menu.
6. Select the patient(s) to export by using the Transfer From search field (the upper field).

You can use Windows commands to select more than one patient.

To select a consecutive list of patients, click the cursor on the first name, move the cursor to the last name, then press and hold down the **Shift + Set** key to select all the names.

To select a non-consecutive list of patients, click the cursor at the first name, move the cursor to the next name, then press and hold down the **Ctrl + Set** key, move the cursor to the next name, then press and hold down the **Ctrl + Set** key again, etc.

You can also search for patients via the **Search key** and **string**.

Or, use **Select All** to select all patient.

NOTE: *You need to use your best judgment when moving patients' images. If there are lots of images or loops, then only move a few patients at a time.*

7. Press **Transfer**. The progress bar displays during the transfer.
8. Once the transfer is complete, press **F3** to eject the media. Specify that you want to finalize the media.

After performing an Export, the system reflects that this operation was successfully completed; however, it is ALWAYS a good idea to verify that there was no corruption to the backup/export media during this process.

To verify that the data was successfully transferred to the media, press **F3**, then select "Finalize" --> "Yes and Verify Files." If there was any corruption to the media during an operation, the message, "An error occurred on the last disk. Please discard it and start over." appears. In this case, please redo the operation with new media.

NOTE: *To display exported DICOM or Raw DICOM images on a PC, you need the dedicated viewer.*

Importing Data

To import an exam(s) to another Ultrasound system:

1. At the other Ultrasound system, insert the media.
2. Press **Archive** and select **Data Transfer**.
3. The Data Transfer screen displays. Select **Import**.
4. Select the media from the Transfer From pull-down menu.
5. The Transfer From search field shows the patients available for import from the removable media you just loaded onto the system.
6. Select the patient(s) or the exam(s) from the list to be imported.
7. Press Transfer. The progress bar displays during the transfer.
8. Please wait for the patient information to be copied to this Ultrasound system. Informational messages appear while the import is taking place.
9. Press **F3** to eject the media.

NOTE: Use Import to restore EZBacked up and/or EZ Moved images.

NOTE: You can retrieve from the media to the Local HDD, playback, or process exam information on the system as Raw Data.

Query/Retrieve (Search and retrieve the data from DICOM device)

NOTE: For Query/Retrieve to find a patient, the patient MUST have a Patient ID.

NOTE: Before you retrieve data from the Worklist server, make sure that default IP address is input in the Default Gateway field in Utility -> Connectivity -> TCP/IP.

Query

1. Press **Archive** and select **Data Transfer**. The Data Transfer screen displays.
2. Select Q/R. The patient/exam list in the Local Archive displays in the Transfer To section.

NOTE: Only "Local Archive - Int.HD" is enabled for Transfer To.

3. Select the Query/Retrieve server from the Transfer From pull-down menu.

NOTE: The server is configured in the Utility screen. Multiple servers are able to be configured.

4. Press **Query** in the Transfer From section. The Query is performed.
5. The server's patient list displays.

*NOTE: Press **Query** again to refresh the list.*

Retrieve

1. Select the patient(s) or the exam(s) to be retrieved from the patient list.
2. Select **Transfer**. Retrieve the data from the Query/Retrieve Server. The progress bar displays during the transfer.

Worklist (Search and retrieve the Patient/Exam information)

NOTE: Before you retrieve data from the Worklist server, make sure that default IP address is input in the Default Gateway field in Utility -> Connectivity -> TCP/IP.

1. Press **Archive** and select **Data Transfer**. The Data Transfer screen displays.
2. Select Worklist. The patient/exam list in the Local Archive displays in the Transfer To section.

NOTE: Only "Local Archive - Int.HD" is enabled for Transfer To.

3. The Worklist used last time is displayed on the monitor display. Select refresh to refresh the list or select another Worklist server from the Transfer From pull-down menu.

NOTE: The worklist server is configured in the Utility screen. Multiple servers are able to be configured.

NOTE: You can configure whether the auto-refresh worklist has been enabled/disabled in the Utility screen. The system automatically refreshes the list when the exam data transfer accesses the Worklist server or changes the Worklist server.

4. Select the patient(s) or the exam(s) from the list.
5. Press Transfer. The progress bar displays during the transfer.

MPEGvue

You can see the exam data on the **Windows PC** by using MPEGvue.



CAUTION

DO NOT transfer more than 50 patients at one time.



CAUTION

DO NOT use lossy compression images, such as JPG or MPEG images, for diagnosis.



CAUTION

MPEGvue function is NOT compatible with other LOGIQ series products. Do NOT share the same USB Drive for MPEGvue between LOGIQ V2/LOGIQ V1 and other LOGIQ series products.

NOTE: If you want to label the removable media, format it before use. The system formats the unformatted CD-R/DVD-R automatically when you select MPEGvue on the data transfer screen.

1. Insert the removable media.
2. Select **Archive** and select **Data Transfer**. The Data Transfer screen displays.
3. Select MPEGvue. The Patient list, which has images in the Local Archive, displays in the Transfer From section.
Start the media formatting automatically except USB HDD. Label the media with "YYYYMMDD_#".

NOTE: Only "Local Archive - Int.HD" is enabled for the Transfer From.

4. Select the media from the Transfer To pull-down menu.

NOTE: Select Removable CD Archive if you use CD-R or DVD-R.

MPEGvue (continued)

- Select the patient(s) or the exam(s) from the list.

NOTE: *If you press Clear in the Transfer From and Transfer To section, all the search criteria clears and the list is refreshed accordingly.*

NOTE: *Trying to save 3D loops using MPEGvue, the 3D loops are saved as still images. Use "Save As" to save 3D loops.*

- Press **Transfer**. The progress bar displays during the transfer.

Displays the check mark in the Copied field of the completed patient.

Patient ID	Last Name	First Name	Copied	Status Msg	Img. size
02	ORTD/YE	SES	<input checked="" type="checkbox"/>	OK	88.1 MB
03					61.5 MB
04					50.8 MB
05					23.1 MB
06					65.5 MB
07					59.1 MB
08	9999999999999999		<input checked="" type="checkbox"/>	OK	101 MB

Figure 15-6. Completed patient

When the message "Not enough free space" displays during MPEGvue,

- CD-R/DVD-R: Please change to a new media.
- USB HDD/USB Flash Drive: Backup the current data in the USB device to the other media and clear the USB device.

MPEGvue (continued)

If the following dialogue and message displays during MPEGvue, reduce the number of exams to gain space, and perform MPEGVue once again to a new media (CD-R/ DVD-R) or the USB device.



Figure 15-7. Error Dialogue

7. When the transfer is completed, select **Exit** to return to the scan screen and then eject the media.

NOTE: *The capacity of media (number of patients) and the writing time depends on the data size of each patient. If you try to save an image larger than 1GB using MPEGvue, it may take a few hours to save the image.*

NOTE: *Before you read the media on the PC, finalize the media on the LOGIQ V2/LOGIQ V1.*

NOTE: *Measurement graphics from the exam performed on the system are maintained with the MPEG exam.*



CAUTION

DO NOT use "Verify" when ejecting the CD/DVD if you transferred multiple patients to the media using MPEGVue.

MPEGvue (continued)

On your PC with Windows 2000/XP

An MPEG exam can be read from any computer with Windows 2000/XP, provided that DirectX 8.1 or later and Windows Media Player 7.1 or later are installed.

NOTE: *Verify the saved image works correctly on the Windows PC. If the image does not work, please save it again on the LOGIQ V2/LOGIQ V1.*

If a warning message displays, press **OK** to continue.

- Windows PC with Windows XP + SP2
All media is readable.
- Windows PC with Windows XP + SP1
All media is readable.
But DVD-R with data greater than 4GB are not readable. An issue report from Microsoft states that SP2 fixes this problem. Please refer <http://support.microsoft.com/kb/329112/EN-US/>.
- Windows PC with Windows 2000 + SP4
Only CD-Rs are readable. DO NOT perform MPEGvue using a DVD-R/-RAM.
- “Active-X” security block on Windows XP + SP2

When attempting to view an MPEGVue exam on a PC which is running on WindowsXP with Service-Pack 2, the image remains blank if you click on a thumbnail.

If this occurs, do the following steps:

- When running MPEGVue and you click on one of the clipboard thumbnail images, the following message appears:
“To help protect your security, Internet Explorer has restricted this file from showing active content that could access your computer. Click here for options”
- Place the mouse over the message “To help protect your security...” and click over it.
- Select “Allow Blocked Content...” in pop-up menu.
- A security warning message appears. Select “YES”.

The Exam should start to display normally at this point.

NOTE: *Every time you attempt to view another exam you will need to repeat the procedure described above.*

MPEGVue (continued)

On your PC with Windows Vista

When you try reviewing MPEGVue on a Windows Vista-based computer, the dialog, “An important update for MPEGVue Player Software Component (vX.X.XX) is available for this computer...” displays. Press **No** on the dialog and eject the medium.

Then do the following steps to install the MPEGVue Player Software Component with administrative rights.

1. Click **Start**, and then click **Control Panel**.
2. In the Control Panel, click **User Accounts And Family Safety**.
3. Click **User Accounts**.
4. Click **Turn User Account Control On of Off**.
5. The message, “Windows needs your permission to continue” displays. Press “Continue.”
6. Uncheck the checkbox for **User Account Control ((UAC) To Help Project Your Computer**, and then click **OK**.
7. When prompted, restart your computer.
8. Insert the medium with MPEGVue data. The dialog “An important update for MPEGVue Player Software Component (vX.X.XX) is available for this computer...” displays. Press **Yes**.
9. The MPEGVue Player Software Component will be installed. When the install is done, check the checkbox for **User Account Control (UAC) To Help Protect Your Computer** according to the steps 1 - 6 above.
10. You can now review MPEGVue on your computer.

MPEGVue (continued)

On your PC with Windows 7

When you try reviewing MPEGVue on a Windows 7-based computer, the dialog, “An important update for MPEGVue Player Software Component (vX.X.XX) is available for this computer...” displays. Press **No** on the dialog and eject the medium.

Then do the following steps to install the MPEGVue Player Software Component with administrative rights.

1. Click **Start**, and then click **Control Panel**.
2. In the Control Panel, click **User Accounts And Family Safety**.
3. Click **User Accounts**.
4. Click **Turn User Account Control On of Off**.
5. Note the original notify level and change notify level to “Never Notify”.
6. The message about confirmation, press **Yes**.
7. Press **OK**.
8. Restart your computer.
9. Insert the medium with MPEGVue data. The dialog “An important update for MPEGVue Player Software Component (vX.X.XX) is available for this computer...” displays. Press **Yes**.
10. The MPEGVue Player Software Component will be installed. When the install is done, change notify level according to the step 1 - 5 of the above.
11. You can now review MPEGVue on your computer.

MPEGvue (continued)



CAUTION

DO NOT modify the folder name and the folder configuration of MPEGvue which is created in the media.

NOTE: Select “MPEG4 Windows Media Format (*.wmv)” when you save the Cine image from CD/DVD to the HDD while reviewing it on your PC.

NOTE: Measurement graphics from the exam performed on the system are maintained with the MPEG exam.

1. To read MPEG exams stored on a CD-R/DVD-R:
 - Insert the MPEGVue CD-R/DVD-R in the computer DVD drive. The MPEGVue Patient list is displayed.

To read MPEGVue exams stored on other media:

- Insert the media containing the MPEG exams and double-click on the file Start_MPEGvue.bat. The MPEGVue Patient list is displayed.

Patient List				
ID	Patient Name	Exam Date	Birth Date	Image
111113-030613AM		11/11/2013		28
110013-024944AM		11/09/2013		9
110413-055649AM		11/04/2013		39

Figure 15-8. Patient list

MPEGvue (continued)

2. Select the desired examination date to display the images.
The MPEGVue screen is displayed.



Figure 15-9. MPEGvue screen

1. Clipboard: select the image to display
2. Selected image
3. Cineloop
4. Single frame image
5. Freeze/run cineloop
6. Scrolling tool when in Freeze
7. Display full screen
8. Save image as .wmv, .bmp, jpeg or .avi
9. E-mail support
10. Display previous/next image
11. Display the MPEGVue patient list
12. Exit

MPEGvue (continued)

E-mail support

Sending images or examinations by e-mail.

NOTE: E-mail support and a desktop icon cannot be used on a non-English PC.

The selected image or the entire examination can be sent by e-mail as an attachment, providing the computer has a mail client application (e.g. MS Outlook, MS Outlook Express).

To send an image

1. Select the image to send on the clipboard and select the e-mail button. The e-mail dialogue window displays.
2. Check Send current image. The e-mail address window displays.
3. Select an existing address or enter a new address. Up to 10 addresses can be stored.
4. Select Send.
5. The e-mail with the image is sent and a Confirmation window displays. Select OK.

The person receiving the e-mail can open the image in Windows Media Player.

E-mail support (continued)

To send an examination

Examinations sent by e-mail as attachments are zip-compressed, encrypted and password protected. If the size of the exam is too large to be sent as a single attachment, it is divided into several zip file attachments and sent in several e-mails.

1. Open the examination to send in MPEG viewer and select the e-mail button. The e-mail dialogue window displays.
2. Check Send current exam. The e-mail address window displays.
3. Select an existing address or enter a new address.
4. Select **Send**. The Password window displays.
5. Enter a password and select **OK**. The exam is sent and a confirmation window displays. Select **OK**.

To open an MPEGvue exam from an e-mail

1. In the MPEG viewer press the E-mail button. The E-mail dialogue window is displayed.
2. Check Receive exam. The Password window is displayed.
3. Enter the password and select **OK**. The exam is uncompressed and opened in the viewer and the E-mail(s) containing the MPEG examination is deleted.

Send To (Send the image to the DICOM Device)

“Send To” sends the selected exam for a patient and to interactively Send-To the exam to a destination DICOM device configured on the system. An exam in this case includes its images and any corresponding Structured Report.

1. Search and select the patient and select **Folder View**. The Exam View screen displays.
2. Select the exam which has the images and press **Send to**.



Figure 15-10. Send To

NOTE: You can only select “Local Archive - Int.HD” for Workflow.

3. The “Send To” Dialogue box displays.
Select the destination device and press **OK**.

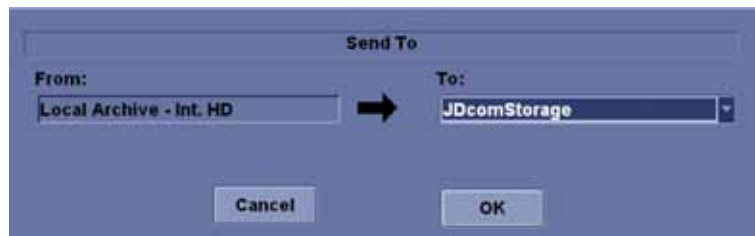


Figure 15-11. Send To Dialogue Box

NOTE: The destination device is configured in the Utility screen. Multiple devices are able to be configured.

The successful/unsuccessful message is displayed at the bottom of the screen.

Selectable Send To

“Selectable Send To” sends the selected images for an exam and to interactively Send-To the exam from Local Archive or DICOM Read to a destination DICOM device configured on the system.

1. Select a patient or an exam in the Archive menu.
2. Go to Active Images.
3. Select an image (images) and press **Send To**. Send To Dialogue displays

NOTE: *If the image is not selected, warning dialog is displayed and no image is sent.*

4. Select a destination from pull-down menu and press **OK**.

“Selected image(s) is (are) send to” message displays on the status bar.



Figure 15-12. Selectable Send To Dialogue Box

Using the DICOM Spooler

To monitor/control DICOM jobs, press **F4**. You can view, resend, redirect, and delete images from the DICOM spooler by selecting a job, then specifying the action to be performed on this job.

NOTE: If you find a failed job(s) in the Spooler, please remove the failed job(s) from the Spooler.

Table 15-3: Spooler status description

Status	Description
Hold	Waiting for user activity. Select Resend or Send-To to complete the job.
Pending	Waiting for the previous job(s) to finish (a previous job may be Active or Pending). No user interaction required.
Append	Not completed. Example 1: Direct Storing job. Waiting for more images or the end of the exam (by selecting New Patient or End Current Patient). Example 2: Print job with 3x3 images has only 8 images. Waiting for one more image or the end of the exam (by selecting New Patient or End Current Patient).
Active	Signifies network activity (or connection attempt).
Success	Sent successfully.
Failed	Unsuccessful job attempt. Job stays in spooler. Select Retry or Delete to complete the job.
Done	Finished successfully.

External drives

Removable media

Removable media can be used for the following purposes:

- Long-term image storage: the final destination of the images, after they are moved out of the system hard disk by using the EZBackup/EZMove (see 'EZBackup and EZMove' on *page 16-24*).
- Backup of patient database and system configuration presets (see 'Backup procedure' on *page 16-21*)
- Export to copy a set of patient records to a third party DICOM review station.
- MPEGVue: review exported images on a Windows computer (see 'MPEGVue' on *page 15-22*).
- Copy of system configuration presets between to units using the Backup/Restore feature (see 'Preset synchronization' on *page 16-23*).
- SaveAs: Save images as JPEG, WMV, AVI, DICOM and RawDICOM for review on a standard Windows computer.

About removable media and long-term image storage

If CD/DVD is used, it is recommended to use Archive Grade or Medical Grade CD/DVD.

No matter which media is used, it is always highly recommended to make a backup of the media, which is the responsibility of the customer.



HINTS

Keeping your media disc in an original media case or caddy all the time will prevent it from becoming dirty or damaged.

DVD Drive

The DVD drive (Standard) is an option and can be connected via USB ports.

You can use these to perform software upgrades, image archiving and service diagnostics.

You can use the following media for the multi-drive:

- CD-R
- DVD-R



CAUTION

DO NOT use or attempt to format CD-RW, DVD+R, DVD+RW or DVD-RW on the LOGIQ V2/LOGIQ V1 DVD Multi-Drive.



CAUTION

Due to the variety of disk types, we cannot guarantee that every media is available.

Recommendation concerning CD and DVD handling

To avoid data loss, never touch the recordable surface of a disk. Handle the disk only by the outer edge. Do not place it face down on a hard surface. Fingerprints or scratches will make the disk unusable. Before usage, verify that the disk surface has no visible scratches. If there are any scratches, do NOT use the disk.

Insert a media

Insert a media with the eject button on the DVD drive.



CAUTION

When you put a media into the DVD drive, please make sure the media is placed in the right position. If the media is not placed in the right position, the media may be damaged.



CAUTION

Make sure that the Disk tray is securely placed in each device during system operation. Mechanical damage may occur if other objects hit the tray.

Eject a media

1. To eject a media, always press **F3**. **DO NOT** use the eject button on the drive.
2. The Eject device menu is displayed. Select **CD/DVD Recordable**.
3. When ejecting a media, you are prompted if you wish to finalize the disk. If you do not finalize the disk, you can add files to the media at a later time. However, you may not be able to view the files stored on this disk with a standard PC. Finalizing a media, allows you to view these files using most standard PCs.

To verify that the data was successfully transferred to the media, Press **F3**, then select "Finalize" --> "Yes and Verify Files." If there was a corruption to the media during an operation, the message, "An error occurred on the last disk. Please discard it and start over." appears. In this case, please redo the operation with new media.

*NOTE: When you press **F3** with a blank media inside the DVD drive, the finalization menu displays. You can select "Yes" or "Yes and Verify Files", but the system ejects the media without doing anything.*

USB Hard Disk Drive/USB Flash Drive/SD card

USB Ports and SD card port

You can use the 2 general external USB ports and 1 SD card port on the left side for USB flash drives and SD card.



Figure 15-13. USB ports on the left side

1. 2 general external USB ports
2. 1 SD Card port

Cautions and Warnings



WARNING

DO NOT use the USB Hard Disk Drive for patient storage. The USB HDD is not considered a permanent storage device.

If you connect the USB HDD to a virus-infected computer, the USB HDD may also be infected with a computer virus.



CAUTION

Before removing the USB drive from the USB port, press Eject (F3) and select USB Drive from the pull-down menu. Disconnect the USB drive after the success dialogue is displayed. If the unsuccessful dialogue is displayed, retry after a while.



CAUTION

DO NOT plug in TWO Bus-powered USB Drives at the same time.



CAUTION

When exporting a large quantity of patient data to the USB-HDD, the system may crash. If this occurs, the export is not completed properly. First, delete the data remaining in the USB-HDD, and then try again with a smaller number of patients.

Cautions and Warnings (continued)



CAUTION

If a problem occurs while exporting to the USB-HDD, such as a crash, the export may not have completed. Try again with a smaller number of patients.



CAUTION

DO NOT Disconnect the USB HDD when performing EZMove on the system.



CAUTION

DO NOT use “Select All” when you export the patient data to the USB-HDD.

NOTE: Do not insert USB Memory devices (hard drives or flash drives) that contain multiple partitions into the scanner. Use single partitioned USB Drives.

NOTE: Some USB memory device manufacturers allow for executable partitions or ship pre-formatted new USB memory devices with multiple partitions pre-configured. BEFORE inserting any memory device into the scanner, insert it into a PC or MAC to verify that there is only a single partition. If multiple partitions exist, contact the USB manufacturer for the steps in reformatting the memory to a single partition.

Formatting the USB Flash Drive

NOTE: Before using the USB flash drive, format it in Utility -> Connectivity -> Removable media.

To format the USB Flash Drive

1. Insert the USB Flash Drive into the front USB port.
2. Select Utility--> Connectivity--> Removable Media.
3. Select USB Drive from the Removable Media pull-down menu.
4. Type the USB Flash Drive label.
5. Press **Format**.

Eject a USB Flash Drive/USB HDD

1. To eject a removable media, always press **F3**. **DO NOT** use the eject button on the drive.
2. The Eject device menu is displayed. Select the relevant media.
3. Select USB Drive from the pull-down menu to disconnect the USB Drive. Disconnect the USB drive after the success dialogue is displayed.

Remove the USB Drive from the USB port.

NOTE: *If the unsuccessful dialogue is displayed, retry after a while.*

NOTE: *Verify is NOT available on Flash Drives or Hard Disk Drive media.*

MPEGvue (Data Transfer)

To transfer a patient/exam to the USB Flash Drive or USB HDD,

1. Insert the USB Flash Drive into the USB port.
2. On the Archive menu, select **Data Transfer**, then **MPEGvue**. Specify USB Drive in the transfer To: pull-down menu. Select the patient/exam you want to transfer. Press **Transfer**.
3. When the transfer has been completed, press **Eject (F3)**. Select the USB Drive from the pull-down menu to disconnect the USB Drive.
4. Remove the USB Drive from the USB port.



CAUTION

After transferring images to a USB Drive using MPEGVue, verify that the images have actually transferred to the USB drive.

Backup/Restore

To Backup/Restore to/from a USB Flash Drive or USB HDD,

1. Insert the USB Drive into the USB port.
2. Press Utility--> System --> Backup/Restore. Select the USB Drive as the media.
3. Follow instructions for Backup/Restore. See 'Backup and Restore' on *page 16-21 for more information*.
4. When the Backup has been completed, press **Eject (F3)**. Select the USB Drive from the pull-down menu to disconnect the USB Drive.
5. Remove the USB Drive from the USB port.

SaveAs

NOTE: See 'Save As' on page 15-9 for more information.

To save images to the USB Flash Drive or USB HDD,

1. Insert the USB Drive into the USB port.
2. Select the image(s) to be saved.
3. Select **Save As** menu in the lower, right-hand corner of the screen. Select the USB Drive as the archive media.
4. Specify: Image only or Secondary Capture, type of compression, quality, and image save format (Raw DICOM, DICOM, Avi, Jpeg, or WMV).
5. Press **Save**. When the images have been saved, press **Eject (F3)**. Select USB Drive from the pull-down menu to disconnect the USB Drive.
6. Remove the USB Drive from the USB port.

NOTE: If you perform the SaveAs function to the USB drive ([drive letter]\Export) in RawDICOM format and review the data on your PC, the title of the data appears as "[drive letter]\GEMS_IMG\2013_Oct\08(date)\FL073749(First Letter of First Name and Last Name + time)", for example.

Direct SaveAs

You can save the image directly to the USB Drive just by pressing a **Print** or **Store** key.

NOTE: "Direct SaveAs" doesn't supports WMV type.

1. Insert the USB Drive into the USB port.
2. Select **Save As** from the pull-down menu in Utility -> Connectivity -> Service. Press **Add**.
3. Select **Save As** in the list. Rename it in the Name field if needed.
4. Select USB Drive in the Destination field.
5. Verify the service.
6. Press **Save**.
7. Assign Save As to the appropriate print/store key in Button tab.
8. Display the image on the monitor and press the assigned print/store key.

Export/Import

To export/import exams using the USB Flash Drive or USB HDD,

NOTE: *Before you export exams to the USB HDD, check “Export to USB HDD: Create DICOMDIR” in Utility -> Connectivity -> Miscellaneous. If you uncheck this parameter, you must import the data to review.*

1. Insert the USB Drive into the USB port.
2. On the Patient menu, select Data Transfer, then Export/Import. Specify USB Drive in the transfer To: pull-down menu. Select the patient/exam you want to transfer. Press **Transfer**.
3. When Export/Import has completed, press **F3**. Select USB Drive from the pull-down menu.
4. Remove the USB Drive from the USB port after the success dialogue displays.

EZBackup (USB HDD only)

1. Select “USB Drive” on the Utility -> Backup/Restore -> EZBackup/Move -> Media.
2. Follow instructions for EZBackup. See ‘EZBackup and EZMove’ on page 16-24 for more information.
3. When EZBackup has completed, press **F3**. Select USB Drive from the pull-down menu.
4. Remove the USB Hard Disk from the USB port after the success dialogue displays.

NOTE: *“Media capacity for estimate (MB)” in Utility -> System -> Backup/Restore -> EZBackup and EZMove are not effective when the Media is “USB HDD”. It only applies to the CD and DVD.*

SD card

You can use SD card for data management, which is the same as USB Flash Drive, to perform the MPEGvue (Data Transfer), Back up/Restore, Save As, Export/Import, EZBackup. For how to use SD card, you can refer to the information about USB Flash Drive in this Chapter.

Network Storage Service

You can save patient data/images to the PC directly with the following functions, if you select Network Storage service.

- Save As
- Export/Import
- MPEGvue
- DICOM Read

NOTE: *DO NOT share the folder used for Export/Import with other ultrasound systems. It causes loss of data if two or more systems access to the same folder. Please create the unique folder for each system.*

NOTE: *Before you export patient data/images using Network Storage, check "Export to Network Storage: Create DICOMDIR" in Utility -> Connectivity -> Miscellaneous. If you uncheck this parameter, you must import the data to review.*



CAUTION

After MPEGVue to Network Storage, the MPEGVue patient may not be listed in the To list. Make sure to confirm on the destination to storage whether the copy of data succeeded.

Potential risk

- Patient/Image data might not be sent at all with inaccurate network configuration.
- Patient/Image data might be lost by disconnecting the network.
- Patient/Image data might be damaged by unstable network/data coupling.
- Patient/Image data might be mixed up by network/data coupling.
- Patient/Image data might be sent to wrong destination if network configuration is not inaccurate.
- The system might be attacked by a virus and vulnerable infection.
- Network is not connected by IP address conflict.

LOGIQ V2/LOGIQ V1 Setup

NOTE: Create a Share folder on your PC on the network before continuing with this setup.

1. Select **Utility -> Connectivity -> Device**.
2. Select **Add**.
3. Type the computer name in the Name field and Static IP address in the IP Address field.

NOTE: Only use alphanumeric characters for the name.

NOTE: If you change Static IP Address after export, you cannot import patient data/image. In this case, type previous IP address again before import.



Figure 15-14. Network Storage Service setup - Device

Network Storage Service (continued)

4. Select **Ping** to verify the icon changes (smiley face appears).
5. Select Service.

Select the **Network Storage** from the pull-down menu.
Select **Add**.

Specify the properties for this service.

- Name: Enter unique name that identifies this service.

NOTE:

Do not use the same name for any other Service or device.

- Password: Enter the password used for logging onto the PC.
- User name: Enter the user name used for logging onto the PC.
- Shared Dir: Enter the Share name of the folder.

NOTE:

Only use alphanumeric characters for the Shared Dir.

6. Select **Save** and select **Verify** to verify the icon changes (smiley face appears).

It takes a long time to access Network Storage Service by the condition of the network.

Setup on your PC

Check with your network administrator about the LAN connection and setting method of the shared folder.

Printing Options

Setting up the Off-Line Paper Printer

You can connect an off-line paper printer via the Isolated USB port.

Following printers can be connected to the power outlet supplied by the system.

- BW Printer: Sony UP-D897, Sony UP-D898MD
- Color Printer: Sony UP-D25MD
- HP Officejet 100 Printer
- HP Officejet Pro 8100 Printer



CAUTION

ONLY plug in devices to the USB ports of the system WHILE the LOGIQ V2/LOGIQ V1 is NOT powered up. If you plug in a device while the LOGIQ V2/LOGIQ V1 is powered on, your system may become unusable.



CAUTION

DO NOT place an off-line paper printer inside the patient environment. This assures compliance to leakage current.



CAUTION

DO NOT place an off-line paper printer inside the patient environment (within the dotted line area noted by “1” in Figure 15-15). Refer to the off-board printer’s manufacture manual for details.

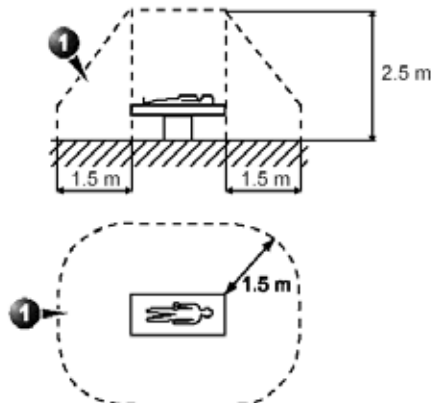


Figure 15-15. Patient Environment

Setting up the off-line paper printer

NOTE: The printer driver is customized for the LOGIQ V2/LOGIQ V1 at the factory; you do not need to change the settings.

1. Connect the printer to the USB port.
2. Select **Utility--> Connectivity--> Service**. Add the **Standard Print** service.



Figure 15-16. Connectivity -> Service Screen

3. Select the printer from the Printer pull-down Properties menu.

NOTE: After selecting the printer, the field turns white.

4. Set the parameters in Properties.
5. Type the printer name in the Name field.

NOTE: This name is used on the Button screen.

Setting up the off-line paper printer (continued)

6. Press **Save**, then select the Button tab.
7. Select the appropriate print key (Print or Print3 or Store) from the Physical Print Buttons section.
8. Select printer from the MyComputer column and press “>>” to move it to the Printflow View column.



Figure 15-17. Connectivity -> Button Screen

9. If you want to assign this printer to the Standard Print Button on the Active Image Screen, select this printer at the Active Image Printer section.
10. Press **Save**.

NOTE: *If you want settings other than 1 image per sheet, or 2x3 sheet, or to improve the image quality, refer to the manual that came with the printer.*

Setting up Digital Peripherals

You set up digital peripherals from the Utility --> System --> Peripherals menu.

NOTE: Printing using a standard printing service overrides the orientation and N-up feature of the printer preferences. Printer preferences are set up in the printer folder (via Utility-->System -->Peripherals. Select Properties under Standard Printer Properties).

Digital Printer Setup

There are two steps to do when setting up a digital printer:
1) follow the procedure below for each printer, then 2) set up specific properties for each printer if you need.

Follow this procedure for each printer:

1. Select Utility--> Connectivity--> Service. Select or add the Standard Print. Highlight Standard Print in the Service list. Select the printer from the Printer pull-down Properties menu.
2. Type the printer name in the Name field. This name is used on the Button screen. After you select the printer from the Printer pull-down Properties menu again, it turns white. Press **Save**.
3. Select **Button**. Select the appropriate print key (Store, Print, Print3) from the Physical Print Buttons section. Select the printer from the MyComputer column and press >> to move it to the Printflow View column. Press **Save**.

In Active Images screen, you can select **Standard Print** to print image in addition to pressing the Print key which is assigned for Printing control.

Setting up specific Properties for each digital printers Instructions

Follow these steps to set up specific properties:

1. Press Utility-->System-->Peripherals. Select the printers from the pull-down menu under Standard Printer Properties. Click **Properties**.



Figure 15-18. Properties

2. Select **Printing Properties** from **Printer** pull-down menu.

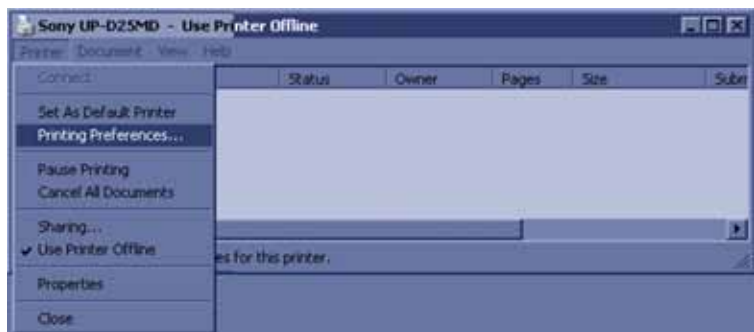


Figure 15-19. Properties setting up

3. Change the settings as necessary. Press **Apply**. Press **OK**.
4. Press **Save**, then **Exit**.

Setting up the Printer to Print Reports

To set up the Off-Line Printer to print reports,

1. Enter **Utility--> System--> Peripherals**.
2. Select the printer from Default Printer pull-down menu.



Figure 15-20. Report Printer Setup

3. Press **Save**.
4. Press **Print** on the Report screen to print the report.

Setting up specific Properties for report printers Instructions

Follow these steps to set up specific properties:

1. Press Utility-->System-->Peripherals. Select the printers from the pull-down menu under Standard Printer Properties. Click **Properties**.



Figure 15-21. Properties

2. Select **Printing Properties** from **Printer** pull-down menu.



Figure 15-22. Properties setting up

3. Change the settings as necessary. Press **Apply**. Press **OK**.
4. Press **Save**, then **Exit**.

Setting Up a Network Printer

The LOGIQ V2/LOGIQ V1 supports the HP printers which use HP Universal Printing PCL6 driver as network printer.

To set up the network printer on the LOGIQ V2/LOGIQ V1, first set up the network printer properties, then assign the print key for network printer.

Setting up the Network Printer Properties

1. Go to Utility-->System-->Peripherals. Select the HP Universal Printing PCL6 from the pull-down menu under Standard Printer Properties. Click **Properties**.



Figure 15-23. Properties

2. Click Printing Preferences in the Printer pull-down menu.



Figure 15-24. HP Network Printers Properties

Setting up the Network Printer Properties (continued)

3. Select Enter the Printer Address, enter the Printer Address.

NOTE:

Contact your network administrator for local network information.



Figure 15-25. Printing Preferences

4. Select the printer, select Check Status to see if the printer is ready for use.

If the printer is ready for use, select OK; if not, please contact your network and office administrator.

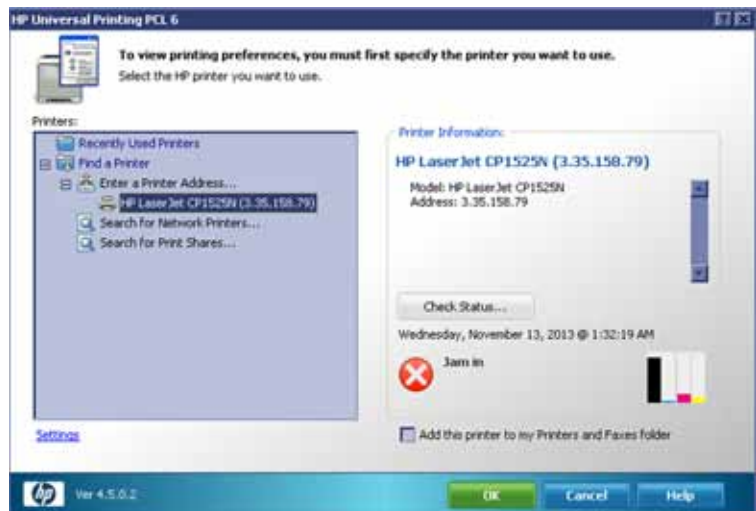


Figure 15-26. Check printer status

Setting up the Network Printer Properties (continued)

5. Change other settings as necessary. Select **Apply**, then Select **OK**.

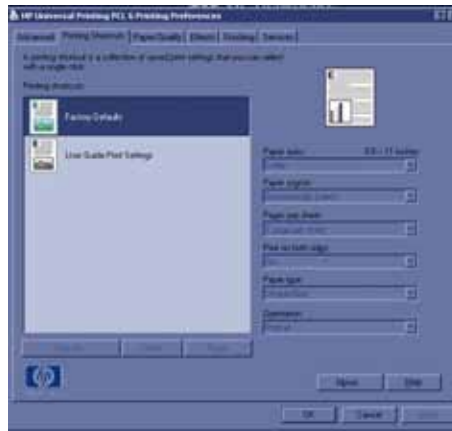


Figure 15-27. Setting Up Other Settings

Assigning the Print key for network printer

1. Go to Utility-->Connectivity -> Service, select or add Standard Printer in Service preset menu. Select HP Universal Printing PCL6 in the Printer drop down menu in the Properties column.
2. Press **Save**, then select the Button tab.
3. In Button tab, configure the print key (Print or Print3 or Store) as standard print, select **Save** and **Exit**.
4. Press the print or store key which is configured as Standard Print.

Chapter 16

Customizing Your System

Describes how to create system, user, and exam presets.

Overview

Preset Menu provides the following functionality:

- **System presets.** View and update general system configuration settings, measurement and analysis settings, and peripheral settings; backup and restore data and configuration files.
- **Imaging presets.** View and update exam and imaging parameters.
- **Comment presets.** Set up comment libraries by application.
- **Body Pattern presets.** Set up body pattern libraries by application.
- **Application presets.** Configure application- and user-specific settings.
- **Test Patterns Presets.** Helps configure system settings.
- **Connectivity Setup.** Define connection and communication setup, including exam dataflow information.
- **Measurement presets.** Customize exam studies, create measurements, set up manual sequencing, and create OB Tables.
- **Reports Presets.** Allows you to edit the report template, diagnosis codes, and report comments.
- **Admin presets.** Perform system administrator activities such as setting up user IDs and logon formats.
- **Service.** Activates the Service Browser.
- **Scan Assistant.** Create, import/export, and manage Scan Assistant programs.
- **Search.** You can search for a parameter on the Utility pages (Measure, Reports, and Service pages cannot be searched.)

To access these functions, select the **Utility** on the keyboard, then select the appropriate menu key.

System Presets

Overview

System presets allows you to view or change the following parameters

- **General** – Location, Date/Time, General User Interface, Title bar, Key Usage, Trackball, Utility, Scan Assistant and Audio and LCD configuration
- **System Imaging** – Biopsy Guides, Automatic Wide Screen, QAnalysis Statistics Value Display, Image Control and Display configuration
- **System Measure** – Measurement, Cursor and Results Window and SonoBiometry configuration
- **Backup/Restore** – Backup, Media, EZBackup/EZMove, Restore, Detailed Restore of User Defined.
- **Peripherals** – Print and Store Options, Standard Printer properties, Default Printer and Setup configuration
- **User Configurable Key** – User Defined keys, Keyboard keys
- **About** – System software, patent, and image information

Changing system parameters

To change system parameters:

1. Select **Utility** on the keyboard.
2. Then select **System**.
The System screen is displayed.
3. On the monitor display, move the **Trackball** to select the tab that has the information you want to change.
4. Select values for the parameters you want to change.
5. To save the changes, select the **Save** button. Select **Exit** to return to scanning. In some cases, you may need to reboot the system for the change to take effect.

System/General Preset Menu



Figure 16-1. System/General Preset Menu

Table 16-1: Location

Preset Parameter	Description
Hospital	Type the <i>institution's</i> name.
Department	Type the institution's department name.
Preset Region (restart needed)	Select region.
Language (restart needed)	Select the appropriate language from the drop-down list. Note: If you select Japanese (JPN), only the warning and status messages are displayed in Japanese. You can not type in Japanese.
Units	Select metric or US units of measurement.
Regional Options	Select to set up the keyboard.

Table 16-2: Date and Time

Preset Parameter	Description
Time Format	Select the time format.
Date Format	Select the date format.
Default Century	Select the default century for the system to use.
Date/Time	Select to display the Date/Time Properties window, to specify the system date, time, time zone, and to auto adjust for daylight savings time.

Table 16-3: General User Interface

Preset Parameter	Description
Color Level (restart needed)	Select System Color according to the condition of the room.

System/General Preset Menu (continued)

Table 16-4: Title Bar

Preset Parameter	Description
Hide Patient Data	When set to Always, patient information is removed from the scanning screen Title bar and when storing images; or you can set this to remove patient information only when storing the image (On Store); or Never. Note: Upon recall of images with measurements, Dual image, the DICOM image is recalled. In this case, there is no patient data burned into the DICOM image. If you DO NOT want this to occur, set this to Never.
Font Size (restart needed)	Select to display patient information in the title bar. You need to reboot the system for this change to take effect.

Table 16-5: Trackball

Preset Parameter	Description
Speed	Set how fast you want the Trackball to move while performing actions such as tracing the anatomy. 0=Slow; 20=Very Fast
Acceleration	Set how fast you want to trackball to move across the display. 0, 1, and 2 with 0 being the slowest acceleration.

Table 16-6: Key Usage

Preset Parameter	Description
Run Fast Key speed	Select the maximum value of the key interval when running Fast Key.
Cursor key mapping	Define the Cursor key function.

Table 16-7: Utility

Preset Parameter	Description
Prompt for Save on Exit	If selected, the system prompts you to save data when you select exit without saving.
Utility Font Size	Select the font size you want to use to view the Utility menus.

Table 16-8: Scan Assistant

Preset Parameter	Description
Always Use Doppler Cursor	Use the Doppler Cursor when you activate Scan Assistant.

Table 16-9: Audio and LCD

Preset Parameter	Description
Reset Audio Volume	Resets audio volume to default configuration.
Reset LCD Brightness	Resets LCD brightness to default configuration.

Foreign Language and Keyboard Setup

NOTE: You must apply the changes on each setup page before moving to the next page.

1. In Utility--> System--> General -> Location, select **Regional Options**.



Figure 16-2. Regional Options

2. The **Regional and Language Options** Screen displays. In the **Regional Options** tab, under **Standards and Formats** select desired language, under **Location** select desired location.



Figure 16-3. Regional Options

Foreign Language and Keyboard Setup (continued)

3. Select the **Advanced** tab, then select the language in the **Language for non-Unicode programs** pull-down menu.



Figure 16-4. Set Language

Foreign Language and Keyboard Setup (continued)

4. To set Foreign keyboard, perform the steps below:
 - a. Select the **Language** tab, select **Details**.
 - b. Select desired language under Default input language.
 - c. Under **Installed Services**, select input method.
If necessary, select **Add** or **Remove** to add or remove input method.



Figure 16-5. Selecting the International Keyboard

- d. Press **Apply**, press **OK**.
5. In the **Regional and Language Options** screen, select **Apply**, select **Yes** in the following pop-up message.

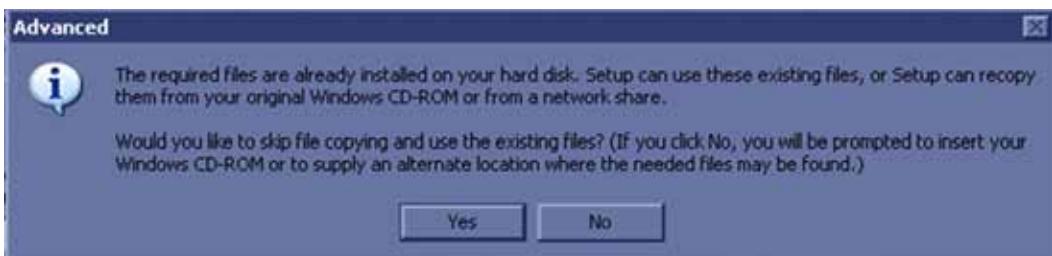


Figure 16-6. Copy and use existing files

Foreign Language and Keyboard Setup (continued)

- In the **Regional and Language Options** screen, select **OK**, select **No** in the following pop-up message.

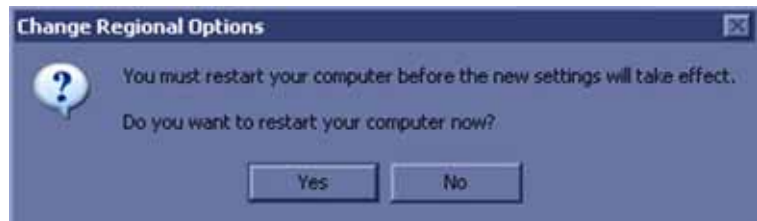


Figure 16-7. Restart Message

- In Utility--> System--> General -> Location -> Language, set the Language as desired.

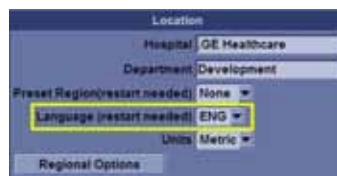


Figure 16-8. Location

- Press **Save**, select **OK** in the pop-up message.



Figure 16-9. Restart Message

- After the system restarts, the system appears in the selected language.

NOTE: Press **Ctrl+Shift** to change the input method, press **Alt+Shift** to change the input language.

NOTE: To have the settings take effect, you **MUST** turn off the system and turn it back on.

NOTE: Service password does not work for Greek and Russian language settings. Change the setting to English.

System/System Imaging Preset Menu

The System/System Imaging screen allows you to specify parameters for key usage, and image control and display.



Figure 16-10. System/System Imaging Preset Menu

Table 16-10: Biopsy Guides

Preset Parameter	Description
Show Center Line	Displays center biopsy guideline.
Show Outer Lines	Displays outer biopsy guidelines.
Enable 0.5cm markers	Activates biopsy depth markers every 0.5cm.
Show Biopsy Mark on CFM Simultaneous Mode	Displays the Biopsy Guideline on the image while in Simultaneous Mode.

System/System Imaging Preset Menu (continued)

Table 16-11: Automatic Wide Screen...

Preset Parameter	Description
Dual Screen	Automatically switch to Wide Screen when in Dual Screen.
DualView (Simultaneous)	Automatically switch to Wide Screen when in Simultaneous DualView Screen.
LOGIQ View	Automatically switch to Wide Screen when in LOGIQ View.
QAnalysis	Automatically switch to Wide Screen when in QAnalysis.

Table 16-12: QAnalysis Statistic Value Display

Preset Parameter	Description
Max Ratio	Select to display the Max Ratio value in QAnalysis.
Time of Max Ratio	Select to display the Time of Max Ratio value in QAnalysis.
Min Ratio	Select to display the Min Ratio value in QAnalysis.
Time of Min Ratio	Select to display the Time of Min Ratio value in QAnalysis.

Table 16-13: Controls

Preset Parameter	Description
Auto Invert on Linear Steer	When selected, for auto calcs, automatically inverts the timeline if needed when using ASO.
Auto Invert on ASO	Automatically inverts the spectrum with ASO.
Link Color/Doppler Invert	When selected, the Doppler timeline scale inverts along with the color ROI.
Audio Volume	Adjusts the Audio Volume.
Auto Freeze	Automatically freezes the system after few minutes of inactivity.
Turn Off CrossXBeam for LOGIQ View (non-linear probe)	Deactivates CrossXBeam when you activate LOGIQ View.
Doppler Scroll Priority	Set to 2D, Doppler, or Last Live Mode.

Table 16-14: Display

Preset Parameter	Description
Horizontal Scale	Select to display width markers.
TGC Display	Select to display TGC curve.
PW Velocity Units in cm/s	Select to change scale on timeline from centimeters per second to meters per second.

Table 16-14: Display (continued)

Preset Parameter	Description
Display image size	Select image display size.
Image Parameter Size (restart needed)	Choose image parameter size. Must reboot the system.
Highlight Image Parameter Changes	Select if you want the display to indicate which controls you adjusted by highlighting the new value on the display.
Show Clipboard	Deselect to hide the clipboard.
Overlay Color (single visible dataset)	Select the overlay color.
Hide Multiple Dataset Menu When Storing	Select to hide the Multiple Dataset Menu when storing.

Table 16-15: Auto Zoom Linear Probe Images at Shallow Depth...

Preset Parameter	Description
Single Screen	Automatically zoom linear probe images at a shallow depth on a single screen.
Dual Screen and DualView	Automatically zoom linear probe images at a shallow depth on the dual and DualView screen.

System/System Measure Preset Menu

The System/System Measure screen allows you to specify measurement parameters such as the type of default OB measurements and calculations. You can also define cursor and Results Window default functionality.

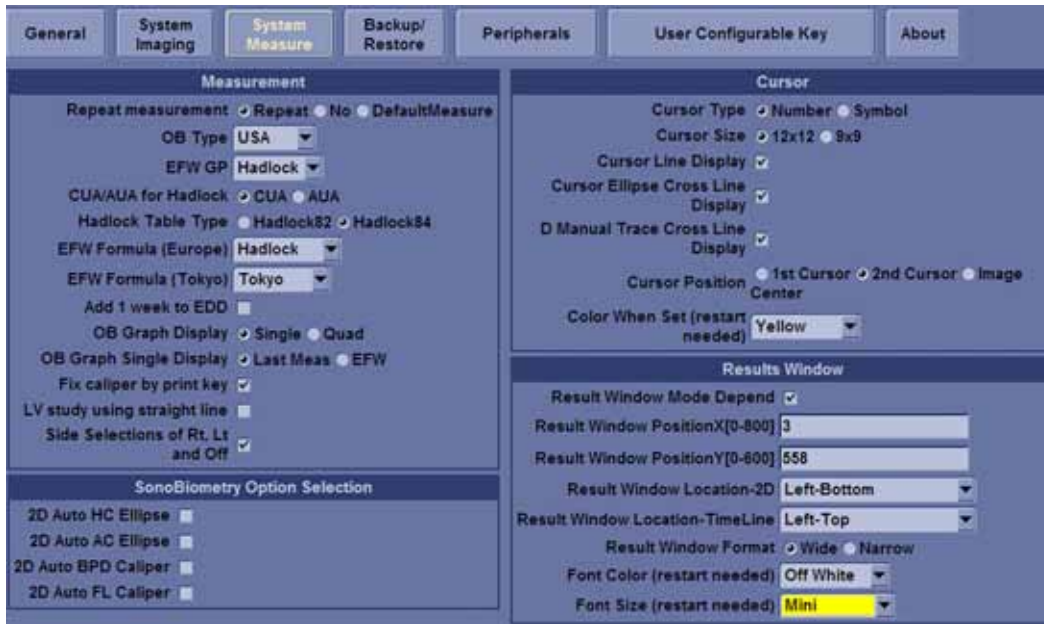


Figure 16-11. System/System Measure Preset Menu

System/System Measure Preset Menu (continued)

Table 16-16: Measurement

Preset Parameter	Description
Repeat Measurement	Select No, Repeat, DefaultMeas
OB Type	Select which OB measurements and calculations studies to use.
EFW GP	Select the source used to calculate EFW-GP Estimated Fetal Weight-Growth Percentile)
CUA/AUA for Hadlock	Select to use CUA (Composite Ultrasound Age) or AUA (Average Ultrasound Age) as the default
Hadlock Table Type	Select Hadlock 82 or Hadlock 84 tables
EFW Formula (Europe)	Select the source used to calculate EFW (Europe) (Estimated Fetal Weight).
EFW Formula (Tokyo)	Select the source used to calculate EFW (Tokyo) (Estimated Fetal Weight)
Add 1 week to EDD	Select to add additional week to estimated date of delivery
OB Graph Display	Select Single or Quad for displaying OB Graphs.
OB Graph Single Display	Select Last Meas or EFW Single OB Graph displayed by default.
Fix Caliper by Print key	Select to use the Print key like the Set key. <i>NOTE: If you select this during a generic volume measurement, the print key does not function like the Set key, but instead ends the measurement sequence and initiates the volume calculation based on the number of measurements taken so far.</i>
LV Study using straight line	Sets straight line as the default for 2D LV studies.
Side selections of Rt, Lt and Off	Select to use "Rt, Lt and Off" for Side Selection. When not selected, displays only "Rt and Lt".
SonoBiometry Option Selection	Select checkboxes to choose SonoBiometry options

System/System Measure Preset Menu (continued)

Table 16-17: Cursor

Preset Parameter	Description
Cursor Type	Select whether to mark measurements with numbers or symbols.
Cursor Size	Specify 12x12 or 9x9.
Cursor Line Display	If selected, after you press Set to complete a measurement, the cursor line is displayed. If not selected, after you press Set to complete a measurement, only the cursor number or symbol is displayed.
Cursor Ellipse Cross Line Display	Check box to display the cross line in Ellipse.
D Manual Trace Cross Line Display	Check box to display the cross line with the caliper.
Cursor Position	Select 1st Cursor, 2nd Cursor, or Image Center.
Color When Set (restart needed)	Select the color.

Table 16-18: Results Window

Preset Parameter	Description
Result Window Mode Depend	Select this if you want the measurement result window to be repositioned, depending on the mode.
Result Window Position X[0-800]	You can set the coordinates for the measurement result window when you do not have the result window set to be mode dependent. This is the X coordinate (left/right)
Result Window Position Y[0-600]	You can set the coordinates for the measurement result window when you do not have the result window set to be mode dependent. This is the Y coordinate (up/down)
Result Window Location-2D	Select the Result Window location on the Monitor Display for 2D mode.
Result Window Location-Timeline	Select the Result Window location for the images with timeline.
Result Window Format	Select Wide or Narrow.
Font Color (restart needed)	Select the color (reboots the system)
Font Size (restart needed)	Select the font size (reboots the system)

System/Backup and Restore Preset Menu

The backup and restore procedures described in this section are divided into two parts. The first part describes procedures to backup and restore patient data. The second part describes procedures to backup and restore system and user-defined configurations.

The Backup/Restore function enables the user to:

- Copy/Restore the patient archive.
- Copy/Restore the system configuration. The Copy/Restore system configuration feature enables the user to configure several units with identical presets, providing that the units have the same software version.

Depending on the system, you can use either a CD-R, DVD-R, USB Flash Drive, or USB Hard Disk for system backup/restore. For the sake of simplicity, we have used the CD-R in the following examples.

NOTE: *The system ONLY supports CD-R / DVD-R and DOES NOT support CD+R / DVD+R.*



WARNING

GE is not responsible for lost data if the suggested backup procedures are not followed and will not aid in the recovery of lost data.



WARNING

The LOGIQ V2/LOGIQ V1 is not intended to be used as a storage device; backup of the Patient and Image Database is your institution's responsibility. GE is NOT responsible for any lost patient information or for lost images.



WARNING

The system crash can cause the HDD corruption. The HDD is not considered a permanent storage device. Backup data on a regular basis.

System/Backup and Restore Preset Menu (continued)

**CAUTION**

To minimize accidental loss of data, perform EZBackup and Backup on a regular basis.

1. First, perform EZBackup to save the images.
2. Next, perform Backup at **Utility -> System -> Backup/Restore**. Enable the following checkboxes under Backup:
 - Patient Archive
 - Report Archive
 - User defined configuration
 - Service

**CAUTION**

Archived data is managed at the individual sites. Performing data backup (to any device) is recommended.

**CAUTION**

Make sure to verify the media after writing of data, such as EZBackup, SaveAs or Export.

Verifying media requires additional time, which varies depending on the amount of data backed up or exported.

**CAUTION**

Before deleting a patient or image from the patient screen, make sure you have saved the data by EZBackup/Backup or Export and verify that the media transfer of data was successful.

System/Backup and Restore Preset Menu (continued)

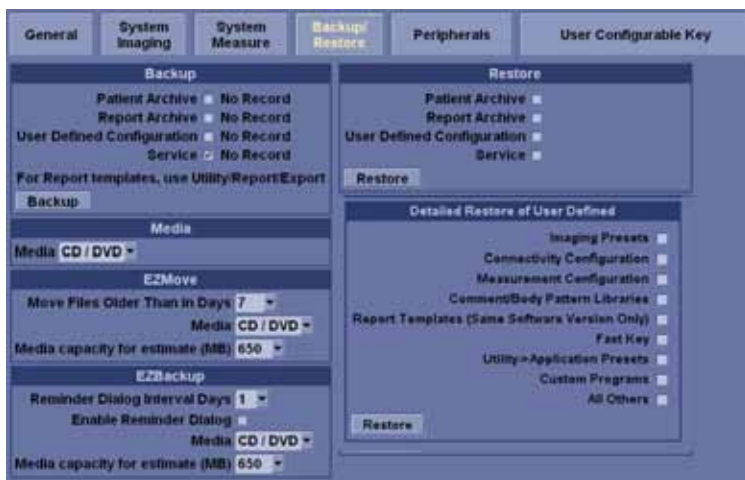


Figure 16-12. System/Backup/Restore Preset Menu

Table 16-19: Backup

Preset Parameter	Description
Patient Archive	Select to back up patient data.
Report Archive	Select to back up report data.
User Defined Configuration	Select to back up the user-defined configuration settings.
Service	Select to back up Service settings.
Backup	Select to begin the backup.

Table 16-20: Media

Preset Parameter	Description
Media	Select media type to use for backup and restore.

System/Backup and Restore Preset Menu (continued)

Table 16-21: EZMove

Preset Parameter	Description
Move Files Older Than in Days	The system will move images older than the number of days specified here. If you enter a zero (0), then all of the images from today on will be moved.
Media	Select media type.
Media capacity for estimate (MB)	Specify the capacity of the backup media.

Table 16-22: EZBackup

Preset Parameter	Description
Reminder Dialog Interval days	Specify the number of days after the last backup that you want the system to prompt you to perform an EZBackup procedure (only for moving images).
Enable Reminder Dialog	Select to activate the EZBackup reminder pop-up dialog.
Media	Select media type.
Media capacity for estimate (MB)	Specify the capacity of the backup media.

Table 16-23: Restore

Preset Parameter	Description
Patient Archive	Select to restore patient data.
Report Archive	Select to restore report data.
User Defined Configuration	Select to restore the user-defined configuration settings.
Service	Select to restore service settings. CAUTION: DO NOT restore service presets on to a different LOGIQ V2/ LOGIQ V1 system. Only restore service presets to the same system.
Restore	Select to begin the restore process for the selected configuration files.

System/Backup and Restore Preset Menu (continued)

The detailed section of this menu allows you to restore one area at a time from the user defined configuration. This allows you to selectively restore what you want to restore across multiple machines. Check the box(es) you want to restore, insert the appropriate media, and press Restore.

NOTE: *When you restore backup data from the Utility menu, the LOGIQ V2/LOGIQ V1 application usually restarts automatically when the restoring is complete.*

Table 16-24: Detailed Restore

Preset Parameter	Description
Imaging Presets	Select to restore imaging presets.
Connectivity Configuration	Select to restore connectivity configurations.
Measurement Configuration	Select to restore measurement configurations.
Comment/Body Pattern Libraries	Select to restore comment and body pattern configurations.
Report Templates (Same software version only)	Select to restore Report templates.
Fast Key	Select to restore Fast Key.
Utility-->Application Presets	Select to restore Utility--> Application presets.
Custom Programs	Select to restore Scan Assistant programs.
All Others	Select to restore all other configurations not listed in the Detailed Restore section. This includes parameters defined on the System preset menus.
Restore	Select to begin the restore process for the selected configuration files.

Backup and Restore

To minimize accidental loss of data, perform backup of the patient archives stored on the local hard drive **DAILY** as described in this section. Use a formatted Backup/Restore disk to back up patient archives from the hard drive, using the backup procedure described in this section. Data from the Backup/Restore disk may be restored to the local hard drive using the restore procedure.

NOTE: *To perform backup and restore procedures, you must login with administrator privileges.*

Backup procedure

Back up patient data **AFTER** you've archived (via EZBackup/EZMove) images so that the pointers to the patient's images reflect that the images have been moved to removable media and are no longer on the hard drive.

1. Insert a media into the drive or USB device into a USB port.
2. On the Archive screen under dataflow, select Local Archive - Int. HD.
3. Go to Utility --> System --> Backup/Restore.
4. In the Backup list,
 - Select **Patient Archive** and **Report Archive** to backup the patient records.
 - Select **User Defined Configuration** to copy system settings and user presets.
 - Select **Service** to backup service presets.

NOTE: *The detailed section of this menu decouples the user defined configuration above. This allows you to selectively restore what you want to restore across multiple machines.*

5. Specify where to save data in the media field.
6. Select **Backup**.
The system performs the backup. As it proceeds, status information is displayed on the Backup/Restore screen.
7. At the end of the process, the Backup completed message is displayed on the monitor.
Select **Eject (F3)** to eject media/disconnect the USB device.
8. Make sure to physically label the media. An identification of the system should also be noted on the media and a backup log should be kept.

File the media in a safe place.

Restore procedure



CAUTION

The restore procedure overwrites the existing database on the local hard drive. Make sure to insert the correct media.

You cannot restore the data between systems with different software versions.



CAUTION

To avoid the risk of overwriting the local patient and report archives, **DO NOT** check Patient Archive when restoring user-defined configurations.

1. Go to Utility --> System --> Backup/Restore.
2. In the Restore list,
 - Select **Patient Archive** and **Report Archive** to restore the patient archive.
 - Select **User Defined Configuration** to restore all system settings and user presets.or
One or several system configuration items to restore parts of the Detailed Restore of User Defined.
 - Select **Service** to restore Service Settings.
3. In the Media field, select the appropriate Source device.
4. Select **Restore**.

The system performs the restore. As it proceeds, status information is displayed on the Backup/Restore screen.
5. The LOGIQ V2/LOGIQ V1 restarts automatically when Restore is done.

Backup and restore strategy: user-defined configurations

In addition to generating a safety copy, the backup/restore function of the user-defined configuration (presets) can be used to configure several LOGIQ V2/LOGIQ V1 systems with identical presets (preset synchronization).

Preset synchronization

The procedure for preset synchronization of several scanners is as follow:

1. Make a backup of the user-defined configurations on a removable media from a fully configured LOGIQ V2/LOGIQ V1 system.
2. Restore user-defined configurations from the removable media to another LOGIQ V2/LOGIQ V1 system (you can restore all the user-defined presets or select specific presets to restore via Detailed Restore).

EZBackup and EZMove

EZBackup or EZMove allows you to manage hard disk space (move images off the hard drive) while maintaining the patient database on the scanner, as well as to back up the patient database and images.

- **EZBackup:** Copy the data from the local HDD to the removable media.
- **EZMove:** Copy the data from the local HDD to the removable media. After copying the image file to the media, EZMove deletes the image file from the Local HD.



HINTS

PLEASE READ THIS

Ensure that you have established a data management protocol for your office/institution. You **MUST** manage the backup media by keeping a log and by creating a media filing system.

For example, if you need to back up 500 MB/day, or 2.5 GB/week, then you need to back up 5 CDs/s/week, or ~250CDs/year.

Generally speaking, you should back up the system when you have 10 GB of images to back up.

You should assign the person who is in charge of performing the backups. Backups will vary by the volume of your work. You need to track how long it takes your office/institution to get to 10 GB, and set the back-up parameters accordingly.

Your office/institution needs to determine your backup strategy, for instance, backup weekly and move monthly. It should be an easy strategy to perform and to remember. And follow this same strategy/schedule consistently.

It's also useful to keep your more recent information on the hard drive since it's easier to recall that way.

EZBackup and EZMove (continued)



CAUTION

You can still do a backup/move daily; but ALWAYS do a patient archive backup after each move.



CAUTION

Only cancel the backup/move in case of an emergency. The system completes backing up the current media and then cancels the operation.



CAUTION

When EZBackup requires more than one disk (CD-R or DVD-R) for backup, a message appears when the first disk is full. If you select "Cancel" to stop the backup procedure and later try EZBackup again, all the data may not be backed up.

Select "Full Backup" on the first EZBackup wizard screen if the last time you were performing EZBackup you selected "Cancel".



CAUTION

If you use EZBackup or EZMove as a "true" patient archive, you must maintain a separate backup of the patient database (Patient Archive and Report Archive). If for any reason the Local Archive - Int HD gets corrupted or the base system software has to be reloaded, then the patient archive is the ONLY way to rebuild the EZBackup and EZMove patient archive.



CAUTION

DO NOT turn off the power while EZBackup is running. The data may be lost. It may take several hours for EZBackup to finish, depending on the amount of data being backed up.

The following may give the impression of a lockup, but EZBackup is continuing in the background.

- The progress bar does not move.
- The screen may become white.
- The hourglass icon keep turning.

EZBackup and EZMove (continued)



CAUTION

NEVER restore the patient archive from media made previous to the last move.

- NOTE: EZBackup/EZMove are saved data as RAW data. If you import data to the system, you can modify the image data.*
- NOTE: To display exported Raw DICOM images on a PC, you need the dedicated viewer.*
- NOTE: When backing up or moving reports using EZBackup and EZMove, use the USB HDD. DVDs and CDs are not supported for backing up or moving reports using EZBackup or EZMove.*
- NOTE: "Archived" information is saved to each exam during EZBackup. When you perform EZBackup, the system backs up the exams except for the archived exam.*
- NOTE: EZBackup/EZMove cannot span a single image across two (2) or more media. Therefore, if EZBackup/EZMove encounters an image that is greater than the capacity of the media, it skips the oversized image.*
- NOTE: EZBackup/EZMove does not store images to media in sequential order. Instead it maximizes the most amount of images per media.*
- NOTE: If the system locks up during the media auto format process, shutdown the system by holding down the power button and boot it up again. After the system is up, replace the media to a new one and execute EZBackup or EZMove again. To avoid a trouble such as data loss, do not reuse the failed media for any other function.*
- NOTE: If you try exporting a previously backed-up exam, the message "Can't Find Source file" displays. The image data had already been removed from the hard disk drive with EZBackup/EZMove.*

EZBackup and EZMove (continued)

Basically, when you perform the EZBackup or EZMove procedure, you insert the media (or connect USB HDD if applicable), the system backs up/moves the images, and creates a reference between the patient database and the media's volume.

EZBackup/EZMove can take up to 20 minutes (or longer, depending on the size of the backup). Make sure to schedule this at the same time daily, when no patients are scheduled.

1. Prepare unformatted media or the USB HDD before starting EZBackup/EZMove.
2. Specify the EZBackup/EZMove setup on the Utility --> System --> Backup/Restore page.
3. To start the EZBackup/EZMove procedure, go to the **Archive** Screen and select EZBackup/EZMove. The EZBackup/EZMove Wizard starts.

NOTE: If you use the USB HDD, some wizards and the pop-up messages DO NOT appear.

EZBackup and EZMove (continued)

4. Verify the information on the first page of the EZBackup/EZMove Wizard, then press *Next*.

Full backup options display on the first page of the EZBackup wizard. If you want to backup all of the exams in the range (even if the exam was previously backed up, check this option). If you uncheck this option, the system only backs up exams which have not yet been backed up.

NOTE: *You can set the range for EZMove in Utility --> System --> Backup/Restore --> Move files older than in days.*

NOTE: *If you update an exam which is already backed up, the exam is also backed up.*



Figure 16-13. EZBackup Wizard, Page 1

EZBackup and EZMove (continued)

5. Verify the information on the EZBackup/EZMove Wizard, Page 2. The backup may span multiple media. This page tells you how many media you need to do this backup. After you have gathered the media (allow for one extra media, just in case), you are ready to begin the backup. Press *Next*. If the storage capacity of the USB HD is insufficient, you will see the message, "Selected Location does not have enough free space."

NOTE: *The calculation for the number of backup CD is only an estimate. Allow for one additional CD when performing an EZBackup/EZMove.*

NOTE: *This message appears if you press Next without inserting the backup media: "Please insert a blank media...". Insert the media and continue.*



Figure 16-14. EZBackup/EZMove Wizard, Page 2

EZBackup and EZMove (continued)

6. A pop-up message appears that provides you with the media label. Label the media, then insert the media. Press **OK**.



Figure 16-15. Insert Media Message

- a. Ensure that you label the media with not only the volume name indicated on the Insert Media Message, but with the name of the LOGIQ V2/LOGIQ V1 system where this backup/move procedure was done.
- b. Update the EZBackup/EZMove log with this information the volume information and the location of the media.
- c. After the backup/move has been completed, file the media.

Table 16-25: Typical EZBackup/EZMove Log

Date	Scanner ID Name	Backup Images Y/N	Older than __ Days	Move Images Y/N	Media Label (and Scanner ID)

EZBackup and EZMove (continued)

7. The status menu appears. When the backup/move has been completed, press **Next**.



Figure 16-16. EZBackup Wizard Page 3

NOTE: *When/if you need to insert the next media, a message appears providing you with the media label. Label the media, then insert the next media and press OK.*

EZBackup and EZMove (continued)

- When the backup is complete, the completed wizard page appears. Press **Finish**.



Figure 16-17. EZBackup/EZMove Wizard, Page 4

- Do a patient archive after each EZBackup/EZMove (move). We recommend attaching the patient list to the EZBackup/EZMove media.

NOTE: Use *Import* to restore EZBackup images.

To Review EZBackup/EZMove and Export Images

You can review backed up media via the Archive Menu, Import, and the DICOM Read dataflow.

If you review EZMoved image,

1. Select the patient on the Patient Menu (on the same system where the EZMove was performed).
2. Insert the media volume indicated on the Patient Menu.
3. View the exam from the media.

NOTE: You may need to insert a media volume prior to or after the recommended media.

NOTE: If the patient is split over multiple media, images on the previous or next media are displayed as triangles.

NOTE: To view the whole patient on the system, use Import, from as many media as you have for that patient. However, take care not to import studies over existing studies; duplicate or missing images may result. Delete the existing exam first.

System/Peripherals Menu

The System/Peripherals screen allows you to specify parameters for the printers.



Figure 16-18. System/Peripherals Preset Menu

Print and Store Options: select **Print and Store Options** to go to the Utility --> Connectivity --> Miscellaneous setup page.

Removable Media: select **Removable Media** to go to the Utility --> Connectivity --> Removable Media page.

Table 16-26: Setup

Preset Parameter	Description
Standard Printer Properties: [Printer] and Properties, and Default Printer	Select to add an additional standard printer via the USB serial port and to configure digital printers. This activates the Windows Add Printer wizard. NOTE: Most printer drivers are available via Windows; however, newer printers may require you to load the manufacturer-supplied print driver. Note: The displayed Sony UP-D898MD/X898MD is just the printer driver for UP-D898MD. Sony UP-X898MD is NOT supported on LOGIQ V2/LOGIQ V1.
Print Full Screen	Select for the standard printer to print the full screen.
Enable Video Invert	Select for the standard printer to print black on white rather than white on black.
Video Output Format	Select the video format, PAL or NTSC.

System/User Configurable Key



Figure 16-19. User Configurable Key Preset Menu

Table 16-27: Keyboard Key and User Defined Key

Preset Parameter	Description
Enable Numeric Hot Key	Select to enable the Numeric hot keys. Only when this is selected, selecting the Numeric hot key on the keyboard can activate the assigned functions.
Enable Alphabet Hot Key	Select to enable the Alphabet hot keys. Only when this is selected, selecting the alphabet hot key on the keyboard can activate the assigned functions (Comments, Body Pattern and Measure).

User Defined and Keyboard keys

User Defined and Keyboards Keys can be programmed as one of the functions in the list. After programmed, the functions can be activated by selecting the User Defined and Keyboard Keys.

To program the numeric hot key on the keyboard:

1. Select the function from the drop-down list for the numeric hot key.
2. Select **Enable Numeric Hot Key**.
3. Pre **Save** and **Exit** to save the settings and exit the utility screen.
4. Select the programmed numeric hot key to activate the assigned function.

To program the user defined key on the control panel:

1. Select the function from the drop-down list for the User defined key.
2. Pre **Save** and **Exit** to save the settings and exit the utility screen.
3. Select the programmed user defined key to activate the assigned function.

System/About Preset Menu



Figure 16-20. System/About screen

The System/About screen lists information about the system software.

Table 16-28: Software

Preset Parameter	Description
Software Version	The current software version on this system.
Software Part Number	The software part number.
Build View	The software build view.
Build Date	The software build date.

Table 16-29: Patents

Preset Parameter	Description
Patents	Lists system patents.

Table 16-30: System Image

Preset Parameter	Description
Image Part Number	The image part number (ghost part number).
Image Date	The image date (ghost date).

Additional About Information

Click and open **Additional About Information** for hardware information: Module Name, Revision and Part Number.

Imaging Presets

Overview

Imaging screens allow you to specify parameters for the following:

- B-Mode (B)
- Color Flow Mode (CF)
- Power Doppler Imaging (PDI)
- M-Mode (M)
- Anatomical M-Mode (AMM)
- Pulse Wave Mode (PW)
- Continuous Wave Mode (CW)
- Harmonics (HAR)
- Tissue Velocity Imaging (TVI)
- Tissue Velocity Doppler (TVD)
- General

Overview (continued)

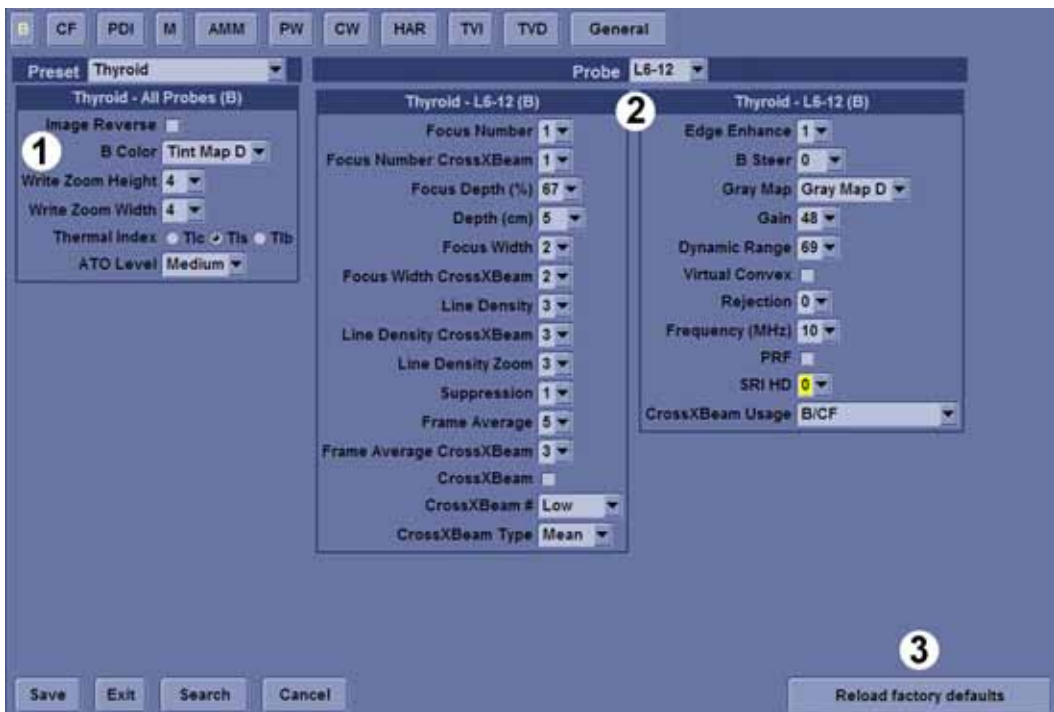


Figure 16-21. Imaging - Example

1. Model/application dependent setup parameters
2. Probe dependent setup parameters
3. Select to reload factory defaults

Changing imaging presets

To change imaging presets:

1. Select **Utility** on the keyboard.
2. Select **Imaging**.

The system displays the Imaging screens.

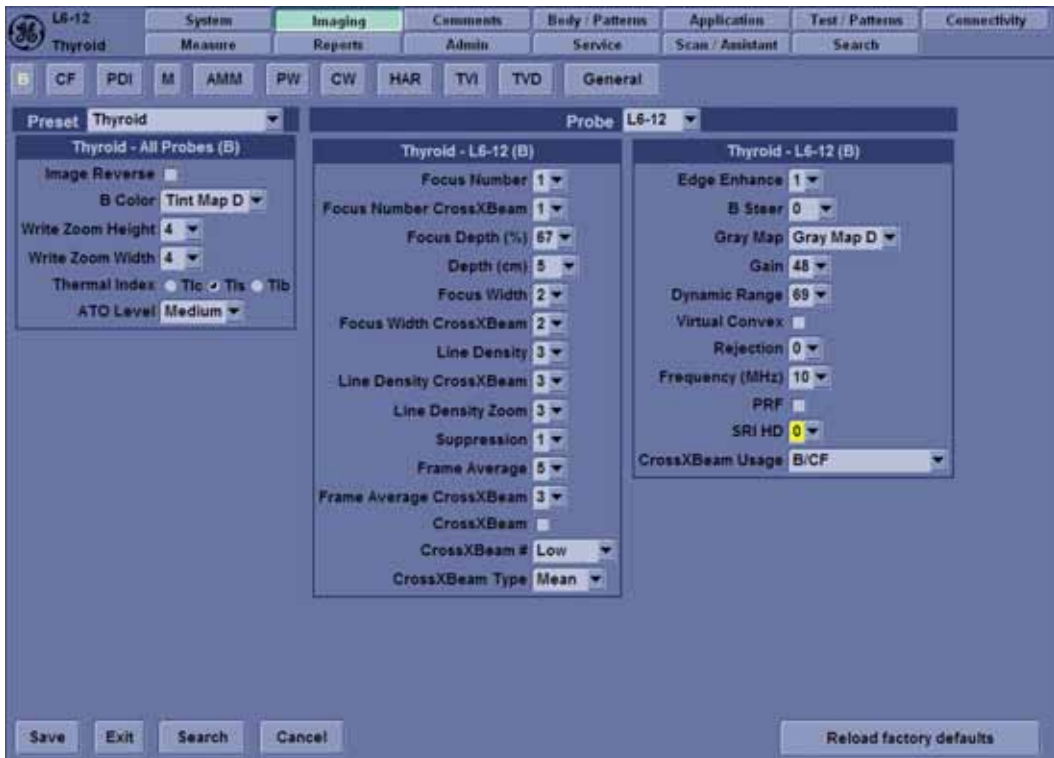


Figure 16-22. Example: B-Mode Preset

3. In the row across the top of the screen, select the mode.
The system displays two sets of parameters and settings. The left column lists all settings for the exam (for example, OB-1). The right column lists settings that apply only to the exam and probe combination.
4. In the Preset list, select the exam.
5. In the Probe list, select the probe.
6. To change a parameter, do one of the following:
 - Select the value from a list.
 - Select one value from a choice of two or more buttons.
 - Select or clear a check box.

Changing imaging presets (continued)

7. After changing the parameters, to save the changes, select the **Save** button.

NOTE: When you Save changes to imaging parameters, the system saves changes to all modes, not just the mode currently displayed.

NOTE: If you have problems with imaging, you can return parameters back to the original settings. Select the exam, probe, and mode, and then select Reload Factory Defaults. The system returns the selected parameters to the original settings.

For information about the specific parameters, refer to Chapter 5 Optimizing the Image.

General

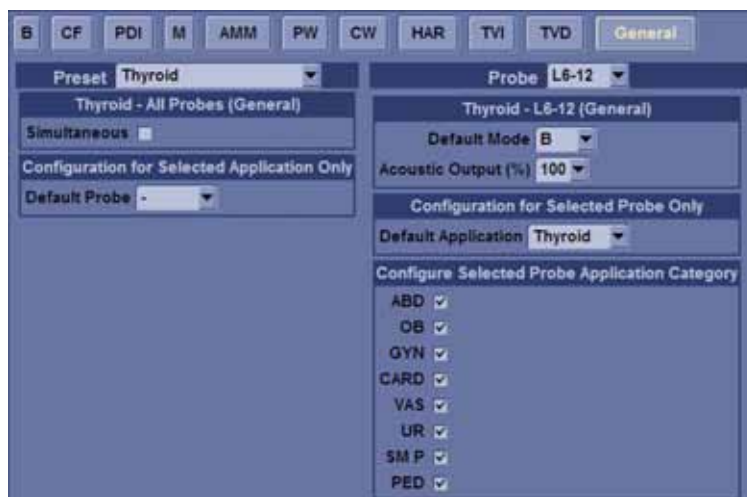


Figure 16-23. General Presets

You can specify a default probe per application and a default application per probe.

Default probe per application

1. To specify a default probe per application, select Utility --> Imaging --> General -> Configuration for Selected Application Only.
2. Select the default probe from the pull-down menu.

Default mode and application per probe

1. To specify a default application per probe, select Utility --> Imaging --> General.
2. Under Probe, specify the desired mode and application from the pull-down menu.

Selected Probe application Category

1. To specify the application category for the selected probe, select Utility --> Imaging --> General.
2. Select the appropriate applications for the selected probe.

Other setting

Checkmark the following field when you want the system to activate a certain display:

- Simultaneous

Comments Libraries Presets

Overview

Comment screens allow you to specify comment text and pointer options, to define comment libraries, and assign comment libraries to applications.

Comments Libraries/Libraries Preset Menu

On the comments *Libraries* tab, you can change and create comment libraries. A comment library is a list of comments that are associated with a specific application. The comments are listed in the library in the order in which they display on the Comment Menu on the screen.



Figure 16-24. Comment Libraries Preset Menu

Table 16-31: Libraries

Presets Parameter	Description
Library	The name of the comment library.
Left and Right Columns	The list of comments for the selected library separated by side.
User Defined Library	The name of a new comment library that you want to create/delete.
Copy from Existing	You can add to or delete from the selection of comments.
Hot Key	Assign frequently-used comments to specific alphanumeric keys (programmed as hot keys)

Defining Comments

1. In the *Library* field, select the library you want.
The system displays all comments for the library. The comments are listed in the order that they are shown when you use comments.
2. To change or add an comment, select the comment or blank location and press **Set**, then do one of the following:
 - Type the comment.
 - Select the comment in the *Copy from Existing* list, and press **Set**.
3. To save the changes, select the **Save** button.

Creating a new comments library

1. In the *User Defined Library* field, type a name for the library, then select **Create**.
The system creates a new library.
2. Enter comments as described in step 2 above section (**Defining Comments**).
3. To save the changes, select the **Save** button.

Deleting a user defined library

1. Select the library name which you want to delete from the pull-down menu.
2. Press **Delete**.
3. Press **Save** to save the changes.

Defining Hot Keys

There are ten alphanumeric keys that are programmable as hot keys to store frequently-used annotations.

1. In the *Hot Key* field, select the desired hot key (A, S, D, F, G, H, J, K, L or ;).
2. Press **Set**.
3. Type the comment or Select the comment in the *Copy from Existing* list, and press **Set**.
4. Press **Save** to save the changes.
5. Ensure that the “Enable Alphabet Hot Key” preset has been selected in the Keyboard key portion in the Utility -> System -> User Configurable key preset screen.
6. When scanning, if a comment is required, select the programmed alphabet hot key to add the corresponding comments.

Comments Libraries/Comments Preset Menu

On the Comments tab, you specify text and pointer options.



Figure 16-25. Comment/Comments Preset Menu

Table 16-32: Text

Preset Parameter	Description
Text Font Size	Specify the font size. The font size increases as the number increases.
Text1 Color / Text 2 Color	Select the color for comment Text1 and Text2.
Text Boundary	Select Group Move or Word Wrapping.
Enable Type Over Mode	Select to type over existing comments. Position the cursor over the text to be changed, then start typing.
Automatically Set Text	If selected, the system sets the comment at the cursor position automatically when text entry is complete.

Table 16-33: Arrow

Preset Parameter	Description
Arrow Length	Select the default pointer length.
Arrow Size	Select the default pointer size.
Keep Arrow Angle	Keep the angle of arrow pointer head until next change.

Comments Libraries/Comments Preset Menu (continued)

Table 16-34: General

Preset Parameter	Description
Retain while entering or leaving timeline mode	If selected, the system keeps the comment(s) on the monitor display when you enter or leave timeline mode.
TextOverlay in Multiple Image	When selected, and you select the F8 key to hide or show comments, if you are in multiple image, the system hides the text in both images. When cleared, the system only hides the text for the active image.
TextOverlay sequence	You can specify to display Text1, Text2, or both. This allows you to have some comments that do not change during the exam while allowing you to change other comments. Toggle the F8 key to cycle through the 3 Text1/Text12 states.
Erase When the image is unfrozen	Deletes comments when you unfreeze the image. If you check this parameter, Text2 automatically erase when you unfreeze the image.
Show ToolTip	If selected, shows tool tip when comments are typed on the screen.
Erase When the probe or application is changed	Deletes annotations when you change the application or probe.

After you change comment options, select **Save** to save the changes.

Comments Libraries/Applications Preset Menu

The Comments Libraries/Applications tab is a link to the Applications preset menu. The Applications preset screen allows you to specify which libraries belong to an application. You also specify which is the default library that displays when you use comments.



Figure 16-26. Applications/Comments Link

The Applications/Comments screen can be accessed through either the Comments Libraries or Applications key.

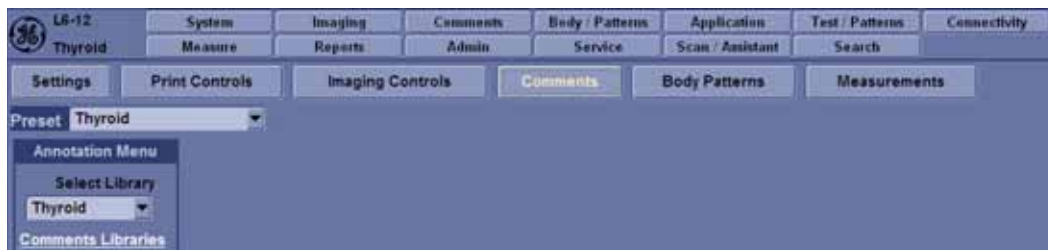


Figure 16-27. Applications/Comments Preset Menu

Specifying which libraries belong to an application

1. On the Comments tab, in the Preset field, select the application.
2. In the Library Group Tabs fields, select the libraries for this application.
3. To save the changes, select the **Save** button.

Table 16-35: Applications

Preset Parameter	Description
Preset	The name of the application preset.
Select Library	Select the library from the drop-down list for the application.

Using comments from a library

To use comments, press the **Comment** key on the Control Panel. Comments are then displayed on the screen.

Select the appropriate comments.

Body Patterns Presets

Overview

Body patterns screens allow you to specify body pattern options, to define body pattern libraries, and assign body pattern libraries.

Body Pattern Libraries/Libraries Preset Menu

On the Body Patterns Libraries tab, you can change and create body pattern libraries. A body pattern library is a list of body patterns that are associated with a specific application. The body patterns are listed in the library in the order in which they display on the control panel.

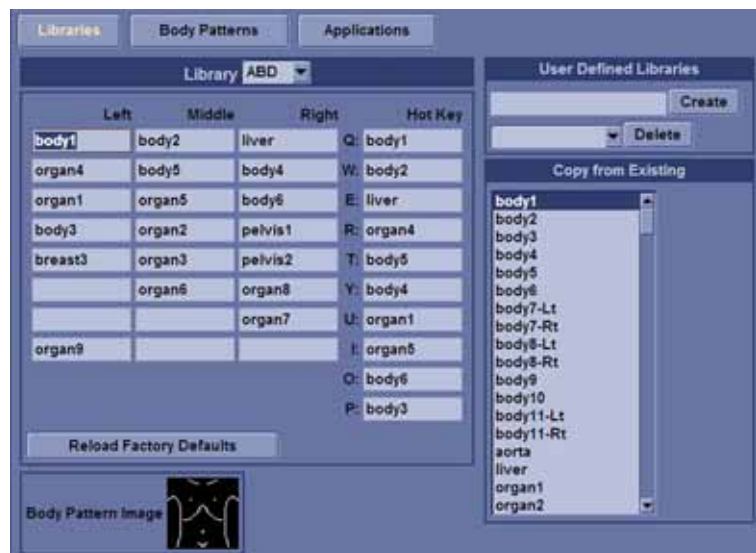


Figure 16-28. Body Patterns Libraries Preset Menu

Body Pattern Libraries/Libraries Preset Menu (continued)

Table 16-36: Body Patterns Libraries

Preset Parameter	Description
Library	The name of the body pattern application library.
Left, Middle and Right Columns	The list of body patterns for the selected library.
Body Pattern Image	Displays the image of the currently selected body pattern.
User Defined Libraries-Create	The name of a new body pattern application library that you want to create.
User Defined Libraries-Delete	Allows the selection of the user defined library to be deleted.
Copy from Existing	A list of body patterns you can use to create an application library.
Hot key	The list of body patterns for the selected library can be assigned to the designated alphanumeric keys as hot keys.

Defining body patterns

1. In the *Library* field, select the application library you want. The system displays all body patterns for the library. The body patterns are listed in the order that they are shown on the menu.
2. To change or add a body pattern, select the body pattern or blank location and press **Set**, then do one of the following:
 - Type the body pattern name.
 - Select the body pattern in the *Copy from Existing* list, and press **Set**.

NOTE: When you select a body pattern name on the menu or in the *Copy from Existing* list, the system displays the pattern in the lower left corner of the screen.

3. To save the changes, select the **Save** button.

Creating a new body pattern library

1. In the *User Defined Libraries* field, type a name for the library, then select Create. The system creates a new library.
2. Enter body patterns as described in step 2 above section (Defining body patterns).
3. To save the changes, select the **Save** button.

Defining Hot Keys

There are ten alphanumeric keys that are programmable as hot keys to store frequently-used body patterns.

1. In the *Hot Key* field, select the desired hot key (Q, W, E, R, T, Y, U, I, O or P).
2. Press **Set**.
3. Type the body pattern name or select the body pattern in the *Copy from Existing* list, and press **Set**.
4. Press **Save** to save the changes.
5. Ensure that the “Enable Alphabet Hot Key” preset has been selected in the Keyboard key portion in the Utility -> System -> User Configurable key preset screen.
6. When scanning, if a body pattern is required, select the programmed alphabet hot key to add the corresponding body pattern.

Body Pattern Libraries/Body Patterns Preset Menu

On the Body Patterns tab, you specify body pattern options.



Figure 16-29. Body Patterns General Preset Menu

Table 16-37: Body Patterns

Preset Parameter	Description
Erase When the probe or application is changed	If checked, when you change probes or applications, the system erases the body pattern.
Erase When the image is unfrozen	If checked, when you unfreeze the image, the system erases the body pattern.
Copy to active side in multiple image	If checked, when you use dual B-Mode, the system copies the body pattern to the active side of the dual image.
Body pattern background	Select whether you want the body pattern background to be Transparent or Opaque.
Use Zoom Rotary knob to select Body pattern	If selected, you can scroll through the body patterns with the Zoom control.
Bump Body Pattern Control for easy entry	If checked, allows you to quickly add a body pattern by nudging the control.

After you change body pattern options, select Save to save the changes.

Body Pattern Libraries/Applications Preset Menu

The Body Patterns Library/Applications tab is a link to the Applications preset menu. The Body Patterns Applications tab allows you to select body pattern application libraries. You also specify which is the default library that displays when you use body patterns.



Figure 16-30. Applications/Body Patterns Link

The Applications/Body Patterns screen can be accessed through either the Body Pattern Libraries or Applications keys.



Figure 16-31. Body Patterns Applications Preset Menu

Table 16-38: Applications

Preset Parameter	Description
Preset	Defines the Body Pattern option.
Select Library	Select the library from the drop-down list for the application.

Selecting body pattern application libraries

1. On the Body Patterns tab, in the Preset field, select the body pattern.
2. In the Library Group Tabs fields, select the application libraries for Body Patterns.
3. To save the changes, select the **Save** button.

NOTE: When you use body patterns, the default library is displayed.

Using body pattern application libraries

See the following Body Patterns Small Parts.



Figure 16-32. Body Patterns Small Parts

To select a body pattern library, select the more to select the designed library.

To select body patterns, use the Trackball and Set key or the hot key.

NOTE: *If use hot keys, ensure that the "Enable Alphabet Hot Key" preset has been selected in the Keyboard key portion in the Utility -> System -> User Configurable key preset screen.*

Application Presets

Overview

Application Settings presets allow you to configure the application-specific settings (presets).

Settings



Figure 16-33. Application Settings Preset Menu

Table 16-39: Preset

Preset Parameter	Description
Preset	Select the application that you want to specify the presets.

Table 16-40: Image Control and Display

Preset Parameter	Description
Show kHz scale	When selected, displays the kHz scale on the left side of the Doppler spectrum.
Show Doppler Rate	When selected, displays the Doppler rate (mm/s) below the Doppler spectrum.
Anatomical Angle Correction	Select to keep the angle constant with regard to the anatomy.

Table 16-40: Image Control and Display

Preset Parameter	Description
Join Dual Image for Linear	Select to place linear probe dual images directly next to each other.
Hide Mode Cursor Key	Select to unmap (hide) the Mode Cursor key, which normally appears on the left Trackball key during live scanning in B-Mode or Color Flow Modes.

Table 16-41: When Entering Dual Image...

Preset Parameter	Description
Duplicate Frozen Image to Opposite Side	When entering Dual Image, duplicate the frozen image to the opposite side.
Duplicate Live Image to Opposite Side	When entering Dual Image, duplicate the live image to the opposite side.

Table 16-42: Patient Info

Preset Parameter	Description
Titlebar Line 1	Select the patient information to display on the scanning screen Title bar.
Titlebar Line 2	Select the patient information to display on the scanning screen Title bar.
Titlebar Line 3	Select the patient information to display on the scanning screen Title bar.

Table 16-43: Comments

Preset Parameter	Description
Active function at Freeze	Select None, Body Pattern, or Comments. If Body Pattern or Comment is selected, the Body Pattern or Comment is activated automatically when freezing the system.

Table 16-44: Footswitch

Function	Description
Left, Middle, Right	Specify footswitch functionality.

Print Control

You have to set parameters with each application.



Figure 16-34. Print Control

Table 16-45: Preset

Preset Parameter	Description
Preset	Select Application from pull-down menu. You can set Time span for each application.

Table 16-46: Live Store

Preset Parameter	Description
Store/Print/P3	Select the behavior of Print key during live scan from Retrospective Clip, Single image only or None for each print key. None: Store a still image when you press Store or print key during Freeze. Retrospective clip: The system stores cine predetermined time before you press the Store or Print key, based on the Time Span setting. Single image only: Store a still image during live scan each time you press Store or print Key.

Table 16-47: Time-Based Store

Preset Parameter	Description
Time span [s]	Select the number of seconds of CINE Loop storage. The default is 3 seconds.
Preview loop before store	When selected, allows you to review cine loops before storage.

Imaging Controls

For B, M, CF, PDI, PW, CW, CM, Cine and Report mode, you can select which controls you want to be available on the Primary Menu for the selected application.



Figure 16-35. Imaging Controls

Comments and Body Patterns

Comments and Body Patterns were described earlier in this chapter.

Measurements

You can set the exam category measurement and calculation package you want to appear when you select the exam category Preset.

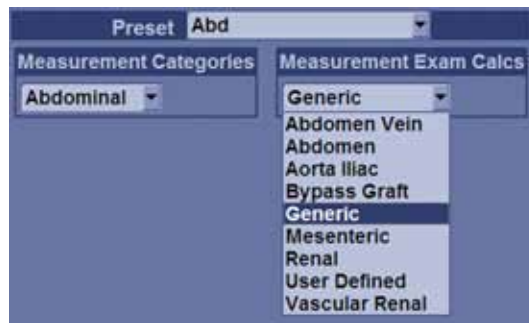


Figure 16-36. Application Measurements Menu

Test Patterns



WARNING

Test Pattern function is **NOT** for Customer Use, for Engineering and Service Only.

Overview

There are different test patterns available: Gray Bars, Color Bars, Resolution, Text, Brightness Calibration, White, Gray, Red, Green and Blue.

Configuring Connectivity

Overview

You use Connectivity functionality to set up the connection and communication protocols for the ultrasound system. This page gives an overview of each of the Connectivity functions.

Structured Reporting

DICOM Structured Reporting provides the results of a procedure as structured data elements (well-defined fields) as opposed to unstructured data (large amounts of text undifferentiated by individual fields). This greatly improves query capability. DICOM Structured Reporting creates coded clinical data that can be used for clinical research, outcomes analysis, and disease management.

Supported parameters

The DICOM supported parameters are listed in the DICOM Conformance Statement at the following web site under DICOM - Ultrasound:

<http://www.gehealthcare.com/usen/interoperability/dicom/>

Connectivity Functions

To set up your institution's connectivity, you must login with administrator privileges.

1. **TCPIP:** allows you to configure the Internet Protocol and wireless Network.
2. **Device.** allows you to set up devices.
3. **Service:** allows you to configure a service (for example, DICOM services such as printers, worklist, and other services such as standard print) from the list of supported services. This means that the user can configure a device with the DICOM service(s) that particular device supports.
4. **Dataflow:** allows you to adjust the settings of the selected dataflow and associated services. Selecting a dataflow customizes the ultrasound system to work according to the services associated with the selected dataflow.
5. **Button:** allows you to assign a pre-configured output service (or a set of output services) to the Print keys on the control panel.
6. **Removable Media:** enables formatting (DICOM, database, or blank formatting) and DICOM verification of removable media.
7. **Miscellaneous:** allows you to set up the patient exam menu options, print and store options, patient/exam Message options, Other ID Options.

Configure these screens from left to right, starting with the Tcpiip tab first.

NOTE: The ultrasound system is pre-configured for many services, with default settings selected. You can change these services and settings as needed.



CAUTION

You must restart the LOGIQ V2/LOGIQ V1 after making any changes to connectivity settings in the Utility menus. This includes any changes on the TCPIP or dataflow setup screens.

TCPIP

This configuration category enables users with administrative rights to set the TCPIP for the system and connected remote archive.



Figure 16-37. Connectivity TCPIP Preset Menu

1. Type the name of the Ultrasound system in the Computer Name field.
2. In the IP settings section, identify the ultrasound system to the rest of the network by one of the following:
 - Dynamic Host Configuration Protocol (DHCP) can be used provided your network supports the DHCP protocol.
 - Type the IP-Address. In this case, uncheck the “Enable DHCP” box and enter the IP address, Subnet Mask, and Default Gateway. Contact your network administrator if you are unsure what values to enter.

NOTE: *If no Default Gateway is required, re-enter the IP address into the Default Gateway.*

3. Select the Network Speed.
4. Select Save settings.
5. Re-boot the ultrasound system.

NOTE: *TCPIP settings do not get restored when restoring backups. This is per system design. The LOGIQ V2/LOGIQ V1 IP address MUST BE unique.*

TCPIP (continued)

Table 16-48: Computer Name

Preset Parameter	Description
Computer Name	Type the unique name for the Ultrasound system (no spaces in name).

Table 16-49: IP settings

Preset Parameter	Description
Enable DHCP	Select this box to enable dynamic IP Address selection. NOTE: The system shall disable IP-Address, Subnet Mask, and Default Gateway when the user chooses to use DHCP.
IP-Address	Type the IP Address of the Ultrasound system. NOTE: IP stands for Internet Protocol. Every device on the network has a unique IP address.
Subnet Mask	Type the subnet mask address. NOTE: The Subnet Mask is an IP address filter that eliminates communication/messages from network devices of no interest to your system.
Default Gateway	Type the default gateway address.
Network Speed	Select the network speed.

Table 16-50: Wireless Network

Preset Parameter	Description
Configuration	Press to configure the Wireless Network -- see instructions below.
IP-Address	Type the IP Address of the Ultrasound system. NOTE: IP stands for Internet Protocol. Every device on the network has a unique IP address.
Subnet Mask	Type the subnet mask address. NOTE: The Subnet Mask is an IP address filter that eliminates communication/messages from network devices of no interest to your system.
Default Gateway	Type the default gateway address.

NOTE: *Restart the system to activate any changes saved from this page.*

Configuring the Wireless Network (Option)

A Wireless Network (WLAN) is available on the LOGIQ V2/ LOGIQ V1. When the WLAN is active, an icon appears in the status bar to indicate whether the WLAN is installed or disconnected.

Connecting to the WLAN

To connect the LOGIQ V2/LOGIQ V1 to the WLAN,

1. Connect the wireless adapter card to the system.
2. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.

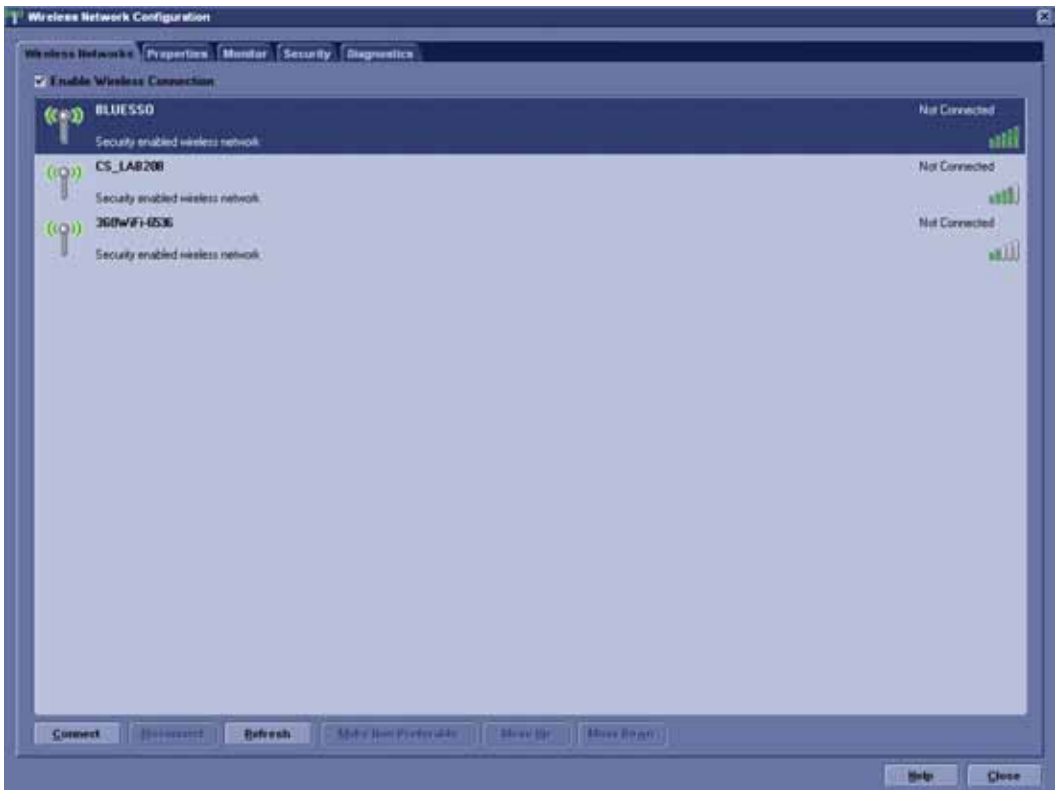


Figure 16-38. Available Wireless Networks

Connecting to the WLAN (continued)

3. If necessary, check the box for “Enable Wireless Connection”.
4. Select the wireless network you want to use or setup, select **Connect**. If prompted, enter the correct settings for this wireless network, for example: Network key.
5. If the connection is successfully, the status bar Active Wireless LAN indicator will no longer have a red “X”.

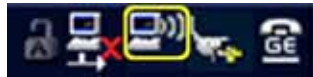


Figure 16-39. Active Wireless LAN Indicator

NOTE: *If the WLAN fails to connect, review and/or recreate the Wireless connection on the Security Tab.*

Adding a Wireless Network

To add a WLAN profile (even for a network which is not yet available),

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the **Security** tab.
3. Select **Add...**
4. Add the following information to the Wireless Network Properties page:
 - Network Name (SSID)
 - Network Authentication (Open, Shared Key, WPA, WPA PSK, WPA2, or WPA2 PSK).
 - Data Encryption
 - Network Key
 - Key Index
5. After you have filled in all the required information, select **OK**. To cancel adding this profile, select **Cancel**.

Removing a WLAN

To remove a WLAN profile (even for a network which is not available),

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the **Security** tab.
3. Select Wireless Network that need to be removed, select **Remove**.

Customizing Wireless Network Settings

To customize an existing WLAN profile,

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the **Security** tab.
3. Select **Customize...**
4. Edit the following information:
 - a. Network Name (SSID)
 - b. Network Authentication (Open, Shared Key, WPA PSK, or WPA2 PSK).
 - c. Data Encryption
 - d. Network Key
 - e. Key Index
5. After you have edited all the information that you want to edit, select **OK**. To cancel the edit, select **Cancel**.

Refreshing a WLAN

Refreshes the list of available Wireless Networks. To refresh the Wireless Network,

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the wireless network you want to refresh.
3. Select **Refresh** from the bottom of the Configuration tool.

Setting a WLAN as Non-Preferable

When you make a WLAN non-preferable, you disconnect the network from the system and delete all connection settings from the system. Afterwards, the system WILL NOT try to reconnect to this WLAN automatically. And if you want to reconnect, you will need to re-add this WLAN.

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the wireless network you want to set as non-preferred.
3. Select **Make Non-Preferable** from the bottom of the Configuration tool. You will receive the following message to confirm this decision: “Are you sure you wish to make network _____ non-preferable? Network will be disconnected and system will not reconnect to this network automatically. Network connection settings will be deleted from the system.”
4. Confirm your decision to repair (**Yes**), or cancel (**No**).

Monitoring the WLAN

If there are wireless network communication problems, you can monitor the wireless network events.

To monitor Wireless Networking events,

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the Monitor Tab.

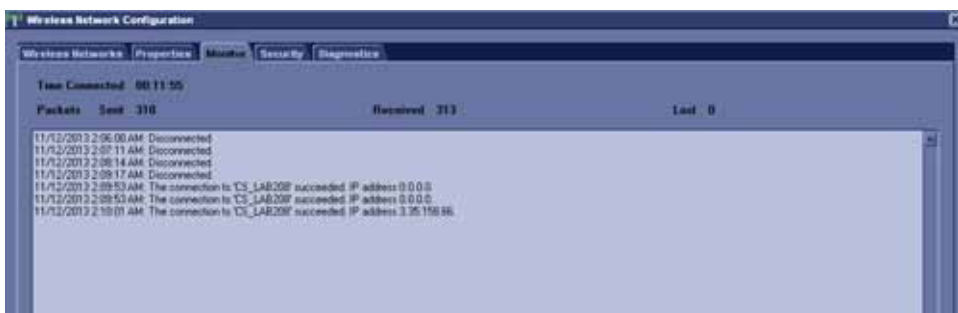


Figure 16-40. Monitor Tab

Repairing the WLAN

Occasionally you may need to repair a WLAN that has lost its connection to the LOGIQ V2/LOGIQ V1. To repair the Wireless Network,

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the Diagnostics Tab.
3. Select **Repair**.

NOTE: *DO NOT cancel the Repair operation after you have selected to repair the Wireless LAN connection.*

If the WLAN is functioning properly, the following message appears. Confirm your decision to repair (**Yes**), or cancel (**No**).



Figure 16-42. Repair Message

Available WLAN Channels

The available WLAN channels show availability of wireless connect points that the scanner can talk to. Each channel supports a finite number of users and has limited signal strength. This may effect the ability to connect, the throughput and the connection dropping out.

To check the available WLAN channels,

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the Properties Tab.



Figure 16-43. Properties Tab

3. Select **Available Channels...**

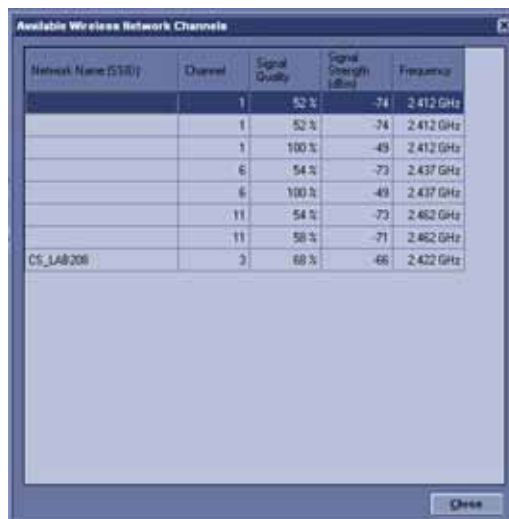


Figure 16-44. Available Channels

Disconnecting from the WLAN

To disconnect from the Wireless Network,

1. Select Utility--> Connectivity--> TCP/IP--> Wireless Network--> Configuration. The Wireless Network Configuration tool appears.
2. Select the WLAN you are connected to.
3. Select **Disconnect**.

Viewing WLAN Online Help

To view the WLAN Online Help, press **Help** (F1 Key).

Device

To add a new device,

1. Press **Add**.
2. Type the device name in the Name field.
3. Type the device's IP address in the IP Address field.



Figure 16-45. Connectivity Device Preset Menu

Table 16-51: Device

Preset Parameter	Description
Add/Remove	Press Add to add a new device; press Remove to delete a device.
Ping	Press Ping to confirm that a device is connected.
Properties: Name	Type the name of the device.
Properties: IP Address	Type the device's IP address.
Properties: AE Title	AE Title of the LOGIQ V2/LOGIQ V1. NOTE: Only available for MyComputer.
Properties: Port Number	IP Port Number Used for DICOM. NOTE: Only available for MyComputer.
Properties: MAC Address	Unique network card address. NOTE: Only available for MyComputer.

To ping a device,

1. Select the device.
2. Press **Ping**. If the smiley face smiles, then the connection has been confirmed. If the smiley face frowns, then the connection has not been made. Check the device name and IP address.

Service

For each Device that you added to the system, you need to set up the service(s) that device supports (you must be an administrator to update these screens).

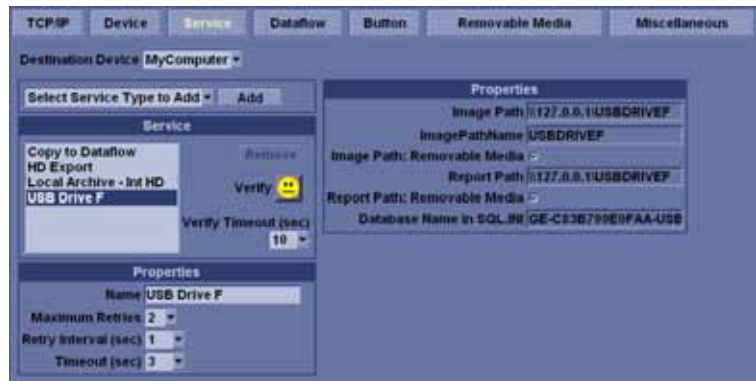


Figure 16-46. Connectivity Services Preset Menu

The Services screen has the following sections of information:

1. **Destination Device** - lists information about destination devices. You can select from a list of currently existing devices.
2. **Service Type to Add** - lists information about services for the destination device. You can add services, select from a list of currently existing services, and remove services.
3. **Service Parameters** - lists parameters for the service currently selected in the Services section. The name and parameters in this section change, depending on what service is currently selected.

Adding a service to a destination device

1. Select the service from the pull-down menu. Press **Add**.
2. Specify the properties for this service. Press **Save**.
3. Verify the service.

Removing a service

1. Select the service. Press **Remove**.
2. Press **Save**.

Changing parameters for a service

There are certain parameters that may need to be set up for each service:

Table 16-52: Service Parameters: Common Service Parameters

Preset Parameter	Description
Name	Free text: give a descriptive name to the device.
AE Title	The Application Entity Title for the service.
Port Number	The port number of the service.
Maximum Retries	Max # – the maximum number of times to try establishing a connection to the service.
Retry Interval (sec)	Specify how often (in seconds) the system should try to establish a connection to the service.
Timeout	The amount of time after which the system will stop trying to establish a connection to the service.

Changing parameters for a service (continued)

Many service parameters are specific to each type of service. The parameters are described on the following pages:

- DICOM Image Storage
- DICOM Performed Procedure
- DICOM Print
- DICOM Query/Retrieve
- DICOM Storage Commitment
- DICOM Worklist
- Standard Print
- USB Quick Save
- Save As
- HD Export
- Network storage

DICOM Image Storage

DICOM Image Storage allows the system to send or receive ultrasound images in a format that can be interpreted by PACS.



CAUTION

GE does not warrant the operation if the DICOM format of send image (US, USMF, SC) does not correspond with the DICOM Server.

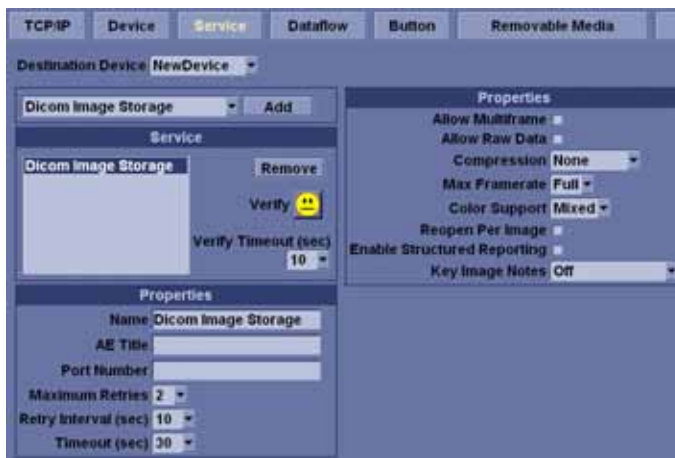


Figure 16-47. DICOM Image Storage Service

Table 16-53: DICOM Image Storage

Preset Parameter	Description
Allow Multiframe	Select to allow cine loop storage.
Allow raw data	Select to save data in both TruAccess (raw data) and DICOM format. Clear to save in DICOM format only.
Compression	Select the compression type.
Max Framerate	Select the maximum frame rate.
Color Support	Select the support color.
Reopen per image	Reopen per image
Enable Structured Reporting	Select for Structured Reporting.
Key Image Notes	Image deletion notification. ONLY available for the Direct Store Workflow and ONLY generated when there are images deleted during the exam. Selecting this lets the reader at the PACS system know which images have been deleted. An indicator is placed on deleted images with a reason, "Rejected for Quality Reasons," for example.

DICOM Performed Procedure

DICOM Performed Procedure provides an acknowledgement that a study has been performed.



Figure 16-48. DICOM Performed Procedure Service

DICOM Print

DICOM Print provides the ability to send or receive ultrasound image data to DICOM printers.



Figure 16-49. DICOM Print Service

Table 16-54: Properties

Preset Parameter	Description
Format	Indicates how many prints to print per page. Partial prints are displayed as one print job.
Priority	Specify the print job priority.
Medium	Select the print medium.
Copies	Enter the number of copies.
Orientation	Specify whether to print the image Portrait (vertically) or Landscape (horizontally).
Film Size	Specify the dimensions of the film size.
Film Destination	Specify the film destination for the exposed film. Magazine – Store in a film magazine. Processor – Develop in a film processor.
Magnification	Specify how the printer magnifies the image to fit it onto the film.
Smoothing Type	Specify the printer's magnification interpolation for the output.
Trim	Specify whether you want a trim box to be printed around each image on the film.
Min Density	Enter a number indicating the minimum density level of the film.
Max Density	Enter a number indicating the maximum density level of the film.
Border	Select to have the border area surrounding and between the images of the film.
Empty Image	Select to have a Black or White empty image.
Color	Select whether to have the image Color or Grey.

Table 16-54: Properties (continued)

Preset Parameter	Description
Configuration Information	Enter vendor-specific image quality settings.
Film Session Label	Type a name for the group of film labels associated with the print job.

Table 16-55: Annotation

Preset Parameter	Description
Enable	Lets you annotate the image.

DICOM Query/Retrieve

DICOM Query/Retrieve provides a list of patients sorted by query parameters.

NOTE: *Some PACS vendors only offer Query/Retrieve as an option. Please confirm that this service is available.*



Figure 16-50. DICOM Query/Retrieve Service

Table 16-56: DICOM Query/Retrieve

Preset Parameter	Description
Maximum Result	Specify the maximum number of patient records you want the system to retrieve when searching the patient database.
Search Criteria	Displays the Search Criteria window, where you can enter search parameters for the system to use when searching the patient database.

NOTE: *If you are experiencing problems with slow responses from DICOM servers, increase the time-out in the DICOM server properties dialog. (Utility -> Connectivity -> Service -> Properties -> Maximum Retries and Timeout). Problems with slow responses may result in images being re-sent automatically and low transfer rates. The retry settings can be used to make jobs retry on bad networks. When portable (off-line), use minimum time-out and no retries or it will affect shutdown speed.*

DICOM Query/Retrieve (continued)

Table 16-57: DICOM Query/Retrieve Search Criteria

Preset Parameter	Description
Select Search Criteria to Add	Select the type of information that you want to define for search parameters.
Tags (at least one)	The name of a tag selected to use for search criteria.
Properties: Value	Type the value of the Selected Tag item. For example, if you select Referring Physician's Name in the Select Tag field, you can enter the name of the physician in the Value field.
Properties: Don't Use	Select to turn off the selected search criteria. To exclude a tag from the worklist query, select Don't Use and then select Add to List.
Add	Select to add the tag and value to the list of search criteria.
Remove	Select to remove the tag and value from the list of search criteria.
Clear	Clears all tags.

Query/Retrieve Per Series

You can now display/retrieve multiple series by patient on the Archive--> Data Transfer--> Q/R page.

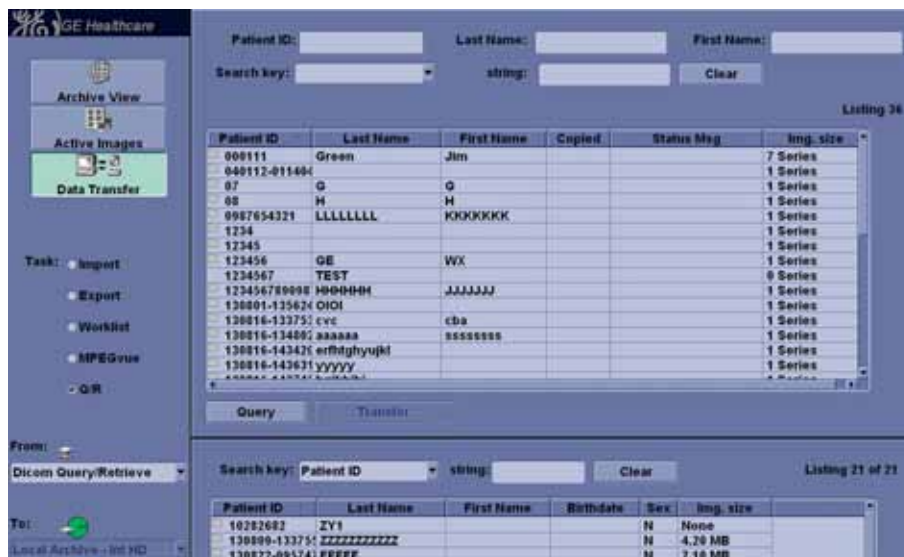


Figure 16-51. Q/R Per Series Example

DICOM Storage Commitment

DICOM Storage Commitment provides acknowledgement from PACS that the study has been accepted into archive.



Figure 16-52. DICOM Storage Commitment Service

Table 16-58: DICOM Storage Commitment

Preset Parameter	Description
Associated Storage	This selection is based on the services entered by the user.

DICOM Worklist

DICOM Worklist provides a list of patients sorted by query parameters.



Figure 16-53. DICOM Worklist Service

Table 16-59: DICOM Worklist

Preset Parameter	Description
Maximum Result	Specify the maximum number of patient records you want the system to retrieve when searching the patient database.
Search Criteria	Displays the Search Criteria window, where you can enter search parameters for the system to use when searching the patient database.

DICOM Worklist (continued)

Table 16-60: DICOM Worklist Search Criteria

Preset Parameter	Description
Select Search Criteria to Add	Select the type of information that you want to define for search parameters.
Tags (at least one)	The name of a tag selected to use for search criteria.
Properties: Value	Type the value of the Selected Tag item. For example, if you select Referring Physician's Name in the Select Tag field, you can enter the name of the physician in the Value field.
Properties: Don't Use	Select to turn off the selected search criteria. To exclude a tag from the worklist query, select Don't Use and then select Add to List.
Add	Select to add the tag and value to the list of search criteria.
Remove	Select to remove the tag and value from the list of search criteria.
Clear	Clears all tags.

Standard Print

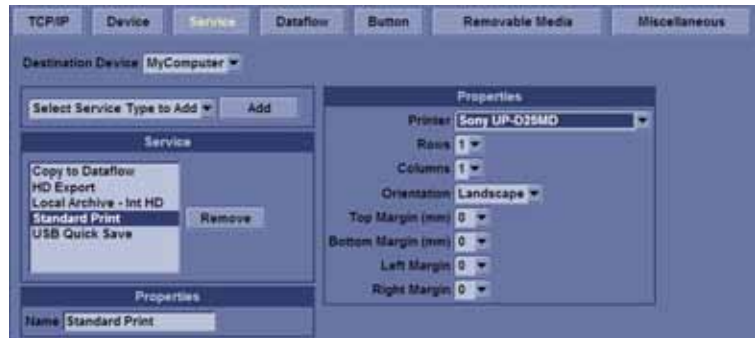


Figure 16-54. Standard Print Service

Table 16-61: Standard Print

Preset Parameter	Description
Printer	Select the printer.
Rows	Specify rows.
Columns	Specify columns.
Orientation	Specify Landscape/Portrait
Top Margin (mm)	Specify the top margin
Bottom Margin (mm)	Specify the bottom margin
Left Margin	Specify the left margin
Right Margin	Specify the right margin

Setting up a Printer

Use Standard Print for digital peripherals. These are printers with either a USB interface or Ethernet interface (Sony UP-D25MD, for example).

On the Utility --> Connectivity --> Button page, select the Print key in the upper, left-hand corner of the display. In the middle portion of the page, under Available Input/Outputs, select the printer you want to configure. Next, press the two right arrows (>>) in the upper, right-hand corner of the page to move this printer into the Printflow View.

You can also configure the Standard Print button that appears on the Active Images screen.

Example: For instance a report printer, on the Utility --> Connectivity --> Service page, in the Service Type to Add box, and press **Add**. In the properties box on the upper, right-hand side, select the type of device and in the Properties box in the lower, left-hand side, type in a unique descriptive name for this device.

USB Quick Save

You can save individual CINE loops (moving images - avi format), still images (jpg format) or report (pdf format) directly to a USB Memory Stick by pressing a print key or to network storage.

If network storage is selected (under Properties) for USB Quick Save, the network storage function needs to be set up. See 'Network Storage' on page 16-88 for more information.



Figure 16-55. USB Quick Save Service

Table 16-62: DICOM Worklist Search Criteria

Preset Parameter	Description
Properties: Name	Type the name.
Properties: Destination	Select the destination.
Properties: DirectoryNamingFormat	Select the Directory Naming Format.

NOTE: After selecting either the USB Key or Network Storage, select Save to save the preset.

NOTE: The print key that has been assigned to the USB Quick Save function should not have any other service functions (except Copy to Dataflow function) assigned to it.



Figure 16-56. Defining Print Key Operation

Save As



Figure 16-57. Save As

Table 16-63: Save As

Preset Parameter	Description
Destination	Specify destination device.

HD Export

You can save individual CINE loops (moving images - avi format) or still images (jpg format) directly to a CD/DVD or Hard Disk by pressing a print key or store key.

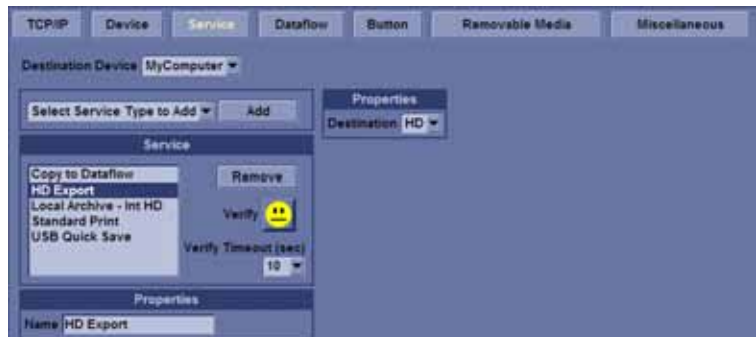


Figure 16-58. HD Export Service

Network Storage

The Network Storage service provides the following:

- MPEGvue patient data to a Windows compatible file share.
- Send images (JPEG), video (AVI) and reports (PDF) to a Windows compatible file share with the USB Quick Save service.
- Exporting is allowed to a network storage location.

NOTE: *Before setting up the ultrasound system, a Windows compatible file share must be setup on the network to connect to. To create the share, the user that is connecting to the share must have the Share permissions of Full Control Or the NTFS permissions of Full Control if the share is located on a NTFS volume. For additional help creating or configuring file shares, please consult your system operating documentation.*

NOTE: *Do not connect multiple ultrasound systems to the same share.*



Figure 16-59. Network Storage Service

Table 16-64: Network Storage Service

Preset Parameter	Description
Name	Enter unique name that identifies this service. <i>NOTE: Do not use the same name for any other Service or device.</i>
Password	Enter the password used for logging onto the PC.
User Name	Enter the user name used for logging onto the PC.
Shared Dir	Enter the Share name of the folder, not the UNC path. For example if the path is \\server\images, you would enter images as the name <i>NOTE: Only use alphanumeric characters for the Shared Dir.</i>

Dataflow



CAUTION

DO NOT rename the factory default dataflow.

A dataflow is a set of pre-configured services. When you select a dataflow, the ultrasound system automatically works according to the services associated with the dataflow. The Dataflow tab allows you to select and review information about dataflows. You can also create, change, and remove dataflows.

Set up dataflows for the services.

NOTE: You must be logged on as Administrator to use the Dataflow tab.



Figure 16-60. Dataflow Preset Menu

Table 16-65: Dataflow

Preset Parameter	Description
Name	Select the dataflow from the list.
Direct Store	Select to store data directly to archive (no buffer storage).
Hidden	Select so that this dataflow does not appear as a Dataflow on the Patient menu.
Default Dataflow	Select to use this dataflow as the default dataflow when you start the system.

Button

You can assign print buttons via the Utility --> Connectivity --> Button page.

Assigning print buttons. First select the print button to configure on the upper, left corner of the page. Then select the device you want to add in the middle part of the page, under Available Input/Outputs. Then click on the right arrow in the top right corner of the page.

NOTE: You can configure each print key to multiple output devices/dataflows.

NOTE: Only attach one DICOM service per print key (e.g., PACS and DICOM printer). Multiple DICOM devices should be configured via a dataflow.

NOTE: When using a print key to send an image directly to a DICOM device, this causes a single DICOM association per image. Most devices (all known printers) work fine with this. However, some storage devices, such as ALI, Kodak Access, and Cemax, assume that the end of each association is the end of the exam and can result in a new folder for each image. In the Utility menu, select a single association or open PR for the desired DICOM storage device.



Figure 16-61. Button Preset Menu

Table 16-66: Button

Preset Parameter	Description
Format	RawDICOM, DICOM, or M&A.
Image Frames	Single (captures a DICOM single frame image), Multiple (captures a DICOM multiframe, CINE) -- only select this if the PACS supports multiframe, and Secondary Capture (forces all DICOM images to Secondary Capture).
Capture Area	For use with Secondary Capture: Video Area, Image Area or Whole Screen.
Compression	Always set to None.
Single Association	Only visible with DICOM image storage destinations. When selected, the spooler sends multiple images in one store job.
Standard Print	Lets you send to a Windows-based printer.

Removable Media

The Removable Media tab allows you to:

- Verify the DICOM directory on removable media.
- Verify the free space of the media.
- Verify that the media is finalized or unfinalized.
- Verify that the media is formatted or unformatted.
- Format removable media (rewritable CD/DVD or USB device).



Figure 16-62. Removable Media Preset Menu

Table 16-67: Tools

Preset Parameter	Description
Removable Media	Select the removable media to format or verify.
Label	Type a label for a new removable media (free text).
Verify	<ul style="list-style-type: none"> • Select to verify DICOM directory on removable DICOM disk. • Verify the free space of the media. • Verify that the media is finalized or unfinalized. • Verify that the media is formatted or unformatted.
Format	Select to format removable media.
Quick Format	To format the media quickly, check this box. If you uncheck this box, the media is formatted with a full format. New media should always be formatted with a full format.

The bottom of the screen lists properties of the selected media.

Removable Media (continued)

Formatting removable media

1. Select the removable media from the Media list.
2. Type a name for the removable media in the Label field.

NOTE: Do not use the following characters for labelling:

*\ / : ; . , * < > | + = []*

3. Select **Format**. Confirm **OK** or **Cancel**.
4. An information window confirms when the format has been completed. Select **OK** to exit.

Verifying removable media

1. Select the removable media from the Media list.
2. Select **Verify**.

Miscellaneous

The Miscellaneous tab allows you to configure key tools related to patient management and print and store options. You can specify default system functionality, such as whether patient ID is required when you archive data, or if you want the system to automatically search the archive for a patient when you enter patient data.

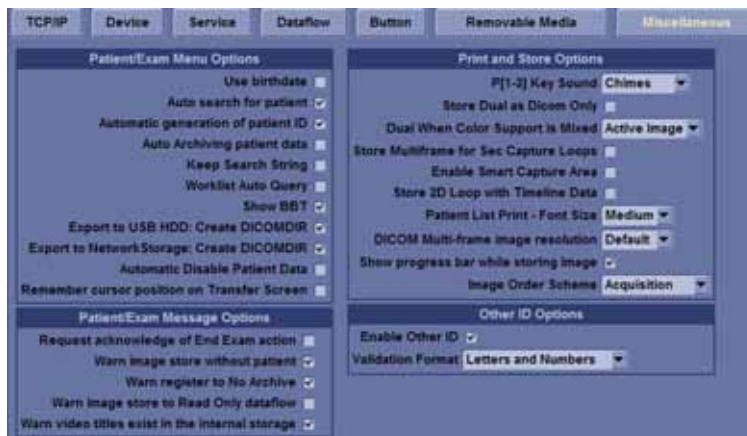


Figure 16-63. Miscellaneous Preset Menu

Table 16-68: Patient/Exam Menu Options

Preset Parameter	Description
Use birthdate	In the Patient information window, enter either the patient age or the birth date: when selected, enter birth date, then the age is calculated; when cleared, enter age (birth date field not available).
Auto search for patient	In the Search/Create Patient window: When selected, the system automatically searches through the selected patient archive, while the user enters patient information. When cleared, the automatic search tool is turned off. If you are trying to keep the past patient data confidential, DO NOT use this feature.
Automatic generation of patient ID	In the Search/Create Patient window: When selected, the Patient ID is not required when entering a new patient in the archive. The system automatically generates an ID number. When cleared, the Patient ID is required when entering a new patient in the archive.
Auto Archiving patient data	Archives patient data automatically.
Keep Search String	Search string is kept rather than cleared.
Worklist Auto Query	Automatically queries the worklist server.
Show BBT	Show BBT field on the OB patient screen to input the basal body temperature.

Table 16-68: Patient/Exam Menu Options (continued)

Preset Parameter	Description
Export to USB HDD: Create DICOMDIR	Create DICOMDIR is a DICOM file format which contains how the directory and DICOM files structured for diagnostic portable media behave. It is important for portability between the LOGIQ V2/LOGIQ V1 to PACS. If you want to save exams to the USB Hard drive and look at it on the PACS, the DICOMDIR is a must.
Export to Network storage HDD: Create DICOMDIR	
Automatic Disable Patient Data	Select to automatically disable patient data. If selected, locks the patient name, date of birth and gender (like Patient ID). The Factory Default for this preset is unchecked.
Remember Cursor Position on the Transfer Screen	To set a default cursor location on the Data Transfer screen: <ol style="list-style-type: none"> 1. Select the "Remember cursor position in the Transfer screen" preset and press Save. 2. On the Data Transfer screen, move the cursor to the desired field. 3. Exit out of the Data Transfer screen. When returning to the Data Transfer screen, the cursor location is in the position you selected.

Table 16-69: Patient/Exam Message Options

Preset Parameter	Description
Request acknowledge of End Exam action	When selected, the user is asked to confirm action when ending an examination.
Warn Image Store without Patient	Select to receive a warning when you press the Print key without an active patient.
Warn Register to No Archive	Select to receive a warning when you register a patient to the "No Archive" data flow. Select a different data flow for permanent storage of patient data.
Warn image store to Read Only dataflow	The system posts a warning message if you attempt to store images to a read-only Dataflow.
Warn video titles exist in the internal storage	The system posts a warning if the video titles exist on the internal DVR flash memory.

Table 16-70: Print and Store Options

Preset Parameter	Description
P[1-3] Key Sound	Select the key sound.
Store Dual as Dicom Only	Select to always store dual images as a DICOM (secondary capture) store, rather than Raw DICOM.
Dual When Color Support is Mixed	Dataflow Mixed is not available. While transferring dual images to the PACS, send black and white images as gray; send color images as color. Set up 2 services (one gray and one color), set up 2 dataflows, and set up 2 buttons. Each button needs to be tied to a different service. Select if you want to keep the user preset for Color Photometric Interpretation while in Dual mode.
Store Multiframe for Sec Capture Loops	Select if you want the CINE loop stored as secondary capture.

Table 16-70: Print and Store Options

Preset Parameter	Description
Enable Smart Capture Area	Check box to select.
Store 2D Loop with Timeline Data	Check box to select.
Patient List Print-Font Size	Select font size.
DICOM Multi-Frame image resolution	Select Default, Medium, or Large for recalled DICOM Multi-frame Frame Cine loops.
Show progress bar while storing image	<p>Show and hide the progress bar while image store on the scan screen. When "Show progress bar" is On (default), the progress bar is shown while storing images when 1 sec is passed since starting image store and completed frames is less than 50% of total frames.</p> <p>When "Show progress bar" is Off (uncheck the box), No progress bar is shown while storing images. Instead system shows status of image store on status bar while system is storing image.</p> <p>Affect the following print flow service and function; Copy to Dataflow, DICOM Image Storage, DICOM Print, HD Export, SaveAs (Raw DICOM or DICOM is selected as format) SaveAs from SaveAs dialogue other than Avi format.</p>
Image Order Scheme	<p>Select to Direct Store images in Acquisition Order, Scan Assistant Order, or Off.</p> <ul style="list-style-type: none"> • Off. The clipboard on the Ultrasound system shows the image in the order it was acquired. Therefore, re-stored images appear where you'd expect. However, on the PACS system, images appear in arrival order or in image number order. • Acquisition Order. From the Ultrasound system perspective, the same as "Off." But on the PACS system (if based on image number order), images are displayed consistently with the way they are stored on the Ultrasound system. • Scan Assistant Order. You can define the storage order (reading order) via Scan Assistant Creator. Therefore, based on the order defined in Scan Assistant, images are re-ordered and displayed in this manner both on the Clipboard and on the PACS system.

Table 16-71: Other ID Options

Preset Parameter	Description
Enable Other ID	<p>Not selected is the Default.</p> <p>If selected, allow entering Other ID, such as Citizen Service Number, Burger Service Number (BSN), National Health System (NHS) number, along with patient ID information on the Patient Screen.</p>
Validation Format	<p>If the Enable Other ID preset is selected, the system validates the format of "Other ID" when an ID is entered. Choose: NHS Number *** ** ***** , Letters and Numbers, Numbers, or Any (no restriction)</p>

Measure

Please refer to Chapter 7, General Measurements and Calculations for more information on setting up Measurement and Analysis Presets.

Reports

Refer to Chapter 14 for more information.

System Administration

Overview

The Admin screen has the following three sections:

- **System Administration** – lists all the options implemented in the system.
- **Users** – allows you to define user IDs, specify operator's registration, operator's rights, and registration of staff related to an examination (for example, referral doctors and sonographers).
- **Logon** – defines logon procedures.

System Admin

The System Admin screen has information about any options implemented for the system.

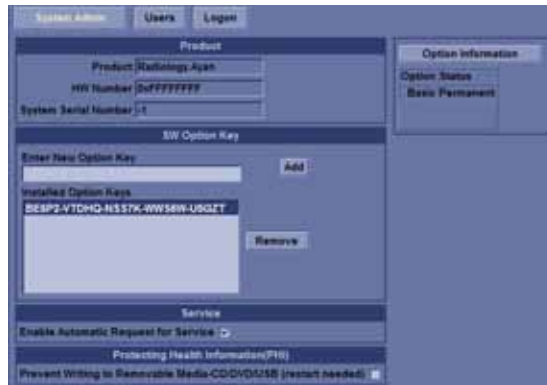


Figure 16-64. Administrative System Admin Preset Menu

Table 16-72: System Administration

Preset Parameter	Description
Product	The name of the product.
HW Number	The hardware number of the product.
System Serial Number	The serial number of the product.
SW Option Key	The software option key section.
Enter New Option Key	Type the key for the option you wish to add and press Add .
Installed Option Keys	Lists the key for the installed options.
Remove	To remove a software option key, select the key in the SW Option Key list, and then select Remove.
Options	A list of the option name and status.
Status	Lists each option's effectivity.

Table 16-73: Service

Preset Parameter	Description
Enable Automatic Request for Service	Check this box to enable the system to send system-generated requests for service, without your intervention.

Table 16-74: Protecting Health Information (PHI)

Preset Parameter	Description
Prevent Writing to Removable Media-CD/DVD/USB (requires reboot)	Prevent from copying data including Patient Information to external storage device.

Users

The Users screen allows you to define user IDs. It also allows you to specify operators registration, operator’s rights setting, and registration of staff related to an examination (for example, referring and interpreting physicians).



Figure 16-65. Users Preset Menu

Table 16-75: User List

Preset Parameter	Description
User List	Lists the user ID for all system users.
Identity	Type the operator’s user ID, Password, Prefix, Last Name, First Name, Middle Name, Suffix, Phone Number.
Group Membership	Select the user’s group. Operator (sonographers, doctors, or any person using the ultrasound system); Ref.Phys. (referring physician can be associated to the patient examination in the extended Patient information window; Perf.Phys. – physician performing the exam can be associated to the patient examination in the extended Patient information window.
Operator Rights	Admin – If selected, the operator has extended rights with access to the administrative setup functionality. The operator can also perform advanced operations

Creating a user

1. Select **Add**.
2. Type the user ID. ENSURE that you DO NOT include the following characters in a user's ID: slash (/), dash (-), asterisk (*), question mark (?), an underscore (_), ampersand (&) or blank spaces. Also, DO NOT set up a user with the same initials/signifier.
3. Type the user's information in the Identity section.
4. Select the user's group(s).
5. If the user needs full configuration and advanced operations access, select **Admin**.
6. Press **Save**.

NOTE: DO NOT add users with the same initials/signifier. The system allows you to do this; however, the first user is erased and only the second remains.

NOTE: When adding a new user, press Add first. Then edit the ID from the default of "NewUser" and edit the other fields. DO NOT press Add again unless you actually want to create another user. Press Save after adding one or more users. The user listed as NewUser on the list will be updated with the edited ID when you re-enter this screen.

Changing a user configuration

1. Move the **Trackball** to a user ID in the User List.
2. Make the desired changes.

Deleting a user

1. Move the **Trackball** to a user ID in the User List.
2. Select **Remove**.

The user is removed from the User List.

Logon

The Logon section defines log on procedures.



Figure 16-66. Administrative Logon Preset Menu

Table 16-76: Logon

Preset Parameter	Description
Auto Logon	Specifies logon procedures: <ul style="list-style-type: none">• When blank, the user must select a user ID and enter a password when logging on.• When selected, the system is started automatically, using the last user logon.
Common Network Login	Specifies the user ID and password used to access the network. User – User ID for network access. Password – Password for network access
Connectivity Maintenance	Reset to factory default.

Service

Press **Service** to activate the Service browser interface.

Scan Assistant

Scan Assistant Manager

Please refer to Chapter 5 for information on using the Scan Assistant Manager to Import and Export Scan Assistant Programs. This section covers how to use the Scan Assistant Creator and how to export the Scan Assistant Creator from the LOGIQ V2/LOGIQ V1 to a PC.

Activating the Scan Assistant Creator

To activate the Scan Assistant Creator on the LOGIQ V2/LOGIQ V1, press the Creator key.



Figure 16-67. Scan Assistant Manager

Scan Assistant Creator

Overview

The Scan Assistant Creator is used to build customized Programs that can be imported onto the LOGIQ V2/LOGIQ V1. These Programs automate many of the steps normally performed manually by the user, thereby reducing the number of user actions and the amount of time to perform an exam.

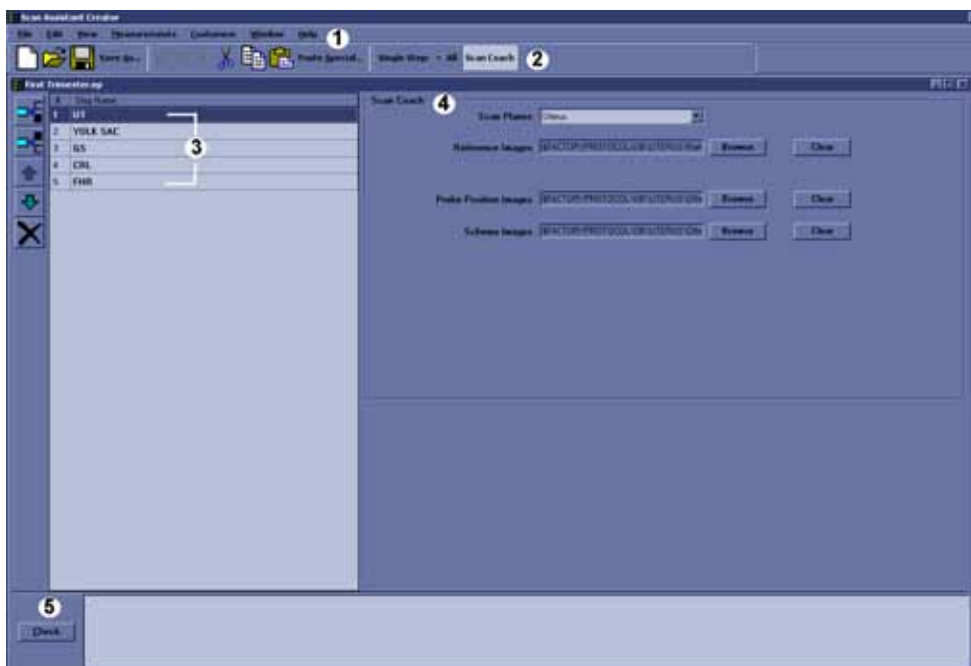


Figure 16-68. Tool Layout Overview

1. Menu and ToolBars
2. Scan Coach Button
3. Steps
4. Scan Coach Attributes
5. Rule Checking

The Scan Assistant Creator tool can be used both on the scanner and as an off scanner tool. Where there are differences in behavior, this user's guide uses the term 'on scanner' to indicate when the tool is running on the scanner and 'off scanner' to indicate when the tool is running off the scanner.

File Handling

When using Scan Assistant Creator off the scanner, it is very important to organize the programs in a way that will make it easy to import the programs onto the scanner. Each Program is a computer file. While these computer files can be copied, pasted and deleted like any other computer file, the Program files are only viewable using the Scan Assistant Creator.

Off-Scanner Directory Structure

The Scan Assistant Creator organizes the Programs in a directory structure that allows easy importing into the LOGIQ V2/LOGIQ V1. In order to be imported, all Programs must be stored in a LOGIQ_SCAN_ASSISTANT Programs Directory. Within this directory, one or more user-specified directories are created. Within each of these user-specified directories are the category directories (VAS, ABD, etc.) that hold the actual Programs.

The dialog in the figure below allows the user to specify the location of the LOGIQ_SCAN_ASSISTANT directory (root directory) and to either select an existing User Program Directory or create a new one.

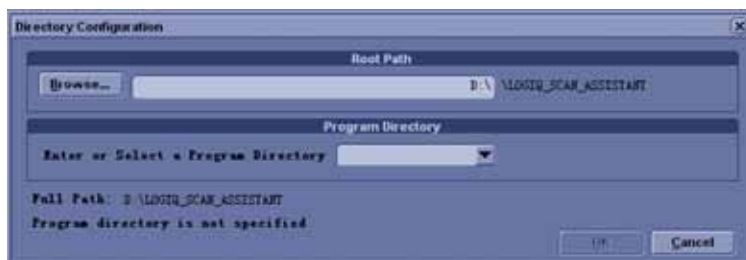


Figure 16-69. Directory Structure

Off-Scanner Directory Structure (continued)

The Directory Structure dialog can be accessed via the File menu.

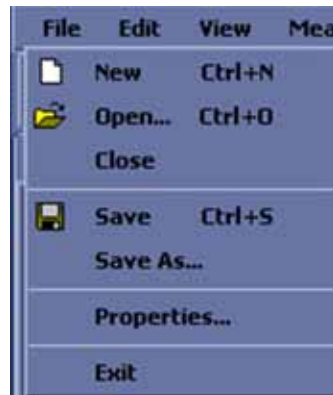


Figure 16-70. File Menu



Figure 16-71. File Toolbar

File Extensions

Factory defined Programs have an .ep (exam Program) extension while user-defined Programs have an .uep (user exam Program) extension. Both factory and user-defined Programs can be read into the Scan Assistant Creator, but only user-defined Programs are created. If a factory Program is read into the Scan Assistant Creator and then edited, it is saved as a user-defined Program.

Upon installation of the Scan Assistant Creator, files with a .ep or .uep extension are automatically associated with the Scan Assistant Creator.

Exporting Programs from LOGIQ V2/LOGIQ V1

Factory or user-defined Programs on the LOGIQ V2/LOGIQ V1 are easily exported for editing with the Scan Assistant Creator.

On the LOGIQ V2/LOGIQ V1:

1. Insert a USB storage device (or CD/DVD).
2. Select **Utility** -> **Scan Assistant**.
3. Select **Export**.
4. Select the media type and specify a directory. If a directory is specified that already exists, the Export adds the Programs along with any existing Programs. If the names of Programs are the same, use the resulting dialog to decide how to continue.
5. Select the Program to be exported and export them.

On the computer with the Scan Assistant Creator installed:

1. Insert the USB storage device (or CD/DVD) used above.
2. Copy the LOGIQ_SCAN_ASSISTANT directory from the USB storage device (or CD/DVD) to the hard drive. The hard drive directory that you copy to is the root directory. If you want to work with the Programs directly on the USB storage device, this step can be skipped.
3. Either open a Program by double-clicking it or selecting File -> Open from the Scan Assistant Creator.

Importing Programs to LOGIQ V2/LOGIQ V1

Programs created with the Scan Assistant Creator are easily imported to the LOGIQ V2/LOGIQ V1.

On the computer with the Scan Assistant Creator installed:

Copy the complete LOGIQ_SCAN_ASSISTANT directory from the computer hard drive to a USB device (or CD/DVD). The LOGIQ_SCAN_ASSISTANT directory needs to be at the top level (not in a subdirectory) on the USB device (or CD/DVD).

Example of Directory structure:

```
LOGIQ_SCAN_ASSISTANT
  MyUserNameDirectory
    ABD
    CARD
    GYN
    OB
    PED
    SMP
    UR
    VAS
```

On the LOGIQ V2/LOGIQ V1:

1. Insert the USB device (or CD/DVD).
2. Select **Utility** -> **Scan Assistant**.
3. Select **Import**.
4. Select the media type.
5. Select the Programs to be imported and import them. If you attempt to import Programs that already exist with the same name, use the resulting dialog to decide how to continue.

Creating New Programs

A new Program is created by selecting File -> New, by clicking on the New document icon in the Toolbar, or by using the keyboard shortcut Ctrl+N.

1. Before creating a New Program, select **Single Step** in the Toolbar.



Figure 16-72. File Toolbar

2. Proceed to add/update your settings for the Step: Step Name, Instructions, etc.
3. Once finished, highlight the finished Step.

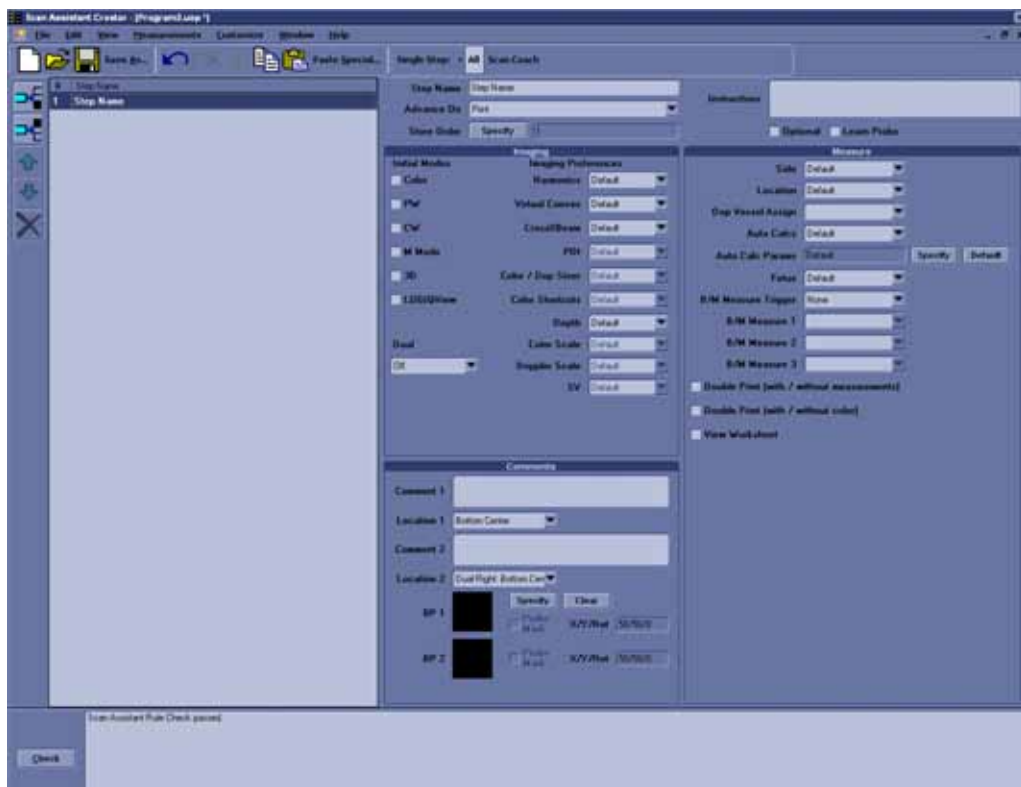


Figure 16-73. Highlight Step to Copy

Creating New Programs (continued)

4. Select **Edit** -> **Copy**



Figure 16-74. Edit -> Copy

5. In the Toolbar along the left, select **Insert Step Before Selected** or **Insert Step After Selected**.



Figure 16-75. Insert Step

6. Highlight the copied step and proceed to edit accordingly.
7. Proceed to follow the same procedure to add more steps to your Program.
8. When you are done, select **Check** to verify your Steps.



Figure 16-76. Rule Check and results area

9. The results are listed as to whether the Scan Assistant Rule Check Passed or if any Issues were detected. Issues found when running the check do not mean the Program is unusable.

NOTE: *The rule check may report an unequal number of left and right steps. This may or may not be the expected result. If a change is made in response to the rule check results, a new rule check can be run to see if the issue has been resolved.*

Opening New Programs

Multiple Programs can be open at the same time by selecting File -> Open. Each Program will open within the primary Scan Assistant Creator window.

Opening Existing Programs

An existing Program is opened by selecting File -> Open, by clicking on the File -> Open icon in the Toolbar, or by using the the shortcut Ctrl+O. Finding the Program file (.ep or .uep) and opening the file automatically opens the file in the Scan Assistant Creator. Multiple Programs can be opened at the same time.

Saving Programs

Programs are saved via the Save or Save As functions available on the File Menu and the File Toolbar. Save is also available via the Ctrl+S keyboard shortcut. "Save" saves the Program using its current name and file location. "Save As" allows the name and file locations to be edited.

When Saving a Program, the Scan Assistant Creator provides an opportunity to run a rule check on the Program before saving it as shown in the following figure. **Yes** runs the rule check, **No** bypasses the rule check and **Cancel** cancels the Save request. See 'Rule Checking' on *page 16-135* for more details on Rule Checking Programs.



Figure 16-77. Program Rule Check Reminder

NOTE: *The name of a Program is appended with an asterisk (*) when the Program has been changed, but those changes have not yet been saved.*

A Program can be closed without saving it using the Close selection on the File Menu or by using the "X" in the upper right corner of the Program window.

Sharing Programs

If you want to share a program with someone else, the file can simply be sent via e-mail as an attachment or copied onto a media. If the person receiving the program has the Scan Assistant Creator tool installed, he can simply open the file and then use “Save As” to save it to an appropriate directory. If the person receiving the program does not have the Scan Assistant Creator tool installed, he can still load the program onto a scanner by creating the following directory structure on a media device, copying the file to one of the category directories and then importing the protocol onto the scanner.

Top Level Directory on media: LOGIQ_SCAN_ASSISTANT User
 Program Directory: Any user name
 Category Directories: Abd, Card, Gyn, OB, Ped, SMP, UR, Vas

If you want to share an entire portfolio of programs with someone else, the entire user program directory can be zipped. Make sure to set the options to include subfolders and to include relative path information. On the receiving end, the user can unzip the directory into a LOGIQ_SCAN_ASSISTANT directory.

Views

A Program is made up of a series of steps. Each step is made up of various step attributes. The step and step attribute data can be viewed in many ways using the Scan Assistant Creator. The different ways to look at the data are called Views. The view of choice is selected from the View Selection Menu or the View Toolbar Menu.

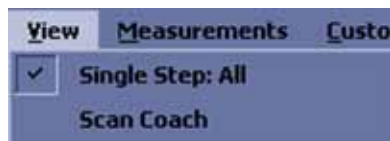


Figure 16-78. View Selection Menu



Figure 16-79. View Toolbar Menu

Single Step Views

The step names are shown on the left with the active step highlighted. The step attributes appear on the right and are separated into four groupings:

General attributes at the top

Imaging and Comment attributes on the left

Measure attributes on the right.

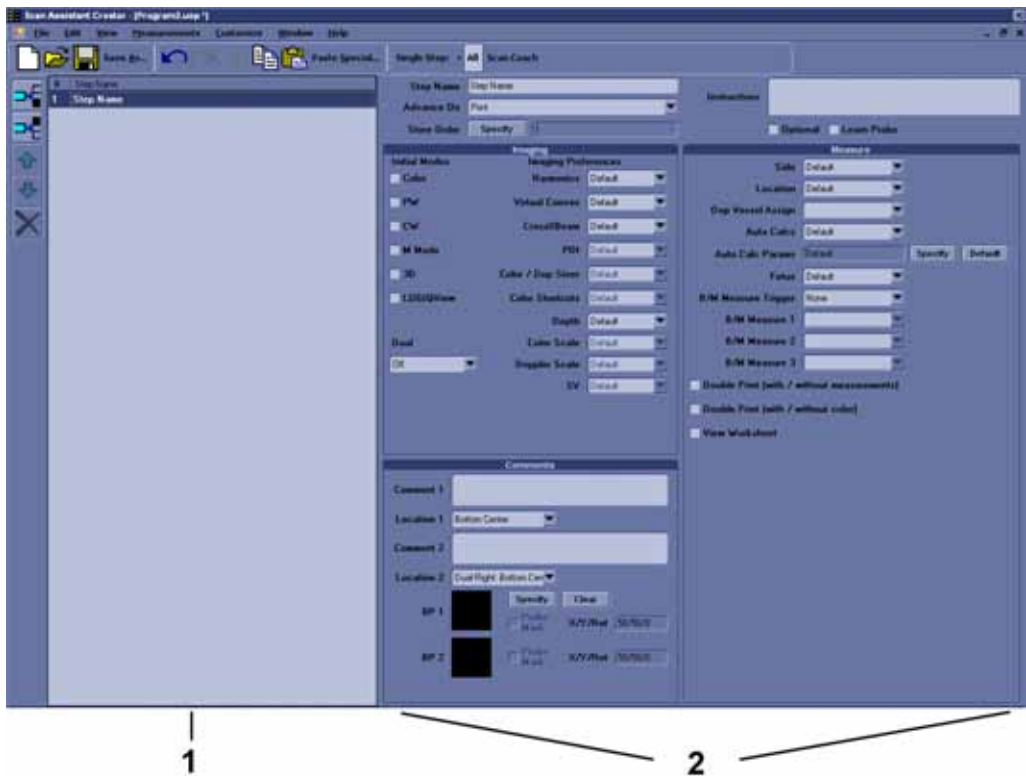


Figure 16-80. Single Step View

- 1. Steps
- 2. Step Attributes

Scan Assistant Features

Scan Assistant allows the user to program the steps in an exam and to program certain attributes for each step. The attributes are what give the Scan Assistant Program behavior. The tables below provide the names of all attributes along with a description of how each one is interpreted by the Scan Assistant feature.

General Attributes

Table 16-77: General Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Step Number	Numeric	Number of the step that appears in the Scan Assistant Navigation menu	1	Previous plus one
Step Name	Any	Number of the step that appears in the Scan Assistant Navigation menu	Step Name	Same as previous step
Advance On	Store	Advance to the next step and go live after Print / Image Store (e.g Store key). This can be a single image store or a loop store.	Store	Same as previous step
	Store & Unfreeze	Advance to the next step after Print / Image Store (e.g. store key) and unfreeze. This can be a single image store or a loop store.		
	User Selection	Advance to next step only after next step is manually selected (e.g. down arrow)		
Instructions	[Any Text]	User notes displayed in the Scan Assistant Navigation menu when the step is active	Blank	Same as previous step
Optional	Optional (checked)	An optional step is given a check mark during Program execution even if no image is acquired	Mandatory	Same as previous step
	Mandatory (unchecked)	A mandatory step is given a check mark only if an image is acquired for the step		
Learn Probe	On (checked)	Learn and change the probe for the user	Off	Off
	Off (unchecked)	No probe change		

Comment Attributes

Table 16-78: Comment Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Comment 1, Comment 2	[Any Text]	User annotation associated with the step.	Same as Step Name attribute	Same as Step Name attribute
Location 1, Location 2	Top Left	Annotation is placed in the top left corner of the image area	Location 1: Bottom Center Location 2: Dual Right: Bottom Center	Same as previous step
	Middle Left	Annotation is placed in the middle left side of the image area		
	Bottom Left	Annotation is placed in the bottom left corner of the image area		
	Top Center	Annotation is placed in the top center of the image area		
	Bottom Center	Annotation is placed in the bottom center of the image area		
	Top Right	Annotation is placed in the top right corner of the image area		
	Mid Right	Annotation is placed in the middle right side of the image area		
	Bottom Right	Annotation is placed in the bottom right corner of the image area		
	Dual Left: Bottom Center	Annotation is placed on the bottom center of the left image in dual screen		

Table 16-78: Comment Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
	Dual Left: Bottom Right	Annotation is placed on the bottom right of the left image in dual screen		
	Dual Left: Top Left	Annotation is placed on the top left of the left image in dual screen		
	Dual Right: Bottom Center	Annotation is placed on the bottom center of the right image in dual screen		
	Dual Right: Bottom Right	Annotation is placed on the bottom right of the right image in dual screen		
	Dual Right: Top Left	Annotation is placed on the top left of the right image in dual screen		
BP1, 2	Blank	Body Pattern not specified. Scan Assistant does not set Body Pattern.	Blank	Same as previous step
BP1, 2	Body pattern graphics with or without probe position	Selected Body Pattern with or without probe position will be set.	Blank	Same as previous step
BP Specify	(Not applicable)	Button used to enable the Body Pattern Selection dialog so that the Body Pattern graphic can be selected and probe position can be set		
BP Clear	(Not applicable)	Clears BP1, BP2 defined for the step		

Table 16-78: Comment Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Probe Mark	On (checked)	BP Probe mark will be set by Scan Assistant	Off	Same as previous step
	Off (unchecked)	Probe mark not specified. Scan Assistant does not set Probe mark.		

Imaging Mode Attributes

The probe and application associated with a program is not configurable. Instead, the scanner remembers the last probe and application used for a given Scan Assistant program and automatically selects them the next time the program is started.

Table 16-79: Imaging Mode Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Color Mode	On (checked)	Color Doppler is on	Off	Same as previous step
	Off (unchecked)	Color Doppler is off		
PW Doppler Mode	On (checked)	PW Doppler is on. If PW Doppler is not on and the new activated step indicates that Doppler should be on, the Mode Cursor is displayed or, if the Mode Cursor is already displayed, then PW Doppler is turned on.	Off	Same as previous step
	Off (unchecked)	PW Doppler is off		
CW Mode	On (checked)	CW-Mode is on	Off	Same as previous step
	Off (unchecked)	CW-Mode is off	Off	
M Mode	On (checked)	M-Mode is on	Off	Same as previous step
	Off (unchecked)	M-mode is off		
3D	On (checked)	3D on	Off	Same as previous step
	Off (unchecked)	3D off		
LOGIQ View	On (checked)	LOGIQ View on	Off	Same as previous step
	Off (unchecked)	LOGIQ View off		

Table 16-79: Imaging Mode Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Dual	Off	Dual screen not in use	Off	Same as previous step
	Left Active	Dual screen is active and the left image is the active image.		
	Right Active	Dual screen is active and the right image is the active image.		
	DualView	DualView is active (both left and right images are live)		
	Dual on Freeze	Dual View is active on Freeze		

Imaging Preference Attributes

Imaging Preferences work slightly different than other attributes. For example, if an abdomen Program has 20 steps and all steps have the Harmonics attribute set to Default, then Scan Assistant will not affect the harmonics setting. Now, assume that steps 10-12 are gallbladder steps and that the harmonics attribute has been set to on for these steps. When transitioning into this group of steps (step 9 to step 10, e.g.), harmonics will be turned on (or remain on if it was previously on). If harmonics is then manually turned off in step 10 then Scan Assistant will not turn it back on when advancing to step 11. In other words, a group of consecutive steps with the same Imaging Preference are treated as a group by Scan Assistant and not as individual steps.

Table 16-80: Imaging Preference Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Harmonics	Off	Harmonics off	Default	Same as previous step
	On	Harmonics on		
	Default	Harmonics not specified. Scan Assistant does not set Harmonics on or off.		
Virtual Convex	Off	Virtual Convex off	Default	Same as previous step
	On	Virtual Convex on		
	Default	Virtual Convex not specified. Scan Assistant does not set Virtual Convex on or off.		
CrossXBeam	Off	CrossXBeam off	Default	Same as previous step
	On	CrossXBeam on		
	Default	CrossXBeam not specified. Scan Assistant does not set CrossXBeam on or off.		

Table 16-80: Imaging Preference Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
PDI	Off	PDI off	Default	Same as previous step
	On	PDI on		
	Default	PDI not specified. Scan Assistant does not set PDI on or off.		
Color/Doppler Steer	Left	Color/Doppler steered to the left	Center	Same as previous step
	Center	Color/Doppler not steered		
	Right	Color/Doppler steered to the right		
Color Shortcuts	Various	Specify the Color Shortcuts		
Depth	Various	Specify the Depth		
Color Scale	Various	Specify the Color Scale		
Doppler Scale	Various	Specify the Doppler Scale		
SV	Various	Specify the SV		

Measurement Attributes

Table 16-81: Measure Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
B/M Measure Trigger	Measure Key	Initiate "Measure 1" attribute when the Measure key is manually selected.	None	None
	Freeze Key	Initiate "Measure 1" attribute when the image is frozen.		
	Store Image	Initiate "Measure 1" attribute when the Measure key is manually selected or the image is stored. This is used to store / print an image and then measure on it and then store it again. Therefore, the Advance On Print attribute is ignored on the first store / print when the Measure Trigger attribute is set to Image Store.		
	None	Measurements are not triggered by Scan Assistant. The "Measure 1" attribute is ignored.		
Side	Rt	The side measurement qualifier is set to Right side of the body	Rt	Derived from Step Name attribute if possible. Otherwise, same as previous step
	Lt	The side measurement qualifier is set to Left side of the body		
	None	The side measurement qualifier is not used (neither Right nor Left)		

Table 16-81: Measure Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Fetus	A	The fetus measurement qualifier is set to Fetus A	A	Same as previous step
	B	The fetus measurement qualifier is set to Fetus B		
	C	The fetus measurement qualifier is set to Fetus C		
	D	The fetus measurement qualifier is set to Fetus D		
Location	Prox	The location measurement qualifier is set to Proximal	Prox	Same as previous step
	Mid	The location measurement qualifier is set to Middle		
	Dist	The location measurement qualifier is set to Distal		
	None	The location measurement qualifier is not used		
B/M Measure 1	Various 2D or M-mode measurements	Specifies the first 2D or M-mode measurement to be initiated. The point at which the measurement is initiated is based upon the Measure Trigger attribute.	Blank	Blank

Table 16-81: Measure Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
B/M Measure 2	Various 2D or M-mode measurements	Specifies the second 2D or M-mode measurement to be initiated after the measurement associated with the Measure 1 attribute is completed.	Blank	Blank
B/M Measure 3	Various 2D or M-mode measurements	Specifies the third 2D or M-mode measurement to be initiated after the measurement associated with the Measure 2 attribute is completed.	Blank	Blank
Doppler Vessel Assign	Various Doppler measurement Vessel folders	Specifies the Vessel folder to assign auto calcs to. The assignment happens when the image is stored / printed (Store key, e.g.).	Blank	Blank
Auto Calcs	Default	Auto Calcs state not specified. Scan Assistant does not set Auto Calcs state.	Default	Same as previous step
	Off	Auto Calcs state set to Off		
	Frozen	Auto Calcs state set to Frozen		
	Live	Auto Calcs state set to Live		
Auto Calc Params	Various Auto Calc parameters	Specifies the auto calc parameters to be used.	Default	Same as previous step
	Default	Auto Calc parameters are not specified. Scan Assistant does not set the Auto Calc parameters.		

Table 16-81: Measure Attributes (continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Auto Calc Specify	[Not Applicable]	Button used to enable the Auto Calcs Parameter Selection dialog so that the Auto Calc Params attribute can be set	[Not Applicable]	[Not Applicable]
Auto Calc Default	[Not Applicable]	Button used to set the Auto Calcs Params attribute to Default.	[Not Applicable]	[Not Applicable]
Double Print (with/without measurements)	On (checked)	If an Image Store / Print (Store key, e.g.) is performed on an image with measurements, the image is stored / printed two times, once with the measurements and once without.	Off	Same as previous step
	Off (unchecked)	No special Store / Print behavior.		
Double Print (with or without color)	On (checked)	If an Image Store / Print (Store key, e.g.) is performed on an image with color, the image is stored / printed two times, once with color and once without. If double print on color and double print on measurements are both configured to be on, the image is stored / printed two times, once with the measurements and once without.		
	Off (unchecked)	No special Store / Print behavior.		
View Worksheet	On (checked)	The worksheet is turned on	Off	Off
	Off (unchecked)	The worksheet is not turned on		

Measurements

Because there are many measurements available on the LOGIQ V2/LOGIQ V1 and because the measurement package is highly customizable, there is some special handling for measurements. The Measurement attributes affected by this special handling are Measure 1-3 and Vessel.

Selecting a Measurement Package

The Measurement selection menu can be used to specify which measurement package is to be used for the Program. The Measurements packages are organized by category and subcategory. The choices for the Measure 1-3 and Vessel attributes are limited by the selection of category and subcategory. To select a subcategory, select a category, move to the subcategory list and select a subcategory. To select all subcategories for a given category, select the category and then reselect the Measurements menu item to remove the menu.

A single Program is not allowed to have measurements from multiple categories, but it may have measurements from multiple subcategories.



Figure 16-81. Measurements Menu

User-Defined Measurements

User-defined subcategories and individual measurements can be used with the Scan Assistant feature. To do so, the Scan Assistant Creator needs to know about the user-defined measurements on the LOGIQ V2/LOGIQ V1.

On the LOGIQ V2/LOGIQ V1, use the Scan Assistant utility menu to Export Programs to a USB storage device (or CD/DVD). On the export menu, check the “Export user config data” checkbox to store the user-defined measurement information to the Program User Directory on the media. The name of the file is UserConfigSystemFile.res. When this file exists in the Program User Directory, then it is used. Otherwise, the default file installed with the Scan Assistant Creator is used.



Figure 16-82. Program Export Menu on LOGIQ V2/LOGIQ V1

Navigating Programs

In addition to moving the windows pointer and selecting an item, there are several keyboard controls that navigate a Program.

Table 16-82: Keyboard Program Navigation

Keyboard Entry	Step Selected	Step Attribute Selected
Enter	Moves to next step. If on the last step, it creates a new step and selects it.	Single Step View: Varies based on the step attribute selected. If on the last step, it creates a new step and selects it.
Tab	Single Step View: Moves to next step. On the last step it moves to the first step attribute.	Moves to next step attribute. If last attribute for the step, moves to next step.
Up Arrow/Page Up	Moves to previous step	Single Step View: Varies based on the step attribute selected.
Down Arrow/Page down	Moves to next step	Single Step View: Varies based on the step attribute selected.
Left Arrow	No action	Single Step View: Varies based on the step attribute selected.
Right Arrow	Single Step View: No action.	Single Step View: Varies based on the step attribute selected.

Editing Programs

When editing Programs, changes can be made at both the step level and the step attribute level. Steps can be added, inserted, moved, deleted, copied and pasted. Step attributes can be modified for a given step or across multiple steps.

Editing Steps

The step toolbar allows steps to be inserted, moved up and down, and deleted. For steps to be moved, one or more consecutive steps must be selected. Some of the controls have shortcuts (Control Key + another key).

When the last step in a Program is selected, the Enter key automatically appends a new step to the end of the Program and selects the new step. When the Enter key is pressed on any other step, the next step is activated. The up and down arrows can also be used to move between steps.



Figure 16-83. Step Toolbar

1. Insert Step above selected step (Ctrl+I)
2. Insert Step below selected step
3. Move selected step(s) up (Ctrl+Up Arrow)
4. Move selected step(s) down (Ctrl+Down Arrow)
5. Delete selected step(s)

Editing Steps (continued)

The Edit Menu and Edit toolbar provides access to the Cut, Copy, Paste and Paste Special features. The Undo and Redo actions also appear on Edit Menu and Edit Toolbar.



Figure 16-84. Edit Menu

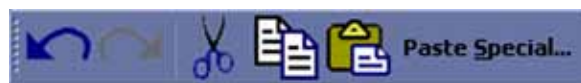


Figure 16-85. Edit Toolbar

When selecting multiple steps for Cutting or Copying, the Shift + Left Mouse and Ctrl + Left Mouse key combinations can be used. Multiple steps are also selected by holding the Left Mouse key and dragging across the steps of interest. When pasting steps they are added after the currently selected step.

The Paste Special control allows copied steps to be pasted with some modification. For example, the steps associated with the Right Kidney can be Copied and Pasted so that they are converted into Left Kidney steps during the paste. The Paste Special dialog is shown in the figure below. Simply select the desired Conversion and choose the “Paste” key.

Editing Steps (continued)

- Step Name (Text)
- Comment 1 (Text)
- Comment 2 (Text)
- Side (Measurement qualifier)
- Location (Measurement qualifier)
- Fetus (Measurement qualifier)



Figure 16-86. Paste Special Dialog

Editing Steps (continued)

The Define Conversions key is used to define the text that is converted. An example is shown in the figure below. If an exact case match is found, it is used for the conversion. If there is a match, but with different case, it is used only if there is not an exact case match.

There are 3 user-defined conversions that can be edited and named. These user-defined conversions can also be used to perform a find and replace capability.



Figure 16-87. Define Conversions Dialog

Editing Step Attributes

To edit a step attribute simply select the step attribute and edit it, such as picking from a drop down menu, checking or unchecking a box or typing in text.

This will take the original step's content and copy it down the highlighted steps. This is also available when multiple attributes are selected within the same step.

If a step attribute is not editable, it may be because the attribute requires a different attribute to be set a particular way in order to become enabled. These dependencies are outlined below.

Table 16-83: Step Attribute Dependencies

Step Attribute	Dependency
PDI	Color step attribute must be checked
Color / Dop Steer	Color or PW step attribute must be checked
Measure 1	Measure Trigger must not be set to None
Measure 2	Measure 1 must be set
Measure 3	Measure 1 and Measure 2 must be set

Editing Multiple Programs

Multiple Programs can be opened at the same time. To switch between Programs, the title banner of the window is selected or the Program is selected from the Window Menu. An asterisk indicates that the Program has been edited but not saved.

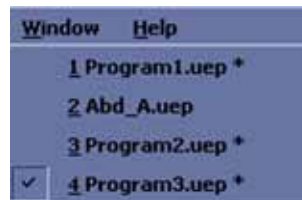


Figure 16-88. Window Menu

With multiple Programs open, steps copied from one Program can be put inserted into another Program via the paste or paste special features.

Undo/Redo

The Undo feature allows the previous action to be undone. For example, pressing undo 6 times will undo the last 6 changes. Redo cancels the Undo of an action. For example, pressing undo 6 times will undo the last 6 changes and then pressing Undo 2 times will cause only the last 4 actions to be undone.

Editing the Current Program on the Scanner

If you are currently using a Scan Assistant program and choose to edit that program while using it, the program will be reloaded when scanning is restarted. If the number of steps is changed, the checkmarks that were in place before editing are cleared. If the number of steps in the program has not changed, the checkmarks that were in place before editing are maintained.

The current program can be restarted at any time by selecting the Stop button on the Scan Assistant navigation window and selecting restart.

Rule Checking

Scan Assistant Creator allows Programs to be checked. During a rule check, Scan Assistant Creator applies a series of rules against the Program being checked and reports any inconsistencies between the rules and the Program. This rule check is intended to find potential issues in the Program before it is tested on a LOGIQ V2/LOGIQ V1. Issues found when running the check do not mean the Program is unusable. It means that if there happens to be a problem with running the Program, the first place to look would be at the Issue noted when you ran the Check.

For example, if there is a step name Right Kidney and the Measurement Location is set to “Left”, the rule check would report this inconsistency.

Running a Rule Check

The “Check” button below the Program area is used to initiate a rule check. The results are displayed in the Rule Check Results window to the right of the button. A rule check is also initiated when attempting to save a Program that has not previously passed a rule check.

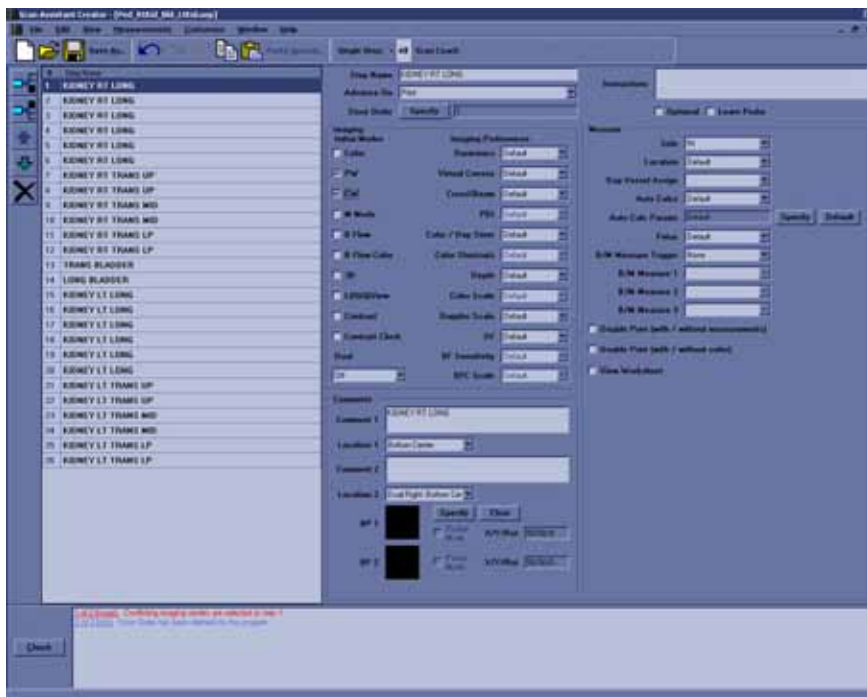


Figure 16-89. Rule Check Button and Rule Check Results

Rule Check Results

If the issue is specific to a particular step, double-clicking on the issue number in the Rule Check Results window selects the step associated with the issue. The results are intended to be potential issues and therefore may be ignored at the discretion of the user. For example, the rule check may report that there are an unequal number of left and right steps. For a particular Program, this may be the expected result. If a change is made in response to the rule check results, a new rule check can be run to see if the issue has been resolved.

Customization

The Customize Menu is shown below.



Figure 16-90. Customize Menu

The column widths of the steps and step attributes are customizable. The desired width is set by selecting and dragging the line separating column headers. These adjustments are remembered for the next time the Scan Assistant Creator is used.

The locations of the toolbars are customizable. The location is set by selecting and dragging the toolbar gripper as shown in the figure below. The toolbars can be placed at the top, left, right or bottom of the Scan Assistant Creator.



Figure 16-91. Gripper used for Toolbar placement

1. Toolbar Gripper

Exporting the Scan Assistant Creator to a PC

To export the Scan Assistant Creator to a PC,

1. Insert a USB Flash Drive in a USB port on the Control Panel.
2. Press **Utility--> Scan Assistant**.
3. Press **Export**.
4. Place a checkmark in the Export Scan Assistant Creator Installation.
5. Press **Export**.



Figure 16-92. Export Scan Assistant Creator Installation

Search

Opens up a search window to find a parameter on the utility pages.

To search for a utility parameter,

1. Select **Search**.
2. Type in the search string. For instance, if you're searching for **Patient info**, you could just type 'patient'.

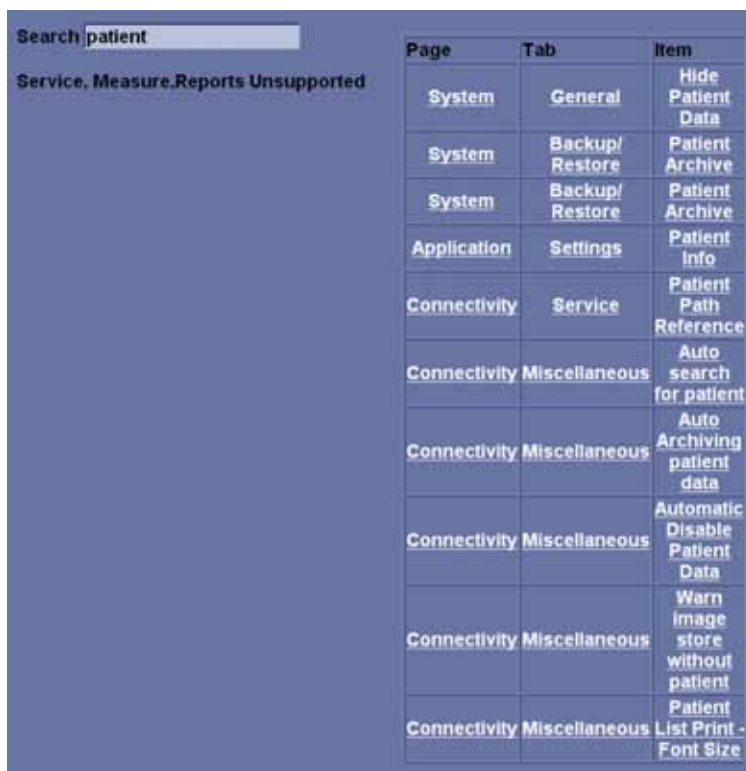


Figure 16-93. Search Example

3. A list of possible matches appears to the right. Select the correct match.

NOTE: *You cannot perform a search on the Measure, Reports, or Service utility pages.*

Chapter 17

Probes and Biopsy

This chapter consists of the information of each probe and describes some special concerns, biopsy kits and accessories as well as basic procedures for attaching a biopsy guide to the different types of probes.

Probe Overview

Ergonomics

Probes have been ergonomically designed to:

- Handle and manipulate with ease
- Connect to the system with one hand
- Be lightweight and balanced
- Have rounded edges and smooth surfaces.
- Stand up to typical wear by cleaning and disinfectant agents, contact with approved gel, etc.

Cables have been designed to:

- Connect to system with appropriate cable length

Cable handling

Take the following precautions with probe cables:

- Keep free from wheels
- Do not bend the cable acutely
- Avoid crossing cables between probes.

Probe orientation

Each probe is provided with an orientation marking. This mark is used to identify the side of the probe corresponding to the side of the image having the orientation mark on the display.



Figure 17-1. Orientation Marking on Probe (Example)

1. Orientation Mark

Labeling

Each probe is labeled with the following information:

- Seller's name and manufacturer
- GE part number
- Probe serial number
- Month and year of manufacture
- Probe designation-provided on the probe grip and the top of the connector housing, so it is easily read when mounted on the system and is also automatically displayed on the screen when the probe is selected.

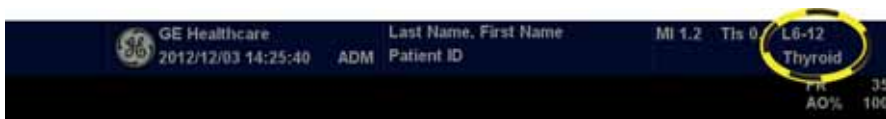


Figure 17-2. Displayed Probe Information

Probe Naming Conventions

Table 17-1: Probe Naming Convention

Type	Frequency	Connector Type
C=Convex L=Linear S=Sector	"4" in 4C-RS	RS

Probe Usage

For details on connecting, activating, deactivating, disconnecting, transporting and storing the probes, See 'Probes' on *page 3-44 for more information.*

Care and Maintenance

Inspecting probes



CAUTION

If any damage is found, DO NOT use the probe until it has been inspected and released for further use by a GE service representative.

Before each use

1. Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage.
Inspect probes for cracks or openings in the housing and holes in and around the acoustic lens or other damage that could allow liquid to enter the probe.
2. Test the functionality of the probe.

After each use

1. Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage.
2. Look for any damage that would allow liquid to enter the probe.

Environmental Requirements

Probes should be operated, stored, or transported within the parameters outlined below.



CAUTION

Ensure that the probe face temperature does not exceed the normal operation temperature range.

Table 17-2: Probe Environmental Requirements

	Operational	Storage	Transport
Temperature	10° - 40° C 50° - 104° F	0° - 50° C 32° - 122° F	-40° - 55° C -40° - 131° F
Humidity	5 - 85% non-condensing	5 - 85% non-condensing	5 - 85% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa



CAUTION

Check the room temperature before you use the probe.

Probe Safety

Handling precautions



Ultrasound probes are highly sensitive medical instruments that can easily be damaged by improper handling. Use care when handling and protect from damage when not in use. **DO NOT** use a damaged or defective probe. Failure to follow these precautions can result in serious injury and equipment damage.

Electrical shock hazard



The probe is driven with electrical energy that can injure the patient or user if live internal parts are contacted by conductive solution:

- **DO NOT** immerse the probe into any liquid beyond the level indicated by the immersion level diagram. Refer to the immersion illustration in the Probe Cleaning Process section. Never immerse the probe connector or probe adaptors into any liquid.
- **DO NOT** drop the probes or subject them to other types of mechanical shock or impact. Degraded performance or damage such as cracks or chips in the housing may result.
- Prior to each use, visually inspect the probe lens and case area for cracks, cuts, tears, and other signs of physical damage. **DO NOT** use a probe which appears to be damaged until you verify functional and safe performance. You must perform a more thorough inspection, including the cable, strain relief, and connector, each time you clean the probe.
- Before inserting the connector into the probe port, inspect the probe connector pins. If a pin is bent, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.
- **DO NOT** kink, tightly coil, or apply excessive force on the probe cable. Insulation failure may result.
- Electrical leakage checks should be performed on a routine basis by GE Service or qualified hospital personnel. Refer to the service manual for leakage check procedures.

Mechanical hazards



CAUTION

A defective probe or excessive force can cause patient injury or probe damage:

- Observe depth markings and do not apply excessive force when inserting or manipulating intercavitary probes.
- Inspect probes for sharp edges or rough surfaces that could injure sensitive tissue.
- DO NOT apply excessive force to the probe connector when inserting into the probe port. The pin of a probe connector may bend.

Special handling instructions

Using protective sheaths



CAUTION

Protective barriers may be required to minimize disease transmission. Probe sheaths are available for use with all clinical situations where infection is a concern. Use of legally marketed, sterile probe sheaths is mandatory for intra-cavitary and intra-operative procedures. Use of legally marketed, sterile, pyrogen free probe sheaths is **REQUIRED** for neurological intra-operative procedures.

Instructions. Custom made sheaths are available for each probe. Each probe sheath kit consists of a flexible sheath used to cover the probe and cable and elastic bands used to secure the sheath.

Sterile probe sheaths are supplied as part of biopsy kits for those probes intended for use in biopsy procedures. In addition to the sheath and elastic bands, there are associated accessories for performing a biopsy procedure which are included in the kit. Refer to the biopsy instructions for the specific probes in the Discussion section of this chapter for further information.

Reordering. To reorder sheaths, please contact your local distributor or the appropriate support resource.



CAUTION

Devices containing latex may cause severe allergic reaction in latex sensitive individuals. Refer to FDA's March 29, 1991 Medical Alert on latex products.



CAUTION

Do not use pre-lubricated condoms as a sheath. In some cases, they may damage the probe. Lubricants in these condoms may not be compatible with probe construction.



CAUTION

DO NOT use an expired probe sheath. Before using probe sheaths, verify whether the term of validity has expired.

Endocavitary Probe Handling Precautions

If the sterilization solution comes out of the endocavitary probe, please follow the cautions below.



Sterile/sanitary sheaths are to be used on the probe during its actual use with patients. Wearing gloves protects the patient and operator.



Sterilant Exposure to Patient (e.g., Cidex)—Contact with a sterilant to the patient’s skin or mucous membrane may cause an inflammation. If this happens, refer to the sterilant’s instruction manual.

Sterilant Exposure from Probe Handle/Connector to Patient (e.g., Cidex)—DO NOT allow the sterilant to contact the patient. Only immerse the probe to its specified level. Ensure that no solution has entered the probe’s handle before scanning the patient. If sterilant comes into contact with the patient, refer to the sterilant’s instruction manual.

Endocavitary Probe Point of Contact—Refer to the sterilant’s instruction manual.

Probe handling and infection control

This information is intended to increase user awareness of the risks of disease transmission associated with using this equipment and provide guidance in making decisions directly affecting the safety of the patient as well as the equipment user.

Diagnostic ultrasound systems utilize ultrasound energy that must be coupled to the patient by direct physical contact. Depending on the type of examination, this contact occurs with a variety of tissues ranging from intact skin in a routine exam to recirculating blood in a surgical procedure. The level of risk of infection varies greatly with the type of contact.

One of the most effective ways to prevent transmission between patients is with single use or disposable devices. However, ultrasound transducers are complex and expensive devices that must be reused between patients. It is very important, therefore, to minimize the risk of disease transmission by using barriers and through proper processing between patients.



Risk of Infection. ALWAYS clean and disinfect the probe between patients to the level appropriate for the type of examination and use FDA-cleared probe sheaths where appropriate.



Adequate cleaning and disinfection are necessary to prevent disease transmission. It is the responsibility of the equipment user to verify and maintain the effectiveness of the infection control procedures in use. Always use sterile, legally marketed probe sheaths for intra-cavitary and intra-operative procedures.

For neurological intra-operative procedures, use of a legally marketed, sterile, pyrogen free probe sheath is **REQUIRED**. Probes for neuro surgical use must not be sterilized with liquid chemical sterilants because of the possibility of neuro toxic residues remaining on the probe.

Probe Cleaning Process

Cleaning probes

To clean the probe:

NOTE: *Do not immerse the probe into any liquid beyond the level specified for that probe. Never immerse the transducer connector into any liquid.*

1. Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage.
2. Disconnect the probe from the ultrasound console and remove all coupling gel from the probe by wiping with a soft cloth and rinsing with flowing water.

NOTE: *DO NOT wipe the probe with a dry cloth.*

3. Soak the probe head in water. Scrub the probe as needed using a soft sponge, gauze, or cloth to remove all visible residue from the probe surface.



CAUTION

Take extra care when handling the lens face of the ultrasound transducer. The lens face is especially sensitive and can easily be damaged by rough handling. NEVER use excessive force when cleaning the lens face.


4. Rinse the probe with enough clean potable water.
5. Air dry or dry with a soft cloth.
6. After cleaning, inspect the probe's lens, cable, casing and connector. Look for any damage that would allow liquid to enter the probe. Also, inspect the probe functionality by live scan. If any damage is found, do not use the probe until it has been inspected and repaired/replaced by a GE service representative.

Cleaning probes (continued)



Figure 17-3. Probe Immersion Levels

Table 17-3: Description of Pictogram for Probe Immersion Levels

Pictogram	Description
	Fluid Level

Disinfecting probes

Perform After Each Use

Ultrasound probes can be disinfected using liquid chemical germicides. The level of disinfection is directly related to the duration of contact with the germicide. Increased contact time produces a higher level of disinfection. Refer to Probe Care Card that was shipped with each LOGIQ V2/LOGIQ V1 probe.



CAUTION

Ensure that you follow the probe disinfection procedure provided by GE.

Table 17-4: Description of Pictogram on Probe Care Card






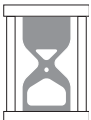

Pictogram	Description
	“ATTENTION” - Consult accompanying documents” is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.
	“CAUTION” - Dangerous voltage (the lightning flash with arrowhead) is used to indicate electric shock hazards.
	Biohazard - Patient/user infection due to contaminated equipment. Usage <ul style="list-style-type: none"> • Cleaning and care instructions • Sheath and glove guidelines
	Ultrasound probes are highly sensitive medical instruments that can easily be damaged by improper handling. Use care when handling and protect from damage when not in use.
	Do not immerse the probe into any liquid beyond the level specified for that probe. Refer to the user manual of the ultrasound system.
	Since there is a possibility of having negative effects on the probe, observe the specified immersing time by the germicide manufacturer strictly. Do not immerse the probe in liquid chemical germicides more than the time prescribed in the care card.

Table 17-4: Description of Pictogram on Probe Care Card (continued)

Pictogram	Description
 A blue circular icon with a white silhouette of a person sitting and reading a document.	"Consult accompany document" - Refer to the ultrasound system user manual for important probe care and cleaning instruction.

Disinfecting probes (continued)



CAUTION

Review the probe care card that is packed with each probe. Please refer to the probe care card for GE approved probe disinfectants.



CAUTION

In order for liquid chemical germicides to be effective, all visible residue must be removed during the cleaning process. Thoroughly clean the probe, as described earlier before attempting disinfection.

You **MUST** disconnect the probe from the LOGIQ V2/LOGIQ V1 prior to cleaning/disinfecting the probe. Failure to do so could damage the system.

DO NOT soak probes in liquid chemical germicide for longer than is stated by the germicide instructions for use. Extended soaking may cause probe damage and early failure of the enclosure, resulting in possible electric shock hazard.

1. Prepare the germicide solution according to the manufacturer's instructions. Be sure to follow all precautions for storage, use and disposal.
2. Place the cleaned and dried probe in contact with the germicide for the time specified by the germicide manufacturer. High-level disinfection is recommended for surface probes and is required for endocavitary and intraoperative probes (follow the germicide manufacturer's recommended time).



CAUTION

Probes for neuro surgical intra-operative use must NOT be sterilized with liquid chemical sterilants because of the possibility of neuro toxic residues remaining on the probe. Neurological procedures must be done with the use of legally marketed, sterile, pyrogen free probe sheaths.

3. After removing from the germicide, rinse the probe following the germicide manufacturer's rinsing instructions. Flush all visible germicide residue from the probe and allow to air dry.



WARNING

There should be no chemical residuals on the probe after cleaning or disinfection.

Disinfecting probes (continued)



CAUTION

CREUTZFIELD-JACOB DISEASE

Neurological use on patients with this disease must be avoided. If a probe becomes contaminated, the probe must be destroyed. there is no adequate disinfecting means.



Biological
Hazard



WARNING

Ultrasound transducers can easily be damaged by improper handling and by contact with certain chemicals. Failure to follow these precautions can result in serious injury and equipment damage.

- Do not immerse the probe into any liquid beyond the level specified for that probe. Never immerse the transducer connector or probe adapters into any liquid.
- Avoid mechanical shock or impact to the transducer and do not apply excessive bending or pulling force to the cable.
- Transducer damage can result from contact with inappropriate coupling or cleaning agents:
 - Do not soak or saturate transducers with solutions containing alcohol, bleach, ammonium chloride compounds or hydrogen peroxide
 - Avoid contact with solutions or coupling gels containing mineral oil or lanolin
 - Avoid temperatures above 60°C (except with Trophon for approved probes.)
- Inspect the probe prior to use and after use for damage or degeneration to the housing, strain relief, lens and seal. Do not use a damaged or defective probe.

Coupling gels



WARNING

Do not use unrecommended gels (lubricants). They may damage the probe and void the warranty. Please refer to the probe care card for GE approved probe gels.

Applying

In order to assure optimal transmission of energy between the patient and probe, a conductive gel or couplant must be applied liberally to the patient where scanning will be performed.



CAUTION

Do not apply gel to the eyes. If there is gel contact to the eye, flush eye thoroughly with water.

Precautions

Coupling gels should not contain the following ingredients as they are known to cause probe damage:

- Methanol, ethanol, isopropanol, or any other alcohol-based product
- Mineral oil
- Iodine
- Lotions
- Lanolin
- Aloe Vera
- Olive Oil
- Methyl or Ethyl Parabens (para hydroxybenzoic acid)
- Dimethylsilicone
- Polyether glycol based
- Petroleum

Planned Maintenance

The following maintenance schedule is suggested for the system and probes to ensure optimum operation and safety.

Table 17-5: Planned Maintenance Program

Do the Following	Daily	After Each Use	As Necessary
Inspect the Probes	X	X	X
Clean the Probes		X	X
Disinfect Probes		X	X

Returning/Shipping Probes and Repair Parts

US Department of Transportation and GE policy requires that equipment returned for service **MUST** be clean and free of blood and other infectious substances.

When you return a probe or part for service (Field Engineer or customer), you need to clean and disinfect the probe or part prior to packing and shipping the equipment.

Ensure that you follow probe cleaning and disinfection instructions provided in the User Manual.

This ensures that employees in the transportation industry as well as the people who receive the package are protected from any risk.

Sterile Ultrasound Procedures

ONLY ultrasound gel that is labeled as sterile, is sterile.

Ensure you always use sterile ultrasound gel for those procedures that require sterile ultrasound gel.

Once a container of sterile ultrasound gel is opened, it is no longer sterile and contamination during subsequent use is possible.

Probe Discussion

Introduction

The LOGIQ V2/LOGIQ V1 supports the following types of probes:

- **Convex Array.** Convex Array probes.
- **Micro Convex Array.** Micro Convex Array probes.
- **Linear Array.** Linear Array probes.
- **Sector Phased Array.** Sector Phased Array probes.



Probes for transvaginal and transrectal applications require special handling. Transvaginal/transrectal examinations and probe insertions should be performed only by personnel with adequate training. Refer to the user documentation enclosed with these probes.

Application

Table 17-6: Probe Indications for Use

Probe Application	4C-RS	8C-RS	3Sc-RS	L6-12-RS	E8C-RS	LK760-RS	12L-RS
Abdominal	X		X				
Obstetrics	X				X		
Gynecological	X				X		
Cardiac		X	X				
Vascular	X			X			X
Transcranial		X	X				
Musculoskeletal	X	X		X		X	X
Urological	X				X		
Small Parts				X			X
Pediatrics and Neonatal		X		X			X
Transvaginal					X		
Transrectal					X		
Biopsy	X		X	X	X		X

Features

Table 17-7: Probe Features

Probe Application	4C-RS	8C-RS	3Sc-RS	L6-12-RS	E8C-RS	LK760-RS	12L-RS
LOGIQ View	X	X	X	X	X	X	X
Easy 3D	X	X	X	X	X	X	X
CWD			X				
TVI/TVD			X				
CrossXBeam	X	X		X	X	X	X
SRI-HD	X	X	X	X	X	X	X
Scan Coach	X	X	X	X	X		X
Virtual Convex			X	X		X	X
B/Harmonic	X	X	X	X	X	X	X
PWD	X	X	X	X	X		X
M Mode	X	X	X	X	X	X	X
AMM	X	X	X				
CMM			X				
Needle				X			X

NOTE: *Not all features, products, probes or peripherals described in this document may be available or cleared for sale in all markets. Please contact your local GE Ultrasound representative to get the latest information.*

Specifications

Table 17-8: Probe Specifications

Probe Designation	Center Image Frequency (MHz)	Frequency Range (MHz)	Doppler Frequency Range (MHz)
4C-RS	3.10	2.00 ~ 5.00	2.00 ~ 3.60
3Sc-RS	2.75	2.00 ~ 4.00	1.70 ~ 3.30
L6-12-RS	7.75	6.00 ~ 13.00	4.00 ~ 6.00
E8C-RS	6.50	6.00 ~ 10.00	4.20 ~ 6.30
8C-RS	6.50	6.00 ~ 10.00	4.20 ~ 6.30

Table 17-8: Probe Specifications (continued)

Probe Designation	Center Image Frequency (MHz)	Frequency Range (MHz)	Doppler Frequency Range (MHz)
LK760-RS	7.15	5.00 ~ 10.00	NA
12L-RS	7.75	6.00 ~ 13.00	4.20 ~ 7.70

Slice Thickness Specification




Table 17-9: Probe Slice Thickness Specification

Probe Designation	Probe Slice Thickness Specification [mm]
8C-RS	<=13.0mm
E8C-RS	<=13.0mm
L6-12-RS	<=15.0mm
3Sc-RS	<=16.0mm
4C-RS	<=12.0mm
LK760-RS	<=12.0mm
12L-RS	<=15.0mm

Probe Illustration




Convex Probe

Table 17-10: Convex Probe Illustration

Probe	Illustration	Probe	Illustration
4C-RS		8C-RS	
E8C-RS			


Linear Probe

Table 17-11: Linear Probe Illustration

Probe	Illustration	Probe	Illustration
L6-12-RS		LK760-RS	
12L-RS			

Sector Probe

Table 17-12: Sector Probe Illustration

Probe	Illustration
3Sc-RS	

Biopsy Special Concerns

Precautions Concerning the Use of Biopsy Procedures



WARNING

Do not freeze the image during a biopsy procedure. The image must be live to avoid a positioning error.

Biopsy guidezones are intended to assist the user in determining optimal probe placement and approximate the needle path. However, actual needle movement is likely to deviate from the guideline. Always monitor the relative positions of the biopsy needle and the subject mass during the procedure.



CAUTION

The use of biopsy devices and accessories that have not been evaluated for use with this equipment may not be compatible and could result in injury.



CAUTION

The invasive nature of biopsy procedures requires proper preparation and technique to control infection and disease transmission. Equipment must be cleaned as appropriate for the procedure prior to use.

- Follow the probe cleaning and disinfection procedures and precautions to properly prepare the probe.
- Follow the manufacturer's instructions for the cleaning of biopsy devices and accessories.
- Use protective barriers such as gloves and probe sheaths.
- After use, follow proper procedures for decontamination, cleaning, and waste disposal.

Precautions Concerning the Use of Biopsy Procedures (continued)



CAUTION

Improper cleaning methods and the use of certain cleaning and disinfecting agents can cause damage to the plastic components that will degrade imaging performance or increase the risk of electric shock.

See 'Probe Safety' on *page 17-6 for more information.*



WARNING

NEVER reuse the TR5° disposable biopsy guide attachment and Disposable sterile Ultra-Pro II Needle guide kits.

Preparing for a Biopsy

Displaying the Guidezone

Activate the Biopsy Kit by selecting it from the B-Mode menu. If necessary, configure the Biopsy kit to the B mode menu controls in Utility -> Application -> Imaging Controls -> Primary menu.

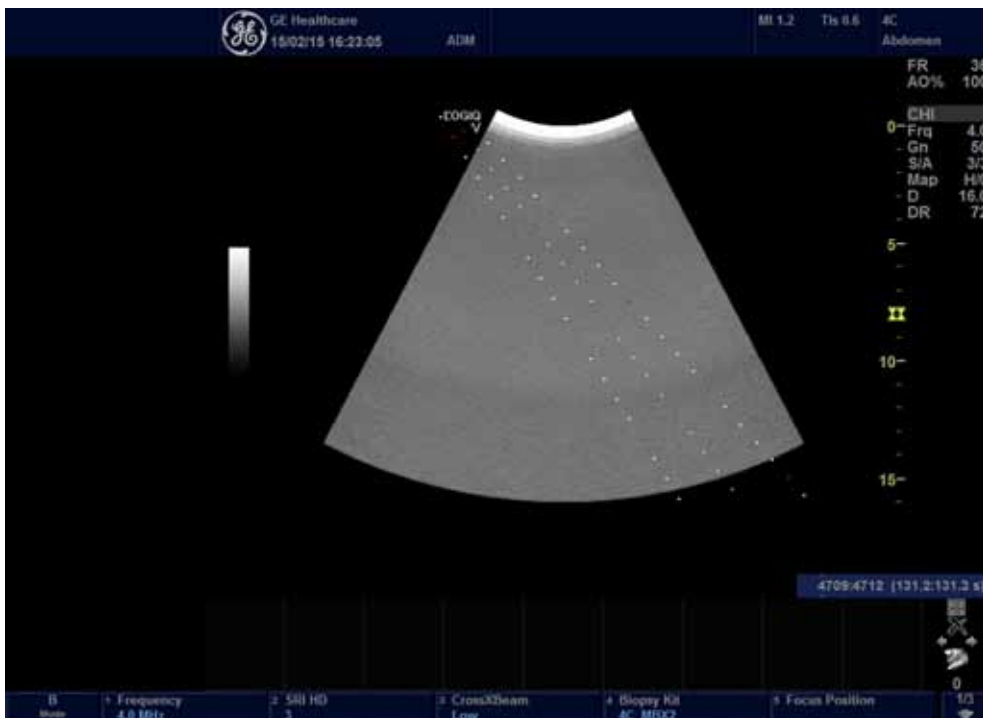


Figure 17-4. Biopsy Guidezones example

The available biopsy options appear when Biopsy Kit is selected. There are fixed and adjustable angle biopsy kits and plastic/disposable and reusable biopsy guides available with the LOGIQ V2/LOGIQ V1 depending on the probe. Select the desired biopsy kit.

NOTE: You can set biopsy guideline display via Utility -> System -> System Image -> Biopsy Guide screen.

Displaying the Guidezone (continued)

NOTE: You can display the biopsy guideline on the CFM image in simultaneous mode. Select the Show Biopsy Mark on CFM simultaneous Mode preset in the Utility -> System -> System Image -> Biopsy Guide screen.

The biopsy guidezone represents a path of the needle. The dots which make up the guidezones is the depth readout where:

- Yellow represent 1 cm increments.
- Red represents 5 cm increments.

The display should be carefully monitored during a biopsy for any needle deviation from the center line or guidezone.

Before scanning, verify the needle can be visualized within the imaging plane. User appropriate needle length to reach target area.

The Biopsy Guidezone adjusts along with image adjustments, such as image inversion/rotations, zoom and depth changes.

The needle may vary from the center line or guidezone for various reasons:

- Needle barrel to needle clearance or strength.
- Bracket manufacturing tolerance.
- Needle deflection due to tissue resistance.
- Needle size chosen. Thinner needles may deflect more.

Table 17-13: Biopsy Guide Availability

Biopsy Guide			E8C-RS	L6-12-RS	3Sc-RS	4C-RS	12L-RS
Fixed Angle	E8C_TR5	Biopsy Depths (cm)	15.3				
	E8C_RU	Biopsy Angle (degree)	90				
Multi-Angle	MBX1	Biopsy Depths (cm)		1.5	4.2	4.0	1.5
	MBX2	Biopsy Depths (cm)		2.5	5.7	6.0	2.5
	MBX3	Biopsy Depths (cm)		3.5	8.2	10.0	3.5

Displaying the Guidezone (continued)



Failure to match the guidezone displayed to the guide may cause the needle to track a path outside the zone.

It is extremely important that when using the adjustable angle biopsy guides, the angle displayed on the screen matches the angle set on the guide, otherwise the needle will not follow the displayed guidezone which could result in repeated biopsies or patient injury.

Preparing the Biopsy Guide Attachment

Convex, Sector and Linear probes have optional biopsy guide attachments for each probe. The guide consists of a non-disposable bracket to attach to the probe, disposable needle clip to attach to the bracket, sheath, gel (sterile gel if necessary) and disposable needle barrels.

The disposable needle barrels are available for a variety of needle sizes.



Please refer to the manufacturer's instructions included in the biopsy kit.



DO NOT attempt to use the biopsy bracket and needle guide until the manufacturer's instructions, provided with the biopsy bracket and needle guide in the kit, have been read and thoroughly understood.

The bracket is packaged non-sterile and is reusable. To avoid possible patient contamination, ensure bracket is properly cleaned, sterilized or disinfected before each use.

Disposable components are packaged sterile and are single-use only. Do not use if integrity of packing is violated or if expiration date has passed.

Fixed Needle Biopsy Guide Assembly



DO NOT use the needle with the catheter (soft tube). There is a possibility of breaking the catheter in the body.



Before inserting the needle, scan the patient to determine the correct puncture depth and site. Only the sterile/sanitary sheath and rubber band are on the probe during the pre-needle placement scanning.

Preparation

To prepare the endocavitary probe for use:

1. Remove the probe from the box and carefully examine it for any damage.
2. If the biopsy guide is to be attached, use the filling removal tool to clean out the attachment area on the probe head.

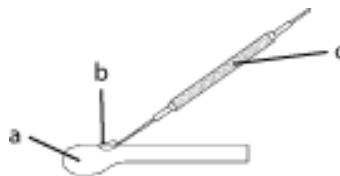


Figure 17-5. Attachment Filling Removal

- a. Probe Head
 - b. Attachment
 - c. Filling Removal Tool
3. Clean, then disinfect the probe.

NOTE: *Ensure that protective gloves are worn.*

Installing the sheath

To install the sheath:

1. Remove the sheath from its package. Do not unroll the sheath.

NOTE: *Remember to rinse all sanitary probe sheaths of powder before placing on the probe. Powder can degrade the displayed image.*

2. Place an adequate amount of ultrasound gel inside the sheath tip (the gel is between the sheath inner surface and the probe aperture).

NOTE: *Ensure that only acoustic coupling gel is used for this purpose.*

3. Place the sheath tip over the probe aperture and then pull the sheath end toward the probe handle.
4. Inspect the sheath for nicks, cuts or tears.

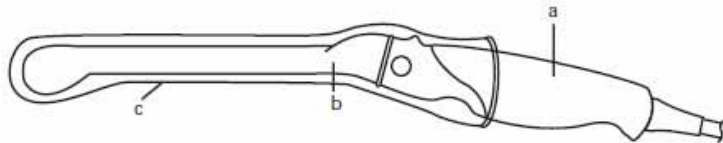


Figure 17-6. E8C-RS Probe with Sheath

- a. Probe Handle
 - b. Probe Body
 - c. Sanitary Sheath
5. Rub a finger over the tip of the probe to ensure all air bubbles have been removed.

Biopsy Guide Preparation

1. If a biopsy is to be performed, snap the metal or plastic biopsy guide on to the probe over the sheath.



CAUTION

Patient injury or repeated biopsies may result. The needle placement will not be as intended if the needle guide is not properly seated and secure.

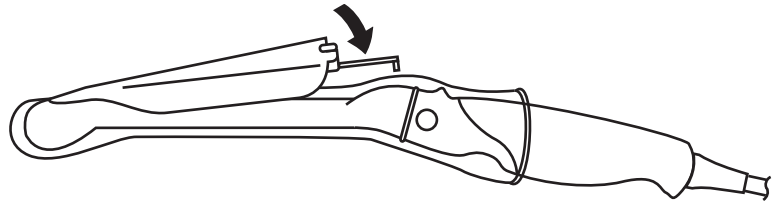


Figure 17-7. Disposable Biopsy Guide 5 degree Angle

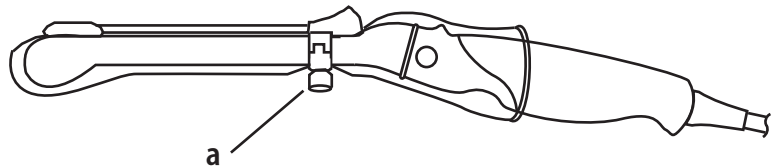


Figure 17-8. Reusable Biopsy Guide

- a. Fix with a screw
2. Place an adequate amount of ultrasound gel on the gel-filled sheath tip's outer surface.
 3. Ensure the guide is properly seated and secure by pushing forward on the needle insertion end of the guide until the attachment node is firmly in place in it's hole.

Multi Angle Biopsy Guide Assembly



WARNING

DO NOT attempt to use the biopsy bracket and needle guide until the manufacturer's instructions, provided with the biopsy bracket and needle guide in the kit, have been read and thoroughly understood.

1. Scan the patient and identify the target for biopsy. Move the probe to locate the target to the center of the image. Enable the system biopsy guidezone and try guidezone angles MBX1 to MBX3 to decide the best angle setting for needle path.



Figure 17-9. Example

2. Pull up on the knob (Figure 17-10 a) to freely move the needle guide attachment. Align the knob with the selected position of the needle guide attachment. Push the knob down (Figure 17-10 b) into the desired slot to secure the angle position of the needle guide attachment.



Figure 17-10. Pull up and push down the knob

Multi Angle Biopsy Guide Assembly (continued)

3. Fit a convex of the biopsy bracket (a) in a concave of the probe (b).

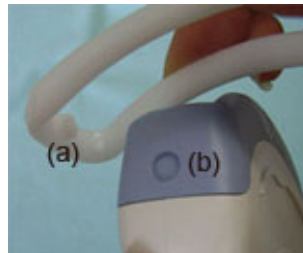


Figure 17-11. Probe/Bracket Alignment

Hold the side (a) and tuck down the needle guide side (b) until it clicks or locks in place.

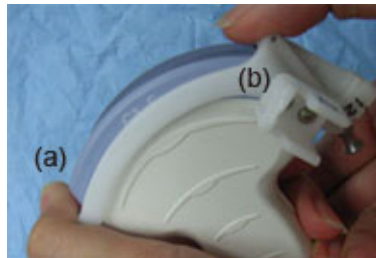


Figure 17-12. Probe/Multi-angle Bracket Alignment 2

4. Place an adequate amount of coupling gel on the face of the probe.

Multi Angle Biopsy Guide Assembly (continued)

5. Place the proper sanitary sheath tightly over the probe and biopsy bracket. Use the rubber bands supplied to hold the sheath in place.

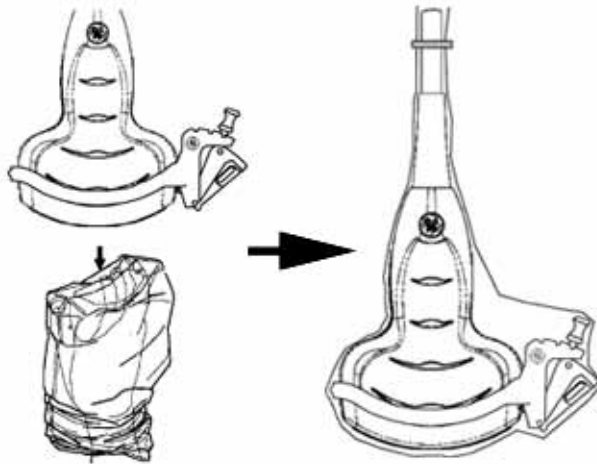


Figure 17-13. Applying Sanitary Sheath

6. Snap the needle guide onto the biopsy guide bracket.

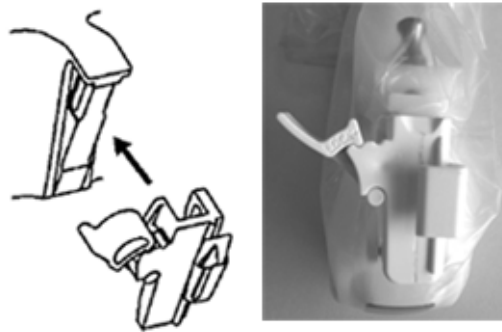


Figure 17-14. Snap the needle guide

Multi Angle Biopsy Guide Assembly (continued)

7. Push the locking mechanism towards the bracket to secure the lock (a). Make sure the needle guide is firmly attached to the bracket.



Figure 17-15. Lock the Needle guide

8. Choose the desired gauge (size) needle barrel. Twist it back and forth to remove it from the plastic tree.



Figure 17-16. Needle Barrel

9. Place the needle barrel into the needle clip with the desired gauge facing the needle clip and snap into place.



Figure 17-17. Needle Barrel Installation

Multi Angle Biopsy Guide Assembly (continued)

Remove the biopsy guide

1. Hold the other side and push out the needle clip attachment side. See Figure 17-18.



Figure 17-18. Remove the biopsy guide



CAUTION

Prevent damage to the probe lens with finger nails.

Releasing the needle

According to the following procedure, you remove the needle from a probe and an assembly without moving the needle.

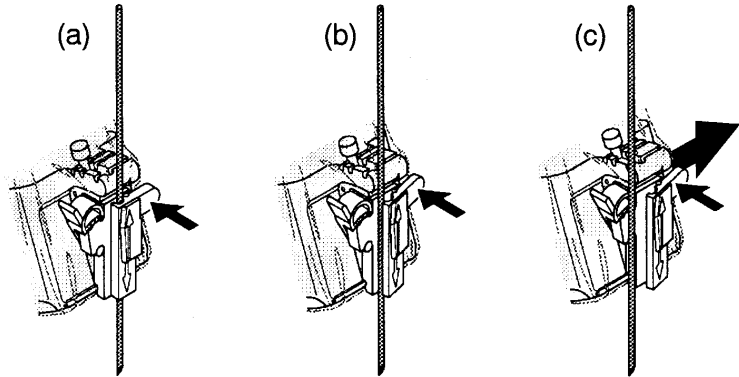


Figure 17-19. Release the needle from assembly

- a. Push the knob portion of a sleeve in the direction of the arrow.
- b. The needle is released from the assembly.
- c. Push the probe and the assembly in the direction of the larger arrow to remove the needle.

Biopsy Needle Path Verification

To verify that the path of the needle is accurately indicated within the guidezone on the system monitor, perform the following:

- Properly install the bracket and biopsy guide.
- Scan in a container filled with water (47° C).
- Display the biopsy guidezone on the monitor.
- Ensure that the needle echo falls within the guidezone markers.

The Biopsy Procedure



WARNING

Biopsy procedures must only be performed on live images.



CAUTION

Ensure that all guide parts are seated properly prior to performing a biopsy.

1. Place coupling gel on the scanning surface of the probe/sheath/biopsy guide assembly.
2. Activate the biopsy guidezone on the system through the B-Mode menu. When using multi-angle guides, ensure that the proper guidezone angle is displayed.
3. Scan to locate the target. Center the target in the electronic guidezone path.

NOTE:

Enabling color flow would allow for visualization of the vascular structure around the area to be biopsied.

4. Place the needle in the guide between the needle barrel and needle clip. Direct it into the area of interest for specimen retrieval.

Post Biopsy

When the biopsy is complete, remove the needle barrel, needle clip and probe sheath. Properly dispose of these items in accordance with current facility guidelines.

Clean and disinfect the probe. See 'Probe Cleaning Process' on *page 17-11 for more information.*

The biopsy bracket can be cleaned and disinfected in a recommended disinfecting agent and reused.



When the biopsy needle guide kit is opened, all parts must be discarded after the procedure whether they have been used or not.

Surgery/Intra-operative Use

Preparing for Surgery/Intra-operative Procedures

Preparing the transducer for intra-operative use follows the same sterile procedure as for biopsy use except that no biopsy attachments are used. See 'Preparing the Biopsy Guide Attachment' on *page 17-31 for more information*. Sterile gel is applied to the transducer face and a sterile sheath completely covers the transducer and cable which has first undergone a thorough cleaning and high-level disinfection.

The invasive nature of surgery/intra-operative procedures requires proper preparation and technique to control infection and disease transmission. Equipment must be cleaned as appropriate for the procedure prior to use.



For surgery/intra-operative procedures, a sterile environment is required. Therefore, both the operator and probe needs to be sterile.

Preparing for Surgery/Intra-operative Procedures (continued)

To ensure a sterile environment during the procedure, it is recommended that this be a two-person job.

1. Perform a high level disinfection of the probe.
2. The scanner (surgeon, sonographer, etc.) should be sterile and gloved.
3. Place an adequate amount of sterile coupling gel on the face of the probe.
4. Place the proper sterile sheath over the probe and cord.

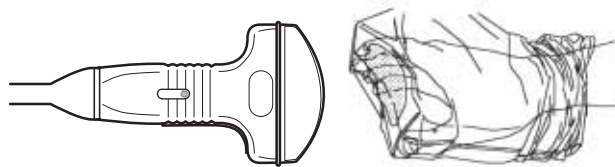


Figure 17-20. Applying Sterile Sheath

5. Depending on the type of procedure, use either sterile water or sterile gel on the sheath cover.

NOTE: *Follow your institutions guidelines on post surgery/ intra-operative procedures for probe cleaning and disinfection.*

Chapter 18

User Maintenance

This chapter supplies system data, assistance information, and system care and maintenance instructions.

System Data

Features/Specifications

Table 18-1: Physical Attributes

<p><u>Console Dimensions and Weight</u></p> <ul style="list-style-type: none"> • Height: approximately 120 mm (4.72 in) • Length: approximately 396 mm (15.59 in) • Width: approximately 368 mm (14.49 in) • Weight (with battery, but without any probes or peripherals): less than 6 kg (13.23 lbs.) <p><u>Console Design</u></p> <ul style="list-style-type: none"> • Integrated SDD type HDD • Integrated speakers • User adjustable audio output control on keyboard • USB flash drive, HDD, DVD-RW, SD card as option to archive patient data • Lithium Ion Battery • Laptop Style <p><u>Console Electrical Power</u></p> <ul style="list-style-type: none"> • Voltage: 100-240 Vac • Frequency: 50/60 Hz • Power: Consumption maximum of 200 VA with on-board peripherals 	<p><u>Keyboard</u></p> <ul style="list-style-type: none"> • Alphabetic and numeric keyboard • Ergonomic hard key layout • Interactive back-lighting <p><u>15" LCD Monitor</u></p> <ul style="list-style-type: none"> • High-Resolution LCD display • Opening angle adjustment: 170 degrees • Horizontal/Vertical View angle: 80 degrees • Brightness adjustment • The LCD panel physical resolution: 1024 x 768
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Table 18-2: System Overview

<p><u>Applications</u></p> <ul style="list-style-type: none"> • Abdominal • Obstetrics • Gynecological • Cardiac • Vascular • Transcranial • Musculoskeletal • Urological • Small parts • Pediatric and Neonatal <p><u>Scanning Methods</u></p> <ul style="list-style-type: none"> • Electronic Sector • Electronic Convex • Electronic Linear 	<p><u>Transducer Types</u></p> <ul style="list-style-type: none"> • Sector Phased Array • Linear Array • Convex Array • Micro Convex Array <p><u>Operating Modes</u></p> <ul style="list-style-type: none"> • B-Mode • M-Mode • Color Flow Mode (CF) • Coded Harmonic Imaging (Phase Inversion Harmonic) • PW Doppler (with HPRF) • Anatomical M Mode • Color M Mode • PDI Mode and Directional PDI • CWD Mode (option) • Cine Mode • Easy 3D (option) • Tissue Velocity Imaging with Q analysis and Tissue Velocity Doppler (option)
<p><u>Standard Features</u></p> <ul style="list-style-type: none"> • Automatic Optimization (ATO/ASO) • Auto Depth • Virtual Convex • Zoom • Other ID • Biopsy • Patient information database • Image Archive integrated on CD/DVD and Hard Drive • Real-time automatic Doppler calcs • General B Mode measurement /calculation • General M Mode measurement /calculation • General Doppler Mode measurement /calculation • Abdominal measurement /calculation • OB measurement /calculation • Fetal Trending • Multi gestational Calcs • Hip Dysplasia Calcs • Gyn measurement /calculation • Vascular measurement /calculation • Cardiac measurement /calculation • Pediatric measurement /calculation • Urological measurement /calculation • Small parts measurement /calculation • inSite ExC Capability 	<p><u>Options</u></p> <ul style="list-style-type: none"> • Report • CWD • CFM (For LOGIQ V1 only) • DICOM • SonoBiometry (AFB) • Auto IMT • LOGIQ View • Scan Coach • Easy 3D • TVI/TVD • Anatomical M Mode • Needle <p><u>Peripheral Options</u></p> <ul style="list-style-type: none"> • B/W image printer • Color image printer • Report printer • USB Footswitch • Wireless Adapter • 2 probe ports

Table 18-3: System Parameters

<p><u>Controls Available on Freeze or Recall</u></p> <ul style="list-style-type: none"> • Automatic Optimization • SRI-HD • B/M Mode (Gray Map; TGC, Colorized B and M; Frame Average [Loops only]; Dynamic Range) • Anatomical M-Mode • Read Zoom • Base Line Shift • Sweep Speed • PW-Mode (Gray Map; Post Gain; Baseline Shift; Sweep Speed; Invert Spectral Waveform; Compression; Rejection, Colorized Spectrum; Display Format; Angle Correct; Quick Angle Correct, Auto Angle Correct) • Color Flow (Overall Gain [Loops and Stills]; Color Map; Transparency Map; Frame Averaging [Loops only]; Flash Suppression, CFM Display Threshold; Spectral Invert for Color/Doppler) • Anatomical M-Mode on CINE Loop <p><u>Controls Available While "Live"</u></p> <ul style="list-style-type: none"> • Write zoom • B/M-Mode (Gain; TGC; Dynamic Range; Acoustic Output; Transmission Focus Position; Transmission Focus Number; Line Density Control; Sweep Speed for M-Mode; # of Angles for CrossXBeam) • PW-Mode (Gain; Dynamic Range; Acoustic Output; Transmission Frequency; PRF; Wall Filter; Spectral Averaging; Sample Volume Gate for PW-Mode Length and Depth; Velocity Scale) • Color Flow (CFM Gain; CFM Velocity Range; Acoustic Output; Wall Echo Filter; Packet Size; Frame Rate Control; CFM Spatial Filter; CFM Frame Averaging; CFM Line Resolution; Frequency/Velocity Baseline Shift) 	<p><u>Scanning Parameters</u></p> <ul style="list-style-type: none"> • Displayed Imaging Depth: 2 - 33 cm • Minimum Depth of Field: 0 - 2 cm (Zoom) (probe dependent) • Maximum Depth of Field: 0 - 33 cm (probe dependent) • Continuous Dynamic Receive Focus / Continuous Dynamic Receive Aperture • Adjustable Dynamic Range • Adjustable Field of View [FOV] • Image Reverse: Right/ Left • Image Rotation: 0°, 180° <p><u>Image Storage</u></p> <ul style="list-style-type: none"> • On-board database of patient information from past exams • Storage Formats: <ul style="list-style-type: none"> • DICOM - compressed/ uncompressed, single/multiframe, with/ without Raw Data • Export JPEG, JPEG2000, WMV (MPEG 4), and AVI formats • Storage Devices: <ul style="list-style-type: none"> • USB Flash Device: 64MB to 4GB (for exporting individual images/clips) • CD-RW storage: 700MB • DVD storage: -R (4.7GB) • Hard Drive Image Storage: ~50GB • Compare old images with current exam • Reload of archived data sets <p><u>CINE Memory/Image Memory</u></p> <ul style="list-style-type: none"> • Selectable CINE Sequence for CINE Review • Measurements/Calculations & Annotations on CINE Playback • Scrolling timeline memory • Dual Image CINE Display • Quad Image CINE Display • CINE Gauge and CINE Image Number Display • CINE Review Loop • CINE Review Speed
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Table 18-4: Measurements and Calculations

<p><u>B-Mode</u></p> <ul style="list-style-type: none"> • Depth and Distance • Circumference and Area (Ellipse/Trace) • Volume (Ellipsoid) • Angle between 2 Lines • % Stenosis (Area or Diameter) <p><u>M-Mode</u></p> <ul style="list-style-type: none"> • M Depth and Distance • Time • Slope • Heart Rate <p><u>Doppler Measurements/Calculations</u></p> <ul style="list-style-type: none"> • Velocity • Time • A/B Ratio (Velocities/Frequency Ratio) • PS (Peak Systole) • ED (End Diastole) • PS/ED (PS/ED Ratio) • ED/PS (ED/PS Ratio) • AT (Acceleration Time) • Accel (Acceleration) • TAMAX (Time Averaged Maximum Velocity) • Volume Flow [TAMEAN and Vessel Area] • Heart Rate • PI (Pulsatility Index) • RI (Resistivity Index) <p><u>Vascular Measurements/Calculations</u></p> <ul style="list-style-type: none"> • Carotid, Vertebral, Subclavian Measurements, Auto IMT • Summary Reports 	<p><u>Obstetrics Measurements/Calculations</u></p> <ul style="list-style-type: none"> • Gestational Age Calculation • EFW Calculation • Calculations and Ratios • Measurements/Calculations • Fetal Graphical Trending • Growth Percentiles • Multi-Gestational Calculation • Fetal Qualitative Description (Anatomical Survey) • Fetal Environmental Description (Biophysical profile) • Programmable OB Tables • Over 20 selectable OB Calcs • Expanded Worksheets <p><u>Gynecology Measurements/Calculations</u></p> <ul style="list-style-type: none"> • Right/Left Ovary Length, Width, Height • Uterus Length, Width, Height • Cervix Length, Trace • Ovarian Volume • ENDO (Endometrial thickness) • Ovarian/Uterine RI • Summary Report <p><u>Urology Calculation</u></p> <ul style="list-style-type: none"> • Bladder, Prostate, Renal, Generic Volume Measurements • Post-Void Bladder Volume <p><u>Cardiology Measurements/Calculations</u></p> <ul style="list-style-type: none"> • Cardiology Measurements and Calculations • Summary Worksheet • Summary Report
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Table 18-5: Probes

<ul style="list-style-type: none"> • 4C-RS (Applications: Abdomen, Obstetrics, Gynecology, Urology, Musculoskeletal, Biopsy) • 8C-RS (Applications: Cardiac, Transcranial, Pediatrics and Neonatal, Musculoskeletal) • 3Sc-RS (Applications: Abdomen, Cardiac, Transcranial, Biopsy) • 12L-RS (Applications: Vascular, Musculoskeletal, Small Parts, Pediatrics and Neonatal, Biopsy) 	<ul style="list-style-type: none"> • L6-12-RS (Applications: Vascular, Musculoskeletal, Small Parts, Pediatrics and Neonatal, Biopsy) • LK760-RS (Applications: Musculoskeletal) • E8C-RS (Applications: Obstetrics, Gynecology, Transvaginal, Transrectal, Biopsy)
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Table 18-6: Inputs and Outputs Signal

<p>External Inputs and Outputs</p> <ul style="list-style-type: none"> • 1 dedicated Isolated USB printer port • 2 general USB ports • 1 SD card port • S-Video out port 	<ul style="list-style-type: none"> • Composite out port • Ethernet port • HDMI port • VGA output through an external video adapter from HDMI
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Clinical Measurement Accuracy

Basic Measurements

The following information is intended to provide guidance to the user in determining the amount of variation or measurement error that should be considered when performing clinical measurements with this equipment. Error can be contributed by equipment limitations and improper user technique. Be sure to follow all measurement instructions and develop uniform measurement techniques among all users to minimize the potential operator error. Also, in order to detect possible equipment malfunctions that could affect measurement accuracy, a quality assurance (QA) plan should be established for the equipment that includes routine accuracy checks with tissue mimicking phantoms.

Please be advised that all distance and Doppler related measurements through tissue are dependent upon the propagation velocity of sound within the tissue. The propagation velocity usually varies with the type of tissue, but an average velocity for soft tissue is assumed. This equipment is designed for, and the accuracy statements listed on are based on, an assumed average velocity of 1540 m/s. The percent accuracy when stated applies to the measurement obtained (not the full scale range). Where the accuracy is stated as a percent with a fixed value, the expected inaccuracy is the greater of the two.

Basic Measurements (continued)

Table 18-7: System Measurements and Accuracies

Measurement	Units	Useful Range	Accuracy	Limitations or Conditions
Depth	mm	Full Screen	<=10%	NA
Angle	degree	Full Screen	<=5%	NA
Distance:				
Axial	mm	Full Screen	<5%	Linear Probes, Convex Probes, Sector Probes
Lateral	mm	Full Screen	<5%	Linear Probes, Convex Probes, Sector Probes
Circumference:				
Trace	mm	Full Screen	<=10%	Linear Probes, Convex Probes, Sector Probes
Ellipse	mm	Full Screen	<=5%	Linear Probes, Convex Probes, Sector Probes
Area:				
Trace	mm ²	Full Screen	<=5%	Linear Probes, Convex Probes, Sector Probes
Ellipse	mm ²	Full Screen	<=5%	Linear Probes, Convex Probes, Sector Probes
Time	s	Timeline Display	<5%	M mode, AM mode, CM mode, PWD mode, CWD mode
Slope	mm/s	Timeline Display	<=10%	M mode, AM mode, CM mode,
Doppler SV Position	mm	Full Screen	<=2 mm	PWD mode
Doppler Velocity	cm/s	Form 0 to 100 cm/s From 100 to 130 cm/s	<15% <10%	PWD mode, CWD mode
Doppler Angle Correction	cm/s	From 0-80°	<=5%	PWD mode

Clinical Calculation Accuracy

Estimate the overall inaccuracy of a combined measurement and calculation by including the stated inaccuracy from the basic measurement accuracy statements.



CAUTION

Diagnostic errors may result from the inappropriate use of clinical calculations. Review the referenced source of the stated formula or method to become familiar with the intended uses and possible limitations of the calculation.

Calculation formulas and databases are provided as a tool to assist the user, but should not be considered an undisputed database, in making a clinical diagnosis. The user is encouraged to research the literature and judge the equipment capabilities on an ongoing basis in order to assess its utility as a clinical tool.

Anti-Virus Software Note

Anti-virus software IS NOT present on the LOGIQ V2/LOGIQ V1 system. Since the LOGIQ V2/LOGIQ V1 is already protected against attack by the measures listed below, no Anti-virus software is deemed necessary.

- Only communication ports required for system operation are enabled.
- Only operating system services required by system application software are enabled.
- Software programs CANNOT be loaded onto the LOGIQ V2/LOGIQ V1 (e.g., e-mail, web browser, etc.).
- An auto-executable file CANNOT be run automatically on the LOGIQ V2/LOGIQ V1.
- The LOGIQ V2/LOGIQ V1 software includes the latest MS Windows security protection.

Due to the safety measures noted above, and the security standards of Windows XP Service Pack 3, the highest safety against viruses, worms, etc., has been provided to ensure sufficient safety measures. In addition, additional security information can be found at <http://www.gehealthcare.com/user/security/index.html>.

System Care and Maintenance

Overview



CAUTION

Standard maintenance must be performed by authorized service personnel for the lifetime of the product (7 years).

The user must ensure that safety inspections are performed at least every 12 months according to the requirements of the patient safety standard IEC 60601-1. Refer to the Service manual, Chapter 10.

Refer to Section 10 of the LOGIQ V2/LOGIQ V1 Service Manual for any additional maintenance guidance.

Only trained persons are allowed to perform the safety inspections mentioned above.

Technical descriptions are available on request.

To ensure that the unit constantly operates at maximum efficiency we recommend that the following procedures be observed as part of the customer's internal routine maintenance program.

Contact the local Service Representative for parts or periodic maintenance inspections.

Inspecting the System

Examine the following on a monthly basis (or whenever there is a reason to assume that any issue may have occurred):

- Connectors on cables for any mechanical defects.
- Entire length of electrical and power cables for cuts or abrasions.
- Equipment for loose or missing hardware.
- Control panel and keyboard for defects.
- Trackball movement

If the trackball is dusty, please clean it. See 'Trackball' on *page 18-15 for more information.*



CAUTION

To avoid electrical shock hazard, do not remove panels or covers from console. This servicing must be performed by qualified service personnel. Failure to do so could cause serious injury.



Electrical Hazard

If any defects are observed or malfunctions occur, do not operate the equipment but inform a qualified service person. Contact a Service Representative for information.

Weekly Maintenance

The system requires weekly care and maintenance to function safely and properly. Clean the following:

- System Cabinet
- LCD Monitor
- Operator control panel
- Footswitch
- Printers

Failure to perform required maintenance may result in unnecessary service calls.



CAUTION

Ensure that you follow the probe disinfection procedure provided by GE.

Cleaning the system

Prior to cleaning any part of the system:

1. Turn off the system power. Disconnect the power cord. See 'Power Off' on page 3-35 for more information.
2. Remove the battery.

System Cabinet

To clean the system cabinet:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.

NOTE: The cloth should be damp, not dripping wet.

2. Wipe down the top, front, back, and both sides of the system cabinet. Be careful with the output and input ports of the system and do not allow anything especially liquid enter into the ports.
3. Wipe off excess cleaning agents.

NOTE: Do not spray any liquid directly into the unit.

LCD Monitor

To clean the monitor face:

Use a soft, folded cloth. Gently wipe the monitor face.

Do NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methyl Alcohol or Methyl Ethyl Ketone) on monitors with the filter (anti-glare shield). Hard rubbing will also damage the filter.

NOTE: When cleaning the screen, make sure not to scratch the LCD.

Operator Control Panel



CAUTION

Before cleaning the control panel, make sure the key cap is firmly in place.

To clean the operator control panel:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.
2. Wipe down operator control panel.
3. Use a cotton swab to clean around keys or controls. Use a toothpick to remove solids from between keys and controls.

NOTE: When cleaning the operator control panel, make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.

NOTE: In case of SARS, use bleach, alcohol, or Cidex in a normal diluted form for cleaning/disinfecting the operator panel.

NOTE: DO NOT use T-spray or Sani Wipes on the control panel.

Footswitch

To clean the footswitch:

1. Disconnect the footswitch from the LOGIQ V2/LOGIQ V1.
2. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.

NOTE: The cloth should be damp, not dripping wet.

3. Wipe the external surfaces of the unit then dry with a soft, clean, cloth.

Trackball

1. Rotate the retainer counterclockwise until it can be removed from the keyboard.

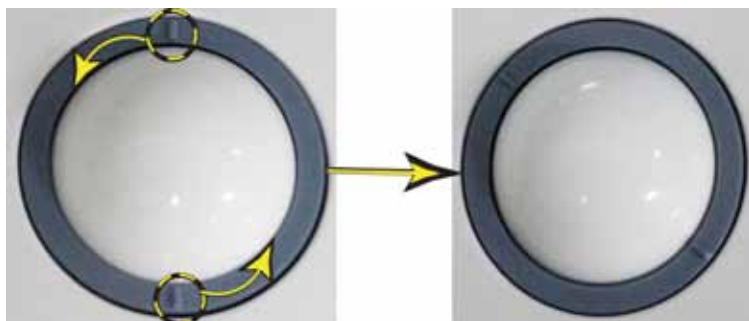


Figure 18-1. Rotate the retainer

2. Separate the trackball and the retainer. Wipe off any oil or dust from the trackball, retainer and the trackball housing using a cleaner or cotton swab.
3. Assemble the trackball and retainer, then put it into the housing and rotate it clockwise until its notches are set in position.



CAUTION

When cleaning, make sure not to spill or spray any liquid into the trackball housing (keyboard or system).

Other Peripheral Maintenance

Refer to the peripheral manufacture's manuals for more information.

Other Maintenance

Replacing illuminated key caps/lamps

Contact a local Service Representative when a key cap or lamp needs to be replaced.

Battery Replacement and Disposal

Battery replacement every three years is recommended.

Contact a local Service Representative for the replacement of the battery. Used batteries will be discarded appropriately by GE.

NOTE: Disposing of the battery should meet local law and regulatory requirements.


Prevention of static electricity interference

Interference from static electricity can damage electronic components in the system. The following measures help to reduce the likelihood of electrostatic discharge:

- Wipe the alphanumeric keyboard and monitor with lint-free tissue or a soft cloth dampened with anti-static spray on a monthly basis.
- Spray carpets with anti-static spray because constant walking on carpets in or near the scanning room may be a source of static electricity.

Disposal

Table 18-8: WEEE symbol

	<p>Bottom of the system and Probe connector</p>
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This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.



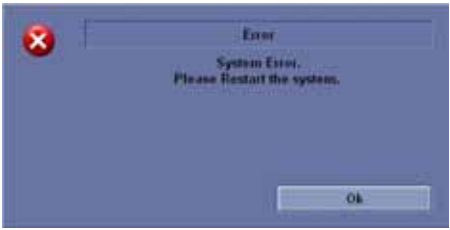
Disposal of Old Electrical & Electronic Equipment (applicable in the European Union and other European countries with separate collection systems). This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

NOTE: *Dispose of the system according to local law and regulatory requirements.*

Troubleshooting

Please refer Service Manual if other messages appear on the monitor display.

Table 18-9: Troubleshooting

 <p>A warning dialog box with a yellow triangle icon. The text reads: "Warning", "System temperature is too high.", "System will shut down.", and "Ok" and "Cancel" buttons.</p>	<p>System temperature is too high. System will shut down.</p> <ol style="list-style-type: none"> 1. Select OK and shutdown the system. 2. Check whether the ventilation hole is blocked, if yes, clean the ventilation hole. 3. If it still not works, stop operating the equipment and perform the proper action for the patient. Inform a qualified service person and contact a Service Representative for information.
 <p>A warning dialog box with a yellow triangle icon. The text reads: "Warning", "System voltage fault.", "System will shut down.", and "Ok" and "Cancel" buttons.</p>	<p>System voltage fault. System will shut down.</p> <ol style="list-style-type: none"> 1. Select OK and shutdown the system. 2. If the same message appears after reboot, shut down the system then turn on the system according to 'Power On' on <i>page 3-31</i>. 3. If it still not works, stop operating the equipment and perform the proper action for the patient. Inform a qualified service person and contact a Service Representative for information.
 <p>An error dialog box with a red 'X' icon. The text reads: "Error", "System Error.", "Please Restart the system.", and "Ok" button.</p>	<p>System Error. Please reboot the system.</p> <ol style="list-style-type: none"> 1. Select OK and reboot the system. 2. If the same message appears after reboot, shut down the system then turn on the system according to 'Power On' on <i>page 3-31</i>. 3. If it still not works, stop operating the equipment and perform the proper action for the patient. Inform a qualified service person and contact a Service Representative for information.

System Software Updates (Software Download)

Software Updates for the unit may be available for download and installation. When a Software Update is available, a message icon is displayed on the system exit window.

Only users with administrator rights are allowed to download Software Updates. You first download the software, then install the software. It is a two-step process.

Once the software installation has begun, the system is not usable until the software installation is done. The installation can take up to 45 minutes to complete. While installing, **DO NOT** turn off system power or the system can be left in a unusable mode. For this reason, you may want to perform the software download one evening and then install the software the next evening.

After the software installation is complete, you will be asked to perform a few system functional checks to determine normal system operation.

NOTE: A software download may take more than 1 hour (and may take several hours), depending on local network conditions. During this time, you cannot perform any other function. Please allow sufficient time to complete the software download and installation.

NOTE: Please ensure network connection when downloading software.

NOTE: After you press a software download button, it may take up to three (3) seconds for the system to respond.

NOTE: Software Updates through the GE service platform may not be available in all countries.

Software download and installation

You receive notification of available software updates via the envelope icon that appears in the status bar on the bottom of the monitor.

NOTE: *To update the software, you must login with administrator privileges.*

1. Press the on/off button on the control panel. The Exit dialog window with software download displays.



Figure 18-2. System - Exit Dialog Window

- **Decline:** You decline the software download; the software is not downloaded, no update will be performed. The software download will not occur and you will not be informed about this package again.
- **Download:** Starts the software download.

Software download and installation (continued)

2. Select **Download**.



Figure 18-3. System - Exit Dialog Window

The download process starts. The progression of the download process is displayed.

NOTE: *The download step can be paused. While paused, you can return to normal operation. However, once the software installation has begun, the system is not usable until the software installation is done. While installing, **DO NOT** turn off system power.*

NOTE: *A typical software update of about 600 Mb may take up to 60 minutes to download, but times may vary depending on your location and network connection.*

- **Pause:** Pauses the software download process. If you select Pause, you can cancel out of this dialog and return to normal scanning or you can power off the scanner. A paused download can be resumed by logging in as Administrator, pressing the power switch, and selecting Resume.
- **Resume:** Press Resume to continue the software download.

Software download and installation (continued)

- The following dialog is displayed when the software download is complete. Select **Install**.



Figure 18-4. Software Ready To Be Installed

- Decline:** DO NOT install the downloaded software; no software upgrade will be performed. If you decline this installation, you **WILL NOT** be offered the chance to install this software package again. You can contact with GE Service Engineer to perform the install at a later time.

Multiple screens appear during the software installation process. **DO NOT** interrupt this process **AND** follow instructions as they appear on the display.

NOTE: *A typical installation may take up to 15 minutes.*

Software download and installation (continued)

4. After the installation complete, select **Shutdown** and then press **Power On/Off** button to reboot the system.



Figure 18-5. Shutdown after Software Installation

5. When the system starts up after the software installation has finished, press **Power On/Off** button any then select **Verify**.

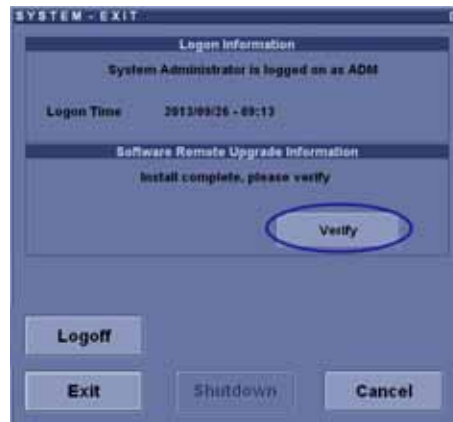


Figure 18-6. Shutdown after Software Installation

Software download and installation (continued)

- The new software verification checklist is displayed, this dialog is **critical**. You **MUST** perform software verification after downloading and installing the new software.



The image shows a software verification checklist dialog box. It contains a list of features with radio buttons for 'Passed' and 'Failed'. The 'Passed' radio button is selected for all features. At the bottom, there is a 'Signature:' label, a text input field, and 'Cancel' and 'OK' buttons.

B/M/PW	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
CF/PDI	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
CW/TDI	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Patient/Database	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Utility	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Report	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Measure	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Peripheral	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Preset	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Service	<input checked="" type="radio"/> Passed	<input type="radio"/> Failed
Signature:	<input type="text"/>	
		<input type="button" value="Cancel"/>
		<input type="button" value="OK"/>

Figure 18-7. New Software Verification Checklist



CAUTION

Perform a check for all the features listed which is supported in the system. You **MUST** ensure that the entire system functions normally as expected.

If any of the features in the list is not supported in the system, fill in **Passed** and do not need to verify it.

These verification results are tracked for regulatory purposes, sent back to GE for tracking, and approved with your signature.

Software download and installation (continued)

- As you verify that each feature works correctly, select “Passed.” If all features work correctly and “Passed” is filled in for all features, type your signature and press **OK**. The system is now ready for use.

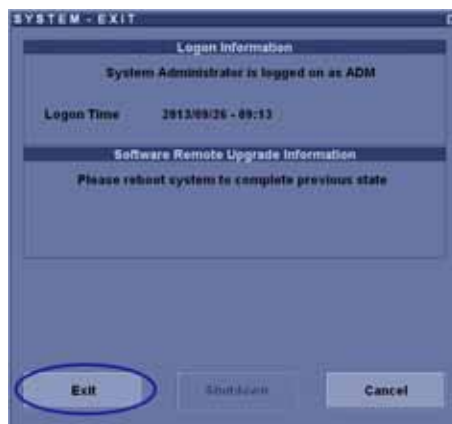


Figure 18-8. Features check Passed



WARNING

However, if any of the features **DO NOT** function as expected, you need to select “Failed” for this feature. Type your signature and press **OK**. Then the System-Exit Window is displayed, select **Exit** and then reboot the system, the system will return to the previous software version.



Wipe Tool

Wipe tool is intended to erase all the patient data with the software to wipe the partitions on the system before the system will be shipped for service.

NOTE: Wipe tool will be performed with the software USB flash drive. Be sure your software USB flash drive is well kept.



CAUTION

The system can not be boot up after wipe process.



WARNING

The wipe procedure will erase all the patient data and all existing software on the system. While the wipe procedure is designed to preserved data, you should save any patient data, images, system setups and customer presets to CD, DVD, USB Flash Drive, or USB Hard Disk before doing the wipe process.

See 'System/Backup and Restore Preset Menu' on *page 16-16* for more information about the backup procedure.

NOTE: Before starting the wipe tool, please ensure that the power can be continuously supplied and there is no risk of power cut off during loading procedure.

1. Insert USB flash drive labeled "System & Application Software" to the system.
2. Properly turn off the system by momentarily pressing the Power/On/Off Switch. In System-Exit window, select **Shutdown** to shutdown the system.

NOTE: If the system will not shut down normally, hold down the Power On/Off Switch until the light turns off.

3. Power on the system. The system will detect the USB flash drive automatically.

Wipe Tool (continued)

4. Select [2] Wipe tool and then select **Next** to continue.

NOTE: All patient data cannot be recovered after this operation. Contact GE service for support.

NOTE: All patient data (if any) will be destroyed! Please backup patient data before executing erasing patient data!

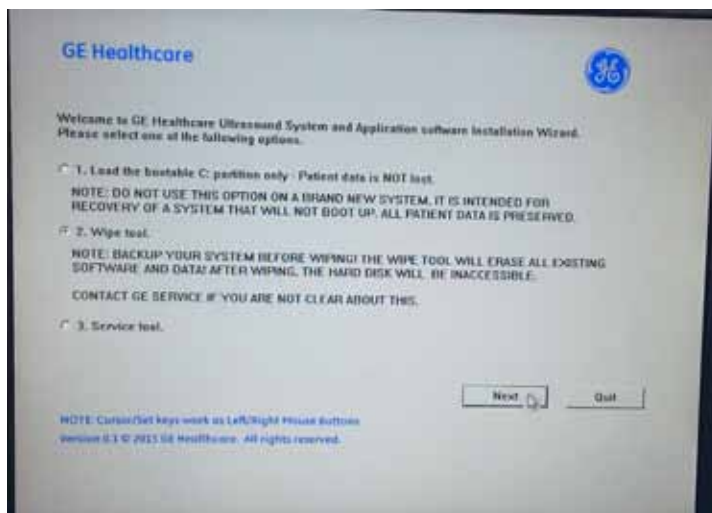


Figure 18-9. Upgrade USB message

5. The system indicates all data will be erased, select **Yes** to continue.



Figure 18-10. Confirmation Dialog

Wipe Tool (continued)

- The software is wiping the partitions. Wait for the wipe procedure to complete. On the screen, it displays how much has been completed.

NOTE: *Do not interrupt the wipe tool process at any time until all the partitions wiping is completed.*



Figure 18-11. Wiping progress

- Select **OK** when the process is complete, and the system will shutdown automatically.

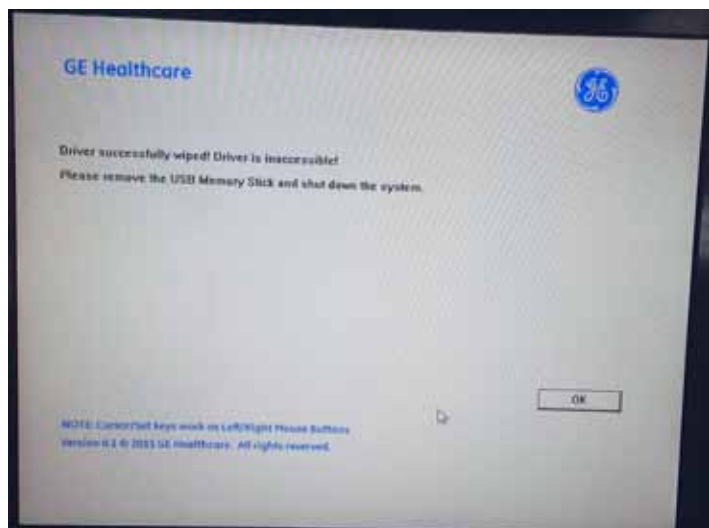


Figure 18-12. Process Complete

Wipe Tool (continued)

NOTE: As the SSD is empty after wipe process, the system cannot boot up. The software should be loaded first after the wipe process.

8. The wipe tool procedure has erased all patient data and all existing software.

NOTE: After the system is returned from service, restore the patient data, images, system setups and customer presets on your system. Contact GE service for support.

See 'System/Backup and Restore Preset Menu' on page 16-16 for more information about the restore procedure.

Quality Assurance

Introduction

A good Quality Assurance Evaluation program consists of periodic systematic actions that provide the user with adequate confidence that their diagnostic ultrasound system will produce consistently high quality images and quantitative information.

Therefore, it is in the best interests of every ultrasound user to routinely monitor equipment performance.

The frequency of Quality Assurance evaluations should be based on user's specific needs and clinical practice.

Periodic monitoring is essential in order to detect the performance changes that occur through normal aging of system components. Routine equipment evaluations may also reduce the duration of exams, number of repeat exams, and maintenance time required.

For details on system and peripheral routine preventive maintenance instructions, See 'System Care and Maintenance' on *page 18-10 for more information.*

Typical Tests to Perform

Quality assurance measurements provide results relating to system performance. Typically these are:

- Axial Measurement Accuracy
- Lateral Measurement Accuracy
- Axial and Lateral Resolution
- Penetration
- Functional & Contrast Resolution
- Gray Scale Photography.

With these tests, a performance baseline can be set at installation with the phantom in your department. Future test results can be compared to the baseline in order to maintain a record of system performance trends.

Frequency of tests

Quality assurance tests are used to determine whether a scanner is providing the same level of performance from day to day.

The frequency of testing varies with the amount of system usage and modes to be tested. It is recommended that the user perform quality assurance tests at least every three months or every 400 patient studies. Tests should also be performed when a question about system performance exists.

A mobile system may require more frequent tests.

Image quality should also be tested immediately after the following events:

- Service calls
- System upgrades/modifications
- Dropped probe, power surge, etc.

Phantoms

Quality Assurance Evaluations should be done with phantoms and test objects that are applicable to the parameters being evaluated or to the user's clinical practice.

Typical phantoms are composed of material that acoustically mimic human tissue. Pins, anechoic and echogenic targets are physically positioned to provide information for a variety of tests.

Doppler phantoms are currently expensive and complicated to deal with on the user level. If a problem with any Doppler parameters or measurement is suspected, contact a local service representative for evaluation.

The RMI 403GS phantom is still available. Due to the superior penetration and resolution capabilities of GE ultrasound systems, the RMI 405GSX is recommended. It is the most current one available to our field service personnel and will provide the targets and extended life necessary for consistent system testing.

Phantoms (continued)

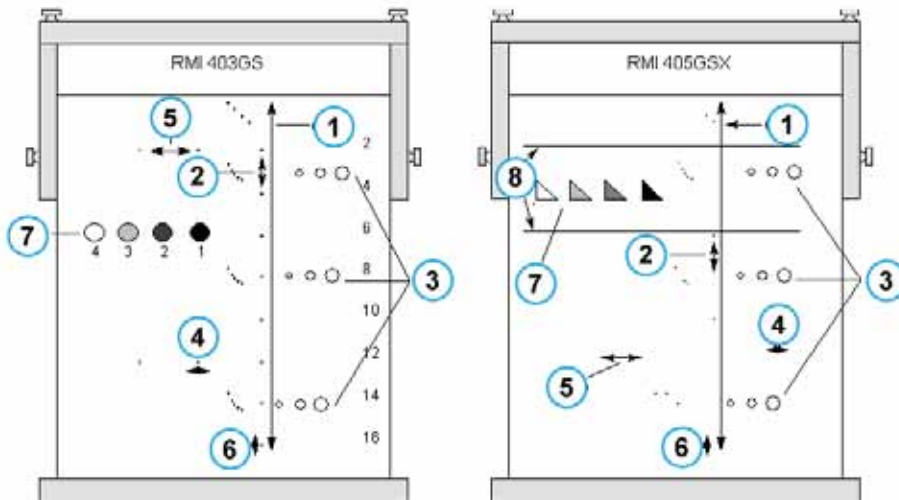


Figure 18-13. Phantoms

1. Penetration
2. Axial Distance Measurement
3. Functional Resolution
4. Lateral Resolution
5. Lateral Distance Measurement
6. Axial Resolution
7. Contrast Resolution and Gray Scale Photography
8. Gray Scale Plane Targets

Baselines

An absolute necessity for a quality assurance program is establishing baselines for each test or check. Baselines are established after the system has been verified to be working properly at installation or after a repair. If a probe or major assembly is replaced, new baselines should be generated.

Baselines can be made by adjusting system parameters to prescribed levels or to the best possible image. The key factor to remember is reproducibility. The same conditions must be reproduced for each periodic check.

All system parameters not displayed on the monitor should be recorded for the permanent record.

Periodic Checks

Periodic checks should be performed in accordance with your facility's quality assurance requirements. For the data to be valid, periodic checks should mimic the baseline setup parameters.

The resulting image, when scanning the phantom exactly as before, should be recorded and compared to the baseline. When a matching image is obtained, it can be assumed that the system performance has not degraded from the baseline.

If a significant difference between the baseline and periodic check is noted, double check the system setup and repeat the test. If the difference between the baseline and periodic check persists, contact a local Service Representative.

Failing to reproduce the control settings as in the baselines will introduce errors in the data and potentially invalidate the results.

Results

Lack of standardization among test instruments, the wide range of acceptance criteria, and incomplete knowledge regarding the significance of certain performance parameters prohibit the establishment of absolute performance criteria for these tests.

Quality Assurance Evaluation results should be compared to previously-recorded results.

Performance trends can then be detected. Unacceptable performance or diminishing trends should be identified for maintenance or repair before a malfunction or inappropriate diagnosis occurs.

The user should determine the best method for recording and archiving the baseline and periodic checks. In most cases the choice is hard copy.

It is important to maintain good consistent records for inspections that may arise, as well as to detect system performance trends.

System Setup

The user should tailor the tests to their particular needs. It is certainly not necessary to make all checks with all probes. A representative example, with the probes used most often by the customer, should be adequate in judging system performance trends.

Use a gray scale phantom as the scan object for the tests. Commercial phantoms are supplied with its own operator manual. Be familiar with proper phantom operating procedures prior to use for quality assurance evaluations.

1. Adjust image monitor. Brightness and contrast should be set to the normal viewing of a good gray scale image.
2. Check all recording devices for proper duplication of image monitor. Ensure that what is seen is what is recorded.
3. Annotate non-displayed image processing controls.
4. Set TGC slide pots to center (detent) position.
5. Place focal zone marker(s) in area of interest for an optimum image.

Test Procedures

The following are recommended Quality Assurance tests. A brief description of the test, the benefit it provides and steps to accomplish the test are supplied.

The importance of recording scan parameters and consistent record keeping cannot be stressed enough. Reproducibility to monitor system trends is the key to quality assurance evaluations.

Using the system's dual image display format is often very convenient and saves recording media.

Axial distance measurements

Description

Axial measurements are the distance measurements obtained along the sound beam. See Figure 18-13 for more information.

Benefit

The accurate measurement of the size, depth and volume of a structure is a critical factor in determining a proper diagnosis. Most imaging systems use depth markers and/or electronic calipers for this purpose.

Method

Axial distance should be measured in the near, mid and far fields as well as in zoom. If necessary, different depths or fields of view can be tested.

Procedure

To measure axial distance:

1. Scan a test phantom with precisely-spaced vertical pin targets. Adjust all scan controls, as necessary, for the best image of the pin targets to typical depths for the probe being used.
2. Press **Freeze** to stop image acquisition and perform a standard distance measurement between the pins at different points in the image. Record all images for archiving.
3. Scan the vertical pins in zoom or at different depth/scale factors.
4. Press **Freeze** to stop image acquisition; repeat the distance measurements between pins and record the images for archiving.
5. Document the measurements for reference and future comparison.

Contact a Service Engineer if vertical measurements differ by more than 5% of the actual distance.

Lateral distance measurements

Description

Lateral measurements are distance measurements obtained perpendicular to the axis of the sound beam. See Figure 18-13 for more information.

Benefit

The purpose is the same as vertical measurements. Precisely-spaced horizontal pin targets are scanned and results compared to the known distance in the phantom.

Method

Lateral distance should be measured in the near, mid and far fields as well as in zoom. If necessary, different depths of fields of view can be tested.

Procedure

To measure lateral distance:

1. Scan a test phantom with precisely-spaced horizontal pin targets. Adjust all scan controls, as necessary, for the best image of the pin targets from side to side.
2. Press **Freeze** to stop image acquisition and perform a standard distance measurement between the pins at different points in the image. Record all images for archiving.
3. Scan the horizontal pins in zoom or at different depth/scale factors.
4. Press **Freeze** to stop image acquisition; repeat the distance measurements between pins and record the images for archiving.
5. Document the measurements for reference and future comparison.

Contact a Service Engineer if horizontal measurements differ by more than 5% of the actual distance.

Axial resolution

Description

Axial resolution is the minimum reflector separation between two closely-spaced objects to produce discrete reflections along the axis of the sound beam. It can also be monitored by checking the vertical size of known pin targets. See Figure 18-13 for more information.

Axial resolution is affected by the transmitting section of the system and the probe.

Benefit

In clinical imaging, poor axial resolution displays small structures lying close together as a single dot. This may lead to improper interpretation of the ultrasound image.

Procedure

To measure Axial resolution:

1. Scan a test phantom with precisely-spaced vertical pin targets.
2. Adjust all scan controls, as necessary, for the best image of the pin targets to typical depths for the probe being used.
3. Press **Freeze** to stop image acquisition.
4. Perform a standard distance measurement of the pin vertical thickness at different points in the image. Record all images for archiving.
5. Scan the vertical pins in zoom or at different depth/scale factors.
6. Press **Freeze** to stop image acquisition; repeat the vertical thickness measurements of the pins and record the images for archiving.
7. Document the measurements for reference and future comparison.

Axial resolution should remain stable over time. Contact a Service Engineer if any changes are observed.

Lateral resolution

Description

Lateral resolution is the minimum reflector separation between two closely spaced objects to produce discrete reflections perpendicular to the axis of the sound beam. It can also be monitored by checking the horizontal size of known pin targets. See Figure 18-13 for more information.

Lateral resolution is dependent upon the beam width produced by the probe. The narrower the beam, the better the lateral resolution.

The beam width is affected by the frequency, degree of focusing, and distance of the object from the face of the probe.

Benefit

Clinically, poor lateral resolution will display small structures lying close together as a single dot. This may lead to improper interpretation of the ultrasound image.

Procedure

To measure lateral resolution:

1. Scan a test phantom with precisely-spaced horizontal pin targets.
2. Adjust all scan controls, as necessary, for the best image of the pin targets from side to side.
3. Press **Freeze** to stop image acquisition and perform a standard distance measurement of the horizontal thickness of a pin at different points in the image. Record all images for archiving.
4. Scan the horizontal pins in zoom or at different depth/scale factors.
5. Press **Freeze** to stop image acquisition; repeat the horizontal thickness measurements of the pins and record the images for archiving.
6. Document the measurements for reference and future comparison.

Pin width should remain relatively constant over time (**1mm**). Dramatic changes in pin width may indicate beam forming problems. Contact a Service Engineer if beam width changes consistently over **2 to 3** periodic tests.

Penetration

Description

Penetration is the ability of an imaging system to detect and display weak echoes from small objects at large depths. See Figure 18-13 for more information.

Penetration can be affected by the system's:

- Transmitter/receiver
- Degree of probe focusing
- Attenuation of the medium
- Depth and shape of reflecting object
- Electromagnetic interference from local surroundings.

Benefit

Weak reflecting echoes are commonly produced from the internal structure of organs. Definition of this tissue texture is important in the interpretation of the ultrasound findings.

Method

Scan a phantom to see how echoes begin to fade as depth is increased. The maximum depth of penetration is the point at which homogeneous material in the phantom begins to lose brightness.

Procedure

To measure penetration:

1. Set the front panel TGC slide pots to their center (detent) position.
2. Gain and acoustic output can be adjusted, as necessary, since these values are displayed on the monitor.
3. Scan a test phantom along the vertical pin targets to typical depths for the probe being used.
4. Perform a standard distance measurement from the top of the image displayed to the point at which homogeneous material in the phantom begins to lose brightness.
5. Document the depth measurement for reference and future comparison.

Contact a Service Engineer if the depth of penetration shifts more than one centimeter (1cm) when using the same probe and same system settings.

Functional resolution

Description

Functional resolution is an imaging system's ability to detect and display the size, shape, and depth of an anechoic structure, as opposed to a pin target. See Figure 18-13 for more information.

The very best possible image is somewhat less important than reproducibility and stability over time. Routine tests at the same settings should produce the same results.

Benefit

The data obtained will give a relative indication of the smallest structure the system is capable of resolving at a given depth.

Procedure

To measure functional resolution:

1. Set the front panel TGC slide pots to their center (detent) position.
2. Gain and acoustic output can be adjusted as necessary, since these values are displayed on the monitor.
3. Scan a test phantom with a vertical row of anechoic cyst targets to typical depths for the probe being used.
4. Evaluate the cysts at various depths for a good (round) shape, well-defined borders and no fill in. Remember, TGC slide pots are centered and should remain fixed. This may NOT provide optimal cystic clearing.
5. Document all results for future reference and comparison.

Contact a Service Engineer if a greatly distorted image is obtained.

Contrast resolution

Description

Contrast resolution is the ability of an imaging system to detect and display the shape and echogenic characteristics of a structure. See Figure 18-13 for more information.

Specific values measured are less important than stability over time. Routine tests at the same settings should produce the same results.

Benefit

A correct diagnosis is dependent upon an imaging system's ability to differentiate between a cystic or solid structure versus echo patterns from normal surrounding tissue.

Method

A phantom with echogenic targets of different sizes and depths should be used.

Procedure

To measure contrast resolution:

1. Set the front panel TGC slide pots to their center (detent) position.
2. Gain and acoustic output can be adjusted, as necessary, since these values are displayed on the monitor.
3. Scan a test phantom with echogenic targets at the depths available.
4. Evaluate the echogenic targets for contrast between each other and between the surrounding phantom material. Remember, TGC slide pots are centered and should remain fixed. This may NOT provide an optimal scan image.
5. Document all results for future reference and comparison.

Contact a Service Engineer if the echogenic characteristics or shapes of the targets appear distorted.

Gray Scale photography

Description

Poor photography will cause loss of low level echoes and the lack of contrast between large amplitude echoes. See Figure 18-13 for more information.

Benefit

When photographic controls and film processors are properly adjusted, weak echoes, as well as strong echoes, are accurately recorded on film.

Procedure

1. Adjust the camera according to the manufacturer's instructions until the hard copy and video display are equal.
2. Scan the phantom and its echogenic contrast targets.
3. Make a hard copy photograph of the display and compare it to the image on the video monitor for contrast and weak echo display.
4. Document all results for future reference and comparison.

Contact a Service Engineer if camera cannot duplicate what is on the image monitor.

NOTE: Optimization of brightness/contrast controls on the display monitor is imperative in order to make sure that the hardcopy and monitor look alike.

The display monitor is adjusted first. The hardcopy camera or printer is adjusted to match the display monitor.

Setting up a Record Keeping System

Preparation

The following is needed:

- Quality Assurance binder.
- Hard copy or electronic file of images.
- Quality Assurance Checklists.
- Display the following information while testing quality assurance:
 - Acoustic Output
 - Gain
 - Depth
 - Probe
 - Dynamic Range
 - Set up new patient to be the name of the test.
- Annotate the following:
 - Any control where its value is **NOT** displayed.
 - Significant phantom information.

Record Keeping

Complete the following:

1. Fill out the Ultrasound Quality Assurance Checklist for each probe, as scheduled.
2. Make a hard copy or archive the image.
3. Compare images to baseline images and acceptable values.
4. Evaluate trends over previous test periods.
5. File hard copy or electronic file of images and checklist in Quality Assurance binder.

Ultrasound Quality Assurance Checklist

Table 18-10: Ultrasound Quality Assurance Checklist (Part 1)

Performed By		Date
System		Serial Number
Probe Type	Probe Model	Serial Number
Phantom Model	Serial Number	Room Temperature
Acoustic Output	Gain	Focal Zone
Gray Map	TGC	Depth
Monitor Setting		
Peripheral Settings		
Other Image Processing Control Settings		

Table 18-11: (Part 2)

Test	Baseline Value Range	Tested Value	Image Hardcopy/ Archived	Acceptable? Yes/No	Service Called (Date)	Date Resolved
Vertical Measurement Accuracy						
Horizontal Measurement Accuracy						
Axial Resolution						
Lateral Resolution						
Penetration						
Functional Resolution						
Contrast Resolution						
Gray Scale Photography						

Assistance

Supplies/Accessories



CAUTION

DO NOT connect any probes or accessories without approval by GE.



CAUTION

Use only GE approved internal equipment when replacing an internal peripheral.

The user or the operator should never install/replace the internal peripheral. Service representatives authorized by GEHC will install/replace the internal peripheral.

Not all features, probes, peripherals or products described in this document may be available or cleared for sale in all markets. Please contact your local GE Ultrasound representative to get the latest information.

Contact the distributor, GE affiliate or sales representative for approved peripherals. For HCATs, contact your sales person.

Supplies/Accessories (continued)

The following supplies/accessories have been verified to be compatible with the system:

Peripherals

Table 18-12: Peripherals and Accessories

Accessory	Units
Footswitch FSU-1000	Each
Footswitch MKF 2-MED GP26	Each
USB Flash Drive 8G	Each
USB3.0 HDD 1TB	Each
DVD-RW	Each
Sony UPD25 Color Printer	Each
Sony UP-D897 Printer	Each
Sony UP-D898MD Printer	Each
HP Officejet 100 Printer	Each
HP Officejet Pro 8100 Printer	Each
Wireless Network USB Adapter	Each
2 Probe ports	Each

Table 18-13: Probes and Accessories




Probe	HCAT	Biopsy Guide	Biopsy Guide HCAT	Biopsy Guide HCAT
8C-RS Micro Convex	H40402LS	Not Available	N/A	N/A
E8C-RS Micro Convex	H40402LN	Fixed angle, Disposable with a Plastic Bracket	E8385MJ	
		Fixed angle, Reusable with a Stainless Steel Bracket	H40412LN	
L6-12-RS Linear	H48062AC	Multi-angle, Disposable with a Reusable Bracket	H40432LC	

Table 18-13: Probes and Accessories

Probe	HCAT	Biopsy Guide	Biopsy Guide HCAT	Biopsy Guide HCAT
3Sc-RS Sector	H45041DL	Multi-angle, Disposable with a Reusable Bracket	H46222LC	
4C-RS Convex	H4000SR	Multi-angle, disposable with a reusable bracket	E8385NA	
LK760-RS Linear	H44901AF	Not Available	N/A	N/A
12L-RS Linear	H40402LY	Multi-angle(in plane biopsy kit), Disposable with a Reusable Bracket	H40432LC	
		Transverse Bracket (out of plane biopsy kit), Disposable with a Reusable Bracket	H48392LL	
		Infinite-angle (in plane biopsy kit), Disposable with a Reusable Bracket	H48392LT	

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