



GE HealthCare

Technical Publications

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Venue Go Basic User Manual

[English \(English\)](#)

Version R4.0 (Including upgrade to R4.0)

Operating Documentation

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Regulatory Requirement

Venue Go™ complies with the regulatory requirements of the following European Medical Device Regulation 2017/745 concerning medical devices.



First CE mark in 2018

This manual is a reference for the Venue Go. It applies to software version 304.35.0.457 or higher software for the Venue Go ultrasound system.



COMPANY DATA



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Revision History

Reason for Change

REV	DATE (YYYY/MM/DD)	REASON FOR CHANGE
Rev. 1	2022/04/28	Initial release (DOC2620584)
Rev. 2	2022/05/22	Removed Privacy & Security section. Updated Probe and Biopsy safety information. Implemented various small corrections and updates. Added ViewPoint reporting option.
Rev. 3	2022/06/26	Added Operator Profile to cNerve tool, corrected list of supported probes in B-Lines tool workflow section, deleted ECG electrodes for pediatrics, updated SOUP table.
Rev. 4	2022/11/08	Added reference image for cNerve tool, Catheter to Vessel Ratio function description, USB DVD and Zebra barcode reader; updated Battery life, ViewPoint, SOUP table; various minor corrections.
Rev. 5	2023/09/13	Updated SOUP, added wireless LAN device and Caption Guidance.
Rev. 6	2024/01/21	Updated version of the Caption Guidance user manual appended to the end of this manual.
Rev. 7	2024/03/12	DICOM store over web, QR code scanning for patient identification.

List of Effective Pages

PAGE NUMBER	REVISION NUMBER
All pages	Rev. 1
All pages	Rev. 2
All pages	Rev. 3
All pages	Rev. 4
All pages	Rev. 5
All pages	Rev. 6
All pages	Rev. 7

Please verify that you are using the latest revision of this document. Information pertaining to this document is maintained on ePDM (GE Healthcare 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.

Regulatory Requirements

Conformance Standards

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

- According to 2017/745 European Medical Device Regulation concerning medical devices, this is Class IIa Medical Device.
- According to IEC/EN 60601-1,
 - Equipment is Class I, Type BF & CF Applied Parts.
 - Cart console is Class I.
 - Continuous Operation
- According to CISPR 11,
 - Equipment is Group 1, Class A ISM not life supporting Equipment. Equipment is Group 1, Class A not life supporting equipment.
 - Cart is Group 1, Class A ISM Equipment.
- According to IEC 60529,
 - Probe head (immersible portion) and cable are IPX7.
 - Probe connector is not waterproof.
 - System is Ordinary Equipment (IPX0).

This product complies with the regulatory requirement of the following:

- Council Directive 2017/745 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.

Authorized EU Representative

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France

-
- 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 60601-1-6 (Usability), EN 1041 (Information supplied with medical devices)
 - IEC 60601-2-37 Medical electrical equipment. 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.
 - Canadian Standards Association (CSA).
 - CSA 22.2, 601.1 Medical Electrical Equipment, Part 1 General Requirements for Safety.
 - ANSI/AAMI ES60601-1 Medical Electrical Equipment, Part 1 General Requirements for Safety.
 - NEMA/AIUM Acoustic Output Display Standard (NEMA UD-3, 2004).
 - Medical Device Good Manufacturing Practice Manual issued by the FDA (Food and Drug Administration, Department of Health, USA).

Certifications

- GE Medical Systems Ultrasound and Primary Care Diagnostics, LLC. is ISO 13485 certified
- GE Medical Systems Information Technologies - Critikon De Mexico S. de R.L. de C.V. is ISO 13485 certified
- GE Medical Systems (China) Co., Ltd. is ISO 13485 certified.

Original Documentation

- The original document was written in English.

Country Specific Approval

- JAPAN

MHLW Certified Number:

Importer information

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Chapter 1

Introduction

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

System Overview

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.

NOTE: *Advanced training availability is region-dependent.*

Read and understand all instructions in this manual before attempting to use the Venue Go system.

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

NOTE: *The Online Help offers a quick way for the user to access the manual.*

The use of the equipment outside the described conditions or intended use, and disregarding safety related information is considered abnormal use. The manufacturer is not liable for injury or damage caused by abnormal use. Any abnormal use will void the warranty of the equipment.

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.

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

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

Documentation



CAUTION

Safety instructions must be reviewed before operating the unit.

Venue Go documentation consists of various manuals:

- The **Basic User Manual** and **Online Help (TRANSLATED)** 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, and user care and maintenance.
- The **Advanced Reference Manual** (English and French only) contains data tables, such as Obstetrics (OB) and Acoustic Output tables.
- The **Service Manual** (English and French only) supplies block diagrams, lists of spare parts, descriptions, adjustment instructions or similar information which helps qualified technical personnel in repairing those parts of the system which have been defined as repairable.

NOTE: *The eDocumentation kit provides instructions on how to read the user documentation via electronic media. All user manuals are provided in electronic format. The eDocumentation media includes English and all other translations.*

The Venue Go 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: *The Basic User Manual is provided only in electronic format. The electronic documentation disk-on-key includes English and all translations.*

NOTE: *The Advanced Reference Manual and Basic Service Manual are provided only in electronic format on the disk-on-key.*

NOTE: *The screen graphics in this manual are only for illustrational purposes. Actual screen output may differ.*

NOTE: *Probe information displayed on screen examples does not necessarily reflect the probes available on your ultrasound system. Please refer to the Probes chapter for a listing of available probes and features.*

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

System description

The console and related Probes are an Active Diagnostic Medical Product belonging to Class IIa according to the MDR 2017/745 regulation for use on human patients.

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 provide 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.

Intended Use

Venue Go is a general purpose diagnostic ultrasound system for use by qualified and trained healthcare professionals for ultrasound imaging, measurement, display and analysis of the human body and fluid.

Venue Go is intended to be used in a hospital or medical clinic.

Indications for Use

The Venue Go is a general-purpose diagnostic ultrasound system for use by qualified and trained healthcare professionals for ultrasound imaging, measurement, display and analysis of the human body and fluid. Venue Go is intended to be used in a hospital or medical clinic. Venue Go clinical applications include: abdominal (GYN and Urology), thoracic/pleural, ophthalmic, Fetal/OB, Small Organ (including breast, testes, thyroid), Vascular/Peripheral vascular, neonatal and adult cephalic, pediatric, musculoskeletal (conventional and superficial), cardiac (adults and pediatric), Transrectal, Transvaginal, Transesophageal, Intraoperative (vascular) and interventional guidance (includes tissue biopsy, fluid drainage, vascular and non-vascular access). Modes of operation include: B, M, PW Doppler, CW Doppler, Color Doppler, Color M Doppler, Power Doppler, Harmonic Imaging, Coded Pulse and Combined modes: B/M, B/Color M, B/PWD, B/Color/PWD, B/Power/PWD, B/CWD, B/Color/CWD.

A list of presets per probe is provided in 'Probe Discussion' on page 9-52.

Image Acquisition, including measurements on acquired images, is intended for diagnostic purposes.

NOTE: *Ophthalmic is not available for Japan.*



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

Contraindications

To avoid injury to the patient, select the Ophthalmic preset when performing an eye exam. The system will not exceed the lower acoustic energy limits for ophthalmic use only if the Ophthalmic preset is selected.

Be sure to use the appropriate probes and presets for eye scanning ('Probe Discussion' on page 9-52).

Clinical benefit

The clinical benefit of a diagnostic ultrasound device is to help healthcare professionals provide an accurate diagnostic information (visualize human tissue/internal structure) that

enhances the diagnostic and treatment care pathways of the patient for a variety of diseases and conditions.

Frequency of Use

Daily (Typically 8 hours ON and 16 hours on standby)

Patient population

- Age: all ages (incl. embryos and fetuses)
- Location: worldwide
- Sex: male and female
- Weight: all weight categories
- Height: no limitations

NOTE: *Extreme obesity may affect operation of the device.*

NOTE: *Do not cross-use the ultrasound system between human use and veterinary/addendum use.*

Operator Profile

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

Prescription Device



CAUTION: Federal law restricts this device to sale 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 https://www.gehealthcare.com/products/ultrasound/ ultrasound-transducers
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. 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 Technologies Contact Center. TEL: (1) 800-558-5102 In other locations, contact your local Applications, Sales, or Service Representative.

Contacting GE Ultrasound (continued)

Table 1-1: Americas

ARGENTINA	GE Healthcare Argentina Nicolas de Vedia 3616 piso 5 Buenos Aires - 1307	TEL: (+54) 11-5298-2200
BRAZIL	GE HEALTHCARE DO BRASIL COMÉRCIO E SERVIÇOS PARA EQUIPAMENTOS MÉDICO-HOSPITALARES LTDA. Avenida Magalhães de Castro, 4800, andar 10 conj. 101 e 102, andar 11 conj. 111 e 112, andar 12 conj. 121 e 122, torre 3 – Cidade Jardim 05676-120 – São Paulo – SP CNPJ: 00.029.372/0001-40 RESPONSÁVEL TÉCNICO: Karolina Morangoni Torres Registro CREA/SP nº 5069785521 REGISTRO ANVISA Nº:	TEL: 3004 2525 (Capitais e Regiões Metropolitanas) 08000 165 799 (Demais Localidades)
CANADA	GE Ultrasound 9900 Innovation Drive Wauwatosa, WI 53226	TEL: (+1) 800-668-0732 Customer Answer Center TEL: (+1) 262-524-5698
LATIN & SOUTH AMERICA	GE Ultrasound 9900 Innovation Drive Wauwatosa, WI 53226	TEL: (+1) 262-524-5300 Customer Answer Center TEL: (+1) 262-524-5698
MEXICO	GE Sistemas Medicos de Mexico S.A. de C.V. Rio Lerma #302, 1º y 2º Pisos Colonia Cuauhtemoc 06500-Mexico, D.F.	TEL: (+5) 228-9600 FAX: (+5) 211-4631
USA	GE Ultrasound 9900 Innovation Drive Wauwatosa, WI 53226	TEL: (+1) 800-437-1171 FAX: (+1) 414-721-3865

Table 1-2: Asia

ASIA PACIFIC JAPAN	GE Healthcare Asia Pacific 4-7-127, Asahigaoka Hinoshii, Tokyo 191-8503, Japan	TEL: (+81) 42 585 5111
AUSTRALIA	32 Phillip Street Parramatta 2150 Sydney, Australia	TEL: 1300 722 229
CHINA	GE Healthcare - Asia No. 1, Yongchang North Road Beijing Economic & Technology Development Area Beijing 100176, China	TEL: (8610) 5806 8888 FAX: (8610) 6787 1162 Service: 4008108188 (24h)
INDIA	Wipro GE Healthcare Pvt Ltd No. 4, Kadugodi Industrial Area Sadaramangala, Whitefield Bangalore, 560067	TEL: (+91) 1-800-425-8025

Table 1-2: Asia (Continued)

KOREA	15F, 416 Hangang Dae ro, Chung-gu Seoul 04637, Korea	TEL: (+82) 2 6201 3114
NEW ZEALAND	8 Tangihua Street Auckland 1010 New Zealand	TEL: 0800 434 325
SINGAPORE	ASEAN 1 Maritime Square #13-01 HarbourFront Center Singapore 099253	TEL: (+65) 6291 8528

Table 1-3: Europe

AUSTRIA	General Electric Austria GmbH & Co OG EURO PLAZA, Gebäude E Technologiestrasse 10 A-1120 Vienna	TEL: (+43) 1 97272 0 FAX: (+43) 1 97272 2222
BELGIUM & LUXEMBURG	GE Healthcare BVBA/SPRL Kouterveldstraat 20 1831 DIEGEM	TEL: (+32) 2 719 7204 FAX: (+32) 2 719 7205
CZECH REPUBLIC	GE Medical Systems Ceská Republika, s.r.o Vyskocilova 1422/1a 140 28 Praha 4	TEL: (+420) 224 446 162 FAX: (+420) 224 446 161
DENMARK	GE Healthcare Park Allé 295 DK-2605 Brøndby, Denmark	TEL: (+45) 43 295 400 FAX: (+45) 43 295 399
ESTONIA & FINLAND	GE Healthcare Finland Oy Kuortaneenkatu 2, 000510 Helsinki P.O.Box 330, 00031 GE Finland	TEL: (+358) 10 39 48 220 FAX: (+358) 10 39 48 221
FRANCE	GE Medical Systems SCS Division Ultrasound 24 Avenue de l'Europe - CS20529 78457 Vélizy Villacoublay Cedex	TEL: (+33) 1 34 49 52 70 FAX: (+33) 13 44 95 202
GERMANY	GE Healthcare GmbH Beethovenstrasse 239 42655 Solingen	TEL: (+49) 212-28 02-0 FAX: (+49) 212-28 02-380
GREECE	GE Healthcare 8-10 Sorou Str. Marousi Athens 15125 Hellas	TEL: (+30) 210 8930600 FAX: (+30) 210 9625931
HUNGARY	GE Hungary Zft. Division, Akron u. 2. Budaörs 2040 Hungary	TEL: (+36) 23 410 314 FAX: (+36) 23 410 390

Table 1-3: Europe (Continued)

IRELAND	NORTHERN IRELAND GE Healthcare Victoria Business Park 9, Westbank Road Belfast BT3 9JL.	TEL: (+44) 028 90229900
	REPUBLIC OF IRELAND GE Healthcare 3050 Lake Drive Citywest Business Campus Dublin 24	TEL: 1800 460 550 FAX: (+353) 1 686 5327
ITALY	GE Medical Systems Italia spa Via Galeno, 36, 20126 Milano	TEL: (+39) 02 2600 1111 FAX: (+39) 02 2600 1417
LUXEMBOURG	See Belgium.	
NETHERLANDS	GE Healthcare De Wel 18 B, 3871 MV Hoevelaken PO Box 22, 3870 CA Hoevelaken	TEL: (+31) 33 254 1290 FAX: (+31) 33 254 1292
NORWAY	GE Vingmed Ultrasound AS Sandakerveien 100C 0484 Oslo, Norway GE Vingmed Ultrasound Strandpromenaden 45 P.O. Box 141, 3191 Horten	TEL: (+47) 23 18 50 50 FAX: (+47) 23 18 60 35 TEL: (+47) 33 02 11 16
POLAND	GE Medical Systems Polska Sp. z o.o., ul. Woloska 9 02-583 Warszawa, Poland	TEL: (+48) 22 330 83 00 FAX: (+48) 22 330 83 83
PORUGAL	General Electric Portuguesa SA Avenida do Forte 6 - 6A Edifício Ramazzotti 2790-072 CARNAIXIDE	TEL: (+351) 21 425 1300 FAX: (+351) 21 425 1343
RUSSIA	GE Healthcare Presnenskaya nab. 10 Block C, 12 floor 123317 Moscow, Russia	TEL: (+7) 4957 396931 FAX: (+7) 4957 396932
SPAIN	GE Healthcare España C/ Gobelás 35-37 28023 Madrid	TEL: (+34) 91 663 2500 FAX: (+34) 91 663 2501
SWEDEN	GE Healthcare Sverige AB FE 314, 182 82 Stockholm Besöksadr: Vendevägen 89 Danderyd, Sverige	TEL: (+46) 08 559 500 10 FAX: (+46) 08 559 500 15 Service Center: (+46) 020-120 14 36
SWITZERLAND	GE Medical Systems (Schweiz) AG Europastrasse 31 8152 Glattbrugg	TEL: (+41) 1 809 92 92 FAX: (+41) 1 809 92 22

Table 1-3: Europe (Continued)

TURKEY	GE Healthcare Türkiye Istanbul Office Levent Ofis Esentepe Mah. Harman Sok. No:8 Sisli-Istanbul	TEL: (+90) 212 398 07 00 FAX: (+90) 212 284 67 00
UNITED ARAB EMIRATES (UAE)	GE Healthcare Dubai Internet City, Building No. 18 First Floor, Dubai - UAE	TEL: (+971) 4 429 6101 or 4 429 6161 FAX: (+971) 4 429 6201
UNITED KINGDOM	GE Medical Systems Ultrasound Pollards Wood Nightingales Lane Chalfont St Giles Buckinghamshire HP8 4SP	TEL: (+44) 1494 544000 FAX: (+44) 1707 289742
For all other European countries not listed, please contact your local GE distributor or the appropriate support resource listed on www.gehealthcare.com .		

Manufacturer



GE Medical Systems
Ultrasound & Primary Care Diagnostics, LLC
9900 Innovation Drive
Wauwatosa, WI 53226
USA

Factory sites

GE Medical Systems Information Technologies
Critikon De Mexico S. de R.L. de C.V.,
Calle Valle del Cedro 1551
Juarez - 32575 Chihuahua
Mexico

GE Medical Systems (China) Co., Ltd.
No. 19, Changjiang Road
Wuxi National Hi-Tech Dev. Zone
214028 Jiangsu
P.R. China

Chapter 2

Safety

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

Owner Responsibility

Owner requirements

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.

Bioeffect Disclosure

Bioeffect disclosure

This section contains the residual risk disclosure.

1. The user manual discloses "Bioeffect" information as follows:

"During a screening and diagnostic ultrasound examination, high frequency sound penetrates and interacts with tissue in and around the area of anatomy to be imaged. Only a small portion of this sound energy is reflected back to the transducer for use in constructing the image while the remainder is dissipated within the tissue. The interaction of sound energy with tissue at sufficiently high levels can produce biological effects (aka bioeffects) of either a mechanical or thermal nature. Although the generation of bioeffect is intentional with therapeutic ultrasound, it is generally undesired in screening and diagnostic applications and may be harmful in some conditions."

2. The user manual discloses safety information as follows:

"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. Display precision is ± 0.1 and accuracy is $\pm 50\%$. Always observe the Acoustic Output display for possible effects."

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.



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.



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

- Severe personal injury
- Substantial property damage.



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 in this manual by the following icons:

Table 2-1: Potential Hazards

Icon	Potential Hazard	Usage	Source
	Biological Hazard Describes precautions necessary to prevent the risk of disease transmission or infections. <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
	Electrical Hazard Describes precautions necessary to prevent the risk of injury through electric hazards. <ul style="list-style-type: none"> • Electrical micro-shock to patient, e.g., ventricular 	<ul style="list-style-type: none"> • Probes • ECG, if applicable • Connections to back panel 	
	Moving Hazard Describes precautions necessary to prevent the risk of injury through moving or tipping hazard! <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 	
	Acoustic Output Hazard <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 	
	Explosion Hazard Describes precautions necessary to prevent the risk of injury through explosion hazard! <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 	
	Fire and Smoke Hazard <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 operator 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.



WARNING

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 manufacturer is not liable for damage caused by abnormal use of the device. The operator 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 safety information is considered abnormal use.



WARNING

The use of the system outside the described conditions or intended use, and disregarding safety related information is considered as abnormal use. The manufacturer is not liable for damage caused by abnormal use of the device.

Patient Safety

Related Hazards



WARNING

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

Use of ECG



WARNING

Do not use the Venue Go ECG wave for diagnostic and monitoring.

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 for long term storage of patient data or images. 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 operator 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.



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.



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 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.



CAUTION

Be certain to ensure privacy of patient information data.

Mechanical hazards



Electrical Hazard

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.

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.



WARNING

Observe probe immersion levels (Figure 9-8 on page 9-21).

Inspect probes for sharp edges or rough surfaces that could injure sensitive tissue.

DO NOT bend or pull the cable forcefully, to avoid mechanical shock or impact to the probe.

Transesophageal probe safety



W **WARNING**

Never use excessive force when manipulating the transesophageal probe.

The detailed operator manual enclosed with the transesophageal probe must be read carefully. Safe and efficient data storage is crucial when doing transesophageal examination. To ensure optimal image storage during a transesophageal examination the user should consider:

- Creating a new examination when using the TEE probe so as to limit the size of the examination.
- Storing the images on the local archive. Storage on a remote archive may be affected by network instability and traffic.



W **WARNING**

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

Scanner and electrosurgical units



W **WARNING**

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 or ECG electrodes while operating the ESU. Where contact cannot be avoided, as in the case of TEE monitoring during surgery, make sure the transducer or ECG electrodes are not located between the ESU active and dispersive electrodes and keep the ESU cables away from the transducer or ECG cables.

Defibrillation



W **WARNING**

Remove any sensors on the patient other than the ECG before defibrillation.



WARNING

Remove the TEE probe from the patient when defibrillators are used.

ALARA



Acoustic Output Hazard

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.



WARNING

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 operators receive proper training in applications before performing them in a clinical setting. Please contact the local GE representative for training assistance.

ALARA training is provided in the Medical Ultrasound Safety booklet shipped in the eDOCs kit. The ALARA education program for the clinical end-user covers basic ultrasound principles, possible biological effects, the derivation and meaning of the indices, ALARA principles, and examples of specific applications of the ALARA principle.

Equipment and Personnel Safety

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

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.

Reporting

In case a serious incident occurred in relation to the Venue Go, this should be reported to GE Healthcare and the competent Authority ('Reporting of serious incidents' on page 10-12).

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 operator 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 operator 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 \downarrow).
- Never use any adapter or converter of a three-prong-to-two-prong type to connect with a mains power plug. The protective earth connection will loosen.
- Be sure that liquid does not drip into the console.
- In North America, a 220-240V installation requires the use of a center-tapped AC power source.



CAUTION

Servicing must be performed by GE qualified service personnel.



WARNING

The internal circuits of the unit use high voltages, capable of causing serious injury or death by electrical shock.



WARNING

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



Smoke & Fire Hazard

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



WARNING

Only approved and recommended peripherals and accessories should be used.

When Venue Go is mounted on a cart, all peripherals and accessories must be securely mounted to the cart.



WARNING

The Venue Go 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.



WARNING

Connecting electrical equipment to multiple socket-outlet effectively leads to creating a mechanical system, and can result in a reduced level of safety.



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

Use a USB printer cable that is less than 3 meters in length.



WARNING

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.



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.



WARNING

Contact with natural rubber latex may cause a severe anaphylactic reaction in persons sensitive to the natural latex protein. Sensitive operators and patients must avoid contact with these items. Refer to package labeling to determine latex content and FDA's March 29, 1991 Medical Alert on latex products.



C CAUTION

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



Biological Hazard

Be cautious to avoid contacting with the needle tip in biopsy procedure.



W WARNING

Be cautious with the self-service parts to avoid fingers getting pinched.



W WARNING

Be cautious when mounting or releasing the system from the cart to avoid fingers getting pinched by the locking mechanism.



C CAUTION

Using a high-frequency surgical equipment with the Venue Go might introduce image interference.



W WARNING

Any electronic device can fail without warning signs, therefore the user is advised to follow local clinical practice guidelines for having a backup imaging plan when performing time-critical image-guided examinations and interventions.



C CAUTION

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



C CAUTION

- Make sure to verify the media after writing data, including Save, Backup and Restore.
- Before deleting a patient or image from the patient screen, make sure you have saved the data and verify that the media data transfer was successful.



Electrical Hazard

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.

Related Hazards (Monitor)



CAUTION

- To avoid result of injury or system damage, **NEVER** place any object or liquid on the Venue Go system.
- **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.
- The Venue Go 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 monitor panel's backlight has a fixed life span. When the screen becomes dark or begins to flicker, contact a qualified Service Representative for information.

General Caution



CAUTION

Standard maintenance must be performed by authorized service personnel during the lifetime of the product (7 years).



Moving Hazard

Proceed cautiously when crossing door or elevator thresholds with the system mounted on the cart. Use the handle to push/pull the cart, e.g., do not hold the Venue Go to push the cart. Failure to do so may cause serious injury or system damage.



CAUTION

The Standard or Demo Cart's maximum capacity loads are:

- 2 kg (4.4 lbs) for the Multipurpose holder (1)
- 2 kg (4.4 lbs) for the Accessories shelf (2)
- 8 kg (17.6 lbs) for the Printer shelf (3)
- 4 kg (8.8 lbs) for the Accessories basket (4)

Refer to the figure below (Figure 2-1).



Figure 2-1. Capacity load for system on Standard cart

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.*



WARNING

Unexpected diagnostic system performance or failure from interference broadcasted by device due to electromagnetic incompatibility with cauterizing knife causing obvious deterioration of image quality.

NOTE: *The system needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the accompanying documents"*

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.*

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 'Preparing the System for use' on page 3-1.



W WARNING

Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

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.



C CAUTION

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) unless intended for use with this system, in the vicinity of this equipment as it may cause performance outside the published specifications.

Keep power to these devices turned off when near this equipment.

Medical staff in charge of this equipment is required to instruct technicians, patients and other people who may be around this equipment to fully comply with the above regulation.

Portable and mobile radio communications equipment (e.g. two-way radio, cellular/cordless telephones, wireless computer networks) 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

Recommended separation distances between portable and mobile RF communications equipment and Venue Go for NOT LIFE-SUPPORTING ME EQUIPMENT and ME SYSTEMS			
Rated maximum output of transmitter, W	Separation distance according to frequency of transmitter, m		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.74
1	1.2	1.2	2.3
10	3.8	3.8	7.4
100	12	12	23

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

For transmitters rated at a maximum output power not listed above the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.



Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Venue Go, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.



Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.



WARNING

Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

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 Operator Modification

The operator should never modify this product. Operator 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.

5. The use of the accessory, transducer or cable with Venue Go other than those specified may result in increased emissions or decreased immunity of the Venue Go.

Peripheral Update for EC countries

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

Peripherals used in the patient environment

Venue Go has been verified for overall safety, compatibility and compliance with the following image recording devices:

- UP-X898MD
- USB 2.0/3.0 Flash Drive (Memory Stick)
- USB Hard Disk Drive (Bus-powered)
- DVD (Bus-powered)



W WARNING

Any devices or cables, other than those sold with the ultrasound system, connected to the peripheral/accessory connector panel or to a USB port on the system, may result in increased electromagnetic emission from the unit, or a decrease in electromagnetic immunity from the unit.



W WARNING

Any accessory equipment connected to the analog and digital interfaces of the system must be certified according to the respective IEC or ISO standards (such as IEC/EN62368-1 or IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment). Any person connecting additional equipment to the signal input part or output part of the ultrasound system, alters this medical system and is therefore responsible for ensuring that the system complies with the requirements of the medical electrical systems of IEC/EN 60601-1 Clause 16. If in doubt, consult the technical service department or your local representative.



W WARNING

Do not touch the conducting parts of the USB or Ethernet cables when connecting equipment to the system.



W WARNING

To avoid leakage current above safety limits prescribed by IEC/EN60601-1 and to endure continuity of protective earth, DO NOT connect Venue Go and mains operated accessories to a multi-socket extension cord.



C CAUTION

Non-supported peripheral devices that use their own AC power source CANNOT be attached to the Venue Go.



CAUTION

Observe all warnings and cautions given in the peripheral device's operator manual when using a peripheral device.



CAUTION

For USB Flash cards: only use shielded USB flash cards that are verified for EMC performance according to EN55011/EN55022. The use of other USB flash cards may cause interference on the system itself or on other electronic devices.

A Wireless LAN device is built into **Venue Go**, and is not user-accessible ('**Connectivity**' on page 8-33). The device is an option which can be enabled by insertion of a unique option-key.

For systems with a Model 8265NGW wireless LAN device: The device conforms to IEEE 802.11ac/a/b/g/n WiFi with Bluetooth 4.0 Standard. Max Tx power in 2.4GHz and 5GHz is 21 dBm; Bandwidth is 5.15GHz-5.85GHz and 2.4-2.4835GHz.

Table 2-3: Wireless LAN Specifications for systems with a Model 8265NGW device

Model	Model 8265NGW	802.11AC, 2X2, Bluetooth® 4.2, PCIe, USB, M.2 2230 MS
Frequency modulation	5GHz (802.11ac/n)	2.4GHz (802.11b/g/n)
Frequency band	5.15GHz - 5.85GHz (dependent on country)	2.400 – 2.4835GHz (dependent on country)
Modulation	BPSK, QPSK, 16 QAM, 64 QAM, 256 QAM	CCK, DQPSK, DBPSK
Wireless medium	5GHz UNII: Orthogonal Frequency Division Multiplexing (OFDM)	2.4GHz ISM: Orthogonal Frequency Division Multiplexing (OFDM)
Channels	All channels as defined by the relevant specification and country rules.	
Data Rates	All data rates are theoretical maximums.	
IEEE 802.11ac Data Rates	Intel® Dual Band Wireless-AC 8265: up to 867 Mbps	
IEEE 802.11n Data Rates	Tx/Rx (Mbps): 300, 270, 243, 240, 216.7, 195, 180, 173.3, 150, 144, 135, 130, 120, 117, 115.5, 90, 86.667, 72.2, 65, 60, 57.8, 45, 43.3, 30, 28.9, 21.7, 15, 14.4, 7.2	
IEEE 802.11a Data Rates	54, 48, 36, 24, 18, 12, 9, 6 Mbps	
IEEE 802.11g Data Rates	54, 48, 36, 24, 18, 12, 9, 6 Mbps	
IEEE 802.11b Data Rates	11, 5.5, 2, 1 Mbps	

For systems with a Model AX210NGW wireless LAN device:
The device conforms to IEEE 802.11 ax/ac/a/b/g/n WiFi with

Bluetooth 5.2 Standard. Max Tx power in 2.4GHz and 5GHz is 21 dBm; Bandwidth is 5.15GHz-5.85GHz and 2.4-2.4835GHz.

Table 2-4: Wireless LAN Specifications for systems with a Model AX210NGW device

Model	Model AX210NGW	802.11AC, 2X2, Bluetooth® 5.2, PCIe, USB, M.2 2230 MS
Frequency modulation	5GHz (802.11ac/n/a/ax)	2.4GHz (802.11b/g/n/ax)
Frequency band	5.15GHz - 5.85GHz (dependent on country)	2.400 – 2.4835GHz (dependent on country)
Modulation	BPSK, QPSK, 16 QAM, 64 QAM, 256 QAM, 1024 QAM	CCK, DQPSK, DBPSK, 16 QAM, 64 QAM, 256 QAM, 1024 QAM
Wireless medium	5GHz UNII: Orthogonal Frequency Division Multiplexing (OFDM)	2.4GHz ISM: Orthogonal Frequency Division Multiplexing (OFDM)
Channels	All channels as defined by the relevant specification and country rules.	
Data Rates	All data rates are theoretical maximums.	
IEEE 802.11ac Data Rates	Up to 867 Mbps	
IEEE 802.11n Data Rates	Tx/Rx (Mbps): 300, 270, 243, 240, 216.7, 195, 180, 173.3, 150, 144, 135, 130, 120, 117, 115.5, 90, 86.667, 72.2, 65, 60, 57.8, 45, 43.3, 30, 28.9, 21.7, 15, 14.4, 7.2	
IEEE 802.11a Data Rates	54, 48, 36, 24, 18, 12, 9, 6 Mbps	
IEEE 802.11g Data Rates	54, 48, 36, 24, 18, 12, 9, 6 Mbps	
IEEE 802.11b Data Rates	11, 5.5, 2, 1 Mbps	
IEEE 802.11ax Data Rates	Up to 2.4 Gbps	

The Venue Go 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. Anyone connecting additional equipment to the signal input part or signal output part of the Venue Go system is in fact configuring 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.

For secured login a USB RFID badge reader is available:

- rfIDEAS RFID Scanner RDR-80582AKU
- Operating Frequency - 125/132 kHz and 13.56 MHz
- @125 kHz BW(-20 db)=5.30 kHz
- @13.56 Mhz BW(-30 db)=6.25 kHz



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.

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. There must be adequate heat dissipation and ventilation to prevent overheating of the device.
3. The added device(s) must be used for their intended purpose having a compatible interface.
4. Risk and leakage current of the combination must comply with IEC/EN 60601-1.
5. Electromagnetic emissions and immunity of the combination must conform to IEC/EN 60601-1-2.

Declaration of Emissions

This system is suitable for use in the following environments. The operator must assure that the system is used according to

the specified guidance and only in the electromagnetic environment listed below.

Table 2-5: Declaration of Emissions

Guidance and manufacturer's declaration - ELECTROMAGNETIC EMISSIONS -for all ME EQUIPMENT and ME SYSTEMS		
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:
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage Fluctuations/Flicker Emissions IEC 61000-3-3	Complies	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.

NOTE: *The Venue Go is a Class-A equipment suitable for use in a professional healthcare facility environment. The operator must assure that the system is used per the specified guidance and only in the electromagnetic environment listed above.*

NOTE: *The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The operator might need to take mitigation measures, such as relocating or re-orienting the equipment.*

Declaration of Immunity

This system is suitable for use in the following environments. The operator must assure that the system is used according to

the specified guidance and only in the electromagnetic environment listed below.

Table 2-6: Declaration of Immunity 3rd Edition

Immunity type	IEC 60601 level	Compliance level	EMC Environment and Guidance
IEC 61000-4-2 Static discharge (ESD)	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	The relative humidity should be at least 30%. Mains power voltage should be typical commercial for use in Medical/hospital environment. Image degradation or interference may occur due to conducted\radiated RF noise on the power mains, signal cables or equipment. Such interferences are easily recognized and distinguishable from patient anatomy and physiological waveforms.
IEC 61000-4-4 Electrical fast transient/burst	±2 kV mains ±1 kV I/O lines	±2 kV mains ±1 kV I/O lines	
IEC 61000-4-5 Surge Immunity	±1 kV differential ±2 kV common	±1 kV differential ±2 kV common	
IEC 61000-4-11 Voltage dips	<5% U _T ; 0.5 cycle 40% U _T ; 5 cycles 70% U _T ; 25/30 cycles	<5% U _T ; 0.5 cycle 40% U _T ; 5 cycles 70% U _T ; 25/30 cycles	
Interruptions	0%U _T ; 250/300 cycles	0%U _T ; 250/300 cycles	
IEC 61000-4-8 magnetic field	3 A/m 50/60 Hz	3 A/m 50/60 Hz	
NOTE: U _T is the AC mains voltage prior to application of the test level.			

Table 2-7: Declaration of Immunity 4th Edition

Immunity type	IEC 60601 level	Compliance level	EMC Environment and Guidance
IEC 61000-4-2 Static discharge (ESD)	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	The relative humidity should be at least 30%. Mains power voltage should be typical commercial for use in Medical/hospital environment. Image degradation or interference may occur due to conducted\radiated RF noise on the power mains, signal cables or equipment. Such interferences are easily recognized and distinguishable from patient anatomy and physiological waveforms.
IEC 61000-4-4 Electrical fast transient/burst	±2 kV mains ±1 kV SIP/SOP	±2 kV mains ±1 kV 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	0% U _T ; 0.5 cycle 0% U _T ; 1 cycle 70% U _T ; 25/30 cycles	0% U _T ; 0.5 cycle 0% U _T ; 1 cycle 70% U _T ; 25/30 cycles	
Interruptions	0%U _T ; 250/300 cycles	0%U _T ; 250/300 cycles	
IEC 61000-4-8 magnetic field	30 A/m 50/60 Hz	30 A/m 50/60 Hz	
NOTE: U _T is the AC mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic IMMUNITY for NOT LIFE-SUPPORTING ME EQUIPMENT and ME SYSTEMS			
Immunity type	IEC 60601 level	Compliance level	Electromagnetic Environment and Guidance
Venue Go is intended for use in the electromagnetic environment specified below. Venue Go operators should assure that it is used in such an environment.			
3rd Ed. / 4rd Edition			
IEC 61000-4-6 Conducted RF	3 Vrms 150 kHz to 80 MHz 6 Vrms in ISM bands (6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,66 MHz to 40,70 MHz.)	[V1] = 3 Vrms [V1] = 6 Vrms	Recommended separation distance: $d = 1.2\sqrt{P}$
IEC 61000-4-39 Immunity to magnetic fields in close proximity	65 A/m 134.2 kHz 7.5 A/m 13.56 MHz	65 A/m 134.2 kHz 7.5 A/m 13.56 MHz	
IEC 61000-4-3 Radiated RF	3 V/m 80 MHz to 2.7 GHz	[E1] = 3 V/m	Recommended separation distance: $d = 1.2\sqrt{P}$, 80 - 800 MHz range $d = 2.3\sqrt{P}$, 800 - 2700 MHz range
Proximity fields from RF wireless communications equipment	Table 8.10 of IEC 60601-1-2:2014		
<p>NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>NOTE 3: P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>NOTE 4: Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,^a should be less than the compliance level in each frequency range.^b</p> <p>NOTE 5: Interference may occur in the vicinity of equipment marked with the following symbol: </p>			
<p>^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which Venue Go is used exceeds the applicable RF compliance level above, Venue Go should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Venue Go.</p> <p>^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p>			

NOTE: The following acceptance criteria were used during EMC testing:

Safety

1. The MI parameter displayed on screen shall not be changed during the test.
2. The TIS parameter displayed on screen shall not be changed during the test.
3. The AO parameter displayed on screen shall not be changed during the test.
4. No change of operation mode is permitted.
5. Any Image disturbances such as snow or rays distinguishable from the measured image are allowed.

Table 2-8: IEC 60601-1-2 Edition 4.1: test specifications for enclosure port immunity to proximity magnetic fields

Guidance and manufacturer's declaration - electromagnetic IMMUNITY for NOT LIFE-SUPPORTING ME EQUIPMENT and ME SYSTEMS		
Test frequency	Modulation	Immunity Test Level (A/m)
30 KHz ^a	CW	8
134.2 kHz	Pulse modulation ^b 2.1 kHz	65 ^c
13.56 MHz	Pulse modulation ^b 50 kHz	7.5 ^c

^a This test is applicable only to ME EQUIPMENT and ME SYSTEMS intended for use in the HOME HEALHCARE ENVIRONMENT.

^b The carrier shall be modulated using a 50% duty cycle square wave signal.

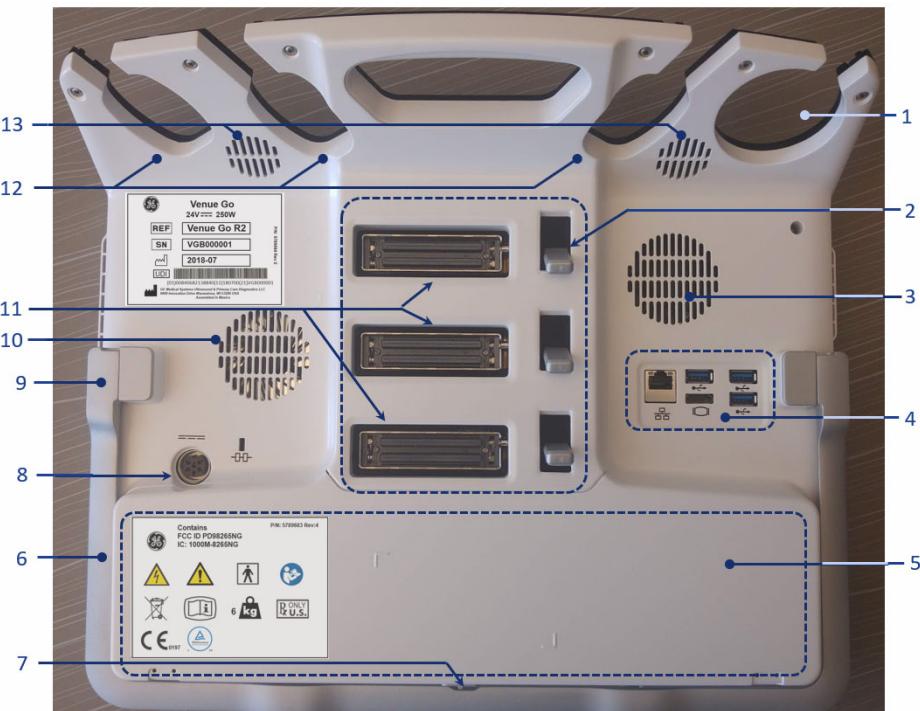
^c r.m.s., before modulation is applied.

Essential performance

The essential performance of the ultrasound unit is:

- The ability to display physiological images as input for diagnosis by trained physician.
- The ability to display physiological traces as aid for diagnosis by trained physician.
- The ability to display quantified data as input for diagnosis by trained physician.
- The ability to display quantified data as input for diagnosis by trained physician.
- The display of ultrasound indexes as aid for safe use of the system.
- The display of probe surface temperature as aid for safe use of the system (Probe dependent).

Patient Environmental Devices



- | | |
|--|---|
| 1. Gel holder | 7. Battery compartment cover latch |
| 2. Probe connector latches | 8. Power supply plug connector |
| 3. Air vent | 9. Friction shaft for adjustable rear support bar |
| 4. Rear panel including: | 10. Air vent |
| • One HDMI port | 11. Three probe connectors |
| • One network port | 12. Probe holder for three probes |
| • Three USB ports | 13. Speaker grid |
| 5. Battery compartment cover | 14. System carrying handle |
| 6. Adjustable rear support bar (kickstand) | |

Figure 2-2. Patient Environmental Devices

NOTE: *Graphics are for reference purposes only.*

Acceptable Devices

The Patient Environmental devices shown in Figure 2-2 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 'Peripheral Update for EC countries' on page 2-20 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 Venue Go must conform to one or more of the requirements listed below:

1. IEC/EN-60601-1 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 by GE in these instructions for use.

Acoustic Output



CAUTION

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

When the **Auto Freeze Time** (probe selection required) preset is selected on the **Config. > Imaging > Global settings** screen, the system auto freezes after the time specified (10 or 30 minutes, 1 hour, or Never) for scanning.

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 standard IEC 60601-2-37.

Acoustic Output Display Specifications

The display consists of three parts: Thermal Index (TI), Mechanical Index (MI), and a relative Acoustic Output (AO) value. The AO value informs the user of where the system is operating within the range of available output.

The TI and MI are displayed at all times. The TI and MI display starts at a value of 0.0 and increments in steps of 0.1. The MI displays values between 0 and 0.4 increment in steps of 0.01 and for values greater than 0.4, increments in steps of 0.1.

The AO percentage (AO%) value informs the user of where the system is operating within the range of available output. Accuracy of the AO% is $\pm 10\%$.

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.

Changing the Thermal Index Type

You can select the displayed TI. Scroll the controls on the right side through several pages till the **Thermal Index** button is visible. Tap it to select a different TI (Thermal Index) type. This preset is application dependent, so each application could specify a different TI type.

Mechanical Index

MI recognizes the importance of non-thermal processes, cavitation in particular. The Index is a relative indicator of the likelihood of mechanical bioeffect within the tissue.

TI and MI Display Accuracy

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 $TI \leq 1.8$.

Display Accuracy and Acoustic Measurement Uncertainties

The display accuracy and measurement precision of the output display are summarized in the table below. Accuracy of the output display (TI, MI) parameters depends on the measurement system precision, the acoustic model used to calculate the parameters and variation in the acoustic output of probes and systems. The measurement precision and overall accuracy of the measurements have been assessed by determining both the random and the systematic uncertainties and given in percent at 90% confidence level for MI and TI from and above the 0.4 limit given the output display standard IEC 60601-2-37.

Parameter	Estimated accuracy ^a	Measurement precision
Pressure, MI	+/-25%	+/-15%
Power, TI	+/-50%	+/-30%
Frequency ^b	+/-1%	+/-1%

^a Accuracy = (Measured value - displayed value)/displayed value * 100%

^b For the measurement system

Ispta

The Ispta is the Spatial Peak Temporal Average Intensity. The absolute maximum regulatory limit of Ispta is 720 mW/cm² to comply with FDA 510(k) guide: "Marketing Clearance of

Diagnostic Ultrasound Systems and Transducers" of June 27, 2019.

Maximum allowable output for MI, TI and ISPTA

The absolute maximum allowable output for Ophthalmic applications is:

- ISPTA less than or equal to 50 mW/cm^2
- MI less than or equal to 0.23
- TI less than or equal to 1

The absolute maximum allowable output for all other applications is:

- ISPTA less than or equal to 720 mW/cm^2
- MI less than or equal to 1.9
- TI less than or equal to 6

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 chapter.

Always observe the Acoustic Output display for possible effects.

NOTE: *Acoustic output setting can be set to display values according to 1st or 2nd edition methods ('Acoustic Output Setting' on page 8-11).*

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 chapter 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 preset sometimes initiates scanning at a reduced default output level. This reduced level is preset programmable and depends upon the exam application and probe selection.

To modify acoustic output, adjust the Power Output level on the scan-control Menu.

Federal Communications Commission (FCC) Statement

15.105(b): The system has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

15.21: You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.



WARNING

- It is prohibited to use wireless LAN function in an airplane, as this may violate the relevant provisions in the aviation regulation.
- Use the wireless LAN function prudently in an emergency vehicle, as other devices or communication signals may be interfered with.
- Use the wireless LAN function prudently in OR/CCU/ICU as it may interfere with other devices.
- The system's intended use is to be operated only when installed on a dedicated Cart, placed on a horizontal desktop or on a mounted boom.
- The system should be installed and operated with a minimum distance of 20 cm between the radiator and your body.
- The system should not be operated when positioned on the operator legs or when being hand carried.

Appendix A: CE Statement & Declaration of Conformity

CE Statement

- For the following countries activating the 5150 MHz~5350 MHz band shall be done for indoor use only: AT/BE/BG/CZ/DK/EE/FR/DE/IS/IE/IT/EL/ES/CY/LV/LI/LT/LU/HU /MT/NL/NO/PL/PT/RO/SI/SK/TR/FI/SE/CH/UK/HR.
- The frequency band(s) in which the radio equipment operates: 2.412 Ghz – 2.484 Ghz and 5.180 Ghz – 5905 Ghz
- Maximum radio frequency power:
2.4 Ghz Band: 21 dBm
5 Ghz Band: 21 dBm
- Accessories: None of the attached accessories contains RF antenna.
- Software:
 - The Acquisition software includes pre-configured workflows that could use the WIFI network for transferring the acquired data to remote station.
 - The user can define a default remote path for a network shared folder. The default remote path can then be selected as a destination archive for exporting of system error log file or use 'Save as...' function for storing images.
 - In addition to storing and processing patient data on a local device, the user can store and access the patient data on a remote server which is outsourced to another company. The user can edit and print the report on the remote server. The patient data can be stored on the outsourced server through DICOM.

EU DoC (Declaration of Conformity)

Hereby, GE Healthcare declares that the radio equipment type Venue Go Point of Care Ultrasound Scanner is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:

[https://www.gehealthcare.com/products/ultrasound/
point-of-care-ultrasound/venueGo](https://www.gehealthcare.com/products/ultrasound/point-of-care-ultrasound/venueGo)

RoHS Venue Go Hazardous Substances

The following product pollution control information is provided according to SJ/T11364-2014 Marking for Control of Pollution caused by Electronic Information Products.



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 Hazardous Substances in Electric 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 Electric and Electronic products will not leak or mutate under normal operating conditions so that the use of such Electric 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 2-9: Table of hazardous substances' name and concentration for Venue Go

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

This table is prepared according to SJ/T 11364
O: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.
X: Indicates that this 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 could be used in Printed circuit solder.

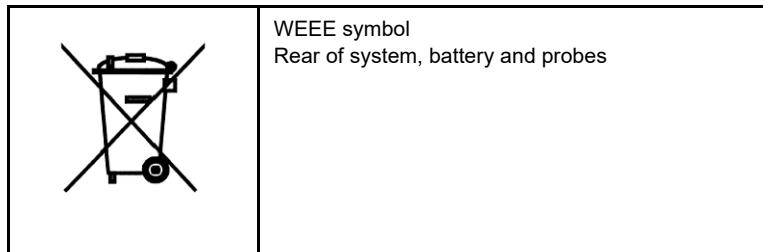
Table 2-10: Table of hazardous substances' name and concentration for carts

Component Name	Hazardous substances' name					
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
Power Assemblies	X	O	O	O	O	O
Cart Assemblies	O	O	O	O	O	O
Wheels	O	O	O	O	O	O

This table is prepared according to SJ/T 11364
O: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.
X: Indicates that this 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 could be used in Printed circuit solder.

Environmental protection

Disposal



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.



A lithium battery is included with this console. Do not puncture, mutilate or dispose of battery in fire. Replace only with same type recommended by the manufacturer. Dispose of used battery according to manufacturers' instructions and in accordance with your local regulations.

Complete the following procedure to access the WEEE passport of the Venue Go product:

1. Go to the GE Healthcare Support Documentation Library (click the link below).
2. Select the **Ultrasound (UL)** modality.
3. Enter the document name or the keyword **WEEE**.
4. Tap **Search**.
5. Select the desired WEEE passport.

<https://www.gehealthcare.com/support/documentation-library>

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. To minimize potential impacts to 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 equipment instructions or your local authorities.

Device Labels

Label Locations

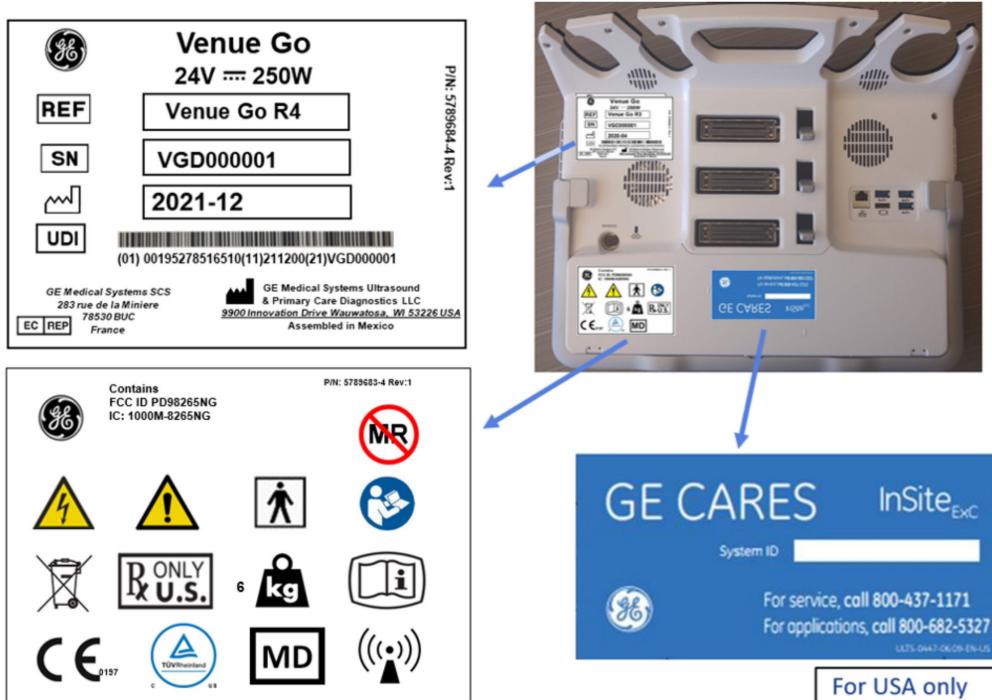


Figure 2-3. Venue Go label locations

NOTE: *Graphics are for reference purposes only.*

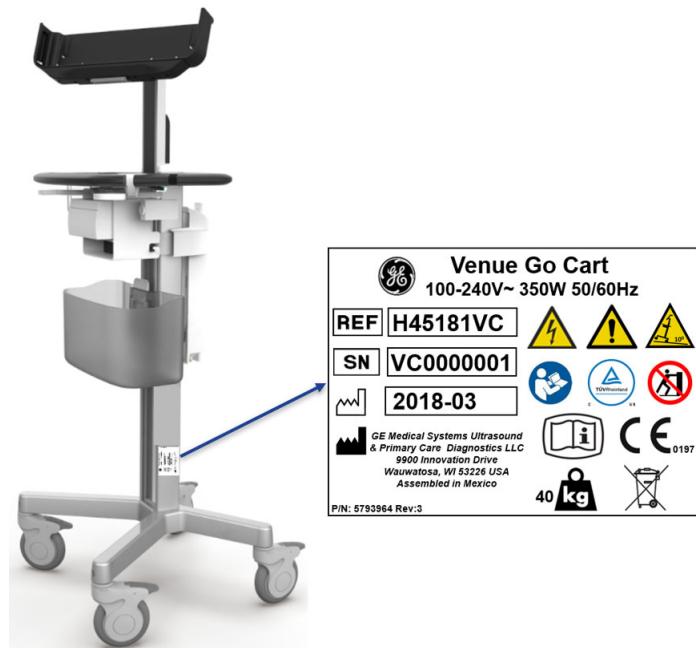


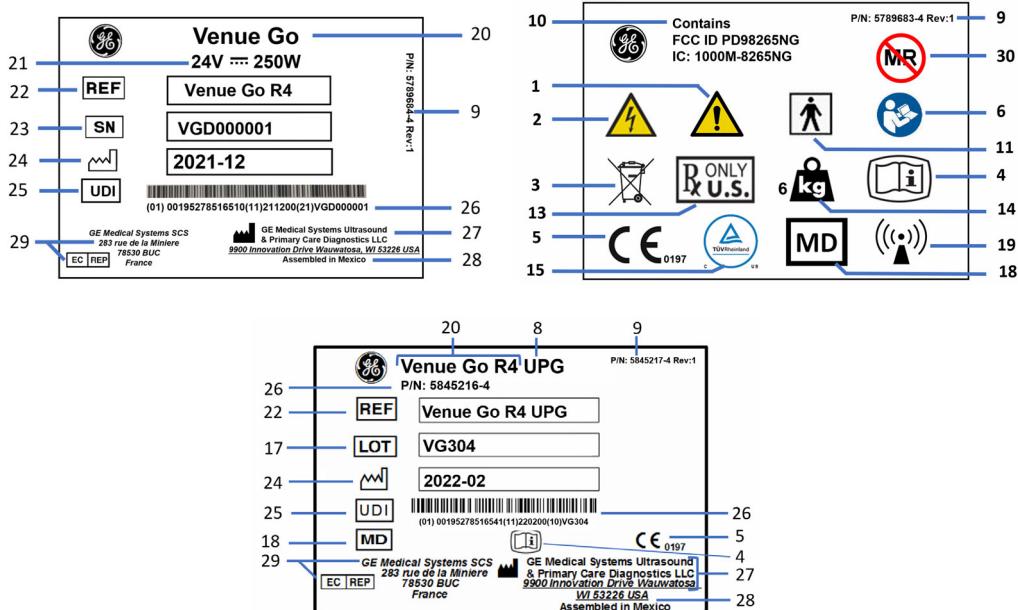
Figure 2-4. Venue Go Standard or Demo Cart labels location

NOTE: The names **Standard cart** and **Demo cart** which are used in this User Manual both refer to the Venue Go Cart product, carrying the Venue Go Cart Label shown above.

NOTE: Graphics are for reference purposes only.

Warning Label Locations

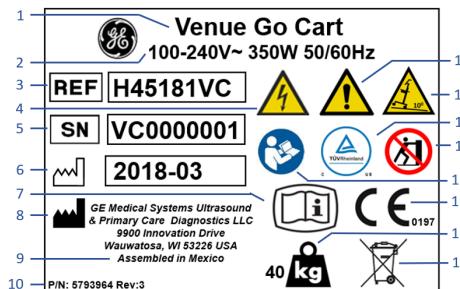
Venue Go labels are provided in English.



1. Possible shock hazard. Do not remove covers or panels. No operator serviceable parts are inside. Refer servicing to qualified service personnel.
2. Warning, dangerous voltage
3. WEEE symbol
4. Electronic elFU symbol (Electronic Instructions for Use)
5. CE Mark of Conformity
6. "ATTENTION - Consult accompanying documents" is intended to alert the operator to refer to the operator manual or other instructions for use when complete information cannot be provided on the label.
7. Pushing the system is prohibited
8. UPG: Upgrade label. This label only appears on upgraded systems.
9. Part-number and revision of the label
10. FCC approval for wireless devices. Includes FCC ID and Canadian ID (IC) numbers.
11. Type BF Applied Parts
12. Warning: system may tip over on a slope steeper than 10 deg.
13. Prescription Requirement (Rx Only) symbol (United states only)
14. System weight symbol with weight value in Kg.
15. TUV Rheinland certification symbol
16. Product Part number and revision
17. LOT: manufacturer batch code identification
18. Medical Device symbol
19. "Non-ionizing electromagnetic radiation" symbol, IEC 60417 REF NO 5140
20. Product name
21. Power and voltage rating
22. REF Catalog or model number symbol
23. SN Serial Number symbol
24. The Month and Year of Manufacture
25. UDI symbol - Unique Device Identification
26. UDI Human Readable Label Text: Global Trade Item Number, GTIN (01), Manufacturing Date (11), Serial Number (21)
27. Manufacturer's name and address
28. Customs Statement - country of origin
29. Authorized EU Representative address
30. MR Symbol

Figure 2-5. Label and Rating Plate Explanations

NOTE: Graphics are for reference purposes only.



1. Product name
2. System power and voltage rating
3. REF Catalog or model number symbol
4. Warning, dangerous voltage
5. SN Serial Number symbol
6. The Month and Year of Manufacture
7. Electronic eIFU symbol (Electronic Instructions for Use)
8. Manufacturer's name and address
9. Customs Statement - country of origin
10. Part-number and revision of the label
11. Possible shock hazard. Do not remove covers or panels. No operator serviceable parts are inside. Refer servicing to qualified service personnel.
12. Warning: system may tip over on a slope steeper than 10 deg.
13. TUV Rheinland certification symbol
14. Pushing the system is prohibited
15. "ATTENTION - Consult accompanying documents" is intended to alert the operator to refer to the operator manual or other instructions for use when complete information cannot be provided on the label.
16. CE Mark of Conformity
17. System weight symbol with weight value in Kg.
18. WEEE symbol

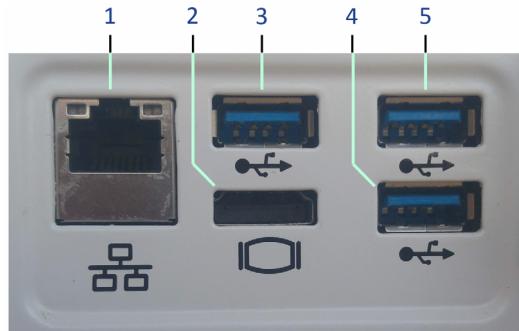
Figure 2-6. Venue Go Cart Label and Rating Plate Explanations

NOTE: Graphics are for reference purposes only.

AC Adapter label location



Figure 2-7. AC Adapter label



1. Ethernet LAN Connection (isolated)
2. HDMI Display port connector (non-isolated)
3. 4. and 5. USB 3.0 Ports (x3) (non-isolated)

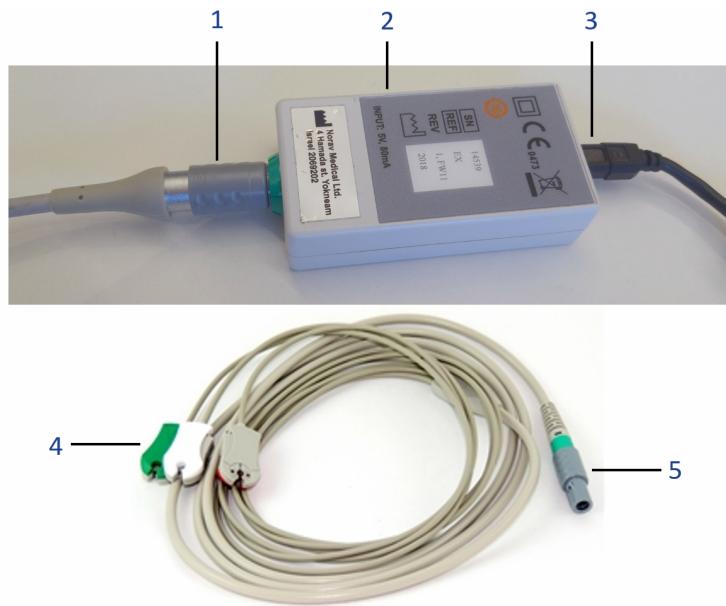
Figure 2-8. Peripheral/Accessory Connector Panel



Use only approved, defibrillation-proof ECG electrodes patient cables. An example of such a cable appears in Figure 2-9.

Approved patient cable names and part numbers are:

- ECG IEC Pat. Cable: 5146739
- ECG AHA Pat. Cable: 5146056



1. ECG cable device connector
2. ECG device
3. ECG USB cable connector
4. ECG electrodes cables with three ECG clips
5. ECG cable device connector

Figure 2-9. ECG module with cable

Probe Label Explanation

The following information appears on all probe labels, regardless of the connector type, except for “IPX7”, “CE Mark”, and “XDclear™” which only appears on applicable probes.

NOTE: *The probe label displayed in this manual is only for illustrational purposes. Refer to the actual probe label for the specific information.*

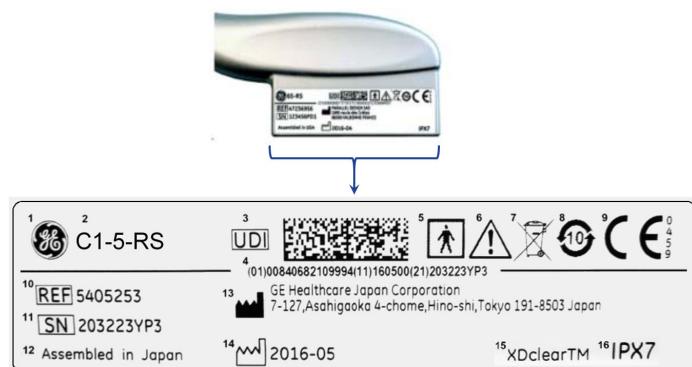


Figure 2-10. Probe label details

Battery Label Explanation

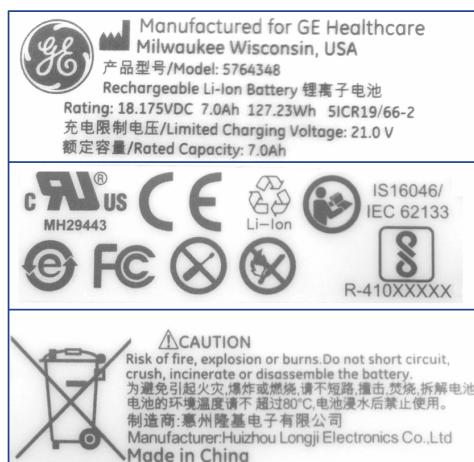


Figure 2-11. Battery label

Icon description

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

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
	Manufacturer's name and address	EN ISO 15223-1: Symbols for use in the labelling of medical devices Standard: ISO 7000-3082	• Rear Panel • Rating Plate • Probes • Upgrade label
	Date of manufacture	EN ISO 15223-1: Symbols for use in the labelling of medical devices Standard: ISO 7000-2497	• Rating Plate • Probes • Upgrade label
	Serial Number. Indicates the manufacturer's serial number so that a specific medical device can be identified.	EN ISO 15223-1 Ref. 5.1.7: Symbols for use in the labelling of medical devices Standard: ISO 7000-2498	• Rating Plate • Probes
	Catalog number: Indicates the manufacturer's catalog number so that the medical device can be identified.	EN ISO 15223-1 Ref. 5.1.6: Symbols for use in the labelling of medical devices Standard: ISO 7000-2493	• Rating Plate • Probes • Upgrade label

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
Type/Class Label	Used to indicate the degree of safety or protection.		Rear Panel
	Prescription Requirement label United States only	21 CFR 801.109	Rating Plate Venue Go R4
	CE Mark of conformity	2017/745 Annex V	Rating Plate Venue Go R4
	Authorized European Representative address		<ul style="list-style-type: none"> • Rating Plate • Upgrade label
	Authorized Swiss Representative address		Swiss rating Plate
	Type BF Applied Part, in which protection against electric shock does not rely on basic insulation only. Provides additional safety precautions such as double insulation or reinforced insulation, because there is no provision for protective earthing or reliance upon installation conditions.	EN/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" Symbol is in accordance with IEC 60417-5333	<ul style="list-style-type: none"> • Probe Connectors • Rating plate
	This symbol indicates that the device is a Medical Device.	190506_MDlabelling_Symbolsguidance_MDR	<ul style="list-style-type: none"> • Rating Plate • Upgrade label
	"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.	EN/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" Standard: ISO 7010-M002	Various
	System weight	N/A. Supplied by GE Healthcare	Various

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
	General Warning Sign Attention - Consult accompanying documents: alerts the user to refer to the user documentation when complete information cannot be provided on the label.	EN/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" Standard: ISO 7010-W001	Various
	Warning, dangerous voltage	EN/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" Standard: ISO 7010-W012	Various
	Direct current: for product to be powered from a DC supply		Rear panel
	Alternating current	EN/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" Symbol is in accordance with IEC 60417-5032	Rear panel
	Indicates that power is supplied to the system (through AC adapter or batteries)	ISO 7000 Ref. 1938	See the Console Overview section for location information.
	Type CF Defib-Proof Applied Part (heart in the box with paddle) symbol is in accordance with IEC 60878-02-06.	IEC 60417 - 5336	on ECG module near ECG patient cable connector
	"Protective Earth" indicates the protective earth (grounding) terminal.	IEC 60417 - 5019	Inside of AC adapter with system Console

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
	<p>"Equipotentiality" indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.</p> <p>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.</p>	EN/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" IEC 60417-5021	Console
	Pushing prohibited	N/IEC 60601-1: "Medical electrical equipment - Part 1: General requirements for basic safety and essential performance" Standard: ISO 7010-P017	Rating Plate, cart rear
	The system might tip over when placed on a slope steeper than 10 degrees.	N/A. Supplied by GE Healthcare	Rating Plate, cart rear
	Loading prohibited	IEC 60878: Graphical symbols for electrical equipment in medical practice Standard: ISO 7010-P012	Rating Plate, cart rear
	Warning, crushing hazard: hand	IEC 60878: Graphical symbols for electrical equipment in medical practice Standard: ISO 7010-W024	Rating Plate, cart rear
	Safety Conformance Certification by Nationally Recognized Testing Laboratory (NRTL)	TÜV Rheinland Test Mark	Rating Plate

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
	<p>WEEE Symbol This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately.</p>	<p>EN 50419: Marking of electrical and electronic equipment in accordance with Article 11(2) of Directive 2002/96/EC (WEEE)</p>	Rating Plate
	<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>Chinese RoHS 2 standard GB/T 26572</p>	Bottom
	<p>This device is delivered with Electronic Instructions for Use (eIFU). This electronic IFU can be downloaded from the Internet. A paper copy Instructions for Use can be ordered at no additional cost.</p>	<p>(EU) No 207/2012 ISO 7000 Ref. 3500</p>	<ul style="list-style-type: none"> • Rating plate (Figure 2-5) • Upgrade label
IPX0	<p>No protection against ingress of water (system)</p>	<p>IEC 60529</p>	
IPX7	<p>Protected against water immersion - Immersion for 30 minutes at a depth of 1 meter (ultrasound probes)</p>	<p>IEC 60529</p>	<p>Relevant transducer labels only</p>
IPX8	<p>Protected against continuous water immersion beyond a depth of 1 meter (ultrasound probes)</p>	<p>IEC 60529</p>	

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
	This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572	RoHS Label People's Republic of China Electronic Industry Standard SJ/T11364-2006	China Rating Plate
	<i>Requirements of concentration limits for certain restricted substances in electrical and electronic products.</i> 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".		
	GOST - R Mark	Russian Federation No. 184-FZ	(pending approval)
	EAC mark Eurasian Conformity mark	TP TC 020/2011	(pending approval)
	GEHC Logo	N/A. Supplied by GE Healthcare	Rating Plate Venue Go R4

Table 2-11: Label Icons

Label/Icon	Purpose/Meaning	Source (title & name of the standard)	Location
Assembled in X	<p>Purpose: identify the customs country of origin of the material (x is a country name).</p> <p>Note: When the Assembled in X statement is not shown on the label, this indicates that the customs country of origin is the same as the country of the legal manufacturer.</p>		<ul style="list-style-type: none"> • Rating Plate • Upgrade label
P/N	Part Number		Rear panel or e-Label
	Batch code. Indicates the manufacturer's batch code so that the batch or lot can be identified.	ISO 15223-1 Ref. 5.1.5 ISO 7000-2492	Upgrade label
	<p>Every system has a unique marking for identification, the Unique Device Identification (UDI) Label. The UDI label consists of a series of alpha-numeric characters and barcode which uniquely identify the Venue Go system as a medical device manufactured by General Electric. Scan or enter the UDI information into the patient health record as required by country-specific laws.</p>	Supplied by Health industry business communications council (HIBCC).	Rear panel and e-Label
	Do not put the battery in fire.	Supplied by GE Healthcare	Battery pack
	Do not disassemble or mistreat the battery.	Supplied by GE Healthcare	Battery pack
	<p>MR unsafe Symbol</p> <p>This symbol indicates that this device is MRI not compatible and should not be used in the Magnetic Resonance Environment.</p>	ASTM F2503 Clause 7.3.3	Universal label

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

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

The Venue Go does not contain any operator serviceable internal components. Ensure that unauthorized personnel do not tamper with the unit.

Perform regular preventive maintenance. See ‘User Maintenance’ on *page 10-1 for more information*.

Maintain a clean environment. Turn off the system and disconnect the power cord before cleaning the unit. See ‘User Maintenance’ on *page 10-1 for more information*.

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



Always use the system on a flat surface in the patient environment. Extend the rear stand for improved stability.

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 3 amp circuit breaker for 220-240 VAC or a 6 amp circuit breaker for 100-120 VAC
- 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 5 meters (15 feet) away from motors, typewriters, elevators, and other sources of strong electromagnetic radiation (non-medical grade UPS must be at least 2 meters (6 feet) away from console).
- 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.



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.



The Venue Go system and probe connector are not waterproof. Do not expose the device to water or any kind of liquid.

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.

Preparing the System for use

NOTE: *In case an overheating/fan speed alert appears ensure adequate system/room ventilation.*

Table 3-1: System Environmental Requirements

	Operational	Storage	Transport
Temperature	10° - 40°C	-20° - 60°C	-20° - 60°C
Humidity	30 - 85% non-condensing	10 - 70% non-condensing	10 - 70% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa



c **CAUTION**

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



c **CAUTION**

The Venue Go system, probe connectors and cart are not waterproof. Do not expose the devices to water or any kind of liquid.



c **CAUTION**

Never set liquids on or above the system or cart to ensure that liquid does not drip into the unit.

Operating Environment

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



c **CAUTION**

Do not cover the ventilation holes of the Venue Go.



c **CAUTION**

The system cannot be used in OXYGEN rich environment.

Operating altitude

Maximum operating altitude for use: 3000m

Probes

Probes should be operated, stored, or transported within the parameters outlined below.

Table 3-2: Probe Environmental Requirements

	Operational
Temperature	10° - 40°C
Humidity	30 - 85% (non-condensing)
Pressure	700 - 1060kPa

Acclimation Time

After being transported or stored, the system requires one hour for each 2.5 degree increment when its storage or transport temperature is below 10 Degree C or above 40 Degree C.

Table 3-3: System Acclimation Time Chart

Degree C	60	55	50	45	40	35	30	25	20	15	10
Degree F	140	131	122	113	104	95	86	77	68	59	50
hours	8	6	4	2	0	0	0	0	0	0	0
<hr/>											
Degree C	5	0	-5	-10	-15	-20	-25	-30	-35	-40	
Degree F	41	32	23	14	5	-4	-13	-22	-31	-40	
hours	2	4	6	8	10	12	14	16	18	20	

Console Overview

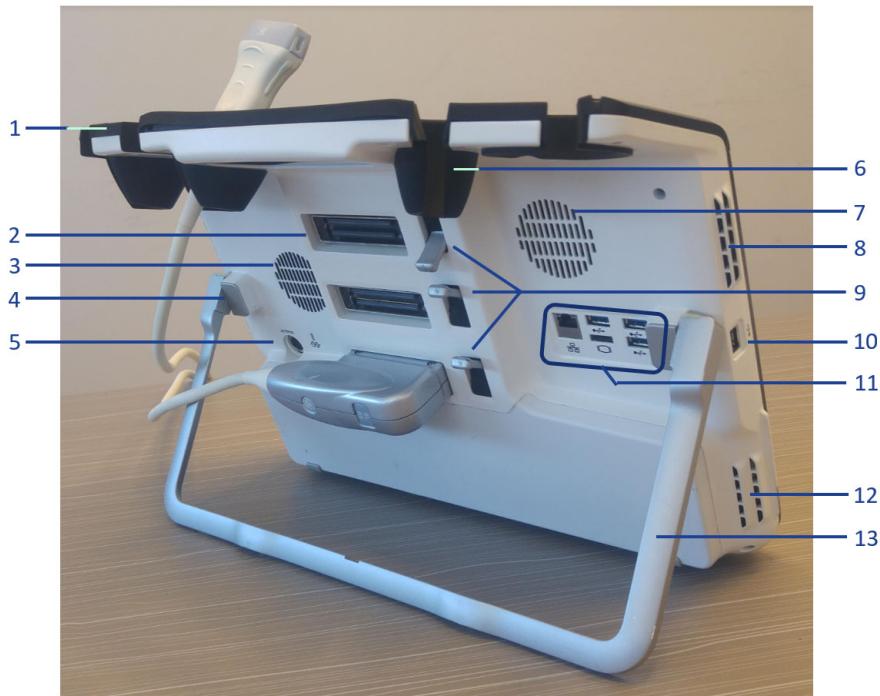
Main system parts

The following are illustrations of the system's main parts:



- | | |
|---|----------------------------------|
| 1. AC power and battery status indicators | 5. Ambient light sensor |
| 2. System identification light | 6. Touch display |
| 3. Removeable probe and gel holder | 7. Rear support adjustable hinge |
| 4. System's ON/OFF button | 8. Adjustable rear support stand |

Figure 3-1. Venue Go front view



1. Removeable probe and gel holder
2. Probe connectors
3. Ventilation inlet
4. Rear support adjustable hinge
5. Power receptacle for AC/DC adapter
6. Speaker
7. Gel bottle holder
8. Ventilation inlet
9. Probe locking handle
10. Left panel USB connector
11. System's I/O port (USB, Network, HDMI sockets)
12. Ventilation outlet
13. Adjustable rear support stand

Figure 3-2. Venue Go rear view

NOTE: *Graphics are for reference purposes only.*

System USB Ports



CAUTION

Peripheral devices that use their own AC power source, which are of non-medical grade, cannot be attached to the system.

USB ports on the Rear Panel

The three USB ports at the back of the system are type USB 3.0. They should only be used for the following devices:

- Flash drive
- Bus-powered USB Hard Disk Drives
- Service Key
- Bar-code reader
- Bus-powered USB DVD

NOTE: *When connecting an external printer to the Venue Go via the USB port on the back of the system, you MUST ensure that the power supplied to the printer is fed from the same power feed as the Venue Go. This assures compliance to leakage currents.*

External drives (USB Flash Drive, USB HDD, USB DVD)

USB Hard Disk, DVD and Flash Drives, which comply with the standards provided in peripherals in the patient environment ('Peripherals used in the patient environment' on page 2-21), may also be used for exporting exams, Save As, and Backup/Restore.

You can use these to perform software upgrades, image archiving, and service diagnostics.

You can use the following media for the multi-drive:

USB Drives are an ESD-sensitive device. Only use USB 2.0 or USB 3.0 Drives recommended by GE.

Storage areas

Storage areas are available and can be used to store gel, options, probe cables, accessories, etc.

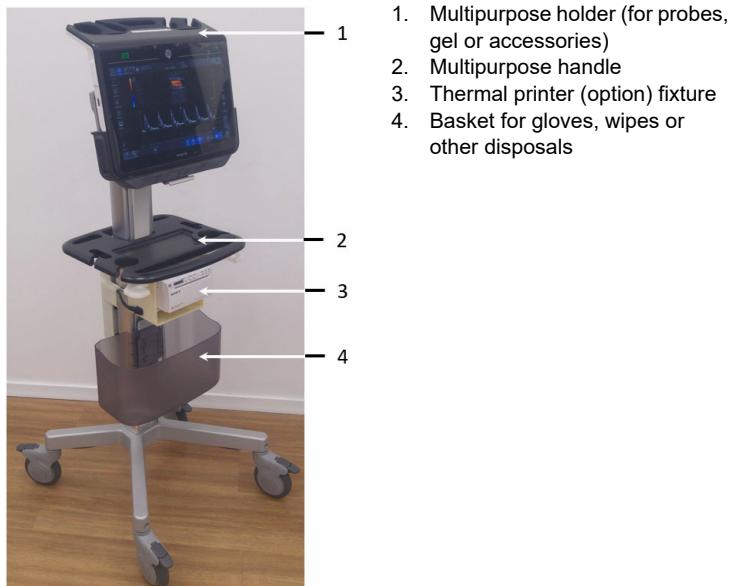


Figure 3-3. Storage Areas



Electrical
Hazard

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

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.

Speakers

Audio is provided by a speaker in the rear (Figure 3-2, item 6).

NOTE: *You may adjust the Doppler volume using a control in the scan parameters menu, while in Doppler scanning mode.*

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 Venue Go system. Lithium ion batteries last longer than conventional batteries and do not require replacement as often. You can expect up to 120 minutes of scanning time with a new, fully charged battery in use to supply power to the system.

NOTE: *While scanning only with the battery supplying power, the battery life may be shorter. Always archive the data and keep your attention on the battery status. When the battery charge level is low, plug the AC power adapter immediately to prevent scanning interruption and data loss that might occur if the system goes into automatic shutdown.*

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.



WARNING

To ensure the battery remains fully charged:

DO NOT disconnect the system power cord or AC adapter from the AC outlet, except for maintenance or during a portable exam.

W **WARNING**

- The battery has a safety device. Do not disassemble or alter the battery.
- Charge and discharge the batteries only when the ambient temperature is between 3°C and 40°C (37°F and 104°F).
- 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 expose the battery to temperature over 50°C (122°F). Keep it away from fire and other heat sources.
- 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.

W **WARNING**

If the Venue Go is not being used on a monthly basis, the battery needs to be removed during the lengthy non-use period.

C **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.

Short term (less than one month) storage of battery pack: Store the battery in a temperature range between -5°C (23°F) and 50°C (122°F).



CAUTION

Long-term (3 months or more) storage of battery pack: Store the battery in a temperature range between -5°C (23°F) and 50°C (122°F)

- Upon receipt of the Venue Go and before first time usage, it is highly recommended that the customer performs 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 Venue Go automatically shut down.
2. Charge the Venue Go to 100% FCC (full current capacity).
3. Discharge of Venue Go for complete shut down

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

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 Venue Go in until the battery is fully charged as indicated by a green screen indicator.*



Explosion Hazard

Use only GE supplied batteries. Replace the battery with the same battery type only. Failure to follow these instructions may present risk of explosion, fire, or high temperature.

Rechargeable battery safe use

Follow below instruction to ensure safe use and adequate maintenance of rechargeable battery.

- Regularly check the appearance of the cell to see if there is no abnormal deformation (bulge) etc.
- Check the battery interface to see if there is no foreign body and deformation.
- Regularly charge the battery if the system is not in use.

View current battery status

When the system is on standby or running, there is a battery charge level indicator on the upper-left corner of the display. When the system is operating, the battery status display, on the upper-right corner of the display, indicates the operational time remaining in hours and minutes. It also shows a progress bar indicating the relative amount of remaining charge, and a background color which depends on the remaining scanning time.



1. AC mains power indicator
2. Battery status indicator
3. System identification and power status stripe indicator
4. Battery charge level and remaining scan time status indicator
5. System's ON/OFF button

Figure 3-4. Battery status

NOTE: If the AC power cable is plugged-in, the AC mains power indicator (Figure 3-4 item 1) is lit green

Remaining battery capacity indicator

The color and number of segments of the battery status display (Figure 3-4 item 2) indicate remaining battery capacity, as shown in the following table.

The stripe indicator (Figure 3-4, item 3) flashes red when the remaining battery capacity is below 10%.

Table 3-4: Remaining battery capacity indicator

Segment number and color	Symbol	Remaining battery capacity level
6 green		85% - 100%

Table 3-4: Remaining battery capacity indicator

Segment number and color	Symbol	Remaining battery capacity level
5 green		68% - 84%
4 green		51% - 67%
3 orange		33% - 50%
2 orange		16% - 32%
1 red		0% - 15%
Empty, Solid light		Battery is totally drained, while AC is disconnected.
Empty, Flashing light		Failure of battery communication, charging circuit hardware, or other related circuitry.
Diagonal red line		Battery power switch is OFF
Dark	(No symbol at all)	Battery removed

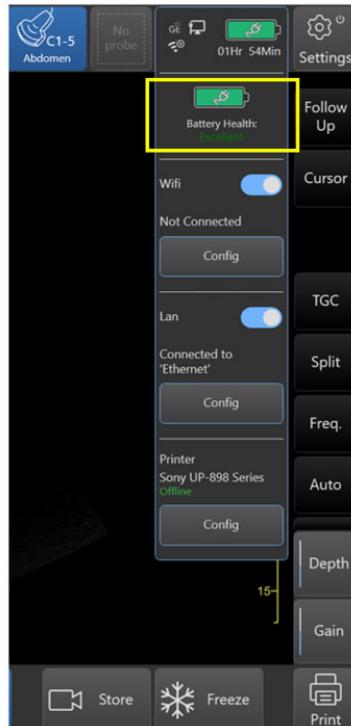
NOTE: A new battery at 100% capacity provides about 2 hours of continuous scanning. An older, fully-charged battery may provide a shorter scanning time.

When using battery and less than 2 minutes remain, the system will initiate an "End Exam" phase, if required, to archive the current exam, and then turn off.

Battery Health Indicator

The system displays battery health indication according to a new battery's capacity (Design Capacity).

Tap the battery button to expand it.



- When battery capacity is between 100% and 70% of Design Capacity, Battery Health is: **Excellent** (in green font)
- When battery capacity is between 69% and 40% of Design Capacity, Battery Health is: **Good** (in yellow font).
- When battery capacity is below 40% of Design Capacity, Battery Health is: **Replace Battery** (in red font).



CAUTION

The following messages reappear every 2 minutes once battery health drops:

- < 40%: *Charging will be disabled soon. Please contact service for battery replacement.*
- < 30%: *Charging is disabled. Please contact service for battery replacement immediately.*

Battery Replacement

The following instructions describe how to replace the rechargeable battery on your Venue Go system.

1. Shut the system down and disconnect the AC/DC power cord.
2. Place the system facing down on a flat horizontal surface covered by a blanket or any thick soft cloth.
3. Lift the flap and turn the battery switch OFF (Figure 3-5, item 1).
4. Remove the probe from the lower probe connector (Figure 3-5, item 2).
5. Lift the rear support backwards as shown in Figure 3-5, item 5.
6. Slide the battery cover latch to the left (Figure 3-5, item 3), and lift up the battery cover.



1. Battery switch, covered by flap
2. Lower probe connector
3. Battery cover latch
4. Battery cover
5. Rear support folded up

Figure 3-5. Preparing Venue Go for battery replacement

NOTE: *Graphics are for reference purposes only.*

7. Grasp the flexible flap on the left side (attached to the battery) and pull the battery up (Figure 3-6).



Figure 3-6. Replacing a battery

8. Remove the second battery in the same way (Figure 3-7).



Figure 3-7. Removing the second battery

9. Place the new batteries with labels facing down (Figure 3-6).
10. Close the battery cover.
11. Turn the battery switch back ON (Figure 3-5, item 1).

The system is now ready to be used.

AC/DC Adapter



c 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 Venue Go. Do not cover the AC adapter with paper, blanket 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 Rear Panel

Venue Go peripherals and accessories can be properly connected using the rear panel of the system.



c CAUTION

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

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



c CAUTION

When connecting external peripherals on USB port or HDMI connector or the external peripheral and external monitor shall be powered through a medical grade isolation transformer if it requires external AC power source. Please contact GE Service Representative for installation of medical grade isolation transformer.



w 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.



When using a peripheral device, observe all warnings and cautions given in Peripheral manufacture's manuals.



Peripheral devices that use their own AC power source cannot be attached to the system.



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.

NOTE: *Venue Go was tested with the following accessories/cables:*

- Power cord
- Potential equalization grounding
- External monitor and HDMI cable
- LAN cable
- USB ports with memory stick, bus-powered DVD, and service dongle
- All approved Ultrasound Probes - Only one Probe can be activated at a time.

Rear connection panel provides:



1. DC power connector
2. Three probe connectors
3. Network connector
4. HDMI video connector
5. Three USB connectors

Figure 3-8. Rear connector panel

AC/DC Adapter Connection

Use the AC/DC adapter designated for Venue Go, which is shown in Figure 3-9. A magnified picture of the AC/DC adapter label appears on Figure 2-7.



Figure 3-9. Venue Go AC/DC adapter

There is an AC/DC adapter like the one shown on Figure 3-9, which is mounted on the cart.

NOTE: *The AC/DC adapter is located inside the AC adapter box (Figure 3-22, item 7).*

A DC cable arrives from the AC adapter, and is located close to the system, ready for insertion.

Insert the circular connector (3) of the cable arriving from the AC/DC adapter into the power receptacle (1), as shown in Figure 3-10.

Be sure to hold the circular connector with the indented notch facing upwards (2), as shown.



1. Power socket for AC/DC adapter cable
2. Circular connector with indented notch on top
3. Connector from AC/DC adapter cable
4. AC/DC adapter connector is inserted into receptacle

Figure 3-10. AC/DC connector insertion

Peripherals Connection

1. Insert the USB memory device into the USB Socket on rear of the system. It is recommended to use a USB 3.0 device for high-speed communication.
2. Connect the external monitor to the HDMI port of the console.
3. Connect the peripherals to any USB port the system including printer, USB memory stick, DVD, and barcode reader.

NOTE: *If connecting the printer, please also connect the printer's power cord and then power on the printer.*

ECG Connection

The ECG option can be attached to the system by the user.

1. Connect the ECG USB cable to any USB connector on the rear panel (Figure 3-11).
2. Connect the round ECG connector to the ECG module.
3. Connect the three electrodes to the patient's body ('ECG cable' on page 5-51).



Use only approved, defibrillation-proof ECG electrodes patient cables ('ECG cable' on page 5-51).



Figure 3-11. ECG cable connector

Wireless WiFi LAN Device

The Venue Go system includes built-in WiFi LAN support. The WiFi device is an option which can be enabled by insertion of a unique option-key.

NOTE: *The Venue Go system supports: WLAN, WPA/WPA2 LEAP/PEAP, FIPS-2 WiFi protocols, WPA- Enterprise and WPA2 Enterprise.*

Set Up Barcode Scanner

The following barcode readers are supported by Venue Go (Figure 3-12 and Figure 3-13).



Figure 3-12. Zebra Barcode scanner Model 5932297



Figure 3-13. JADAK Barcode scanner model JDK-2528

The barcode scanner needs to be set up before the first use.

To set up the barcode scanner, follow the steps below:

1. Power on the system. Connect barcode scanner to the system. The Barcode Reader can be properly connected using any of the USB ports.
2. Scan the three barcodes shown below (Figure 3-14).

First scan the Remove Custom Defaults barcode (1), then scan the Activate Defaults barcode (2). This is to reset the scanner to the factory default settings. Finally, scan the USB Serial barcode (3). The Barcode scanner is ready for use.



— 1

DEFOVR.

Remove Custom Defaults



— 2

DEFALT.

Activate Defaults

Figure 3-14. Barcode

NOTE: Only the printed barcodes on the paper can be scanned. If you do not have the printed version, be sure to print them to the paper first and scan them on the paper.

External Monitor

Adding an External Monitor

You can set up an External Monitor to view the contents of the system's display.



DO NOT use the External Monitor for diagnostic purposes.

To set up the external monitor,

1. Connect the External Monitor's HDMI cable to the rear panel HDMI socket.



Although there is an isolated power supply, **DO NOT** place an External Monitor inside the patient environment. Refer to the External Monitor's manual for details.

Peripheral devices that use their own AC power source CANNOT be attached to the Venue Go.

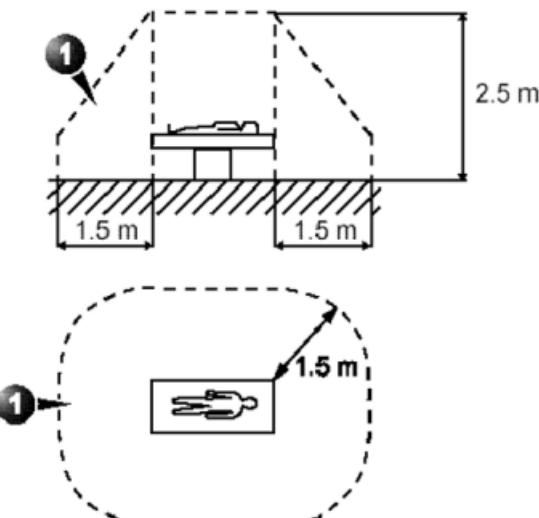


Figure 3-15. Patient Environment

2. Plug in the External Monitor's power cable. You should now be able to see the image on the External Monitor.

NOTE: *Any display connected to the HDMI output is intended to serve as a clone of the image on the main display. In the event that a display connected to HDMI video output is not capable of displaying the resolution being used by the main display, then the auxiliary display will be blank or show a "no-signal" message.*

Adjusting the image brightness on the External Monitor

1. Tap **Settings > LCD**.
2. Tap **External Monitor**.
3. Display the test pattern image on display.
4. View it on the external display.
5. Adjust contrast/brightness on the Venue Go's panel to optimize the image on the external display.
6. Display any scanning image on display. View it on the external display.

Disposable monitor cover

In order to protect the screen and your hands from contamination, you may use the ClingTouch™ Sterile Disposable Monitor Cover, as follows:

1. Unfold the disposable cover.
2. Peel off the tape to expose the sticky strip on the cover.

Preparing the System for use

3. Place the cover so that the sticky strip clings to the upper frame of the monitor.

The system is now ready for use.

NOTE: *The cover is intended for single use. Do not reuse.*

NOTE: *Be sure to check the expiration date before using the cover.*



Figure 3-16. Label for disposable monitor cover

NOTE: *Graphics are for reference purposes only.*

Attaching the Security Cable

To ensure that the Venue Go is not removed from the premises, attach the security cable (Figure 3-17).



Figure 3-17. A typical security cable

1. Wrap the cable around an immovable object.
2. Rotate the key to the unlocked position (clockwise).
3. Insert the lock into the security slot located at the system's rear cover.
4. Rotate the key to the locked position (counterclockwise).

System Positioning/Transporting

Using the carts

The carts are used to move the system and position it conveniently at the location of the exam. The carts include a cradle which allows a quick mount or dismount of the system.

The carts contain an AC adapter which can supply power to the system.

Mounting the Venue Go on a cart

To mount the system on a cart:

1. Lower the cart ('Cart adjustment' on page 3-30).
2. Lock the cart's wheels ('Wheels' on page 3-34).
3. Adjust the cradle (Figure 3-22 item 2) to be vertical.
4. Hold the Venue Go by the handle with one hand and lift it up.
5. Retract the adjustable rear support stand (Figure 3-2 item 13) to be close and parallel to the system's body.
6. Use your other hand to support the system from the bottom.
7. Gently slide the system into the cradle (Figure 3-18). Make sure the system slides along the vertical groove in the cradle's frame.



Figure 3-18. Sliding the system into the cradle

8. Remove your hand from the bottom frame and slide the system down until the latch locks the system into place (Figure 3-19).



1. Cart cradle frame
2. Venue Go bottom frame
3. Locking latch on the cradle

Figure 3-19. System is locked into the cradle

9. Connect the DC power cable on the rear. ('Connecting the System to AC power' on page 3-41).

NOTE: *Probes and other cables may remain connected to the system while placing it in the cradle, however you may find it easier to mount the system when the cables are disconnected and removed out of the way.*



When sliding the system into the Cart's cradle (Figure 3-22 item 2) be careful to avoid pinching your fingers between the frame of the cradle and the body of the system.



Verify that the system is firmly fixed to the cart so it doesn't fall down.

Releasing the Venue Go from the Cart

Before removing a powered-on Venue Go, check the battery availability and charge, as the system switches over to battery operation when released from the cart.

1. Pull the DC power plug out from the Venue Go's rear panel.
2. Grasp the latch at the bottom of the cradle and pull it towards you (Figure 3-20).
3. Hold the system by its handle and lift the system out of the cradle.



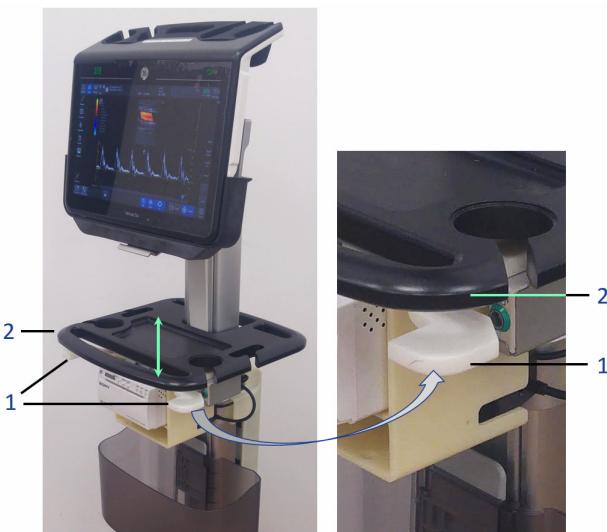
Figure 3-20. Pulling the latch

Cart adjustment

To adjust the cart's height:

1. Press the height adjustment handle (1) using one or both hands.
2. Lift or lower the cart's front handle (2) using both hands.
3. Release the height adjustment handle (1).

Height adjustment is locked in place, and the system is ready for use.



1. Height adjustment handle - both sides
2. Cart front handle

Figure 3-21. Adjusting the Standard or Demo cart's height



Be sure to lock the wheels before adjusting the cart's height.



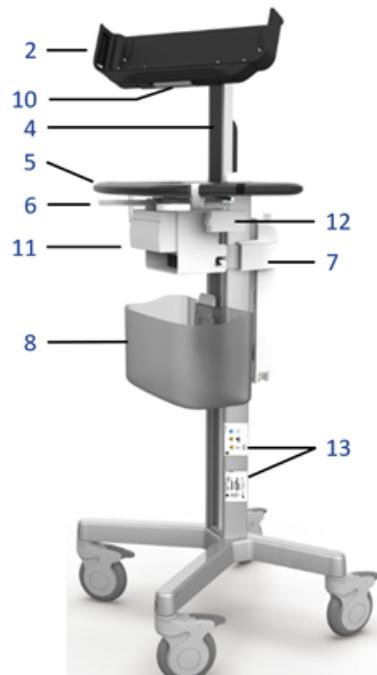
When the cart's handles are used for power cable management, the sudden raising of the cart to a higher position may cause the AC plug to break.



When adjusting the cart while scanning, the power cord and wheels may become entangled, which may result in cable damage.



Damage to the probe cable may result if the brake pedal catches the cable and pulls it tightly against the base leg. This puts stress on the probe and connector while the probe is in the probe holder.



- | | |
|---|--------------------------------------|
| 1. Venue Go system | 8. Accessories basket |
| 2. Cart cradle | 9. AC cable connector to cart |
| 3. Vertical/horizontal tilt adjustment | 10. Cradle system latch |
| 4. Up/down adjustment column | 11. Printer bay with mounted printer |
| 5. Multipurpose front and rear handles | 12. ECG module |
| 6. Height adjustment handle | 13. Cart Labels |
| 7. AC cable hook and AC adapter box cover | |

Figure 3-22. Standard cart components

Moving the System with the cart

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

1. Unplug the system's power cord (if plugged in).

NOTE: *You may optionally press the Power On/Off switch at any time, to power off the system. This will conserve battery charge when a long period of portability is anticipated.*

LOOSELY (not twisting tightly), hang the Power Cord around the AC cable hook on the AC adapter box on the rear of the cart (Figure 3-22, item 7).



NEVER allow the Power Cord to drag on the floor.

NEVER roll over the Power Cord with the wheels.

2. All cables from off-board peripheral devices (external Color Digital/Report printer, etc.) and the ethernet connection must be disconnected from the console.
3. Ensure that no loose items are left on the system or cart.
4. Ensure that probe cables are out of the way from the wheels and not protruding beyond the cart. Use the probe management hooks located below the Operator Panel to further secure the probe cables.
5. Adjust the system to its lowest position by using the up/down release under the handles on the front of the cart.

When moving the system



To avoid possible injury and equipment damage:

- Always use the front or rear handles to move the system.
- Do not let the system strike walls or door frames.
- Limit movement to a slow careful walk.
- Use extra care when crossing door or elevator thresholds.

NOTE: *When moving the system, be sure the path is clear. Limit movement to a slow careful walk.*

NOTE: Utilize additional care and personnel when moving on a steep incline (>5 degrees).

Cable management



W **WARNING**

To avoid the cables catching on external devices, please ensure the power cord and probe cables are wrapped properly, not extended beyond sides of console.

- Place probes securely in proper probe holders.

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 with the cart' on page 3-32 for more information), also perform the following:

1. Before transporting, place the system and probes in their special storage case.
2. Secure the cart with straps or as directed otherwise to prevent motion during transport.
3. Ensure that the cart and system are firmly secured while inside the vehicle.
4. Load and unload the system to a vehicle parked on a level surface.



C **CAUTION**

This equipment must not be used during transportation (e.g., ambulance cars, aircraft).

Wheels



1. Wheel is free 2. Wheel is locked

Figure 3-23. Venue Go wheels

- Step on the outer pedal (Figure 3-23, item 1) to brake the wheel.
- Step on the inner pedal (Figure 3-23, item 2) to release the wheel brake.

NOTE: *Examine the wheels frequently for any obvious defects that could cause them to break or bind.*



If you use/park the system on a slippery slope, you MUST set the brake on each wheel.

Reinstalling at a new location

1. When the cart is in place at a new location, lock the wheel brakes.
2. Power up the system as explained in the following section.

The Demo Cart



Figure 3-24. Demo cart

In some countries, upon a special order, it is possible to obtain a special Demo cart which can be dismantled into two parts: The wheel-base and the main column (Figure 3-25).

When the cart is dismantled it takes up less volume, allowing to transport it in a smaller passenger car.



Figure 3-25. The wheel-base and the main column

A Demo cart contains two latches near the wheelbase (Figure 3-26).



Figure 3-26. The latches on the cart's wheelbase

Dismantling the cart

1. Remove the basket by pressing the latch above the basket it and lifting it up until it comes out (Figure 3-27).



Figure 3-27. Removing the basket

2. Lower the cart by pushing it down to its minimal height.
3. Insert a locking pin at the rear (Figure 3-28, A). Make sure it is inserted all the way (Figure 3-28, B).



A

B

Figure 3-28. Locking pin

4. Push down the latches located on either side of the main column, to disengage them (Figure 3-29, B).



A: Latch engaged

B: Latch disengaged

Figure 3-29. Wheelbase latch positions

5. Lift up the main column from the wheelbase. They are now two separate assemblies (Figure 3-25).

Assembling the cart

1. Place the wheelbase frame so that the long wheel bar is facing towards you.
2. Hold the main column with its front side facing towards you.
3. Place the column into the matching groove at the center of the wheelbase.
4. Lift up the latches on either side of the column (Figure 3-30).



A

B

Figure 3-30. Latch locking the hook

5. Verify that the latch is locking the hook (Figure 3-30, B).
6. Pull out the Locking pin (Figure 3-28) by pressing the blue button and pulling it out.
7. Assemble the basket by pushing it down till the latch locks the basket in place.

Wall mount installation

Venue Go may be mounted on to a wall mount, with the use of a VESA (Video Electronics Standard Association) interface.

Figure 3-31 shows an example of a typical wall mount accessory, to be provided by the customer.

The wall mount is provided by the customer. It must contain a VESA mount interface with a 75 x 75 mm hole mount pattern. The wall mount must be able to carry a weight of 10 Kg or more.

A system cradle can be supplied by GE as an accessory. The cradle is permanently mounted to a wall-mount by the user, fastened to the VESA 75 x 75 interface by four screws.



Figure 3-31. A typical wall mount

Mounting the Venue Go on a Wall Mount

The Venue Go system is placed in and secured to the cradle.

To mount the Venue Go system to the cradle:

1. Hold the system vertically and slide it into the cradle.
2. Slide the system down until it stops and clicks into place, indicating that the retaining hooks are holding the system in place.
3. Hook up the AC/DC power adapter's power connector.



Verify that the system is firmly fixed to the Cradle so it doesn't fall down.

Releasing the Venue Go from the Wall Mount

1. Lower the cart ('Cart adjustment' on page 3-30).
2. Lock the cart's wheels ('Wheels' on page 3-34).
3. Adjust the cradle (Figure 3-22, item 2) to be vertical.
4. Pull the DC power connector out from the Venue Go's rear panel.
5. Grasp the handle at the bottom of the cradle and squeeze it towards you.
6. Lift the system off the cradle.

Powering the System

Turn the system ON by pressing on the ON/OFF button (Figure 3-32, item 5) for about a second. Using power provided by the internal battery, the system may be powered and used without connecting it to an AC source.



1. AC mains power indicator
2. Battery status indicator
3. System identification and power status stripe indicator
4. Battery charge level and scan time status indicator
5. System's ON/OFF button

Figure 3-32. Power and battery status

Connecting the System to AC power

To connect the system to the electrical supply use the AC adapter (Figure 3-9):

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 AC adapter mains plug to the AC wall outlet.
4. Attach the AC adapter system cable to the rear of the system (Figure 3-10).

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

The power indicator (Figure 3-32, item 1) turns ON as soon as power reaches the system.



c 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 Venue Go. 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.



c CAUTION

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



c CAUTION

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

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



w 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 3-2 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.



c CAUTION

To avoid leakage current above safety limits as prescribed by IEC 60601-1 and to ensure continuity of protective earth, DO NOT connect Venue Go and mains-operated accessories to a single or multiple socket extension cord, power strip, or an adapter plug.

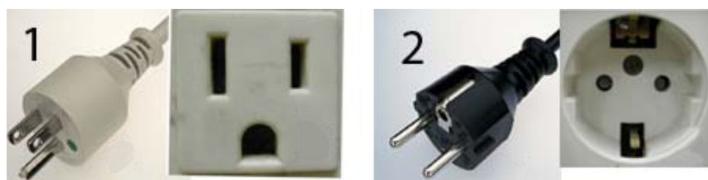


Figure 3-33. Example Plug and Outlet Configurations

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

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

Power ON

When the **Power ON/OFF** switch on top of the system (Figure 3-1, item 4) is illuminated orange the system can be turned ON.

NOTE: *In case the Power ON/OFF switch is not illuminated the battery may be totally drained. Make sure the AC/DC connector is inserted properly on the rear panel (Figure 3-10) and the adaptor plug is connected to an AC outlet.*

1. Tap the **Power ON/OFF** switch momentarily.
Venue Go goes through its boot-up process, and the **Power ON/OFF** switch turns green.

Power Up Sequence

The system is initialized. During this time:

- The system boots up and the status is reflected on the display.
- Probes are initialized for immediate operation.

NOTE: *If Probe Check is ON by default, the system runs the Probe Check sequence on the selected probe ('Probe check' on page 3-55).*

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).

Password Protection

Login

Personal IDs and associated passwords can be preset on the Venue Go, or the lock screen may be configured to be the default start up screen.

If the User Auto Logon preset is blank, you are prompted to login by entering Operator and password. You can also log in using a physical RFID element (i.e., Badge). When the RFID option is enabled, the lock screen displays an indication to tap a badge to log in (Figure 3-34, item 4).



Figure 3-34. Operator Login Window

1. **Operator:** Select the Operator.
2. **Password:** Enter Operator's password (optional).
3. Select type of Logon, Emergency or Cancel.

NOTE: *Emergency logon allows you to store an exam but not save it into the Archive.*

4. To log in with a badge (Tap in), touch the RFID scanner with the badge/chip.

NOTE: *If there is an issue logging in with a RFID, enter your Operator and Password to login.*

If the system screen locked during an active exam due to inactivity, and the logged in user taps in or enters Operator and password, the screen unlocks.

NOTE: While in the lock screen, the system also allows for changing the system operator. When a different user logs in (with a badge or by entering Operator and password), the system prompts whether to end the current exam or continue. Tap **End the current exam**.

Multifactor login and Grace period

Venue Go supports a safety mechanism called multifactor login for ensuring that the “Tapped in” user is the actual user. If the server supports Multifactor login, the user must enter the operator/password and a badge login.

A “Grace Period” (amount of time during which the multifactor authentication is valid) may be added to the multifactor login. During the grace period, next time the user does not have to use the multifactor login and may use the tap in tap out method. When the grace period expires, the user is requested to provide multifactor authentication details to log in.

Whether Venue Go requires a multifactor login or a multifactor login with grace period is determined via the authentication server and is not part of the system configuration.

NOTE: *Emergency mode is available in all scenarios where the screen is locked.*

Logoff

To logoff, tap **Patient** on the top left of the screen and then tap **Logout** at the bottom of the patient screen. When the RFID option is enabled, tap out by touching the RFID scanner with your badge a second time. Venue Go prompts you if you wish to log-out.

NOTE: *A second tap from a different user (When a user is already logged in) is ignored.*

Power OFF

To power OFF the system:

1. Press and hold briefly the Power ON/OFF switch on top of the system.
The System Exit window appears.
2. Select **Standby** during daily usage.
3. Select **Full Shutdown** for long term shut off.

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.*

It is recommended to leave AC power cord connected to the power outlet, to maintain a fully re-charged battery.

Power OFF - Alternative method

The system can be also powered OFF using the following alternative method:

1. Tap **Settings**.
2. Tap the **Power** button that appeared below **Settings**.



Figure 3-35. Power OFF via Settings

The System Exit window appears.

3. Tap **Standby** or **Shutdown**.

Crash recovery instructions

In case the system fails to respond to your commands within a typical time duration, reset the system manually as follows:

1. Hold down the power switch for about 5 seconds.
A normal power down sequence begins.
2. Wait until the system shuts down completely and the power switch is OFF.
3. Restart the system using the standard power-up sequence ('Power ON' on page 3-43).
All images and measurements, except for generic worksheets, are preserved in the system.
When the system is fully powered up, an alert appears, indicating that the previous exam is incomplete.
4. Respond to the prompt to continue the previous exam.
5. Check that all images and measurements have been preserved in the system.
If you do not have any images on the clipboard, the patient must be retrieved from the database.
6. Resume the exam.

Adjusting the system's position on the cart

Rotate, tilt, raise and lower the system on a cart

When the system is mounted on a cart, its position can be adjusted for easy viewing and for touch screen ease of operation.

- The system can be rotated left/right around the cart's central pivot point.
- The system can be tilted forward/backward for the optimum viewing angle.
- The system can be raised or lowered for the best viewing height.

See 'Cart adjustment' on *page 3-30* for detailed instructions.



CAUTION

Damage to the probe cable may result if the brake pedal catches the cable and pulls it tightly against the base leg. This puts stress on the probe and connector while the probe in the probe holder.

Adjusting the monitor's Brightness

Adjusting the LCD monitor's brightness is one of the most important factors for proper image quality.

To adjust the brightness:

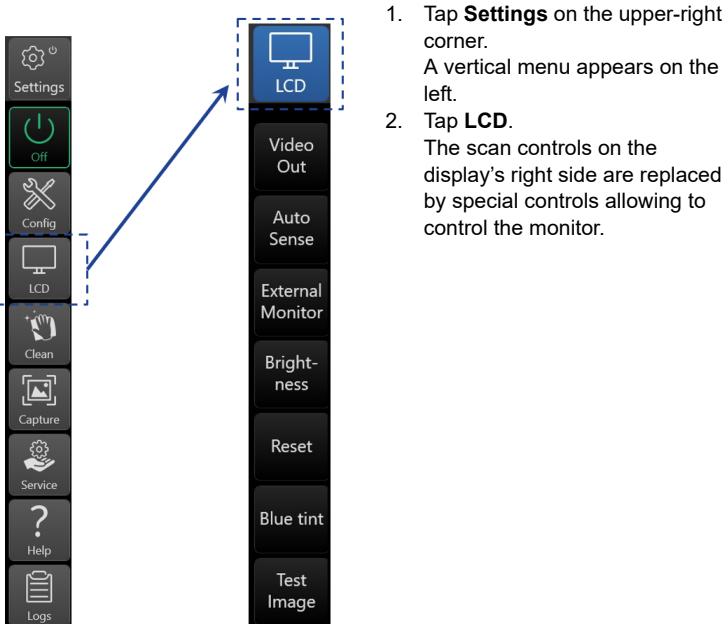


Figure 3-36. Adjusting the display

Coarse brightness adjustment

1. Tap **Settings**, then tap **LCD** as explained above.
2. Tap **Test image**.
3. Tap **Brightness** and move the slider as required, until all gray shades are visible without loss or saturation of gray shades.

Fine brightness adjustment

As ambient light changes from time to time you may wish to do some fine adjustment of the brightness.

1. Scan and freeze an image.
2. Tap **Settings**, then **LCD** as explained above.
3. Tap **Brightness** and move the slider as required.

Setting Automatic Brightness (Auto Sense) adjustment

Repeat the above instructions and tap **Auto Sense**. The Automatic screen brightness adjust feature is activated. Auto Sense attempts to maintain a well-adjusted screen under all ambient light conditions by using a special built-in light-sensor. If the brightness control is re-adjusted the Automatic Brightness feature is turned off.

Setting Blue Tint

1. Repeat the above instructions and tap **Blue Tint**.
2. Adjust the amount of blue tint which is added to the B, MM, PW or CW imaging modes.

Adjusting the external monitor

Connect the system to an external HDMI display ('External Monitor' on page 3-24).

Repeat the above instructions and tap **External Monitor**. It allows you to optimize Contrast / Brightness and blue-tint to suit the particular external display.

When the button is de-activated, the previous settings that were optimized for the internal display will be restored.

Using Test image

When adjusting an external display or any peripheral hard-copy device, you may turn this function ON to generate a screen-calibration pattern to assist in exact calibration.

Cleaning the touch panel display

To allow cleaning of the touch panel display without affecting the system operation, tap **Settings**, then tap **Clean**.

The screen turns black (Figure 10-2), allowing you to clean the panel. Swipe the arrow right to return to normal operation.

Probes

Introduction

Only use approved probes (See ‘Probes and Biopsy’ on page 9-1 for more information.)

All approved imaging probes can be connected into any of the Venue Go’s probe ports, in any order.

Connecting the Probe

There are 3 probe connectors on the rear panel of the system (Figure 3-37).

Each connector is comprised of a probe-socket (2) and a locking latch (1).

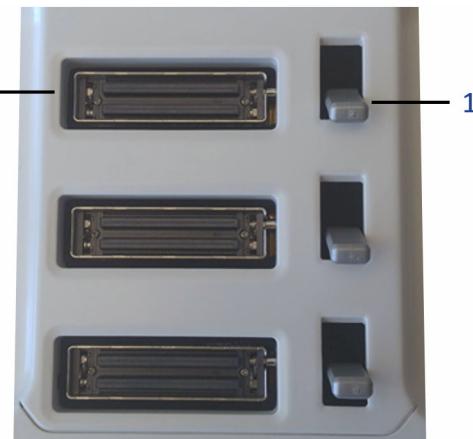


Figure 3-37. Three probe connectors on the rear panel

Probes can be connected whether the console is powered ON or OFF.



Figure 3-38. Three probe connected to the rear panel

Preparing to use the 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.
3. Put the probe in the probe holder.

To connect a probe to the system

1. Hold the probe connector horizontally with the cable pointing to the left (as shown).
2. Prior to inserting the probe, ensure that the connector locking handle is positioned downwards.
3. Align the connector with the probe port and carefully push into place.
4. Push the connector locking handle upwards to secure the probe connector.
5. Carefully position the probe cord so it is free to move and is not resting on the floor.



CAUTION

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

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.

Cable Handling

Take the following precautions with probe cables:

- Keep free from the cart's wheels. Use the cable hooks located below the operator shelf.
- Do not bend the cable acutely
- Avoid crossing cables between probes.

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 preset for the examination.
- Begin the scan session using the default Power Output setting for the probe and exam.

Probes and presets may be selected either from the Main Scanning or Patient screens ('Selecting the probe and preset' on page 4-15).

Activating the Probe

To activate the probe, select the appropriate probe and preset from the probe selection screen ('Selecting the probe and preset' on page 4-15).

The probe's default settings for the mode and selected exam are used automatically.



CAUTION

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

Disconnecting the Probe

Probes can be disconnected at any time. However, the probe should not be active when disconnecting it.

1. Push the probe latch downward to unlock it (Figure 3-39):
2. Pull the probe connector straight out of the probe port carefully.



Figure 3-39. Unlocking probe latches



CAUTION

DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage. Use the integrated cable management hook to wrap the cord.

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

Transporting Probes

Secure the probe in its holder for moving short distances.

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 or in the wall rack designed for probe storage.

1. Place the probe connector into the carrying case.
2. Carefully wind the cable into the carrying case.
3. Carefully place the probe head into the carrying case. DO NOT use excessive force or impact the probe head.

Probe check

Overview

Probe check is a diagnostic tool that indicates whether the probe is damaged.

The probe is tested via transmission and reception tests on each probe channel and by evaluating probe elements and image quality metrics.

Probe check requires that the probe lens surface is clean (free of dirt, water or gel). The tool does not require any other special protocol or additional equipment.

Using Probe check

Tap the desired probe and preset and the automatic test runs.

If the system is not configured to automatically run Probe check, or if you wish to run Probe check manually, tap **Probe check** at the bottom of the probe preset list.

Regardless of the method (automatic or manual) in which activated, a message appears indicating that the system is running a 2-10 second probe assessment on the selected probe.

Tap **Confirm** to run Probe check or tap **Cancel** to decline.

After 2-10 seconds, a message indicating whether the probe passed or failed Probe check appears.

The probe's pass status appears in the status bar.

If the probe failed Probe check, a message appears, recommending the following actions:

- Clean probe surface and retest.
- Call service.
- Select **Continue** and evaluate the image quality manually.

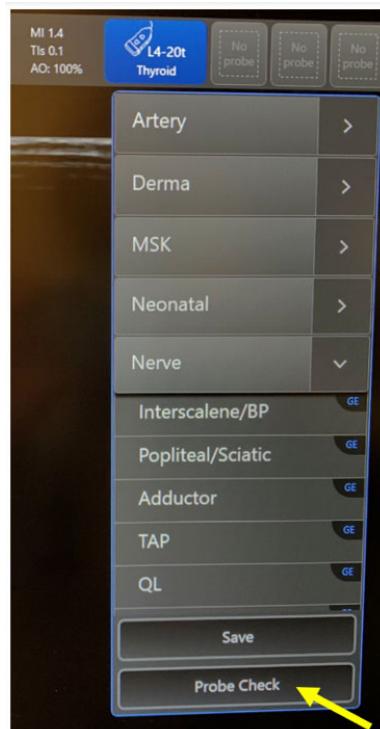


Figure 3-40. Selecting probe check manually

Operator Controls

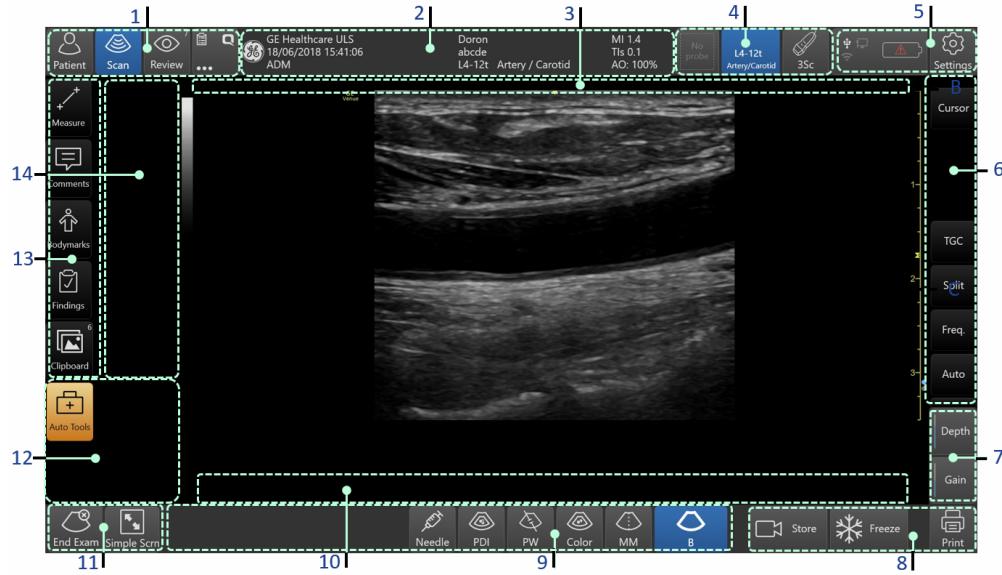
Touch display

You interact with Venue Go using your fingers to tap, double-tap, swipe, and pinch objects on the touch display. Multi-touch with fingers is supported by Venue Go.

Display layout

The system supports two display layouts. The standard, default layout is shown on Figure 3-41. The Full-screen layout is shown on Figure 3-42.

The standard display layout is divided into several main zones, as shown below.



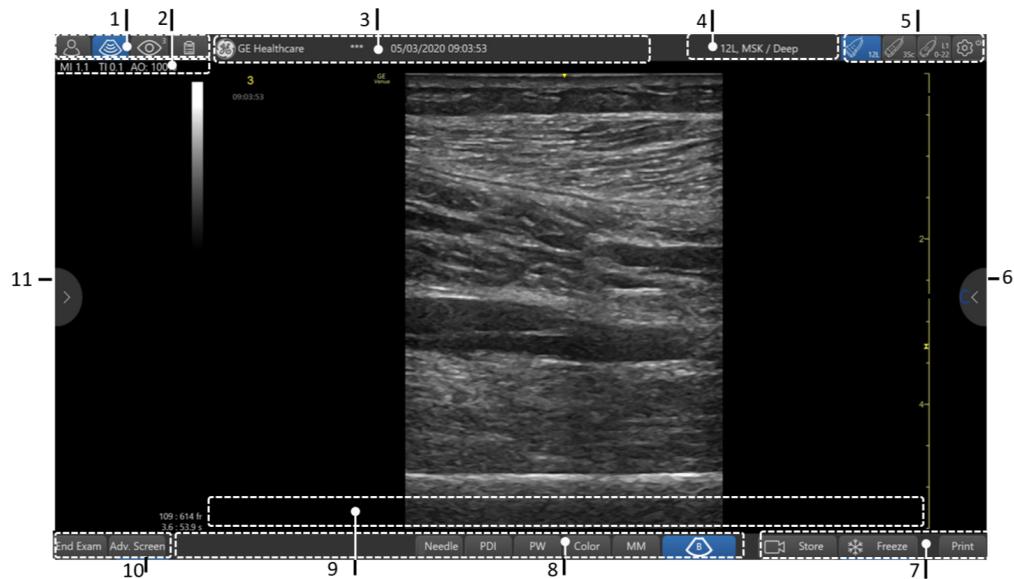
1. Main functions selection
2. Title bar
3. Status messages
4. Probe selection
5. Configurations, settings, battery, and peripherals status area
6. Right menu for scan controls area
7. Depth & gain controls
8. Store, Freeze & Print control
9. Modes controls
10. Cine-loop control area
11. End Exam and Simple/Advanced screen selection
12. Auto Tools controls area
13. Measurements, annotation findings and clipboard controls
14. Left Menu assigned for Shortcuts, Measurements, annotation, findings and clipboard content

Figure 3-41. Standard display layout

Using the Simple Screen mode

When tapping the Simple Screen button (Figure 3-43, item 23) the image enlarges and some of the buttons are made smaller or completely disappear.

The Simple screen layout is shown on Figure 3-42.



1. Main functions selection
2. Acoustic power parameters
3. Title bar
4. Probe/Preset in use
5. Probe selection and configuration button
6. Right panel pull-out tab
7. Store, Freeze & Print control
8. Modes controls
9. Cine-loop control area
10. End Exam and Simple screen selection
11. Left panel pull-out tab

Figure 3-42. Simple screen display layout

Should you need to use a control located on the side control panels, simply tap or drag inside one of the tabs (Figure 3-42, items 6 or 11).

The side panel appears for you to use.

You may drag the side panel out of the screen to hide it, or it may be configured to auto-hide by a configurable time-out ('Simple screen' on page 8-14).

It is also possible to customize some of the available buttons on the bottom or left control panels.

Exam function controls

The touch display contains exam function and mode/function specific controls. The screen layout of the main scanning screen is shown here.

Preparing the System for use

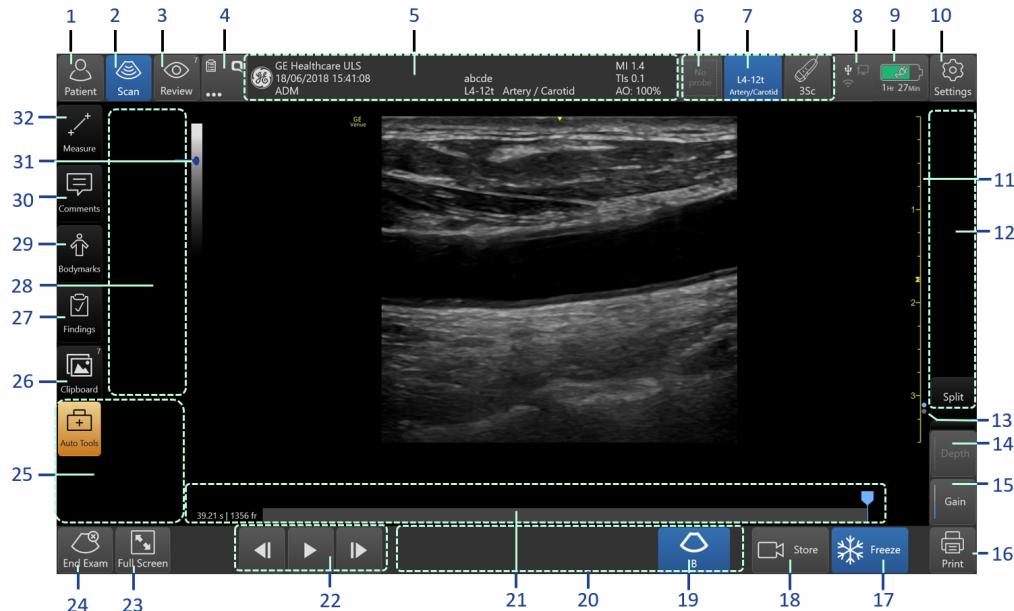


Figure 3-43. Exam function controls



Use only fingers, or fingers with gloves to operate on the system. Never use any sharp tools to scratch the LCD.

Chapter 4

Performing an Exam

Describes how to perform an exam, annotate, measure and store the images.

Overview

After turning on the system, it displays the main scanning screen and is ready to be used.

A typical exam includes some of the following:

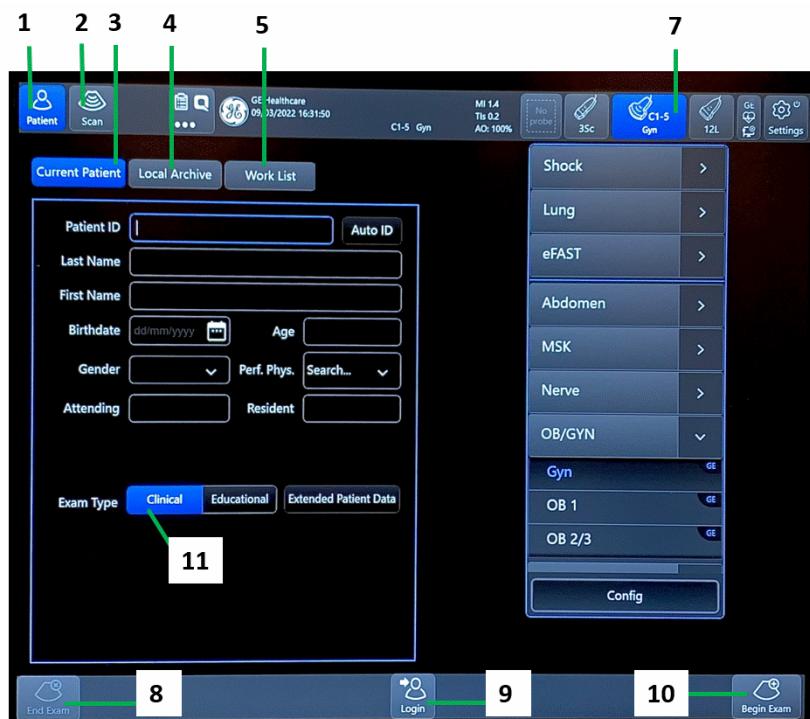
- Beginning a new exam
- Image scanning
- Measurements
- Annotations
- Image management
- End the current exam

Begin a new exam

Beginning a new patient

1. Tap **Patient** on the upper-left of the screen (Figure 3-43, item 1).

The Patient entry screen appears (Figure 4-1).



1. Patient page activation
2. Scan screen activation
3. Current patient entry screen tab
4. Local Archive tab
5. Worklist tab
6. Ext. Sources tab
7. Probe and presets selection
8. End Exam button
9. Login button
10. Begin/Resume Exam button
11. Educational workflow toggle (administrators only).

Figure 4-1. Typical basic patient entry page

2. Enter patient name or ID.

- OR -

Scan the QR code on the patient's wrist using the barcode reader.

NOTE: You may leave these fields empty and fill them up later.

3. Tap **Begin Exam** on the bottom right of the screen (Figure 4-1, item 10).

An active exam opens for storing patient data.

At this point the exam is defined as an Opened exam. You can easily save images, measurements and different types of data into it while performing the exam.

NOTE: In case some patient-related data from the previous exam still remains in the currently open exam the button on the bottom right of the screen reads **Resume Exam** and the **End Exam** button (Figure 4-2) is highlighted (not grayed out). Before beginning a new exam, save or delete any data belonging to the previous patient.



Figure 4-2. Buttons on bottom of patient entry page – non-empty exam

Ending the previous exam

Before beginning a new exam, make sure the system is free from any patient-related data, which may remain from the previous exam. To do that you need to end the previous exam.

While in the Scanning screen, look for an **End exam** button

 at the bottom left corner of the screen. Or, while in the Patient Entry screen, look for an active (bright) **End exam**

button.

If an **End exam** button appears, it means that the system still contains patient-related data which remained from the previous exam. To avoid mixing this current data with previous patient's data, either delete this data or save it to Archive by ending the previous exam. To archive the current exam tap **End exam** and follow the steps provided by the system's messages.

If the **End exam** button does not appear, or is grayed-out, it means that the system is free from any previous patient's data. At this state, you may start performing a new exam.

When you're done examining the current patient, end the exam as described below. This stores all of the data saved in the

opened exam for the current patient into the Archiving system, and opens a new empty exam for the next patient.

To end an exam:

1. Tap **End Exam**.

Where RFID authentication applies, tap the RFID scanner with your badge a second time.

A prompt appears: **Are you sure you want to end this exam?**

2. Tap **Yes**.

In case patient ID wasn't entered the exam can not be saved. The following prompt appears:

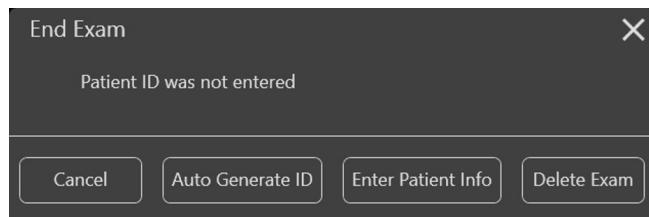


Figure 4-3. End exam prompt: Patient ID was not entered

3. Tap **Enter Patient Info**.

The Patient Entry screen appears.

4. Enter the current patient's ID.

In case the Patient's ID is not currently known you may tap **Auto Generate ID**, This stores the current exam into the Archive, under a unique auto-generated patient ID, and leave a blank patient-entry screen in preparation for the next patient.

Alternatively you may tap Delete Exam to erase all of the data in the current exam, or you may just cancel to avoid further action

Turning On a system containing a non-empty exam

The data stored to the open exam during the examination is retained in a temporary buffer. This data remains in the exam buffer as long as the exam remains open, even after the user shuts down the system or even after power failure.

When system is turned ON while the exam buffer is not empty, a prompt appears (Figure 4-4):

"Unsaved patient/exam data detected for patient {name}.

- There are unsaved images

Do you want to **keep** the data and continue the unsaved exam, or **delete** the data and start a new exam?"

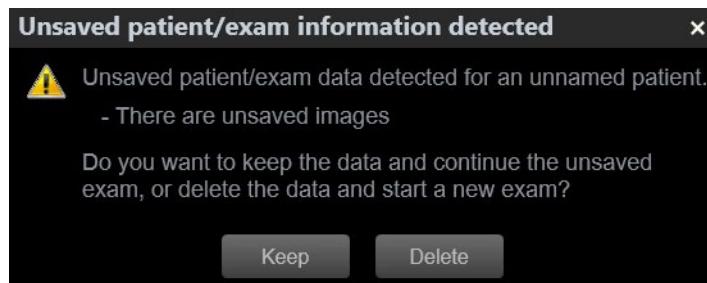


Figure 4-4. Exam buffer clearing prompt



CAUTION

Whenever you have finished the examination, be sure to perform End exam ('Ending the previous exam' on page 4-4). This:

- saves the exam permanently into the Archive system, and
- ensures that as you start a new exam you do not have any data left over from the previous exam.



CAUTION

Whenever you start an examination of a new patient, be sure to tap **Begin exam** and not **Resume exam**. This will insure that you start with a totally empty exam that has no remains from any previous exam.

Entering patient's details

You may enter patient details (name or ID) at any time during the exam.

NOTE: *Exam data such as images or measurements may be stored even before any patient's name or ID was entered.*



CAUTION

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

To enter patient's details at any time before, during or at the end of the exam:

1. Tap **Patient** on upper left corner.
2. Using the bar-code reader, scan the patient's ID bar-code.

- or -

Using the on-screen keyboard, enter the patient's details such as:

- Patient ID
- Patient last & first names
- Additional information may be entered into other fields by tapping **Extended data**.

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.



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.

NOTE: *The system may be configured to generate a unique ID for each new exam, to allow performing the exam without entering patient details, yet allow proper separation between exams of different patients.*

NOTE: *Only use periods, spaces, dashes and alphanumeric characters for the Patient Name.*

NOTE: *Do not use the following characters when filling in patient information: " / : ; . , * < > | + = [] & !, @, #, \$, %, ^, &, *, (,), ?, / , ~ , [], { }.*

NOTE: *Patient information cannot be saved without a patient ID.*

Scanning without entering any patient data

To scan a patient without entering any patient data:

1. Tap **Patient**.
2. Select a probe and preset, as explained below. The scanning screen appears following preset selection.
- or -

Tap **Begin Exam** to step into the scanning screen while maintaining current probe and preset.

3. Tap **End Exam** when done.

A message appears, prompting you to enter Patient ID and other patient details before ending the exam.

Educational workflow

If scanning is being performed for educational purposes, you can enable Educational workflow. All communication to the PACS is disabled while scanning in Educational workflow. Collected data is not sent to PACS upon ending the exam or when using direct store.

Educational workflow may be enabled from the patient screen in any exam. You may also toggle between educational and clinical exam states in the same exam by turning Educational workflow ON and OFF in the patient screen.

NOTE: *The Educational workflow option is only available to an administrator.*

NOTE: *The Educational workflow option is not available when Venue Go is configured to be connected to the ViewPoint 6 Workstation. When performing an exam with ViewPoint you may mark the exam as Educational in the patient Information tab on the report page ('Quick Report' on page 7-122).*

Beginning a New Exam for a patient appearing in Archive

1. Tap **Patient** on the upper-left of the screen (Figure 3-43, item 1).
The Patient entry screen appears (Figure 4-1).
2. Enter the patient's ID.
If the entered ID matches any ID stored in Archive, a message appears: **Patient ID already exists**.
3. Tap **Begin Exam** to add a new exam to the existing patient.
A window appears comparing the main details of the archived patient with those of the new patient.
4. Verify patient identification, then tap **Add Exam**.

A new exam opens, allowing you to perform the exam in the regular way.

NOTE: *If the latest selected patient's exam has been created in the last 24 hours a prompt appears. Select either to continue the last exam or to create a new one.*

Selecting a patient from the Patient list to perform a new exam

1. Tap **Patient Page**.
2. Tap the **Local Archive** tab (Figure 4-5, item 4).
A list of the patients contained in the Local archive appears.
3. Scroll the patient list to locate a specific patient.

4. Tap the patient to select it.
The selected patient's row highlights in blue.
5. Tap **Review exam** to review the selected patient's exams (Figure 4-5, item 11).
- or -
Tap **Begin exam** to begin a new exam for the selected patient (Figure 4-5, item 10).

Navigating the patient list

To find a specific patient more easily you can:

- Tap any column header to sort the list according to the contents of that column.
- Swipe up or down to scroll through the list of patients.
- Tap on any field: **Patient ID**, **Last name** or **First Name** located in the filter area (Figure 4-5, item 13), and type the patient's data.
The patient's list (Figure 4-5, item 12) updates to display only the filtered patient list.
- Tap **Clear Search** (Figure 4-5, item 14) to clear the contents of the filter.
- Search by exam date by selecting **From** or **To** dates, or simply tap **Today's exams**.
- To begin an exam, tap a specific patient and proceed as described in 'Beginning a New Exam for a patient appearing in Archive' on *page 4-8*.

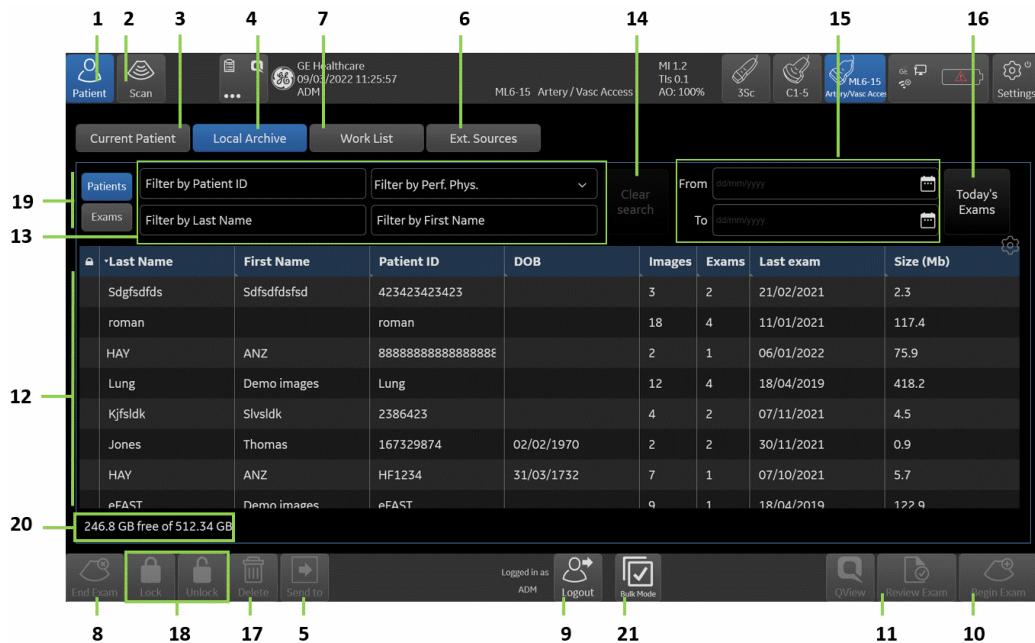
Reviewing patient exams

1. Navigate and select the patient of interest ('Navigating the patient list' on *page 4-9*).

NOTE: *The number of exams and the date of the last exam appears on the list, along with the total number of images stored for this patient.*

2. Tap **Review Exam** (Figure 4-5, item 11).
3. Proceed as detailed in 'Using image review' on *page 7-117*.

Performing an Exam



1. Patient page activation
2. Scan screen activation
3. Current patient entry screen tab
4. Local Archive tab
5. Send to button
6. Ext. Sources tab
7. Worklist tab
8. End Exam button
9. Login/Logout button
10. Begin/Resume Exam button
11. Review Exam button
12. List of patients in Archive
13. Filter to search for a patient by fields (Last/first names or ID)
14. Clear Search filter button
15. Filter to search for a patient by dates
16. Set filter to today's date
17. Delete button
18. Lock/unlock buttons
19. Patient/Exam buttons
20. Free space available on the media
21. Bulk Mode button

Figure 4-5. Typical Archive page with patients list

Reviewing and managing patient exams

Tap the **Local Archive** tab to view a Patient List screen, similar to Figure 4-5, item 4. This screen provides several functions:

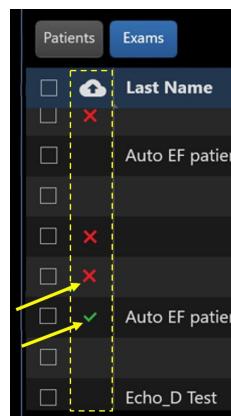
- **View Multi Exams:** In case of patients that contain a multiple number of exams, the **Local Archive** tab allows you to view some details and contents of each exam separately.
- **Export Exams:** This tab can be used to export (copy) exams with images to an external media device. The exams

may be exported in several formats. The export menu allows to anonymize the exported exams.

- **Work with bulk items:** All operations that may be performed on a single selected item can be performed on a selection of exams/patients, including various ways of beginning/opening an exam.

NOTE: *All scenarios which lead to exam begin/resume shall be performed on the first selected patient/exam. A notification indicating this is displayed.*

- **Delete Exams or Patients:** This tab can be used to select different exams or patients and delete them from the local archive.
- **Lock or Unlock patients:** This tab can be used to mark patients as locked, so they can not be deleted from the patient archive.
- **View network transfer status:** in case exams are sent to a hospital PACS, a status flag may appear to show success or failure of the transfer.



- **View the total free space still available:** the Local archive tab displays the available space on the Archive dedicated drive.

To View Multi Exams

1. Tap **Patient Page**.
2. Tap the **Local Archive** tab (Figure 4-5, item 4).
A **Patient List** view appears, listing all of the patients contained in the Local archive.
The patient-list appears by default. The number of exams per patient is listed on one of the columns.
3. Tap **Exams** (Figure 4-5, item 19).

The **Patient list** changes to display an **Exam list** view with a line entry appearing for each exam.

4. Tap **Patients** (Figure 4-5, item 19) to return to the Patient list view.

To export exams

1. Tap the **Ext. Sources** tab.
2. Enter the Patient-List view or Exam-list view ('Reviewing and managing patient exams' on page 4-10).
3. Tap over the checkboxes on the left to select the patients or exams you wish to export.
4. Insert a USB media device into the USB port.
5. Tap **Send To** (Figure 4-5, item 5).

A menu appears (Figure 4-6) showing the source (**From:**) and destination (**To:**)

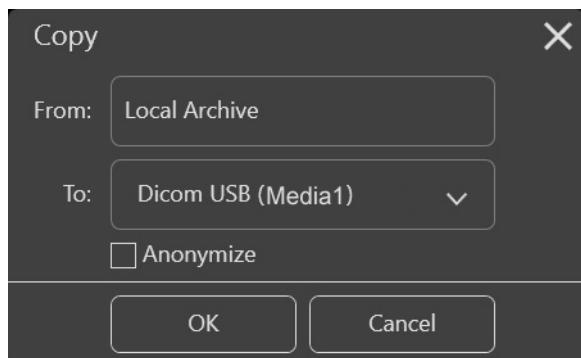


Figure 4-6. Export menu

6. Tap the **Destination** field to select the desired format:
 - DICOM
 - JPEG, AVI, WMB
 - Raw Data
7. Tap the **Anonymize** flag to send the exam without patient name and ID.
8. Tap **OK**.

To Import Exams

NOTE: Operations that can only be performed on local archive exams include deleting, locking, unlocking and sending exams.

1. Tap the **Ext. Sources**.

- A patient list view appears. This tab is for reviewing and managing exams on external sources.
2. Insert a USB media device into the USB port.
 3. Tap **Source** and select your USB device.
A list of patients contained in the USB device appears.
 4. Tap the checkboxes on the left to select one or more patients.
 5. Tap **Import Data** (on the bottom-right corner of the display),
A confirmation prompt appears.
 6. Tap **OK**.

To Lock or Unlock Exams

1. Access the **Local Archive** tab ('Reviewing and managing patient exams' on page 4-10).
2. Remain in **Patient List** view or switch to **Exam List** view.
3. Tap the checkboxes on the left to select the exams you wish to lock or unlock.
4. Tap **Lock or Unlock**.
A Lock symbol appears next to each of the locked exams, or is removed from the unlocked ones.

To Delete Exams

1. Acess the **Local Archive** tab ('Reviewing and managing patient exams' on page 4-10).
2. Remain in **Patient List** view or switch to **Exam List** view.
3. Tap over the checkboxes on the left to select the patients or exams you wish to delete.
4. Tap **Delete**.
A confirmation prompt appears.
5. Tap **OK**.

Worklist - Search and retrieve the Patient/Exam information

NOTE: *Before retrieving data from the Worklist server, make sure that the default IP address is input in the Default Gateway field in Settings > Connectivity > DICOM Worklist (Figure 8-21).*

1. Press **Patient** and select the **Worklist** tab.
The previously used Worklist, similar to the one shown in Figure 4-7 appears.
2. Tap **Refresh** on the screen's upper-right area.

Performing an Exam

The patient list is refreshed.

3. Apply filters ('Navigating the patient list' on page 4-9).
4. Tap a patient to select it.
5. Tap **Begin exam**.
6. Tap **End exam** when done.

The exam is saved to the local archive.

The screenshot shows the GE Healthcare GE Worklist interface. At the top, there are several icons: Patient (blue), Scan, a clipboard, three dots, GE Healthcare logo, date/time (14/03/2024 15:58:43), ADM, 35c Cardiac, MI 1.4, Tls 0.6, AO:100%, 35c Cardiac, C1-5, ML6-15, battery status, and Settings. Below this is a navigation bar with tabs: Current Patient, Local Archive, **Work List**, and Ext. Sources. The Work List tab is selected. To its right are search fields for Patient ID, Accession, Last Name, and First Name, along with date pickers for From (14/03/2024) and To (14/03/2024), a Today's Exams button, and a Refresh button. The main area displays a table of patient data:

Last Name	First Name	Patient ID	DOB	Exam Type	Accession No.	Sched. Date	Sched. Time
Jessica	Garia	F2GK12619	31/03/1732	EXAM66	00011	14/03/2024	17:57
Charlie	Brown	TLVN4322	26/03/1827	vvv vvv mfthj	00008	14/03/2024	11:08
Lanam	Monika	AV35674	04/03/1678	req 1	00035	14/03/2024	08:56

At the bottom, there are buttons for End Exam, Logged in as ADM, Logout, and Begin Exam.

Figure 4-7. A typical Worklist containing a patient list

Selecting the probe and preset

The probe and preset can be selected by using a pull-down menu that typically looks like the example shown in Figure 4-8.

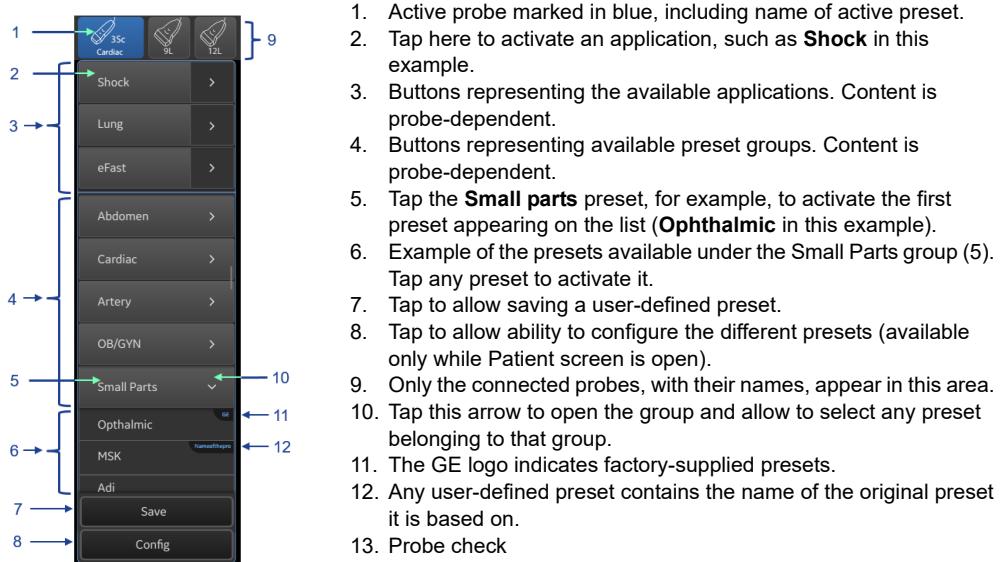


Figure 4-8. Probe and Preset pull-down menu

The preset menu can be accessed by tapping the required probe and then selecting the required preset.

The upper-left area of the scanning screen may sometimes display a group of related presets, named shortcuts (Figure 4-9). Selecting any shortcut has the same effect as selecting the same preset from the pull-down menu.



Figure 4-9. Available shortcuts

By tapping any preset on the pull-down preset list or on the shortcuts list, the system proceeds to scan while using the newly selected preset.

Selecting an application

In case of a patient in shock you may wish to perform a quick assessment of vital body areas such as the heart, lungs and abdomen. This may be done by selecting an application to optimize the performance of a protocol-specific exam, such as the Shock or eFAST exam.

Selecting the probe and preset using the Patient screen

While in the **Patient** screen, the same preset menu appears, as shown above, but no shortcuts appear.

To select a preset

1. Tap **Patient**.

The symbols and names of the probes that are currently connected to the system appear on the upper-right (Figure 4-7, item 9).

The currently selected probe and preset appear in the blue button (Figure 4-7, item 1).

2. Tap the desired probe.

The selected probe background turns blue, and a list of associated presets appear below it.

3. Tap the desired preset.

A new probe and preset are activated.

The main scanning screen appears.

NOTE:

*The previous probe remains marked in dark blue. In case you select **Begin** or **Resume Exam** the previous probe and preset remain active.*

Selecting probe and preset via main screen shortcuts

In the main scanning screen, the current active probe and active preset are marked as a blue button with a probe symbol.

- To change a preset: tap on button representing the current probe (marked as a blue button). A preset-menu appears to select a different preset.
- In cases where preset shortcuts appear on the upper left area of the display, the active preset is marked in blue. To

change a preset, simply tap on the appropriate preset, marked as a gray shortcut.

- To change a probe: Tap on the image of the desired probe. The new probe becomes active, using the same preset as was used on the previous probe.

NOTE: *If the newly selected probe does not support the previous preset, a preset menu appears (Figure 4-7) allowing you to select a different preset.*

Scanning

Use the system to scan in any of the different scanning modes available for the selected probe and preset.

Storing loops or images

While scanning you may store single images or cineloop video clips in prospective or retrospective modes ('Storing a cineloop' on page 7-113).

If an image is frozen on screen it will be saved as a single frame.

If the image is in live scanning or in video-replay mode, it will store as a cine-loop.

Prospective or retrospective modes may be configured on the system ('Global settings' on page 8-9).

NOTE: *The **End Exam** button  appears on the bottom-left of the screen as soon as the first image has been stored, indicating that the system contains patient-specific data.*

To store a loop from replay mode

1. Scan and tap **Freeze**.
2. Tap **Replay** to replay the cineloop.

You may swipe to move the left or right trimming borders to define the beginning and end of the cineloop replay segment.

3. Tap **Store** when the cineloop displays the requested video segment.

The cine-loop is stored.

NOTE: *When you tap **Store** during scan (Live Store), Venue Go stores the cine for the specified length of time set in the*

Loop-length adjustment. When you tap **Store** during ECG scan, Venue Go stores the cine for the specified number of heart cycles set in the **Number of cycles** adjustment.

NOTE: You may set system to **Replay before store**. In this case when scanning and tapping **Store** once, Venue Go performs cine-loop replay prior to storage. You may review or trim the loop as desired. The loop has not been stored yet. Tapping **Store** again stores the loop to archive.

Making measurements

You may make different measurements on a still frame.

Manual measurements are stored automatically to the exam's database, unless specified otherwise.

Measurements performed by a semi-automatic tool are NOT automatically stored to the exam's database. You should view the calculated results on the screen. If the results are valid they are approved by tapping **Store**. The image or loop, with the associated results are stored to the clipboard, while the calculated results are stored to the exam's database.

Adding findings

You may add a **Finding** to any frozen image or loop, and store it. Stored findings are added to the exam's database for further reporting.

Adding annotations to an image

You may add Comments or Bodymarks to any image and store it. Stored images include recorded annotation ('Annotating an Image' on page 6-10).

Review exam's stored images

Review any of the stored images, at any time during the exam, using one of the following methods:

- Using the clipboard: allows to review images from the scanning screen ('Clipboard image review' on page 7-115).
- Using the Image Review feature: allows to perform a more orderly review of all images accumulated so far ('Using image review' on page 7-117).

In case images were stored during the current exam, a **Review** button appears at the top left area of the screen (Figure 3-43, item 3). The number of stored images appears over the **Review** button.

Tap **Review** once to display a column of thumbnail images. Swipe this column up or down to view more of the images. Tap any thumbnail image to expand it into full size ('Clipboard image review' on page 7-115).

Tap **Review** twice (or once while a column of thumbnail images is displayed), in order to enter Image review mode, where the whole screen is displaying a grid of images. Tap any image in the Review grid to expand that image into full-image size.

Review all measurements taken during an exam

Review any of the stored measurements and calculations, at any time during the exam, using the Worksheet. Use it also to delete or modify any of the stored measurements. In addition, the worksheet allows you to view OB fetal growth charts ('OB Worksheet' on page 7-101).

Follow-up tool

Overview

The Follow-up tool allows the user to scan a patient, and at the same time view images from a previous exam, side by side with images from current exam.

The user may select a previously stored image to appear on one side of the screen. The system automatically reloads the scanning parameters, labels, bodymarks and annotations from the selected stored image and applies them to the live scanning image which appears on the other side of the screen.

Follow-up scanning allows the physician to use consistent scanning parameters from exam to exam on the same patient, for image comparison, and may assist in assessing a patient condition over time.

The Follow-up exam

1. Start an exam in the usual procedure.
2. Enter the scanning screen.
A **Follow up** button is visible on the right area of the screen while scanning in B, Color or PDI modes.
3. Tap **Follow up** to start a Follow-up study.
In case there are previously stored images, the **Review** screen appears.
4. Navigate to the desired exam or image.
5. Identify the image of interest and tap it once to select it.
The selected image is indicated by a checkmark, and the **Follow up** button appears on the bottom-right.
6. Tap **Follow up**.

The Follow up screen appears.

NOTE: *If more than one image is selected, the Follow up button turns dark-gray and becomes non-active. If no image is selected, the Follow up button does not appear. Make sure only one image is selected at one time.*

The Follow-up screen

While in Follow-up study, the screen splits into two parts. The active scanning area is on the right side by default. The image review area displays a recalled image, and is on the left side by default.

NOTE: *The default sides can be swapped by user's configuration.*

When conditions permit (see hints below), the scanning image synchronizes with the recalled image and a cyan **Synced** label appears. This means that the scanning parameters of the scanning image are duplicated from the recalled image. This assures that the scanning image is acquired under the same settings as the recalled image.

The user may further adjust the scanning image at any time. In such cases the image setting does not resemble the recalled image, and a red **Not Synced** label appears. Tapping **Sync** below the image may re-synchronize the images.



HINTS

- If the recalled image was acquired with a different probe from the currently active one, a message appears, stating that a different probe was used. Additionally, a red **Not Synced** label appears.
- If the recalled image was acquired with the same probe but with a different preset from the currently active one, the recalled preset automatically become effective and a cyan **Synced** label appears.
- Follow up synchronization is available only on images made in B, Color or PDI modes.
- Timeline images such as PW or M Mode can not be synchronized.
- Images acquired with special tools can not be synchronized. This includes Auto-VTI, Auto B-lines, Auto IVC, Lung Sweep, Venue-View, Needle or biopsy.
- Images should be saved in RawDICOM format in order to synchronize.
- Secondary-captured images, or images imported from foreign sources cannot be synchronized.

The image review area displays a single image by default. There image has tabs on either sides, allowing navigation to a next or previous image in the exam.

If preferred, the user may tap 2x2 to display 4 images at a time. Images may be scrolled up or down. Tap on any image to select

to synchronize with it. The blue frame indicates which image is currently synchronized.

Using Follow up tool with diagrams

The Follow up tool may be used in conjunction with the Shoulder Diagram.

When Follow-up tool is active and the current preset supports using a diagram, Shoulder diagram may be selected:

- The diagram appears on the split screen with the active zone highlighted in orange, as when using diagram without Follow-up tool.
- The zone and side labels appear on both sides of the split screen (left and/or right).

NOTE: *Ensure that the correct side and zone are selected.*

NOTE: *All markings on the diagram, such as camera icons and findings, refer to the active exam.*

When Shoulder Diagram is active, select a diagram zone and then tap on the Follow-up button to use the Follow up tool:

- The screen splits. One side (left by default) displays a review screen of the same zone and side of the diagram.

NOTE: *The user may config the system to choose a different past exam.*

- The scan parameters used to acquire the followed image in the diagram review screen are applied to the live scanning screen. The 'Synced' label appears, as in Follow-up when there is no diagram.
- When the user taps on other zones on the diagram, the followed zone is updated accordingly to the selected diagram zone.



HINTS

- If no exam with the same diagram type exists, the general Follow-up review screen appears.
- If Follow up is activated while in Shoulder Diagram, and it isn't the first time Follow up has been activated during the current exam, the image on the Follow-up side of the split screen is the last stored image in the selected zone from the follow up chosen exam.
- If the user selects a zone in the selected followed exam with no available images, the sync button is disabled. A message stating that there are no previous images in the current zone to follow-up on appears.
- If more than one image is stored to a zone, select the 2x2 view to view multiple images.

NOTE: Only images from the selected followed zone are displayed.

- The user can minimize the diagram at any time. When the diagram is minimized, the system behaves as if no diagram is available, and proceeds to the general Follow-up screen.

Follow-up tool configuration

Follow up tool settings are configured via:

Setting >Config > Imaging > Advanced Tools > Follow Up tools section.

Comparison Image Side

Select the comparison image displayed position (Left - factory default or Right).

Bilateral feature

Bilateral allows for a side-by-side comparison of the zone on the currently scanned side with the same zone on the opposite side of the body, and to sync acquisition parameters.

NOTE: *Bilateral is available only when using Shoulder Diagram.*

While shoulder diagram is active, a **Bilateral** button appears in the right-hand settings menu on the screen.

When Bilateral is turned on:

- The screen splits and the live side of the screen is highlighted with a blue frame. When scanning the right shoulder, the active scan is displayed on the right side of the screen and vice versa.

NOTE: *The user can configure the right shoulder to be on the left side of the screen.*

NOTE: *If a stored image doesn't exist for the symmetrical zone, the screen remains split, and a message appears: No images available for the current zone.*

- The shoulder diagram remains in the corner of the screen.
- The symmetric zone's last stored images/cine-loops (the same zone as the active side, but on the other shoulder) is displayed on the non-active side of the screen.
- The zone's name and side (right or left) appears on each image.
- **Sync** and **2x2** buttons appear on the screen.
- The system syncs all acquisition parameters of the stored image to the live scan.

NOTE: *The system does not sync labels, bodymarks and annotation.*

NOTE: *Sync is selected by default. After tapping Sync or changing scan parameters, Sync changes to Resync. Tap Resync to revert live scan parameters to the scan parameters of the displayed stored image on the symmetrical zone.*

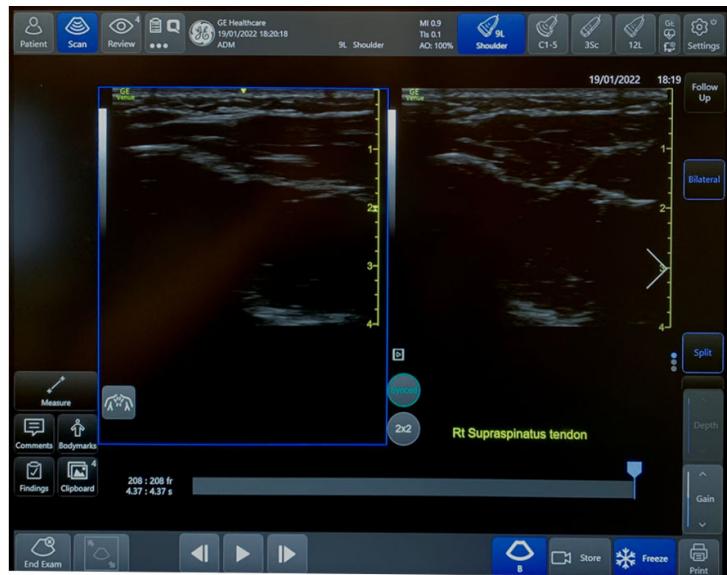


Figure 4-10. Bilateral

- Tap **2x2** to display all stored images/cine-loops at once. Upon entering the 2x2 view, a **1x1** button appears in place of **2x2**. Tap **1x1** to return to viewing one image/cine-loop at a time.
- Tapping on another zone on the diagram, the non-active zone is updated to the image of the symmetrical zone according to the newly selected diagram zone.

Bilateral store

Tap **Store** to store the live image and cineloops to the active zone. A secondary capture raw data image of the split screen is stored to the clipboard.

NOTE: *Zone and side labels appear on all stored images and cineloops captured in Bilateral. When exporting the image/cine the zones labels appear on the stored image/cine.*

Exiting Bilateral

To exit Bilateral, tap **Bilateral** or **Split**.

NOTE: *While Bilateral is active the **Bilateral** and **Split** buttons are ON and highlighted. Tap any of these buttons to exit Bilateral.*

Chapter 5

Optimizing the Image

B-Mode

Intended Uses

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

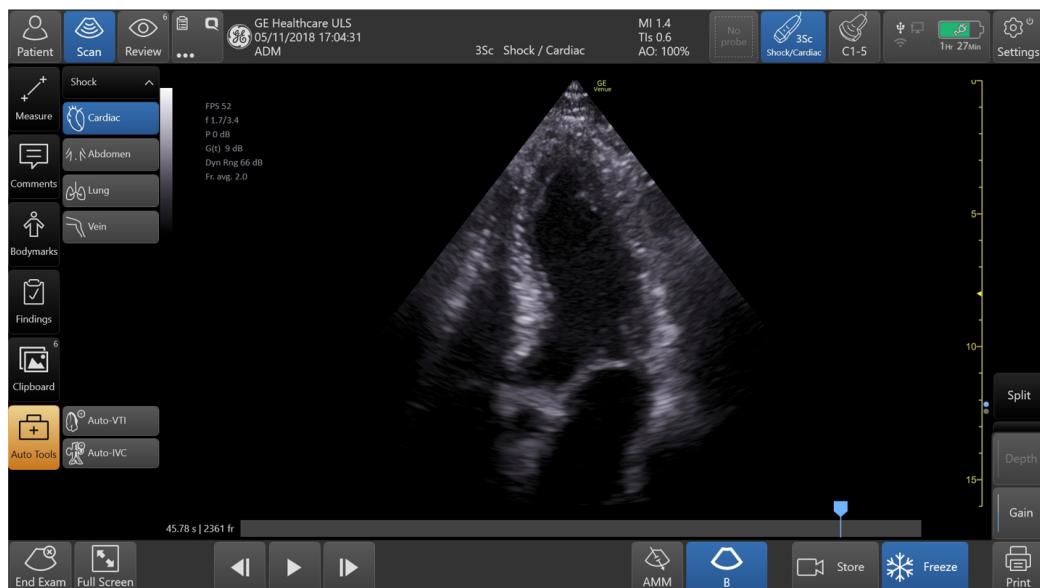


Figure 5-1. B-Mode Display - Representative example

B-Mode controls

Table 5-1: B-Mode Controls

Control	Effect on image
TGC	Adjust individual TGC sliders to adjust the intensity of echoes in a particular depth of the image.
Gain	To make the overall image brighter or darker: <ul style="list-style-type: none"> • Swipe vertically over the gray bar column in the B-mode image. - or - • Tap the +/- arrows on the Gain button - or - • Tap Gain, then drag the slider up/down
Depth	To increase or decrease scanning depth: <ul style="list-style-type: none"> • Swipe vertically over the B-mode image depth scale. - or - • Tap Gain and slide up/down or tap +/- to increase or decrease scanning depth.
Modes	B/M/Color/PDI/PW/CW toggles between the scanning system's main modes. Contents are dependent on probe, preset and mode in use.
Needle	Press to activate the Needle Recognition mode. Gain, Angle and Thickness can be adjusted. The needle function only applies to linear probes and the C1-5-RS convex probe.

Optimizing the Image

Table 5-1: B-Mode Controls (Continued)

Control	Effect on image
Scan controls	<p>To activate controls listed below, tap on the control. If necessary, drag the related slider or tap any related button.</p> <ul style="list-style-type: none">• Frequency: Adjusting the frequency allows you to optimize resolution and/or penetration. There are 3 steps to select from, based on the anatomy and the patient type being scanned.• CHI (Coded Harmonic Imaging): Improves image clarity and tissue contrast by reducing clutter and artifacts.• Compound (also known by the term "CrossXBeam"): Combines three or more frames from different angles into a single frame. This is intended to improve contrast resolution.• Gray Map: Affects the presentation of B Mode information.• Focus Pos: Focus optimizes the image by increasing the resolution for a specific area.• Reverse: Used for anatomical correctness (Left/right rotation).• Split: Used to split the screen into two, allowing different, independent views on each half. Split-screen is vertical (vertical border line) in most cases. On some linear probes, while scanning at very shallow depth, split-screen is based on a horizontal border.• Auto: Automatically improves the homogeneity and contrast resolution of the image by changing the gain and gray scale to match the image data.• Dynamic Range: Changes the amount of gray scale information displayed. It is useful for optimizing tissue texture for different anatomy.• Reject: Allows for the elimination from the display of low level echoes caused by noise.• Frame Averaging (or persistence): Smooths the image by averaging frames. Reduces noise in the image.• SRI (Speckle Reduction Imaging): Smooths the image when image speckle interferes with the desired image detail.• Edge Enhance: Makes the image edge clearer/sharper.• Width: Adjusts field of view. Adjusts the Width to the smallest reasonable size to maximize frame rate (on sector and convex probes only).• Power: Adjusts acoustic power output. Changing acoustic output will change the intensity, pressure, or power generated by an ultrasonic transducer.• Center line: Marks the centerline on the image, for all linear and convex probes.• Up/Down: Flips the image 180 degrees up/down.• Line Density: Optimizes B-Mode frame rate or spatial resolution for the best possible image.

Optimizing B-Mode

Depth

Description	Depth controls the distance over which the B-Mode images anatomy. To visualize deeper structures, increase the depth. If there is a large part of the display which is unused at the bottom, decrease the depth.
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Adjusting

Method 1: While in live scanning, tap over the yellow vertical depth scale. When the scale turns green you may swipe vertically over it to change scanning depth.

Method 2: While in live scanning, tap the Depth button (1). A depth slider appears.

a. Touch the Depth vertical slider's handle (3). The maximal depth value appears besides it (4).

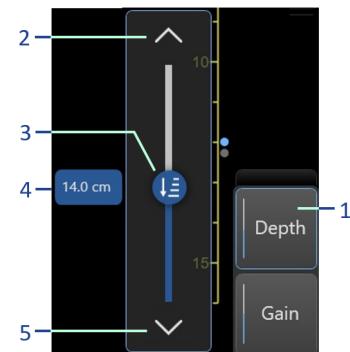
b. Drag the handle up or down to modify depth by several steps.

- or -

Tap on the upward arrow (2) to decrease depth one step at a time.

- or -

Tap on the downward arrow (5) increase depth one step at a time.



Preset	You can preset the depth default value by saving it into a user-preset.
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Values	Depth Minimum & maximum range and incremental steps vary by probe and application. Depth displays on the depth-scale in centimeters.
---------------	---

Depth values are returned to the factory-preset or user-preset value when you change **Probe**, **Preset**, or **Application**.

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.
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Effect on other controls	After adjusting the depth, you may need to adjust the TGC and focus. Changing Depth ,
	<ul style="list-style-type: none"> • clears and restarts Cine memory. • erases real-time calculations graphics on the display (but not the completed results on the worksheet page).

Bioeffects	Imaging and display parameters adjust automatically for each depth setting.
	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.
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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.
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Adjusting

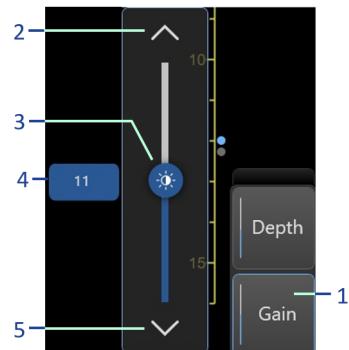
Method 1: Swipe vertically over the gray bar upwards or downwards to increase or decrease gain respectively.

Method 2: Tap the **Gain** button (1). A Gain slider appears.

- Touch the **Gain** vertical slider's handle (3). The current gain value appears beside it (4). Drag it up or down to modify gain continuously.
- or -
- Tap the up arrow (2) or down arrow (5) to adjust the gain setting one step at a time.

Imaging and display parameters adjust instantly.

Gain values vary depending on the probe; they are not associated with a particular value or position of the gain-slider.



NOTE: You can change the gain on a frozen image. B-Mode gain is independent of M-Mode and Doppler and Color Flow Gain.

Preset	You can store gain setting to any probe-preset.
Values	Gain displays on the monitor in db. Maximum gain varies by probe. Gain values vary by probe, application, and frequency setting. Gain values are returned to the factory or user preset value when you change Probe , Preset , or Application .
Benefits	Gain allows you to balance echo contrast so that cystic structures appear echo-free and reflecting tissue fills in.
Effect on other controls	After you adjust the Power Output, you may need to adjust the gain. 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 effect on Power Output. However, with increased gain, the power output level can usually be reduced to produce an equivalent image quality.

NOTE: Always optimize gain before increasing the Power Output.

Focus Position

Description	The position of the focal zone(s) may be moved up or down. A graphic indicator corresponding to the focal zone position, appearing along the depth slider.
	The best focusing is at the focal zone location. Put focal zone(s) at the area of interest. Be conscious of where the focal zones are.
	Focal zones should be placed roughly in the lower half of the display depth, at or below the organ of interest.
Adjusting	To move the focal zone to the near/far field: Touch the focus indicator along the depth slider, then drag it vertically to any desired depth, - or - Tap Focus pos. and drag the slider up/down.
Values	Focus zone position vary depending on the depth, probe, application, and frequency setting selected.
Benefits	Focus optimizes the image by increasing the resolution for a specific area.
Effect on other controls	None
Bioeffects	Changing the focal zone may change the TI and/or MI. Observe the output display for possible effects.

Auto Optimize

Description	Auto button, while scanning in B-mode, automatically improves the contrast resolution of the B-mode image, based on the real-time B-mode data, by changing the local TGC gain to match the image data. Auto is available in PW/CW modes but has different functionality.
Preset	Set "Auto" ON or OFF and store into a user's preset.
Values	Auto is active until you deactivate it or when you change Probe , Preset , or Application .

Optimizing the Image

Benefits	Auto can benefit in reduced optimization time and a more consistent and accurate optimization process.
Effect on other controls	You may need to adjust the B-Gain.
Mode cursor	
Description	Displays the Mode cursor on the B-Mode or color-mode image. Depending on the mode being used, the mode cursor may be a simple radial line for M-Mode, or a line with a sample-volume (SV) gate while in PW Doppler mode, or a single focal marker while in CW Doppler mode.
Adjusting	To activate/deactivate the Mode cursor : <ul style="list-style-type: none">• Tap Cursor button to activate or de-activate the mode cursor. - or -• Tap M-Mode (MM) or Doppler mode (PW or CW) a single tap, to activate the mode cursor. Tap Cursor button to de-activate it.• Tap B-Mode to deactivate the cursor.• Use your finger to drag the cursor into the required position.• Tap the requested mode button such as M-Mode, PW or CW to enter time-sweep mode.
Values	ON/OFF
Benefits	Mode cursor 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.
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.

Adjusting To activate SR-HDI, tap the **SRI** button and move slider.

NOTE: *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 **Split** button.*

Values 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.

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

Compound

Description Compounding is the process of combining three frames from different steering angles into a single frame. **Compound** is performed at real-time frame rates, using bi-cubic interpolation.

Compound is available on Convex and Linear probes.

Compound is also known by the term CrossXBeam.

Adjusting To activate Compound, while scanning tap the **Compound** key on the scan control area.

Preset You can preset B-Mode Compound to a user preset.

Values All linear and certain curved convex probes are supported. B-Mode Compound is available while in **B-Mode**, **Color Flow**, or **PW Doppler** mode. Steering is optimized by probe.

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 recognition, and cystic boundary definition.

Coded Harmonic Imaging (CHI)

Description	Coded Harmonics Imaging (CHI) enhances near field resolution for improved small parts imaging as well as far field penetration. CHI improves image clarity and tissue contrast by reducing clutter and artifacts.
Adjusting	Tap CHI to activate Coded Harmonic imaging.
Values	On/Off. 'CHI' appears in place of 'B' in the Info Window. NOTE: <i>Changing multi frequency resets those parameters which are presettable by frequency to their preset values for the current harmonic frequency.</i>
	Multi frequency values are returned to the factory or user preset value when you change Probe, Preset or Application.
Benefits	CHI diminishes low frequency high amplitude noise and improves imaging technically difficult patients. CHI 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 may change the TI and/or MI. Observe the output display for possible effects.

Frequency

Description	Changes acquisition frequency to best optimize for a particular patient type.
Adjusting	Adjusting the frequency allows you to increase resolution at the expense of penetration, or increase penetration at the expense of resolution. There are 3 steps to select from based on the anatomy and the patient type being scanned. To select a different frequency tap Frequency , then tap Res , Gen , or Pen to select one of 3 frequencies: <ul style="list-style-type: none">• Res: Resolution - System scans at a higher than average frequency to enhance resolution in the near field.• Gen: General - System scans at mid-frequency suitable for an average size patient.• Pen: Penetration - System scans at a lower than average frequency to enhance penetration in the far field.

The selected frequency appears in the scan-info window, if configured to show it ('Global settings' on page 8-9).

Values	Vary, depending on the probe and application. Frequency values are returned to the factory or user preset value when you change Probe , Preset or Application .
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.
TGC	
Description	TGC (Time-Gain control) amplifies returning signals to correct for the attenuation caused by tissues at increasing depths. TGC sliders are spaced proportionately to the depth. The area each slider amplifies varies as well.
Adjusting	The default TGC curve is a straight vertical line at the center-position of the sliders. This default setting matches an average patient. To adjust TGC: <ul style="list-style-type: none">• Tap TGC to turn on a group of 8 TGC sliders.• Slide each of the sliders to adjust gain at a particular depth zone, or use your finger to quickly drag or "draw" the TGC graph on the screen The TGC sliders will disappear from screen after a timeout period.
Values	When you change the depth, TGC is rescaled across the new depth range. Each slider is proportionately scaled across the depth.
Preset	The TGC will always default to a central straight vertical line upon change of Probe , Preset or Application .
Benefits	TGC balances the image so that the density of echoes is the same throughout the image.
Width	
Description	You can widen or narrow the size of the sector angle to maximize the image's Field of View (FOV).

Optimizing the Image

Adjusting	To narrow/widen the angle, tap the Width control button and adjust slider as required.
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 heart.
Effects 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.
Adjusting	To tilt the angle to the left/right, tap Tilt and adjust the slider as required.
Values	Varies, depending on the probe.
Benefits	Allows you to move a reduced sector angle laterally, without moving the probe. Beneficial in GYN.
Bioeffects	Tilting 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. 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.
Adjusting	To increase/decrease, tap Dynamic Range and adjust slider as required.

Values	The current value is displayed. 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 Probe , Preset or Application .
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 dark or anechoic.

Effects on other controls	Dynamic range operates in realtime, Freeze, CINE, and CINE Timeline. It also affects Gain.
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Reverse (if preset)

Description	Rotates the image vertically to produce a mirrored image swapping left/right direction.
Adjusting	Tap  .
Values	The image rotates left/right. Reverse settings vary by probe and application.
	Reverse settings are returned to the factory or user preset value when you change Probe , Preset or Application .
Benefits	Used for anatomical correctness.



CAUTION

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

Line Density

Description	Optimizes B-Mode frame rate or spatial resolution for the best possible image.
Adjusting	Tap Line Density and adjust slider as required.
Values	Vary by probe.
NOTE:	<i>Not available in timeline.</i>
Benefits	A lower line density increases the frame-rate and is useful in fetal heartbeat, adult cardiac applications and in clinical Radiology applications requiring significantly higher frame rates.

A higher line density reduces the frame-rate, and is useful in obtaining very high resolution, e.g., thyroid, testicles.

Effects on other controls	Line density changes the vector density and frame rate.
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Maps

Description	Maps affect the presentation of B-Mode information. The system supplies system display maps for each of the modes B/MM/Color/PDI and Doppler. Maps are preset-specific.
Adjusting	To select a map, tap Gray Maps . A map window displays. The image reflects the map as you go through the selections. 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.
Values	Map values vary by probe, application, and frequency setting. Map values are returned to the factory or user preset value when you change Probe , Preset or Application .

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, tap Frame Average and adjust slider as required.
Values	The current value displays on the Touch Panel. Frame Average values vary by probe, application, and multi frequency setting. Frame Average values are returned to the preset value when you change Probe , Preset or Application .
Benefits	Smooths the image.
Up/Down	
Description	Flips the image 180 degrees up/down.
Adjusting	To flip the image vertically, select Up/Down on the Touch Panel.

Values Up/down. Values vary by probe and application. Values are returned to the preset value when you change: Probe, Preset or Application.

Benefits Beneficial in transvaginal and transrectal scanning.



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

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).

Adjusting Adjust up to increase and down to decrease.

Benefits Allows for the elimination from the display of low level echoes caused by noise.

Centerline

Description The centerline on the image, for all linear and convex probes.

Adjusting To turn Centerline ON or OFF:

- Tap **Centerline** on the scan control menu,
- or -
- Tap the triangular marker at the center of the image's skinline area.

Virtual Convex

Description On linear probes, Virtual Convex provides a larger field of view in the far field.

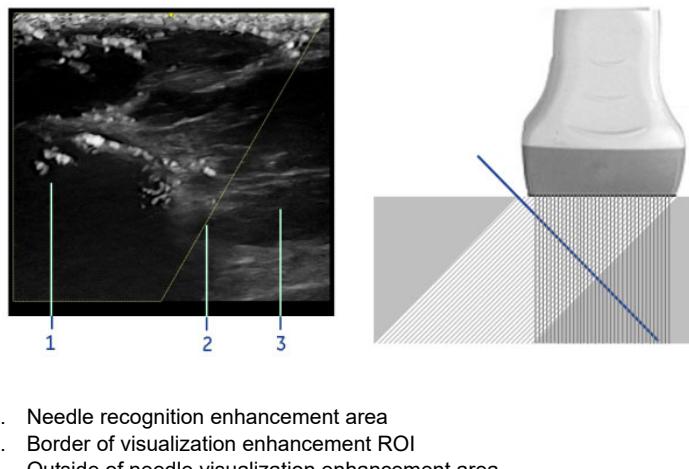
Adjusting To activate/deactivate Virtual Convex tap the Virtual Convex ON/OFF button, on the right-hand panel.

Benefits Virtual convex allows for a wider field of view. Available in B, Color/PDI Flow, Doppler and M modes. Compounding 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.

Needle recognition

Description	Needle recognition allows you to obtain better needle visualization in the enhanced area surrounded by the yellow dashed line (Figure 5-2).
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1. Needle recognition enhancement area
2. Border of visualization enhancement ROI
3. Outside of needle visualization enhancement area

Figure 5-2. Needle recognition

Needle recognition functionality is available with linear probes 12L-RS, L4-12t-RS, 9L-RS, L8-18i-RS, L10-22-RS, L4-20t-RS, ML6-15-RS and convex probe C1-5-RS.

Figure 5-2 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.

When Needle recognition is turned ON, there is a marked ROI where visualization is effective. Additionally, there are several controls dedicated to fine-tune the visualization of the needle:

- Needle Gain
- Needle direction
- Needle angle
- Needle thickness

Needle button

To enable/disable Needle Recognition Mode, tap Needle on the scan modes region.



Needle gain

Set by tapping **Needle Gain** and adjusting the slider for the appropriate needle visibility.

NOTE:	<i>Increasing the Needle Gain enhances the needle visibility while decreasing the Needle Gain decreases artifacts and noise. Adjust the Needle Gain to balance the needle enhancement versus level of artifacts/noise.</i>
Needle angle	Set by tapping Needle Angle and adjusting the slider to match approximately the angle between the needle and probe surface. This further improves the visibility of the needle.
Needle thickness	Adjust by tapping Thickness and adjusting the slider for the appropriate needle visibility.
NOTE:	<i>Thick ON setting displays thicker and more prominent appearance of needle, while Thick OFF setting displays thinner but more realistic needle appearance. Thickness enhancement is achieved by using different imaging frequencies for the tissue and needle images.</i>
Needle direction	Tap one of the buttons shown below to set needle direction to correlate with the direction at which the needle approaches the image (from left or right side of the probe).
	
NOTE:	<i>Adjust the needle recognition steering angle to form the needle and the beam angle as perpendicular as possible to get the best needle enhancement.</i>
NOTE:	<i>The beam divergence and effects of beam steering with a transducer may prevent a segment of the needle shaft from showing in the image if the needle angle is too steep.</i>
NOTE:	<i>For best results please insert the needle at perpendicular to the dotted Enhancement ROI line (Figure 5-3), or at a needle angle that is slightly less than the Beam Angle (Figure 5-4).</i>

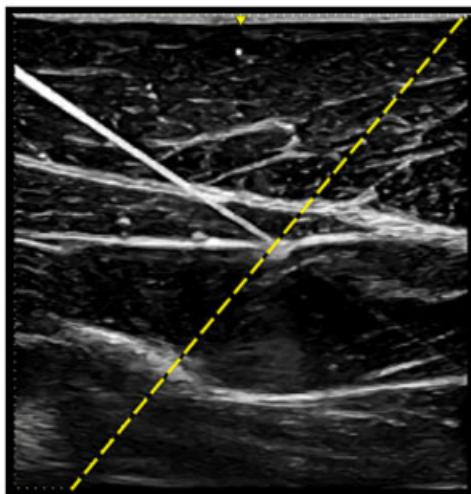


Figure 5-3. Example of needle that is perpendicular to the guide line

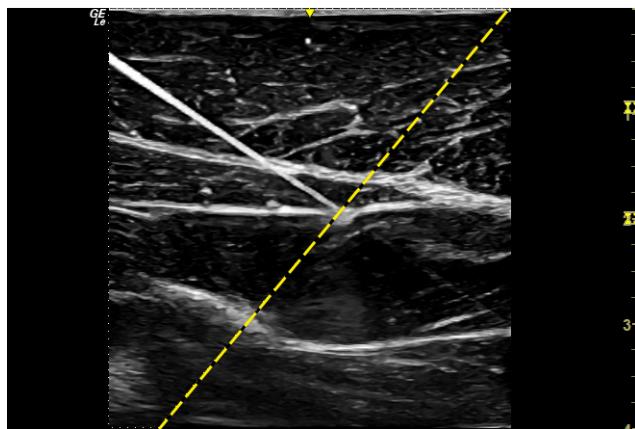


Figure 5-4. Example of needle angle that is slightly less than the beam angle

- 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.*
- NOTE: *Switch needle On/Off can help to identify artifacts and other not interesting structures.*
- NOTE: *Needle Recognition values (including enable/disable, Needle Direction, Beam Angle and Needle Gain, etc.) are returned to*

factory or user preset value when you change: Probe, Preset or Application.

Benefits Provides better biopsy needle recognition than normal B-Mode.

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

Venue View (Option)

Description Venue 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.

Venue 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.

NOTE: *Venue View is available in B-mode only.*

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

Venue View functionality is available in B mode with linear probes 12L-RS, L4-12t-RS, 9L-RS, L8-18i-RS, L10-22-RS, ML6-15-RS and L4-20t-RS.

Using Venue View To perform an exam using Venue View:

NOTE: *Optimize parameters for tissue texture and visible window
PRIOR TO activating Venue View.*

1. Perform a detailed examination of the anatomy/pathology.
2. Press **Venue View** on the Control Panel.
3. To start acquiring the image, press **Start**.



HINTS

When you scan, scan slowly and in a uniform motion lengthwise, end-to-end (with or against the probe orientation marker). Venue 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 Venue View as it is being acquired.

- To complete the scan, press **Stop** or **Freeze** (or allow the scan to auto complete). Venue View is then displayed, scaled to fit entirely on the screen.
- To restart the scan, tap **Restart**, and then tap **Start** to begin the Venue View sweep.
- As you perform the long sweep, tap **Clear** while in live scan in case you wish to clear the data acquired so far and continue the sweep from the current point.

4. Perform measurements and record images.

NOTE: *Measurement error is within 10% or 4 mm of the distance you measured for all supporting probes.*

Uniform motion

The quality and usefulness of Venue 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 Venue View has no affect upon Acoustic Output values.

Color Flow mode

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.

Activating Color Flow

To activate Color Flow mode:

- Tap **Color**. The Color ROI appears over the B-Mode image. Adjust the color ROI window (as explained below).

Uses

Color Flow is useful to see flow in a broad area. Color Flow allows visualization of flow in the Color 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.

Exiting Color Flow

To exit Color Flow, select **Color-Mode** or **B-Mode**.

Optimizing Color Flow

Color Flow mode controls

Table 5-2: CF Mode Controls and effect on the image

Control	Effect on image
ROI	The smaller the color window, the faster the frame rate and vice versa.
Gain	Gain amplifies the overall strength and visibility of color samples.
Scan parameters	<ul style="list-style-type: none">• Scale: Imaging of higher velocity flow requires increased scale values to avoid Parameters aliasing.• Tissue Priority: Threshold of gray scale level where color Doppler is overwritten. Limit color flow overlay to low level echoes inside vessel walls. Help to minimize color 'bleeding' outside vessel walls.• Sample Volume Gate: Defines the sampled area from which flow data is measured.• Steer: Provide a Doppler cursor angle suitable for linear probe orientation.• Flash suppression: Decrease unnecessary low frequency signals caused by motion. Affects low flow sensitivity versus motion artifact.• Color map: Show the direction of the flow and highlight the higher velocity flows.• Invert: Allow to view blood flow according to personal preference, without flipping the probe.• Line Density: Trades frame rate for sensitivity and spatial resolution. If the frame rate is too slow, reduce the size of the region of interest, select a different frame rate setting, or reduce the packet size.• Simultaneous: While using CFM or PDI, tap the Simult. button to display B and B+Color, or B and B+PDI in real-time on the left and right side.• Lateral Averaging: While using CFM or PDI in Live mode it allows to smooth the color samples in the lateral direction.• Radial Averaging: While using CFM or PDI in Live mode it allows to smooth the color samples in the radial direction.

Adjusting Size/Position of the color Region of Interest (ROI)

Description Adjust size and position of the color ROI.

Adjusting To change position of the color ROI:

1. Tap anywhere within the ROI.

The ROI turns green.

2. Drag the green ROI to relocate it over the image.

To change size of the color ROI:

1. Touch any edge of the ROI:

The edge turns green.

2. Drag the green edge line in the desired direction.

Alternatively:

1. Touch any corner of the ROI:

Two adjacent edges of the ROI turn green.

2. Drag the green borders in any desired direction to resize the ROI.

Values Sector and Convex Probes: Ranges from 5 degrees to full B-Mode image.

Linear Probe: Ranges from 5mm to full B-Mode image.

Benefits Increase the color window to see a larger area; decrease the color window to improve frame rate and spatial resolution.

Effect 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.

Gain

Description Gain amplifies the overall strength and visibility of echoes processed within the Color Flow ROI.

Adjusting To decrease/increase Gain, slide gain touch-slider up/down.

- or -

Swipe vertically over the color bar column in the color mode image,

- or -

Tap the arrows on the **Gain** button ('Gain' on page 5-6).

Gain values change depending on the probe and application; they are not associated with a particular position of the slider.

Values Values vary by probe, application, and multi frequency setting. Gain displays as dB. Gain values are returned to the factory or

user preset value when you change Probe, Preset or Application.

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 effect on Power Output. However, with increased Gain, the power output level can usually be reduced to produce an equivalent image quality.

Scale (Velocity Scale)

Description Increases/decreases the Scale on the color bar.

Adjusting To raise/lower the velocity scale, adjust **Scale**.

Values Scale on the slider are in kHz. The full-scale on the color-map is given in velocity (cm/sec.)

Velocity Scale values are returned to the factory or user preset value when you change Probe, Preset or Application.

Benefits Imaging of higher velocity flow requires increased scale values to avoid aliasing.

Effect on other controls Changing the Velocity Scale may affect Power Output and frame rate. When you adjust the velocity scale, CINE memory is cleared.

Bioeffects Changing the 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.

Adjusting To raise/lower the wall filter, tap Wall Filter, then adjust Wall Filter slider.

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, Preset, or Application**.

Benefits	Gets rid of excess, unnecessary low frequency signals caused by motion.
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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.
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NOTE: *Invert reverses the color map, NOT the color Scale.*

Adjusting	To reverse the color flow, press Invert (Color Invert) . In Triplex, both Color Flow and Doppler Mode velocity scales are inverted.
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Values	Invert and non-Invert. Values vary by probe and application. Invert values are returned to the factory or user preset value when you change Probe , Preset , or Application .
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Benefits	Allows you to view blood flow according to your personal preference, without flipping the probe.
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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.
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Adjusting	To adjust the baseline, adjust Baseline up/down, as necessary.
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Values	Zero velocity follows the baseline. The total Scale range remains the same. Values vary by probe and application. Baseline values are returned to the factory or user preset value when you change Probe , Preset , or Application .
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Benefits	Unwraps the alias during color flow imaging. Higher velocities can be displayed without reversal of colors.
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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 linear image to the left/right, adjust Angle Steer .
Values	Linear probes can be steered left (20 degrees), center, or right (20 degrees). Angle Steer values are returned to the factory or user preset value when you change Probe , Preset , or Application .
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.

Line Density

Description	Optimizes the Color Flow frame rate or spatial resolution for the best possible color image.
Adjusting	To adjust the line density, tap Line Density and adjust with the slider.
Values	The current frame rate is shown on the display. Frame Rate/Resolution values vary by Probe , Preset , or Application . 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.
Effect 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.

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 displays. To cycle through available maps, select Map , move the hand symbol to view available maps, and press Set to select.
Values	<p>Velocity Maps: Flow shown as blue away/red toward the probe.</p> <p>Velocity Variance Maps: Provides a measure of turbulence (stenosis). Adds green to velocity maps.</p>
Benefits	Shows the direction of the flow and highlights the higher velocity flows.

Tissue priority

Description	Tissue Priority assigns the gray scale level at which color information stops.
Adjusting	To increase/decrease the gray scale Tissue Priority, select Tissue Priority left/right.
Values	<p>The settings cycle through various values: 0%-100% of the gray scale. High values display more color; low values display more B-Mode gray scale data. The Color Tissue Priority level is displayed on the Touch Panel.</p> <p>Values vary by probe and application and are returned to factory or user preset value when you change Probe, Preset, or Application.</p>
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 the value for Frame Average on the Touch Panel.
Values	Frame Average values vary by probe and application. The values are returned to factory or user preset value when you change Probe , Preset , or Application .

Optimizing the Image

Benefits	Higher frame averaging keeps the color displayed longer for increased flow visualization while lower frame averaging provides greater flow dynamics.
Effect 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.

Sample Vol (Sample Volume)

Description	Adjusts the size of the color flow Doppler transmit wave (or pulse) and size (or length).
Benefits	Lower setting gives better flow resolution and a higher setting increases sensitivity.
Bioeffects	Changing the sample volume may change the TI and/or MI. Observe the output display for possible effects.

Color Frequency (MHz)

Description	You can set the Color Frequency (MHz). Lower frequency improves penetration. Higher frequency improves color spatial resolution.
Adjusting	Tap Frequency while in Color mode and swipe slider as required.

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 color ROI as in Color mode. To exit, press PDI or select a new mode.

PDI Scan Controls	Most Color-mode scan controls are also found in PDI mode, but some color-mode controls are not used in PDI mode. The following table summarizes the scan controls:
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Table 5-3: PDI Scan controls

Control	Availability in PDI mode
Adjusting Size/Position of the color Region of Interest (ROI)	Available in PDI Mode. See color section for explanation
Gain	Available in PDI Mode. See color section for explanation
Scale (Velocity Scale)	Available in PDI Mode. See color section for explanation.
Flash suppression	Available in PDI Mode. See color section for explanation
Invert (Color Invert)	NOT available in PDI Mode
Baseline	NOT available in PDI Mode
Angle Steer	Available in PDI Mode. See color section for explanation
Line Density	Available in PDI Mode. See color section for explanation
Map	Available in PDI Mode. See color section for explanation
Tissue Priority	Available in PDI Mode. See color section for explanation
Frame Avarage	Available in PDI Mode. See color section for explanation
Lateral and Radial averaging	Available in PDI Mode. See color section for explanation
Sample Vol	Available in PDI Mode. See color section for explanation
Color Frequency (MHz)	Available in PDI Mode. See color section for explanation

Power Doppler Imaging+ (PDI+)

Description	Power Doppler Imaging + (PDI+), like regular PDI mode, 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. Meant for slower blood flows, like those found in wrists, ankles, hands, and feet, PDI+ provides higher resolution than regular PDI mode. A detailed description, adjusting methods and scan controls appear above ('Power Doppler Imaging (PDI)' on page 5-28).
NOTE:	<i>PDI+ supports all scanning modes and controls supported by PDI, except needle and simultaneous modes.</i>
NOTE:	<i>PDI+ is only available for the L4-20t-RS and L10-22-RS probes in the Wrist/Hand and Ankle/Foot presets.</i>
Adjusting	Tap PDI . The color flow window appears over the B-Mode image and a PDI+ button appears in the right-hand menu.

Optimizing the Image

Tap **PDI+** to enter PDI+ mode. The sensitivity in the color ROI increases. Move the color ROI as in Color mode.

To exit tap **PDI+**, tap **PDI**, or select a new mode.

NOTE: *PDI + mode is not recommended for deeper flows. If you are scanning deep flows with PDI +, activate regular PDI.*

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. Tap **M-Mode** or **Cursor**.
3. Position the mode cursor over the area that you want to display in M-Mode.
4. Tap **M-Mode**.
An M-mode trace appears. Both B-mode and M-mode are in live mode.
5. Adjust the Sweep Speed, Gain, Power Output, and Focus Position, as needed.
6. Press **Freeze** to stop the M trace.
7. Tap **Store** to save image to archive.
8. Press **Freeze** to continue imaging.
9. To exit, press **M-Mode** or **B-Mode**.

M-Mode Display & Controls

Cursor

Adjusting To position the M-Mode cursor, touch the M cursor with your finger and drag it right or left to reach proper position.

Gain

Description M-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 increase/decrease gain, slide the gain slider up/down, or tap on the up/down arrows on either end of the scale.

Gain values vary depending on the probe; they are not associated with a particular position of the gain-slider.

NOTE: *Changing the M-Mode Gain while in both M-Mode and B-Mode are Live affects both M-Mode and B-Mode image gain.*

NOTE: *Changing the M-Mode Gain while in Live M-Mode and frozen B-Mode does not affect the B-Mode image gain.*

Preset You can store gain setting to any probe-preset.

Values Gain displays on the monitor in db. Maximum gain varies by probe. Gain values vary by probe, application, and frequency setting.

NOTE: *Maximum gain is factory preset to an optimum setting to eliminate noise in the display.*

Gain values are returned to the factory or user preset value when you change **Probe**, **Preset**, **Application**, or **New Patient**.

Benefits Gain allows you to balance echo contrast so that cystic structures appear echo-free and reflecting tissue fills in.

Effect 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.

NOTE: *Always optimize gain before increasing the Power Output.*

Sweep Speed

Description Changes the speed at which the timeline is swept.
Available in M-Mode, Anatomical M Mode, PW/CW Doppler, and M-Color Flow modes

Adjusting Use one of the following methods:

- Place two fingers over the M-Mode image and pinch or spread, to decrease or increase sweep-speed respectively.
- Tap the Sweep Speed button on the scan controls. A slider pops up. Move slider to increase/decrease the 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 **Probe**, **Preset** or **Application**.

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

NOTE: *The sweep speed information, displayed in units of [mm/sec] 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.*

Layout

Description Tap Layout several times to modify the dimensions of the B-mode and M-mode area division.

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.

Optimizing the Image

Activating	To activate Anatomical M-Mode, tap AMM (Anatomical M Mode).
NOTE:	<i>AMM is only available on Cardiac applications on sector probes.</i>
Adjusting	<p>Place two fingers over the M Cursor and use rotating motion to rotate the M Cursor to any desired angle.</p> <p>Tap the M Cursor with one or two fingers to drag it and position it over the required area of the B-Mode image.</p>

M Color Flow Mode

Description

M Color Flow is used for cardiac applications. There is a cursor on the B-Mode image that determines the extent of the Color.

Color mapping is overlaid on top of the M Mode scroll image.

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.

Activating

To activate M Color Flow Mode, tap **MM** (M-Mode). Then tap **Color** (Color Flow) - or - tap **Color**, then **MM**.

To toggle between M Color Flow controls and Color Flow controls, press the appropriate Touch Panel Mode tab.

Values: ON/OFF

Benefits

Color Flow Mode and Color 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.

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 section 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. Select the preset, application and probe to be used.
2. Locate the anatomy to be examined. Get a good B Mode image. Tap **Color** to help locate the vessel you wish to examine.
3. Tap **Cursor** to display the PW-cursor over the image,
- or -
Tap **PW** mode.
The **PW cursor** appears.
4. Position the **PW cursor** as necessary.
5. Tap **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.

6. Position the sample volume cursor by touching the cursor and moving it left and right, Up and down. Size the gate as required.
7. Optimize the PW Doppler spectrum, as necessary. Refer to the Doppler Optimization section of this chapter for more information.
8. To exit PW Doppler Mode, tap **PW**, or **B** mode.

PW Doppler Mode Display

Table 5-4: PW Doppler Mode Display

Doppler Display	Effect on image
Scale	Velocity Scale, displayed as cm/sec. or m/sec.
Wall Filter	Wall filter size, displayed as WF in cm/sec.. Removes the noise caused by vessel or heart wall motion at the expense of low flow sensitivity.
Doppler Gain	Displays 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.
Sweep Speed	Controls speed of spectral update. 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). When the velocity scale is less than 10 cm/s, it is displayed to the first decimal point (4.6 rather than 5 cm/s). The Doppler velocity scale adjust as you adjust the Scale.
Compression	Affects the amount of Doppler amplitude data displayed.
Auto	Auto in PW Doppler Mode 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.

Activating Triplex Mode

To activate Triplex Mode, enter color PW mode then tap **Simultaneous** located in the scan-controls area.

The Doppler spectrum displays along with the Color Flow and B-Mode image.

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.

CW Doppler - Steerable Continuous Wave Doppler (CW)

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.

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.

Activating CW Doppler

To activate CW Doppler Mode, press CW once to see the Doppler cursor, and once again to view the spectrum.

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

You can now position the line cursor over the required area of flow. Use Doppler Audio to listen for when the cursor is positioned over an area of flow.

Tap **Update** to toggle between real time B-Mode with Doppler Mode and real time spectral display.

Tap **Simult.** to view real time CW Doppler and B-Mode display.

To exit CW Doppler Mode, tap B mode or tap CW mode button.

NOTE: CW is available only in Cardiac presets on sector probes.

Update

Description	Toggles between Live Doppler and live B-mode. Available in PW and CW modes.
--------------------	---

Optimizing the Image

Adjusting	When Simultaneous is OFF, either the image or timeline is active. Tap Update to switch the active side between the image and the timeline.
	When the Update button is off (gray) it pauses the image while keeping the CW/PW timeline active. Tap Update again to turn it ON (blue) to pause the CW / PW timeline and run the image.
Values	ON/OFF
Benefits	Update increases the Spectral Doppler display quality.

Bioeffects Activating Update may change the TI and/or MI. Observe the output display for possible effects.

Simultaneous (Duplex/Triplex)

Description	Duplex allows two modes to be active at the same time; Triplex allows three modes to be active at the same time.
	<ul style="list-style-type: none">• B + PW (Duplex)• B + PW + Color (Triplex)

Tap **Simult.** To toggle between simultaneous and update presentation while viewing the timeline. Available in PW and CW modes.

Tap **Update** pause the image while keeping the CW / PW timeline active.

When **Simultaneous** is OFF, either the image or timeline is active. Tap **Update** to switch the active side between the image and the timeline.

Adjusting Tap Simultaneous to turn ON or OFF.

Benefits Allows the user to have multiple modes active at the same time.

Auto Spectrum Optimize (ASO-Auto)

Description	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). "Running Auto Spectral Optimization" appears at the bottom of the monitor upon activation. Upon deactivation, the spectrum is still optimized.
--------------------	---

Adjusting	Tap Auto while the PW/CW timeline is active. The baseline and vertical scale will undergo a momentary re-adjustment, to optimize the display of the current spectrum.
Benefits	Auto can shorten optimization time and provide a more consistent and accurate optimization process.
Effect on other controls	You may need to adjust the Gain.

Doppler Sample Volume Gate Position

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 sample volume gate position, tap the cursor (it turns green when selected) then move it in any direction until it's positioned inside the vessel of interest.
NOTE:	<i>Gate may be adjusted if Doppler is in Live mode, also when B-mode is in Freeze.</i>
Values	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, tap SV Length button and adjust SV Length slider. Or, Place two fingers over the Doppler gate and perform a "spread" or "pinch" gesture to enlarge or reduce, respectively, the SV gate size.
Values	Values vary by probe and application. Sample volume gate size values are returned to the factory or user preset value when you change Probe , Preset or Application .

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.

Scale (velocity Scale)

Description Adjusts the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines pulse repetition frequency (PRF).
If the sample volume gate range exceeds single gate Scale capability, the system automatically enters HPRF mode, displaying multiple gates along the cursor.

High PRF 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.

The system enters High PRF mode automatically, whenever required due to settings of other parameters such as Doppler scale or gate position. In HPRF mode there will typically be additional sample volume gates, colored red, on the Doppler cursor.

NOTE: *Ensure that only one gate overlays a blood vessel at a time. Otherwise, signals from more than one flow area are superimposed.*

Adjusting To raise/lower, tap **Scale** and adjust the **Scale** slider on the Touch display. The display updates velocity scale parameters after you adjust the velocity scale.

Values Velocity Scale values vary by probe and application. In Triplex, when you change the velocity scale in Color Flow, the Doppler Mode velocity scale is also updated if Triplex is on.
Velocity Scale values are returned to the factory or user preset value when you change **Probe**, **Preset** or **Application**.

Benefits Blood flow information is not cut off due to the effect of aliasing.

Effect on other controls When you raise the velocity scale, the spectral waveform may decrease in size; when you lower the velocity scale, the spectral waveform may increase in size. Changes in the spectrum are relative to changes in the velocity scale, that is, it sizes accordingly. When you adjust the velocity scale, CINE memory is cleared. Adjustments may affect sample volume size and Doppler wall filter.

Bioeffects Changing the velocity range may change the TI and/or MI. Observe the output display for possible effects.

Angle Correct

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.

NOTE: *When the Doppler Mode Cursor and angle correct indicator are aligned (the angle is 0), you cannot see the angle correct indicator.*

Adjusting Flow toward the probe is mapped above the baseline and vice versa.

To adjust the angle relative to the probe face, tap **Angle Correct** and adjust with slider. The velocity scale changes when you adjust angle correct.

Values 1 increments from 0 to 90. The possible range of operation is from 0 degrees to 90 degrees in either direction. For optimum velocity measurements, the angle of incidence should be between 45-60 for vascular applications.

Angle Correct values vary by probe and application. Angle Correct values are returned to the factory or user preset value when you change **Probe, Preset or Application**.

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 to 60 degrees (or 10 degrees in cardiac applications).

Adjusting To quickly adjust the angle, tap **Quick Angle**. Quick Angle varies between 60 degrees left/right and 0 degrees.

Optimizing the Image

Values 0 degrees and 60 degrees (or 0 and 10 degrees in cardiac applications).

Wall Filter

Description Filters out low flow velocity signals. It helps get rid of excessive noise caused from vessel movement.

Adjusting To increase/decrease, select **Wall Filter**, then adjust Wall Filter slider.

Values Values vary, depending upon the probe and application. The current value displays on the Touch Panel and the monitor. Wall Filter values are returned to the factory or user preset value when you change the following: **Probe**, **Exam Category**, **Preset**, or **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.

Effect on other controls Wall filter may be changed by changes to the velocity scale.

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. To shift the baseline, drag **Baseline** up down directly on the spectral image, or tap on baseline key and adjust with slider.

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 50% is the center of the display, +95% is the top edge of the display and 5% is the bottom edge of the display. Baseline values vary by probe and application and are returned to the factory or user preset value when you change **Probe**, **Preset** or **Application**.

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.
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Mode Cursor

Description	Displays the Doppler Mode cursor on the B-Mode image.
Adjusting	To activate/deactivate the Doppler Mode cursor, tap Cursor . The Mode Cursor key is highlighted. Drag the cursor on the image to position on the desired target. Tapping PW/CW or M-Mode is an alternative way to turn the mode-cursor ON.

Values	ON/OFF
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Benefits	Lets you position the cursor before you go into Doppler Mode.
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Steer

Description	You can slant the Mode Cursor or 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.
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Adjusting	To slant the Mode cursor or the color ROI on the linear image to the left/right, adjust Steer to the left or right. Press Steer .
------------------	---

Values	Linear probes can be steered left (20 degrees), center, or right (20 degrees). Steer values are returned to factory or user preset value when you change Probe , Preset or New Patient .
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Benefits	Provides a Doppler cursor angle suitable for linear probe orientation. Beneficial in Vascular applications.
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Bioeffects	Activating angle steer may change the TI and/or MI. Observe the output display for possible effects.
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Audio Volume

Description	Controls audio output.
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Optimizing the Image

Adjusting To adjust the audio, tap **Volume** while scanning in PW or CW, then slide the control. The volume defaults to the last Doppler audio volume setting.



CAUTION

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

Values Usually, a one-third adjustment of the slider gives you the best volume. The volume decreases/increases logarithmically.

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

Invert

Description Vertically inverts the spectral trace without affecting the baseline position.

Adjusting To invert the spectral trace, press **Invert**.

The plus (+) and minus (-) signs on the velocity scale reverse when the spectrum is inverted.

Positive velocities display below the baseline.

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

Values Forward/reverse. 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 **Probe**, **Preset** or **New Patient**.

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.

Compression

Description Compression controls how echo intensities are converted to shades of gray, thereby increasing the range of contrast you can adjust.

Adjusting	You access Doppler compression while in live Doppler Mode. To increase/decrease, swipe the slider left/right.
Values	The current value displays on the slider. Compression values vary by probe and application and are returned to the factory or user preset value when you change Probe , Preset or Application .
Benefits	Optimizes the image's texture and smoothness by increasing or decreasing the amount of gray scale.
Effect on other controls	Dynamic range operates only in realtime; Compression is available while frozen, in CINE, or CINE Timeline.

Layout - Display format

Description	Changes the horizontal border between B-Mode and M-Mode or Doppler Mode, making the B-mode and timeline image larger or smaller.
Adjusting	Select Display Format .
Values	Vertical 1/3, 1/2, or 2/3 B-Mode, or Timeline Only.
Benefits	You can select how to have your Doppler timeline and anatomy displayed.

TDI mode

Introduction

TDI or Tissue Doppler Imaging (sometimes called TVD or Tissue Velocity Doppler) is a mode of operation where Pulsed Wave (PW) Doppler is used to plot the velocity of the heart muscle or myocardium through the phases of one or more heart-cycles.

The tissue velocity curves are in general taken by positioning the PW Doppler sampling gate over the base of the mitral annulus at the insertion of the mitral leaflets, in the septal and lateral points of the four-chamber view. Similarly, it is used to plot the anterior and inferior mitral annulus points of the two-chamber view.

Operation

NOTE: *TDI mode is available on the 3Sc-RS probe in the cardiac preset.*

1. Activate the 3Sc-RS probe in the cardiac preset.
2. Tap **PW** once, or tap **Cursor** once.
A TDI button appears along the scan controls row of buttons.
3. Tap **TDI** once.
A simultaneous B+PW mode activates.
4. Position the PW sample volume over the moving tissue structure to obtain the TDI plot.

The scan controls used in TDI are like the ones used in PW Doppler.

NOTE: *HPRF, Wall filter, Reject and Compress controls are not available under TDI mode.*

ECG (option)

Introduction

The system supports an ECG module, capable of displaying the patient's ECG trace and heart rate. The ECG trace is generated by monitoring the patient, using 3 ECG electrodes, or by interfacing to an external ECG monitor.



CAUTION

Use only GE accessories.

Conductive parts of electrodes and associated connectors for applied parts, including neutral electrodes should not contact other conductive parts, including earth.

Simultaneous use of two or more applied parts causes summation of patient leakage currents.



CAUTION

Heart rate may be adversely affected by cardiac arrhythmias or the operation of cardiac pacemaker pulses.

NOTE: *The heartrate extracted from the ECG trace is expressed in bpm (beats per minute) with maximal error of +/-5%.*

NOTE: *The ECG functionality is not intended for patient monitoring nor to support alarm functionality. This input is intended as a tool for synchronization and gating of images and cineloop control during ultrasound examinations.*

Overview

An ECG input is available (optionally) on Venue Go. The ECG connector accepts ECG signals, either directly from body electrodes, or from an external bedside ECG monitor.

The displayed scanned image is synchronized with the ECG trace. In Doppler or M-Mode, the traces are synchronized to that particular mode's sweep. The user can control the gain, position and sweep speed of the traces ('ECG settings menu' on page 5-52).

Approved accessory cables provide the proper signals to the system's ECG input.



WARNING

- Do not use the Venue Go ECG trace for diagnosis and monitoring.
- Only approved and recommended peripherals and accessories should be used.
- ECG electrodes should not make contact with other conductive parts, including earth.
- After the defibrillator stimulates the patient, the ECG needs 4 to 5 seconds for recovery.
- The quality of the ECG trace depends on the stability and conductivity of the electrodes during the examination. Patient's movements can introduce noise or disturbances on the trace.
- Make sure that the lead wires do not swing.
- Clean the cables with a hospital approved cleaning procedure such as those recommended by AAMI or AORN. Do not immerse cables in water.
- Worn or damaged ECG electrodes cables are the most common cause of poor ECG signals. ECG signals (or wave patterns) that consistently contain noise or artifact may suggest need for ECG electrodes replacement.
- The ECG module (Figure 2-9) is not waterproof. Do not expose the module to water or any kind of liquid. Maintain in a dry place
- The ECG module may be wiped clean with a soft cloth. Do not use harsh cleaning agents to clean the unit.



CAUTION

Use only approved, defibrillation-proof ECG electrodes patient cables. An example of such a cable appears in Figure 5-5.

Approved patient cable names and part numbers are:

- ECG IEC Pat. Cable: 5146739
- ECG AHA Pat. Cable: 5146056



Figure 5-5. ECG electrodes patient cable

NOTE: *With the use of a special cable adapter it is possible to interface the Venue Go to an external bedside ECG monitor. Please use **External ECG cable plus adapters, P.N H48972AG**. You may need some assistance from a GE field engineer.*

ECG cable

The ECG cable consists of a triple color-coded electrode cable to be inserted into the ECG input connector. Each electrode cable hooks up to the appropriate stick-on electrode by a color-coded clip type connector.

Table 5-5: ECG lead placement

Lead	Patient cable marking		Position on patient
	AHA	IEC	
I	RA (white)	R (red)	Right arm
II	LA (black)	L (yellow)	Left arm
III	RL (green)	N (black)	Right leg

ECG Trace Display

When ECG trace is turned On, the scanned image is synchronized with the ECG trace. In Doppler or M-Mode, the traces are synchronized with that particular mode's sweep.

The user can control the gain, position and sweep speed of the traces.

ECG settings menu

1. Tap **Settings**.

If the ECG module is available, an ECG button appears on the vertical column .

2. Tap **ECG**.

The ECG Settings menu controls ECG input signals.

Table 5-6: ECG settings menu

Parameter	Description
Sweep speed	Changes trace speed. The sweep speed of the physio signal on the B-Mode image can be set independent of the timeline (Doppler and M-Mode) sweep speed.
ECG display	Turns ON the ECG trace and Heart Rate detector for display on the monitor.
ECG gain	Controls ECG trace amplitude.
ECG position	Controls ECG trace vertical positioning on the image display.
Invert	Vertically inverts the ECG trace.

Chapter 6

Scanning and Display Functions

*Describes additional ways in which to adjust the image.
In addition, describes ways to get useful information
electronically.*

Zooming an image

Introduction

Zoom is used to magnify a selected portion of the image. You can zoom a live or frozen image with your fingers.

Zoom magnifies the display of the data without making any changes to the ultrasound image data that is acquired.

Zoom is available in Live, frozen, Cine, or recalled images.

Activating Zoom

Using two fingers with "spread" or "pinch" gesture, you may magnify or reduce the image size respectively. A reference image appears in the lower-left area of the display.

Bioeffect

None

Split Screen

Overview

To activate split screen, press **Split**.

NOTE: *The Split button appears on the scan control area, on the right side of the screen.*

- Live mode:
When you tap **Split**, both the latest frame that the system automatically stored and the live image will be on the screen.
- Frozen mode:
When you tap **Split**, both the latest image that you stored and the live image will be on the screen.

To exit split, tap **Split** or **B Mode**.

Simultaneous split in color or PDI modes

Simultaneous: While using CFM or PDI, tap the Simult. button to display B and B+Color, or B and B+PDI in real-time on the left and right side.

NOTE: *When using linear array probes at a shallow depth of 2 cm or less, screen splitting is horizontal, with the two images one above the other. On deeper fields of view, the screen splits vertically with the two images appearing side-by-side.*

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:

- Tap **Freeze**.

The **Freeze** key turns blue and image is set to freeze mode (Frozen image).

If you are in a mixed mode, both screen formats stop immediately. Deactivating Freeze restarts both modes and places a black bar on the trace to indicate the time discontinuity.

To reactivate the image, tap **Freeze** again.

The **Freeze** key becomes gray (unfreeze). Image turns into real time scan mode (Live image).

NOTE: *Deactivating Freeze erases all measurements and calculations from the display.*

NOTE: *When probe L4-12t-RS is used, one of its buttons may be configured to activate Freeze.*

Post-processing

You can use the following controls to process a frozen B-Mode image:

- Map
- Zoom
- Rotation
- Reverse
- Rejection
- Compression
- Gain

You can use the following controls to process a frozen Color Flow or Doppler Mode image:

- Angle Correct
- Invert
- CF
- Tissue Priority

NOTE: *Color cannot be added to B-Mode image that has been frozen.*

NOTE: *Color, Doppler or M-Mode can be removed or restored from an image while in Freeze mode, by simply tapping on the appropriate mode button.*

Using Cine

Introduction

CINE is useful for focusing on images during a specific part of the cycle or to view short segments of a scan session.

CINE images are constantly being stored by the system and are available for playback or manual review via CINE.

Timeline data is continually stored, filling up a time-line data buffer, along with corresponding B-Mode images.

You can view CINE as a continuous loop via CINE Loop controls or manually review CINE images frame by frame.

Data in Cine is available until new data is acquired. CINE is stored on the system's memory and can be archived in the storage device.

Activating Cine

To activate Cine:

- Tap **Freeze**.
- Swipe your finger over the image left or right, to browse the cine fram-by-frame,
 - or -
- Touch the frame handle control (Figure 6-1, item 3) and drag it left or right.

Cine controls

Table 6-1: Cine controls

Control	Effect on image
<	Previous frame
>	Next frame
Play/Pause	Playback/Pause the Cine loop

NOTE: Use fingers to select the processing bar to view frames.

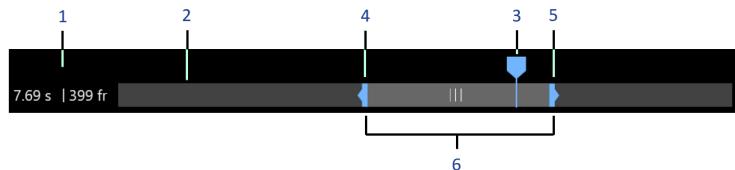
Cineloop overview

When the scan mode is frozen, the system automatically displays the CINE gauge control (Figure 6-1).

The CINE gauge (located on the bottom of the monitor), initially appears in a simplified format. Later, upon replaying the cineloop, the Cine Gauge appears in the Extended format (Figure 6-1).



Simplified CINE gauge



Extended CINE gauge

1. Frame and time readout
2. Cine bar
3. Frame handle: marks the **current frame**
4. Left trim marker: marks the **start frame**
5. Right trim marker: marks the **last frame**
6. Clip marker: marks the **loop length and position**

Figure 6-1. Cine gauge controls

The CINE gauge, together with some buttons located adjacent to it, allows to control different cineloop functions.

To view a cineloop frame-by-frame

1. Scan in any mode and tap **Freeze**.
2. Place a finger over the frame handle and drag it horizontally.
The cineloop scrolls frame-by-frame. The frame indicators readout changes accordingly.
3. Lift the finger to stop frame motion.

Frame indicators

In addition to the Frame Handle, there is a readout indicating which frame you are viewing of the whole loop (for example: 47:231), as well as the time at which this frame occurs within the loop (for example: 2.23:5.23 s)(Figure 6-1, item 1).

To play a cineloop

1. Scan in any mode and tap **Freeze**.
2. Tap **Replay**.

The boundary and clip markers (Figure 6-1, items 4, 5, and 6) appear over the Cine bar.

The cineloop begins playing between the two displayed boundaries.

The default distance between the boundary markers is according to a pre-configured Loop-length setting.

- When the ECG is in use, the pre-configured length is given in number of detected heart cycles.
- When ECG is not in use, the length is given in seconds.

To adjust a cineloop

While the cineloop is playing ('To play a cineloop' on page 6-8), the following adjustments are available:

- Drag the left trim marker to adjust the cineloop's **start frame**.
- Drag the right trim marker to adjust the cineloop's **last frame**.
- Drag the clip marker to adjust the cineloop's **length and position**.
- Tap Cycle select to move between heart beats and select the heart cycle of interest (requires the use of ECG).
- Tap **Number of cycles** to select the number of heart beats to play back (requires the use of ECG).

To adjust cineloop playback speed

Tap **Speed** in the Cine control area (Figure 6-1) and adjust **Speed** to set the cineloop playback speed.

Annotating an Image

Introduction

Select **Comment** to activate comment mode.

The comment function provides the capability to type the comments of free text and/or add the comments from the comment library. It also provides the operator with bodymark and arrow pointers.

Comment retention

Comments are retained and carried over when switching to multi-image 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.

Annotating an image using the library

Annotating an image using the system preset library

1. Tap **Comment**.
2. Choose the desired comment from the system preset library.

NOTE: *You may swipe the screen to see more comments in the preset library.*

3. Move the annotation box to the desired position. Press anywhere on the scanning screen to set the comment or tap **Clear**  or **Clear All**  to clear the comment.

Annotating an image with typed words

1. Tap **Comment**.
2. Use the keyboard to type comments.

3. Move the annotation box to the desired position. Press anywhere on the scanning screen to set the comment or select to clear the comment.

Edit while annotating

There are two modes of comments available: **Active** and **Confirm**. The comments are green while active and yellow when set.

NOTE: *Comments can only be edited in the active mode.*

To delete an annotation

1. Tap **Freeze**.
2. Select **Comment**.
3. Select the desired comment (it changes to green fonts).

NOTE: *Text and bodymark annotation may be customized to user's preference ('Text Annotation and Bodymark configuration' on page 8-29).*

4. Tap **Clear** to delete the selected comment.

NOTE: *To delete all the comments, tap Clear All.*

NOTE: *If you select Delete All, all comments, including arrow pointers, bodymarks and text, will be deleted.*

To move an annotation

1. Tap **Freeze**.
2. Select **Comment**.
3. Select the desired comment and drag it to the target position.

To set the Home position

The default location where text may be typed on the screen is the Home Position. It is possible to set the default home position at any time from the Annotation screen.

To set the home position:

1. Tap **Comment**.

If there is any pre-existing annotation text tap **Clear All**



beneath the annotation menu.

2. Tap any point on the image to position the text marker on the desired default home position.
3. Tap **Home**  beneath the annotation menu.
The home position default location is set.

Bodymark

1. Tap **Bodymark**.
A large bodymark appears with a symbol for the probe.
2. Position the probe symbol to indicate the scanning position:
 - Touch the probe symbol on its front part to move it.
 - Touch the probe symbol on the handle to rotate it.
3. Tap **Done** to close the large bodymark. A small bodymark is placed on the upper left corner by default.
4. Should you wish to move it, simply drag the bodymark anywhere on the screen.

NOTE: *Tap Clear to remove the bodymark from display.*

Arrow Pointers

1. Tap **Comment**, then select **Arrow**.
2. Select the desired arrow pointer and move it to the target position on the screen.

NOTE: *You may change the size of the arrow pointers by selecting Small, Medium or Large.*

3. Press anywhere on the scanning screen to set the arrow pointer or press to delete it.

Scribble

Scribble is a tool meant to assist the user during system training and teaching by providing the user with a touch operated pointer and free drawing that are also visible on an external monitor and/or share screen.

Scribble is available for the following screens: Scan, Patient, Config, Review, Worksheet, and Lung sweep.

Activating Scribble

Tap **Scribble** on the right-hand menu .

- A floating menu appears on the screen containing the following buttons: **Pointer**, **Pen.t**.



- **Pointer** is highlighted and active by default, and includes a drop-down menu with a capture button.
- To mark or to add free annotations on the screen, tap **Pen**. A drop-down menu appears with the following selection: **Undo**, **Redo**, **Clear all**, and **Capture**.
- Toggle between **Pen** and **Pointer**. The active button is highlighted accordingly.

NOTE: *The pointer location, as well as markings and annotations remain unchanged when toggling between Drawing and Pointer.*

- The floating menu can be relocated by dragging it across the screen.
- The menu can be collapsed, and the buttons hidden, by tapping **More/Less**.
- Tap **Close** to exit Scribble.

Using Scribble

When **Pointer** is selected:

- The pointer remains visible.

NOTE: *The pointer is not visible when it's dragged over Scribble's floating menu.*

- Pointer is operated by drag and drop. Move the pointer by tapping and dragging it; lift your finger off the screen and the pointer stays in its location.
- When pointer is active the user may perform other actions such as pressing on buttons, gestures, changing modes, and measurements.
- The pointer stays in its location while the user performs other actions.

When **Pen** is selected:

- Any touch on the screen creates a drawing on the screen.

NOTE: *Drawings are not visible over Scribble's floating menu but are hidden beneath.*

NOTE: *While using Drawing in an active scan screen, the store and freeze buttons are active and available for use. Drawing does not work over these two buttons.*

NOTE: *All drawings and annotations are stored both in cine and in a still image, while Scribble's floating menu is not.*

- The user can remove the last annotation by tapping **Undo** on the drop-down menu.
- The user can recover the last drawing that was removed, by tapping **Redo** on the drop-down menu.
- The user may remove all drawings on the screen by tapping **Clear** on the drop-down menu.

When **Capture** is selected:

- A secondary capture of the screen is be taken and added to clipboard.

NOTE: *To protect sensitive data, capture is not available in the following patient screens: Patient information, Local archive, Manage Archive and Worklist.*

- The captured image includes all existing drawings and/or pointer. The captured image does not include the floating menu.

NOTE: *To protect sensitive data, if a title bar exists on the current screen, the captured image anonymizes the patient ID and name by replacing them with asterixes (**).*

- If there is no opened exam when tapping on capture, Venue Go opens a new exam and saves the capture to it.
- You can export the capture.

Important notes

NOTE: *If a message such as Battery indication or Overheat alert appears while Scribble is active, the system temporarily disables the active drawing or active pointer before displaying the message.*

NOTE: *All open drawings on-screen are cleared when exiting Scribble. This includes moving to a different screen, such as Simple screen.*

Using InSite RSVP

InSite RSVP

InSite RSVP is your direct link with a GE Online Service Engineer or Applications Support Engineer by creating a Request for Service via the InSite RSVP link at the top of the display screen.

Types of InSite RSVP service

- **Contact GE.** Opens a service dispatch with GE Service.
- **Connect Clinical Lifeline.** Sets the system in a state of readiness for Virtual Console Observation.
- **Connect to GE.** Direct contact with GE Technical Support.

Initiating a Request for Service (RFS)

To initiate an RFS,

1. Tap the GE InSite RSVP icon, located at the top of the display.

This opens the RFS screen, which sends a service dispatch directly to Remote Service or Applications Team after you fill in the following information:

- Type in last name, first name, phone number
- Select problem type
- Select problem area
- Type in the problem description

2. Tap **Send**.

The RFS is initiated, and the following prompt appears:

Contact GE

System Id: VGC999996VENGO

Problem Type: Service

Problem Area: Hardware Mechanical

Problem Description: the fan makes loud noise

First Name: my name

Last Name: last name

Phone Number: 123456789

Email: a@a.com

Submit Reset

Figure 6-2. Request for Service confirmation prompt

3. Tap OK.

All requests for service are listed on the queue for your review.

Contact GE

System Id: VGC999990VENGO

Problem Type:

Problem Area:

Problem Description:

First Name:

Last Name:

Phone Number:

Email:

✓ Request submitted successfully. Your RFS request number is: 04554577

Figure 6-3. Request for Service Queue

You can confirm your RFS submission, as well as RFS's automatically sent by the system. The Venue Go can automatically submit a Request for Service. These are displayed on the Machine Queue.

In addition, you can use the Users screen to identify your institution's point of contact for service dispatches.

Initiating a Technical or Clinical Support Request

When the Remote Applications or Service person reaches you, they will ask you to click the InSite icon and choose either **Connect to GE** or **Connect Clinical Lifeline**.

To initiate Technical or Clinical support:

1. Tap the GE InSite RSVP icon, located at the top of the display.
A pop-up appears with the following options:
 - Connect to GE
 - Connect Clinical Lifeline
 - Cancel
2. Select the option the GE representative asks you to select.

NOTE:

*Selecting **Connect to GE** changes the polling time from 15 minutes to 15 seconds so that your call can be answered as quickly as possible. Selecting **Connect Clinical Lifeline** also activates disruptive mode.*

InSite RSVP icons appear differently, depending on their state:

Table 6-2: InSite Icons

GE InSite – Connected	
GE InSite - Connected; Disruptive Mode - Enabled	
GE InSite - Connected; Disruptive Mode - Disabled	
GE InSite - Idle; Disruptive Mode - Enabled	

Table 6-2: InSite Icons

GE InSite - Idle	
GE InSite - Software Available for Download	

InSite RSVP definitions

Here are definitions for the different InSite RSVP states:

Virtual Console Observation (VCO). Allows Technical Support to control Venue Go functionality remotely.

Disruptive. Allows GE's Technical Support person to connect to your system via VCO, to run diagnostics directly on your Venue Go 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 RSVP is activated, but not open for Technical Support access. If you see a yellow icon, InSite RSVP is activated and the Technical Support person can look around on your system, but cannot perform any service-related functions.

Connected. InSite RSVP is connected.

Not Connected. InSite RSVP is disconnected.

NOTE: *When Disruptive mode has been activated or a diagnostic has been run, the message, "Due to Service testing restart needed" 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 RSVP

The GE Technical support person exits Disruuctive mode and VCO, and then asks you to reboot Venue Go.

Electronic Documentation

Documentation Distribution

Documentation is provided via:

- AIUM Acoustic Output Booklet (USA only)
- Online Help (on the Ultrasound Scanner via Help)
- Internet: GE healthcare Documentation web site
- Electronic media. You can view user documentation on a PC, which includes:
 - Basic User Manual (translated)
 - Reference Manual (English only)
 - Release notes (translated)
 - Basic Service Manual (English only)

NOTE: *All user documentation is provided in multiple languages if translations were available at the time of media publication.*

Using online help

Online Help is available via the **Help** icon.

Tap **Settings** then tap the **Help** button.

The User Manual appear on a PDF browser screen. You may use different swipe gestures to navigate the manual. Tap the "binoculars" icon to search for a term.

Paper copy

The EU Commission Regulation on electronic instructions for use of medical devices, in the European Union, states a paper copy of Instructions for Use can be ordered at no additional charge. Send a request to your Sales or Service representative. They will transfer your request to: CEMEURDIST@med.ge.com. This request should be treated within 7 days.

Available on the Internet

The latest version of the instructions for use is available on the Internet at:

<https://customer-doc.cloud.gehealthcare.com/#/cdp/dashboard>

On the home page, under **Search Direction Number**, enter Direction 5903763-100 for the User Manual, or 5903669-100 for the Service manual. Select **Search**.

When the desired document appears, either download the file, or select the file name link to view the file.

Label/Icon	Purpose/Meaning	Location
	Symbol indicating that the instructions for use are supplied in electronic form.	<ul style="list-style-type: none">• Rating plate on the rear panel• Upgrade label

Electronic media

Accessing documentation via a Windows PC

To view user documentation on a Windows PC,

1. Insert the USB flash drive (supplied with **Venue Go**), labeled **Venue Go R3, P/N 5903763 Rev. 1** or higher, into an available USB port and access it.
2. Navigate to the following folder:
{drive letter}:\DOC_MEDIA
3. Double-tap **gedocumentation.html**.

An index page opens, listing the languages in which the User Manual is available.

NOTE: *If the html file does not open, right click the 'gedocumentation.html' document and open with a different internet browser.*

4. Select the item you want to view (tap the blue, underlined link in the File Name column). To close the window, tap the 'X' in the upper-right corner of the browser window.

NOTE: *If your PC does not have Adobe Reader, a free download is available on the [Adobe website](#).*

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 using 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.



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 and trained personnel following good clinical practice.



Please remember that you are responsible for confirming the correctness and accuracy of the user input formula that is added to your system on your behalf.

General Instructions

You can take measurements in all modes and image formats, including real-time, frozen, CINE or images recalled from archive. After you select a preset which, in turn, defines an exam category, the available calculations are displayed in the measurements menu.

Measure & Assign Vs. Assign & Measure

The system provides functionality for two measurement conventions:

- **Assign and Measure:** the user activates the Measurement mode, selects and then performs a pre-labeled measurement.
 - The user is guided through the study.
 - The selected measurement is highlighted in the Measurement menu.
 - The performed measurement is indicated in the Measurement menu.

The studies and their parameters are user-configurable. The user can create its own studies containing the relevant measurements ('Measurement menu' on page 8-17)

- **Measure and Assign:** the user activates the Measurement mode, then selects and performs a generic measurement.
After completion, the user may assign a label to the measurement.

Generic Distance measurements

This section describes the performance of "Measure & Assign", thus a simple generic distance measurement is performed and later assigned to a predefined label.

1. Tap **Freeze** and then tap **Measure**.

A pointing hand symbol appears with an active measurement caliper above it (Figure 7-1).



Figure 7-1. Open pointing hand symbol

The symbol for an active measurement caliper is a green open plus sign.

A measurement menu appears on the left edge of the screen to provide different measurements tools and parameters.

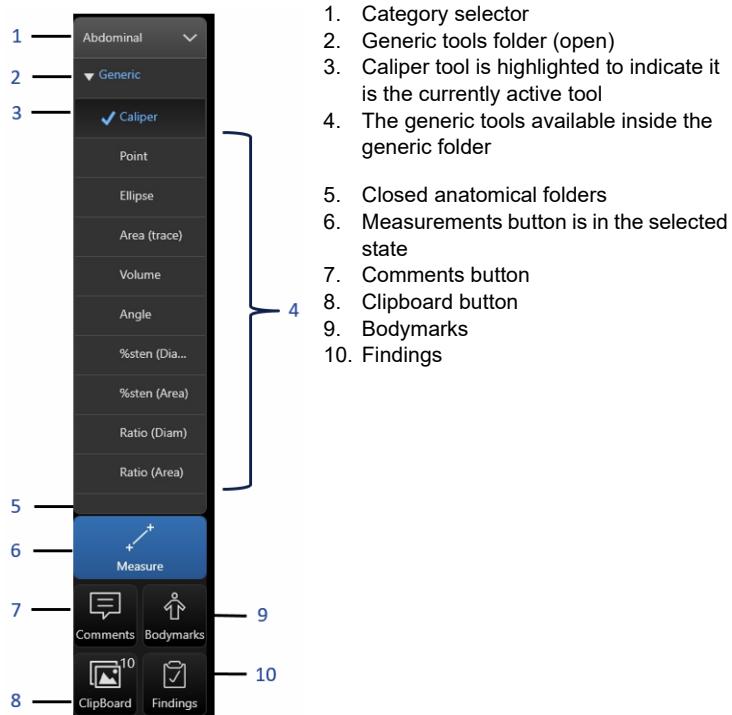


Figure 7-2. Measurements menu

2. Touch the hand symbol or its vicinity and drag it on the screen. The active caliper moves along with the hand symbol.
While moving the caliper anywhere on the B-mode image, a Result window appears on upper left corner, showing the depth of the cursor from skinline. This is marked by a green solid caliper followed by the letter d.
3. To measure distance between 2 points, drag the hand symbol and position the caliper on the first point, then tap once on the hand symbol.
The caliper is fixed in place and turns solid with the digit "1" appearing beside it.
The hand symbol changes to a closed fist symbol. Drag the hand symbol, the second caliper moves and the distance between the 2 calipers is indicated in the result window, preceded by a green digit "1" and the letter L (Figure 7-3).

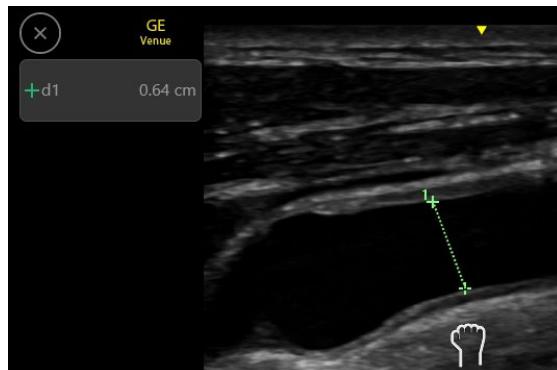


Figure 7-3. Closed fist symbol - tool is active

While you are taking a measurement, the value in the Results Window updates until you complete the measurement.

4. To complete the measurement, tap the hand-symbol once. The 2nd caliper is fixed in place. The calipers placed so far turns blue with a connecting dotted line between them. A new active green caliper appears and may be dragged to a new point to allow the next measurement.



Figure 7-4. A second caliper begins

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.

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").

NOTE: The tool used so far is a "generic" distance tool. It did not assign the result of the measurement to any named anatomical measurement.

Moving or minimizing the result window

- Tap on the circle-X symbol (Figure 7-5) to minimize the window into the caliper symbol shown on the right.
- Tap on the caliper symbol to maximize the result window.

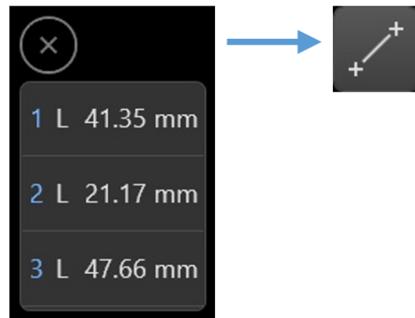


Figure 7-5. Minimizing the Result Window

- Tap and drag the result window or the minimized caliper symbol to reposition it anywhere on the scanning screen.

Editing a distance measurement

When one or more measurements have been made, you may wish to edit any of them by deleting, correcting or assigning the measurement to some specific named anatomical measurement.

To correct caliper position

- Tap any plus-sign you wish to reposition, or tap on the line in the result window you wish to correct.

The graphical measurement associated with that line becomes active and turns green, with a horizontal menu containing **Assign**, **Delete** and **Done**.

The hand symbol appears under one of the plus symbols belonging to the caliper. You may drag the hand symbol to reposition that caliper, or tap the other connecting plus-signs if you wish to reposition the other side of the caliper.

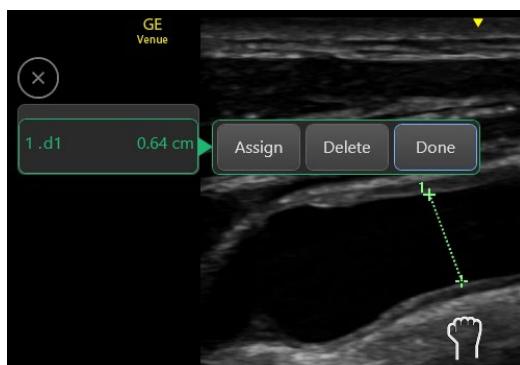


Figure 7-6. Correct caliper position

To delete a measurement

1. Tap any plus-sign you wish to delete, or tap on the line in the result window you wish to delete.
2. When the horizontal menu appears on the selected measurement, tap **Delete**.

NOTE: *Tap **Done** to cancel measurement deletion.*

Assigning a measurement

After performing some generic measurements:

1. Tap any plus-sign caliper you wish to assign, or tap the line in the result window you wish to assign.
2. Tap **Assign** on the horizontal menu.
A list of anatomical labels appears on a vertical menu.
3. Select the appropriate name.

The list of measurement labels appearing on the assignment list depends on the current **Exam** category, appearing on top of the measurements menu (Figure 7-2, item 1).

See ‘Using categories’ on page 7-9 for more information on how to change an exam category.

Pre-assigned distance measurements

Pre-assigned distance measurements allow you to first select an anatomical label and then perform the measurement.

1. Tap **Freeze**, then tap **Measure**.
A pointing hand symbol appears, with an active measurement caliper above it (Figure 7-1).

A measurement menu appears on the left edge of the screen to provide various measurements tools, anatomical folders, and labels.

An example of such a menu is shown in Figure 7-2, which appears when using an abdominal preset.

2. To make, as an example, bladder volume measurements, tap the **Bladder** folder. The folder opens to show 3 labels named **Bladder W**, **Bladder H**, and **Bladder D**. Different bladder dimensions appear.
3. Select a label (**Bladder W** for example).
4. Drag the hand symbol to position the caliper in the correct place.
5. Tap the hand symbol and move it. The caliper tool and measurement of **Bladder W** appear in the Result window.
6. Scan and freeze to repeat all three dimensions to get the Bladder volume calculation.

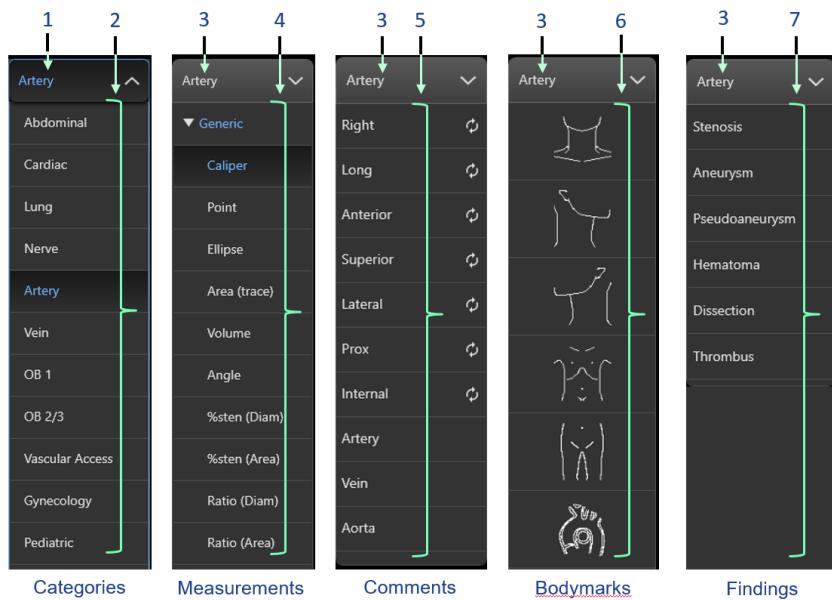
You may edit or delete any measurement in the same way described in the previous section.

Using categories

The system organizes measurements, annotation comments, bodymarks and finding lists in different menus, whose contents are identified by Categories. Typical menus are shown in Figure 7-7.

The top of the list contains the name of the Current category (3). Tap the current exam category (3). It turns blue (1), and a list of available categories appears (2), from which you can select a different category.

The currently selected scanning preset determines the default Category for each of the menus. If you wish to perform a measurement which appears on a different Category you may change the category. Tap the current category label (3). A list of available exam categories appears. Select the desired category from the list (2). The contents of the measurements menu changes accordingly.



1. Selected Category
2. List of available categories
3. Current active category
4. Measurements belonging to the current category
5. Annotations belonging to the current category
6. Bodymarks belonging to the current category
7. Findings belonging to the current category

Figure 7-7. Typical menus for measurements, annotation comments, bodymarks and findings

B-Mode Measurements

The following listed measurements can be made in B-Mode:

- Depth
- Distance
- Ellipse
- Volume
- Area trace
- Angle

Depth Measurement

Depth is the vertical distance from skinline to the target point.

To make a depth measurement:

1. Tap **Measure** once.
A Measurement menu opens on the left (Figure 7-2) and a hand symbol appears, with an active caliper above it.
2. Drag the hand symbol and place the caliper over any point.
The depth reading appears and updates as the caliper is moved

Distance measurements

To make a distance measurement:

1. Tap **Measure** once; an active hand-symbol appears, with an active caliper at its center.
2. Select **Caliper** in the generic measurements folder.
3. To position the active caliper at the start point, touch and drag the hand symbol and place the caliper over the start point.
4. To fix the start point, tap the hand-symbol. The system fixes the first caliper and displays a second active caliper.
5. Position the second active caliper at the end point, move the hand symbol and place the active caliper on the end-point.

A dotted line connects the measurement points, if preset accordingly.

6. To complete the measurement, tap the hand-symbol.

The system displays the distance value in the Results Window.

Measurement of Circumference and area by Ellipse

You can use an ellipse to measure circumference and area. To measure with an ellipse:

1. Press **Measure** once; an active hand-symbol caliper displays.
2. To position the active caliper, drag the Hand symbol.
3. To fix the start point, tap on the hand-symbol. The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper, move it using the hand symbol, to define one axis of the ellipse.
5. Tap the hand-symbol to set 2nd caliper in place.
An active caliper appears, allowing you to define the second axis of the ellipse.
6. Drag the hand symbol to position the 3rd caliper into place.

To correct the positioning of the ellipse tap any of the 3 calipers to make it active. Correct its position by dragging it with the hand-symbol.

Trace

To trace the circumference of the anatomy and calculate its area:

1. Press **Measure**.
2. Select **Area (Trace)** in the generic measurements folder.
3. To position the caliper at the start point, move it with the hand symbol.
4. To fix the trace start point, tap on the hand-symbol.
The caliper changes to an active caliper.
5. To trace the measurement area, move the Hand symbol around the anatomy.
A dotted line shows the traced area.
6. To complete the measurement, tap on the hand-symbol.
The system displays the circumference and the area in the Results Window.

Hints

Before you complete the trace measurement:

- To erase the line (bit by bit) back from its current point, move the Hand symbol back over the trace.

%Stenosis by diameter

NOTE: *When you use diameter to calculate the %stenosis, always take the measurement from a cross-sectional view of the vessel.*

To calculate %stenosis by diameter:

1. Tap **Measure** once.
An active hand-symbol with a caliper is displayed.
2. Select **%sten(Diam)** from the generic measurement menu.
3. Make a distance measurement of the inner area of the blood vessel (d1).
The system displays an active caliper for the second distance measurement.
4. Make a distance measurement of the outer area of the blood vessel (d2).

The system displays each distance measurement and the %stenosis in the Results Window.

For details on how to make a distance measurement, see 'Distance measurements' on page 7-11.

NOTE: *For the diameter calculation, do NOT take a distance measurement from a longitudinal view. This may lead to an inaccurate assessment of %stenosis.*

%Stenosis by area

To calculate %stenosis by area:

1. Tap **Measure** once.
An active hand-symbol with a caliper is displayed.
2. Select **%sten(Area)** from the generic measurement menu.
3. Make an area measurement of the inner area of the blood vessel (A1).
The system displays an active caliper for the second area measurement.
4. Make an area measurement of the outer area of the blood vessel (A2).

The system displays each area measurement and the %stenosis in the Results Window.

Volume

The volume calculation can be made by making three distance measurements.

1. Tap **Measure** once.
An active hand-symbol with a caliper is displayed.
2. Select **Volume** from the generic measurement menu.
3. Make three distance measurements.

The system displays the distances and the volume in the Results Window.

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.*

For details on how to make a distance measurement, see 'Distance measurements' on page 7-11.

A/B Ratio

In B-Mode, you can calculate A/B ratio by diameter or by area.

Diameter Ratio

To calculate A/B ratio by diameter:

1. Tap **Measure** once.
An active hand-symbol with a caliper is displayed.
2. Select **Ratio(Diam)** from the generic measurement menu.
3. Make a distance measurement of the first diameter (d1).
The system displays an active caliper for the second distance measurement.
4. Make a distance measurement of the second diameter (d2).
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 measurements' on page 7-11.

Area Ratio

To calculate A/B ratio by area:

1. Tap **Measure** once.
An active hand-symbol with a caliper is displayed.

2. Select **Ratio(Area)** from the generic measurement menu.
3. Make a trace measurement of the A area.
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.

Catheter to Vessel Ratio (CVR)

This function calculates the Catheter to Vessel Ratio (CVR) and presents the ratio between the measurement of a vein diameter and a list of predefined catheter's sizes.

NOTE: *The Catheter Ratio measurement is only available for the following presets: Artery - Lower, Upper, Vasc Access; Vein - Lower, Upper, Vasc Access.*

1. Tap **Measure**.
An active hand-symbol with a caliper is displayed.
2. Select **Catheter Ratio** from the measurement menu on the left-hand side of the screen.
3. Measure the vessel diameter by measuring the vessel diameter with a distance measurement (**Caliper**) or a circle to trace vessel circumference (**Circle**): select the measurement method from the **Catheter Ratio** drop-down menu.
4. Make a measurement of the vein diameter (d) using **Caliper** or **Circle**.

The system displays a results window containing the vessel diameter in millimeters (mm) and a predefined list of catheter names and diameters and the calculated ratio between the measured vessel diameter and catheter's diameter in percentages.

The vessel's diameter measurement results is stored in the worksheet.

NOTE: *You may edit or delete the measurement of the vessel's diameter and edit the predefined list of catheters (adding or hiding) in config. In the Meas/Text tab: select Measurement Menu > Artery > Catheter Ratio.*

Angle Measurement

This function measures the angle between two intersecting lines:

1. Tap **Measure** once.
An active hand-symbol with a caliper is displayed.
2. Select **Angle** from the generic measurement menu.

3. Position the caliper by dragging the hand symbol.
4. To fix the position of the first caliper, tap the hand symbol.
5. Drag the hand symbol to plot the first line.
6. Tap to fix caliper in place and begin to plot the second line of the angle.

The system displays the angle value in the Results window.

Doppler Mode Measurements

The following 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. Scan the anatomy of interest in live B-Mode.
2. Position the PW cursor over the vessel or tissue of interest.
3. Activate live Doppler Mode.
4. Press **Freeze**.

Velocity

To measure velocity:

1. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.
2. Select **Point** from the generic measurement menu.
3. To position the caliper at the desired measurement point, move the Hand symbol.
The velocity value appears.
4. Tap the hand symbol to fix the caliper in place and make another velocity measurement.
The system displays the velocity measurements in the Results Window.

TAMAX and TAMEAN

TAMAX Manual Trace

1. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.
2. Select **Trace** from the generic measurement menu.
3. To position the caliper at the trace start point, move the Hand symbol to the start point.
4. To fix the start point, tap the hand symbol.
5. To trace the velocity spectrum boundary, move the caliper by dragging the hand symbol.

NOTE: *To edit the trace line, move the caliper backwards.*

6. To complete the measurement, tap on the hand symbol. The system displays the measurement values 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. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.
2. Select **Slope** from the generic measurement menu.
3. To position the caliper at the start point, move the Hand symbol.
4. To fix the start point, tap on hand symbol. The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper at the end point, move the Hand symbol.

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. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.

2. Select **Time** from the generic measurement menu.
3. To position the caliper at the start point, move the Hand symbol.
4. To fix the start point, tap on hand symbol. The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper at the end point, move the Hand symbol.

The system displays the time interval between the two calipers in the Results Window.

Pulsatility Index (PI)

For manual trace:

1. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.
2. Select **PI** from the generic measurement menu.
3. To position the caliper at the trace start point, move the Hand symbol to the start point.
4. To fix the start point, tap the hand symbol.
5. To trace the velocity spectrum boundary, move the caliper by dragging the hand symbol.
6. Manually trace the entire waveform.

NOTE: To edit the trace line, move the caliper backwards.

7. To complete the measurement, tap on the hand symbol.
- The system displays peak systole, minimum diastole, end diastole, TAMAX, and PI in the Results Window.

Resistive Index (RI)

1. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.
2. Select **RI** from the generic measurement menu.
3. To position the caliper at the start point, move the Hand symbol.
4. To fix the start point, tap on hand symbol. The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper at the end point, move the Hand symbol.

The system displays PS, ED, and RI in the Results Window.

S/D or D/S Ratio

To calculate velocity ratio:

1. Tap **Measure** once.
A hand symbol along with an active caliper with a vertical and horizontal dotted line displays.
2. Select **S/D or D/S Ratio** from the generic measurement menu.
3. To position the caliper at the start point, move the Hand symbol.
4. To fix the start point, tap on hand symbol. The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper at the end point, move the Hand symbol.

The system displays Vd, Vs and D/S or S/D ratio in the Results Window.

Doppler Auto Calcs control enhancements

1. Scan in PW mode using any non-cardiac presets.
2. Tap **Auto Calcs** while in Live or Freeze modes.

A column of Auto Calc controls appear (Figure 7-8, A). Swipe vertically to display more Auto Calc controls (B).

NOTE: *The Auto Calcs function is not available while using the system with Cardiac-related presets.*



Figure 7-8. Auto Calcs - Controls pages 1 and 2

On Auto Calc controls page 2 you may select any number of parameters to appear in the measurements results window. The current selection enables PS, ED and RI.

When Auto Calc is active, the system analyzes the acquired Doppler spectrum and attempts to measure the value of the selected parameters automatically.

M-Mode Measurements

Basic measurements that can be taken in the M Mode portion of the display are:

- Tissue Depth
- Time Interval
- Time Interval and Velocity
- Heart Rate

NOTE: *The following instructions assume that you do the following:*

1. Scan the anatomy of interest in live B-Mode.
2. Position the M-Mode cursor over the tissue of interest.
3. Activate live M-Mode.
4. Press **Freeze**.

Tissue depth

Tissue depth measurement in M-Mode functions the same as depth measurement in B-Mode. It measures the vertical distance from skinline to the target point.

To make a depth measurement:

1. Tap **Measure** once.
A hand symbol appears, with an active caliper above it.
2. Drag the hand symbol and place the caliper over any point on the M-Mode image.
The depth reading appears and updates as the caliper is moved.

Distance Measurement on M-Mode

To make a distance measurement:

1. Tap **Measure** once.
An active hand-symbol appears, with an active caliper at its center.
2. Select **Dist** from the generic measurement menu.

3. To position the active caliper at the start point, touch and drag the hand symbol and place the caliper over the start point.
4. To fix the start point, tap the hand-symbol. 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 hand symbol and place the active caliper on the end-point. Note that it can only be moved vertically relatively to the first caliper. A dotted line connects the measurement points.
6. To complete the measurement, tap the hand-symbol. The calipers turn blue and a new caliper is ready for another distance measurement.

The system displays the distance value in the Results Window.

Time interval on M-Mode

To measure a horizontal time interval and velocity:

1. Tap **Measure** once.
An active hand-symbol appears, with an active caliper at its center.
2. Select **Time** from the generic measurement menu.
3. To position the active caliper at the start point, touch and drag the hand symbol and place the caliper over the start point.
4. To fix the start point, tap the hand-symbol. 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 hand symbol and place the active caliper on the end-point. Note that it can only be moved vertically relatively to the first caliper. A dotted line connects the measurement points.
6. To complete the measurement, tap the hand-symbol. The calipers turn blue and a new caliper is ready for another time measurement.

The system displays the Time value in the Results Window.

Slope (Time interval and Velocity) on M-Mode

To measure time and velocity between two points:

1. Tap **Measure** once.
An active hand-symbol appears, with an active caliper at its center.

2. Select **Slope** from the generic measurement menu.
3. To position the active caliper at the start point, touch and drag the hand symbol and place the caliper over the start point.
4. To fix the start point, tap the hand-symbol. 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 hand symbol and place the active caliper on the end-point. Note that it can only be moved vertically relatively to the first caliper. A dotted line connects the measurement points.
6. To complete the measurement, tap the hand-symbol. The calipers turn blue and a new caliper is ready for another slope measurement.

The system displays the Slope value in the Results Window.

A/B Ratio (diameter, time, or velocity) on M-Mode

In M-Mode you can measure A/B ratio by diameter, time, or velocity.

1. Tap **Measure** once.
An active hand-symbol appears, with an active caliper at its center.
2. Select **Ratio(Diam)**, **Ratio(Time)**, or **Ratio(Velocity)** from the generic measurement menu.
3. Perform two measurements of **distance**, **time** or **velocity** in the same way described above.

The system displays the A/B ratio of time, distance or velocity in the Results Window.

Caption Guidance

Caption Guidance is a visual AI realtime guide that enables the user to obtain different cardiac views through textual guidance, prescriptive graphical navigation, and reference images. Caption Guidance also includes an automatic diagnostic-quality image record.

Caption Guidance is based on Caption AI™ Ultrasound Imaging System application software, developed by and licensed from Caption Health Inc.

Caption Guidance is supported by the following probes: 3Sc-RS and M5Sc-RS.

NOTE: *Caption trademarks are registered trademarks of Caption Health Inc.*

NOTE: *This tool requires a software option string to be enabled.*

Accessing the Caption Guidance tool and operator's manual

1. Open the **Auto Tools** menu.
2. Tap **Guidance**.



Figure 7-9. Accessing Caption Guidance

General Measurements and Calculations

For instructions, warnings, labeling and other support information about Caption Guidance operation, refer to the *Caption Guidance Operator's Manual*.

To access the *Caption Guidance Operator's Manual* on Venue Go:

- While the Caption tool is active, tap **Caption IFU** from the Application window, located on the top right panel.

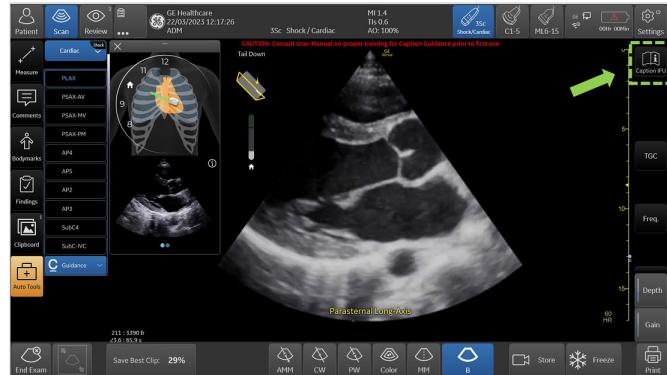


Figure 7-10. Accessing Caption Guidance manual, option 1

- or -

- Tap **Help > Caption IFU** under the **Settings** menu.



Figure 7-11. Accessing Caption Guidance manual, option 2

- The *Caption Guidance Operator's Manual* is appended to the end of this document.

Assessment of Patients in Shock

Introduction

The system includes several semi-automated workflow tools designed to shorten the time of common assessments, especially for patients suspected to be in shock. In each case, these tools speed up normal workflow steps. The user chooses to accept the automated workflow results as consistent with their clinical impressions, or to reject them and follow a standard manual measurement workflow.

The user activates the tools from the application menu, by preset for the appropriate organ (e.g. lung, cardiac, abdomen), and by scanning protocol.

Quality indicators

Each of these tools performs best when the quality of the image is sufficient to enable reliable replication of the conventional manual workflow. To assist the user to optimize the image for the workflow tools, the system presents a quality indicator with red, yellow or green colors. Green is optimal, red is unacceptable, and yellow is of average quality.



In the case of measurements performed manually by the user, the results are saved automatically into the exam's database. However, in case of a semi-automatic tool, such as the AutoIVC tool, auto VTI tool or the Auto B-Linse tool, even if the quality indicators are green, the user needs to approve the measurement by visual inspection before storing the results into the worksheet database.

After inspecting and approving the measurements, just store the image containing the measurements to store the results into the exam's database.

If the image is not stored, the measurements that were automatically performed on it are not stored into the exam.

Auto IVC Tool

The IVC (Inferior Vena Cava) automated measurement intends to provide a parameter for assessing fluid responsiveness in shock patients. The collapsibility Index (also known as the Caval Index) represents the collapsibility of the inferior vena cava and is calculated by the ratio between the maximal and minimal diameter of the IVC.

$$CI = 100 \times (1 - D_{min}/D_{max}) [\%]$$

$$\text{Distensibility Index (DI)} = 100 \times (D_{max}/D_{min} - 1)[\%]$$

The Distensibility Index (DI) represents the distensibility of the IVC in the artificially ventilated patient.

The scientific literature recommends performing the measurement of CI or DI at a distance about 2-3 cm from the diaphragm.

Use a low frequency probe such as the 3Sc-RS or M5Sc-RS phased array probe, or the C1-5-RS curvilinear probe, and scan the patient to achieve a longitudinal view of the IVC between the diaphragm and the heart.

After finding this view and activating the AutoIVC tool, the system finds the IVC descending from the right atrium of the heart, it places an anatomical M-mode cursor line positioned through the IVC and measures the maximal and minimal diameters of the IVC throughout a respiratory cycle (Figure 7-12).

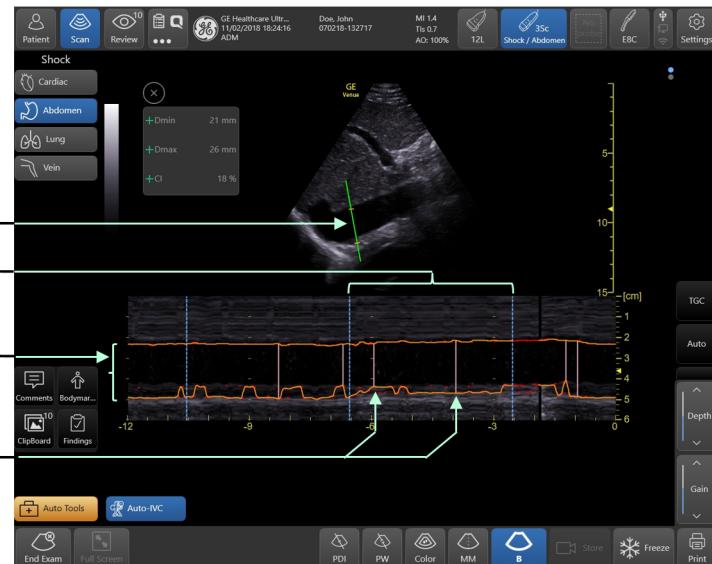
The M-Mode timeline traces the diameter of the IVC over time and the collapsibility Index results are displayed. The system presents two green calipers to represent the point of maximal and minimal IVC diameter. The user can then adjust their positions, or the position of the anatomical M-mode cursor over the B-mode image, according to their clinical judgement.

As the user finds this view, the system displays quality indicator to indicate how well the image represents an ideal model of this view. The quality match is represented by the color of the anatomical M-Mode cursor placed by the system over the B-mode image, and varies from green to yellow to red to represent ideal/average/unacceptable image presentation respectively.

The time line is divided by default into time intervals of 4 second each, (Calculation Time Interval, or CTI) and displays the results for the selected interval. The last CTI is selected by default. If required, the user can select a different CTI. The borders of each CTI are marked by two light blue dotted lines. The user can store the timeline along with the finally selected caliper

positions. The ratio result is stored in the measurements results window.

NOTE: Anatomical M-Mode is a special form of M-mode. Standard M-mode represents the intensity of echoes along a line from the face of the transducer into the body along the lines of ultrasound transmission. An Anatomical M-Mode displays approximately the same thing, but the M-mode line does not have to follow the lines of transmission. It can be placed at any arbitrary position or angle.



1. Anatomical M-Mode cursor. Its color serves as a quality indicator
2. Calculation Time Interval (CTI) zone - marked by vertical light blue lines
3. The IVC border trace (in orange) over the anatomical M-Mode timeline
4. A pair of green distance markers measuring Dmax and Dmin within each CTI

Figure 7-12. A typical screen layout from Auto IVC tool

Auto IVC Tool workflow

1. Connect a 3Sc-RS, M5Sc-RS or C1-5-RS probe to the system.
 2. Select the probe on the top bar of the screen and choose an **Application** (Shock or eFAST).
- The system moves to the default layout of the application.

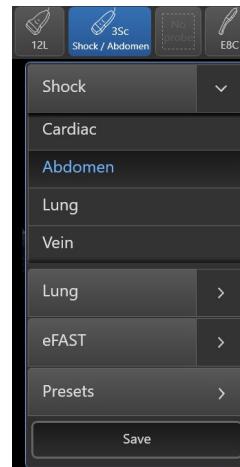


Figure 7-13. Application and assessment selection

3. Choose the assessment (Abdomen/Heart/Venous), either from the menu shown in Figure 7-13, or from the shortcut menu shown in Figure 7-14.

The system adjusts the imaging preset and the available measurements associated with the assessment chosen.



Figure 7-14. Assessment selection: Heart

4. Scan the patient in the subcostal position to view the IVC on the B-mode screen.
5. While scanning, tap **Auto-IVC** on the left lower corner of the screen. If the patient is ventilated tap **Ventilator** on the bottom menu to switch the measurement from CI to DI.
 - The system displays B-mode along with Anatomical M-mode (AMM) timeline.
 - The system automatically positions an AMM cursor over the IVC.

- The color of the AMM cursor indicates the quality of the anatomy presentation.
- The cross-section of the IVC is traced along the M-Mode timeline.
- CTI markers appear as red vertical lines at 2.5 sec. intervals.



Figure 7-15. Tool selection button

6. View the AMM cursor appearing and stabilizing automatically on the IVC.
7. If the AMM has not been positioned correctly, you may reposition it to a preferred location.
To relocate the cursor, tap on the desired spot on the IVC or drag and drop the cursor into the new position.



Figure 7-16. Live Auto IVC Tool Screen layout

8. When the cursor is green, this indicates that the image is optimal, **Freeze** the image to assess the loop.
The system marks the interval (CTI) with the highest quality for the CI or DI measurement.

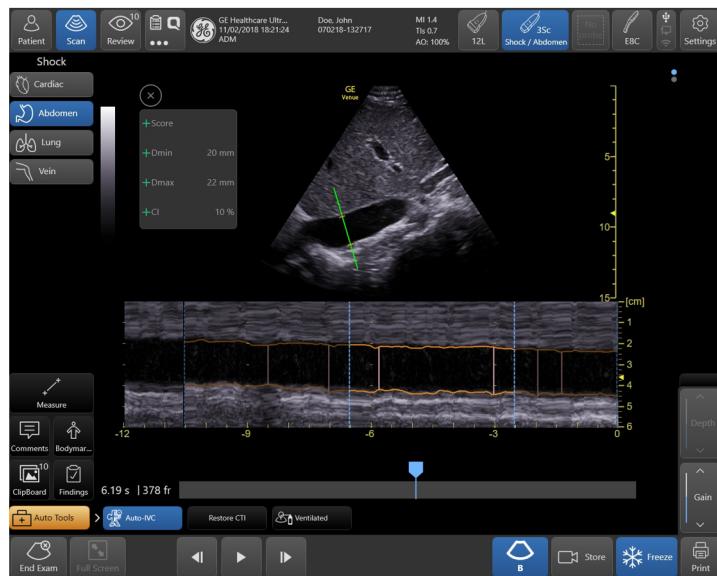


Figure 7-17. Frozen Auto IVC Tool screen layout

- If required, tap on a different CTI to select the preferred CTI which is defined between the two vertical light blue markers on the M-mode timeline.

The system highlights the selected CTI on the AMM timeline and display the maximum diameter measured frame in the B-mode screen. The results of the measurements appear in the result box, on the right upper side of the screen.

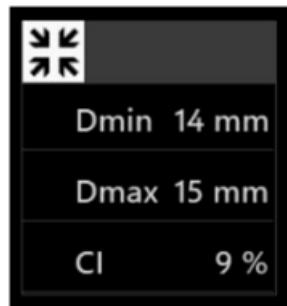


Figure 7-18. Result box

- If required, reposition the green calipers on the M-mode display.

To relocate the calipers, drag and drop the caliper and look at the changing value of the measurement.

To restore the results of the automated tool tap **Restore - CTI** on the left lower part of the screen. The results are displayed in the result box.



Figure 7-19. Restore CTI button

11. Click **Store** to store the image and the measurement.

It is possible to use the Auto IVC tool on a stored loop. To do so, select a loop that provides the IVC in the subcostal view for the clipboard. Play the loop, and tap the Auto-IVC tool.

The system archives the 2D+AMM image of the selected measurements and display the minimal diameter frame and the AMM timeline with the relevant CTI highlighted and the measurement box. Additionally, the measurements are archived in the worksheet.

Auto Velocity-Time Integral Tool



Experience in echocardiography (obtaining a 3 or 5 chamber view and VTI measurements) is necessary for appropriate use of the VTI tool.

Estimates of cardiac output (CO) can be helpful when assessing patients suspected to be in shock. This is a measurement of total fluid flowing out of the left ventricular outflow tract over time and is represented in liters per minute.

The system estimates the Velocity Time Integral (VTI) by using pulsed Doppler to trace the maximum velocity in the left ventricular outflow tract (LVOT) and integrating this over time. The result is the velocity-time-integral (VTI).

To estimate total CO volume, the system calculates:

$$\text{CO (Liter/Min)} = \text{VTI(cm)} \times \text{LVOT CSA (cross section area cm}^2\text{)} \times \text{HR / 1000}$$

The LVOT CSA is calculated from the value of LVOT diameter.

The user has three choices:

- Leave the LVOT empty, in which case the CO is not calculated nor displayed.

- or -
- Measure the LVOT diameter directly from a PLAX cardiac view,
- or -
- Enter a value for the LVOT diameter by directly typing the value (in mm or cm, depending on configuration) into the LVOT diam. field, as shown below.

In either case, the LVOT CSA is calculated by assuming a circular cross-section and using the formula:

$$\text{LVOT CSA} = (1/2 \times \text{LVOT diam})^2 \times 3.141$$

In case the user has directly typed the LVOT diameter value, the result shows both the LVOT area and the CO value.

Additional calculations

It is possible to configure the system to display the following calculations:

SV (Stroke volume) calculation:	$\text{SV}[\text{ml}] = \text{VTI} \times \text{LVOTarea}$
CI (Cardiac Index) calculation:	$\text{CI}[\text{Liter/min./m}^2] = \text{CO}/\text{BSA}$
CO Flux calculation:	$\text{CO Flux} [\text{liter/min/cm}^2] = \text{CO}/\text{LVOT}_{\text{area}}$ $= \text{VTI} * \text{HR}/1000$

The Auto-VTI tool can be used when scanning the patient with a 3Sc-RS phased array probe, using a 3-chamber or 5 chambers view from the apical position or standard apical long axis view.

After automatically locating and positioning the ROI over the LVOT, the tool finds the Aortic valve and places the gate at an optimal position on the image. The calculations are done on real time and the results are displayed in the results box. By storing the loop the results are saved in the measurements report.

The quality indicator is represented by the color of the ROI placed by the system over the image, and varies between green/yellow/red to represent ideal/average/unacceptable image quality respectively.

Auto VTI Tool workflow

1. Connect a 3Sc-RS probe to the system.
2. Select the probe on the top bar of the screen and choose an **Application** (Shock or eFAST).

The system moves to the default layout of the application.

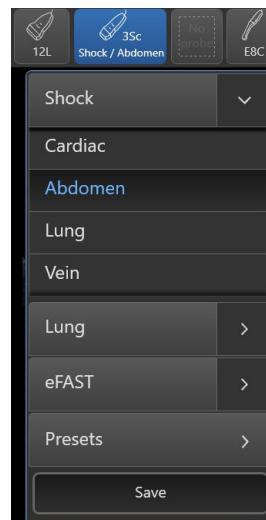


Figure 7-20. Application selection

3. Choose the Cardiac assessment.

The system adjusts the imaging preset and the available measurements associated with the chosen assessment.



Figure 7-21. Assessment selection: Heart

The **Auto Tools** selection controls appear on the lower-left corner of the screen (Figure 7-22).



Figure 7-22. Tool selection button

NOTE: *The Auto Tools controls also appear when using a basic Cardiac preset without enabling the Shock application.*

4. Scan the patient in the apical position to view the heart in a 5 chamber or 3 chamber long axis view on the B-mode screen.

5. While scanning, tap **Auto-VTI** (Figure 7-21).

The system displays a magnifying glass search symbol for a brief second, while it is searching for the LVOT structure. It places a ROI over the LVOT. In case the LVOT is not recognized, the system places the ROI at the center of the image.

If the ROI has not been positioned correctly, you may reposition it to a preferred location.

6. View the PW gate appearing and stabilizing automatically over the LVOT flow.

- The color of the ROI indicates the quality of the image.
- The blood-flow through the LVOT is traced along the PW time-line.
- The system marks the measurements outline on the PW timeline, and calculates the VTI, HR, every 2 seconds if the signal quality is good or acceptable. Additionally, the system may calculate CO, SV, CI or CO Flux ('Additional calculations' on page 7-34) if the LVOT diameter was measured or defined (see explanation in section LVOT definition).

7. If the gate has not been positioned correctly, you may reposition it to a preferred location.

To relocate the gate, tap on the desired spot in the ROI or drag and drop the gate into the new position. The system displays the LVOT VTI, Heart rate and CO results in the results box.

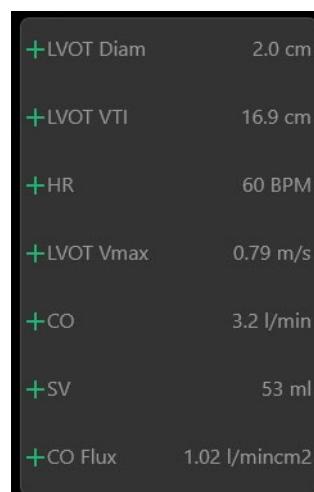
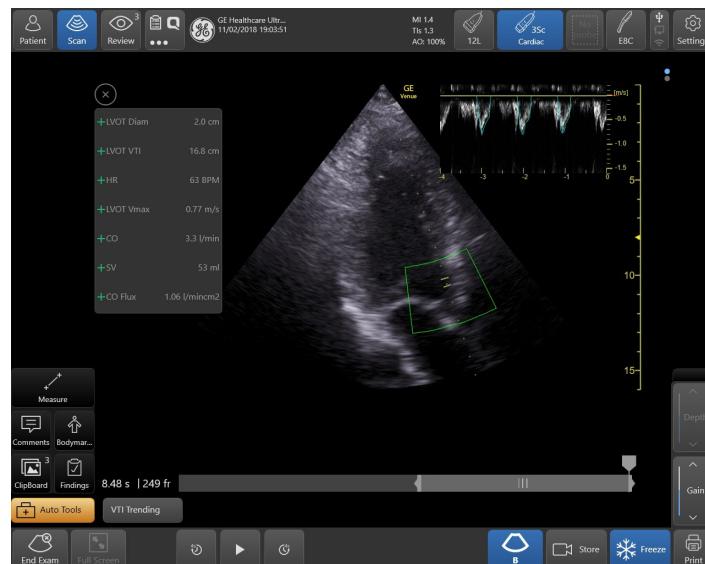


Figure 7-23. Auto VTI results box

NOTE: Tap over the LVOT Diam line. The line expands, allowing you to type a value. Type Done to accept the value and re-calculate CO accordingly.

8. When the ROI is green, indicating the PW signal quality is good, **Freeze** the image to assess the loop.

The system freezes the cine and mark the outline of the PW timeline.



1. Doppler Spectrum with envelope trace outline
2. Doppler gate
3. ROI - Color of graphics is a green/yellow/red quality indicator

Figure 7-24. VTI tool screen layout

9. If required, reposition the gate in a different location in the ROI while reviewing the frozen loop.

The system updates the results box and PW timeline automatically. The original location is marked with a green square. To restore the gate to its algorithm calculated original position, tap the green square.

10. Click **Store** to archive the images and measurements.

The system archives a single frame with the results and display the results in the worksheet.

Using Cine on AutoVTI images

On frozen images

When using the AutoVTI tool, the results appearing on screen when tapping Freeze indicate the PW spectrum of last 4 seconds of scanning time segments. For viewing an earlier spectrum time-segment, tap the Cine control. The following symbols appear:



Tap on one of the “clock” symbols to view spectra from earlier or later time segments.

On recalled images

If you open the clipboard and select any AutoVTI image, you may still perform slight adjustment of PW gate position.

Tap the Cine button. You may now re-position the PW gate to a different location within the LVOT ROI.

Auto VTI measurements Trending Graph

Introduction

When performing cardiac measurements of the VTI in the LVOT, using the Auto VTI tool, it is possible to store and view up to four VTI measurements on a graph. The graph displays the VTI trending, as it allows to follow the VTI measurements and their relative change, or trend, over time, within the exam.

An example of a VTI trending graph is shown in Figure 7-25.

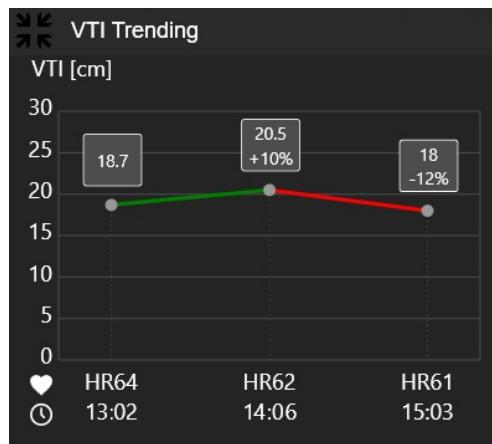


Figure 7-25. Auto VTI Trending graph

The trending graph displays up to four VTI measurements, with the relative percent change. The heart-rate and time at which a measurement was performed, are displayed on the horizontal axis.

To View the Auto VTI Trending Graph

1. Perform LVOT VTI measurement using the Auto VTI tool ('Auto Velocity-Time Integral Tool' on page 7-33).
2. While in the Auto VTI display, store the image containing the Auto VTI result.
3. If required, repeat the Auto VTI measurement during the exam, and store again.
4. Tap **Trending** at any time to view the current Auto VTI trending graph (See Figure 7-25).

The graph displays up to four points related to the latest stored Auto VTI measurements.

In addition to the VTI results indicated for each measurement point, the graph also displays:

- The % change relative to the previous measurement.
- A green connecting line for positive trend, and a red line for negative trend.
- The heart-rate and time at which each measurement was stored.

To delete a point on the Auto-VTI Trending Graphs

1. Produce the Auto VTI Trending graph.
 2. Tap any point you wish to delete.
- The point turns into a red X circle mark.

3. Tap the red circle once to delete the point from the graph.

To Recall Auto VTI Trending Graphs from Archiving

When recalling an image from Archive containing an Auto VTI result, you may tap **Trending**. In this case the trending graph will appear and display the VTI trending graph for the last four VTI measurements.

NOTE: *At any time you may store an image with the displayed trending graph for archiving purposes.*

Auto B-Lines Tool

The B-lines tool provides automated count of the number of B-Lines in adult or pediatric lungs. B-Lines are an acoustic artifact in lung ultrasound caused by conditions such as pulmonary edema (extra vascular lung water), pulmonary fibrosis, pneumonia and others.

While ordinary medical ultrasound cannot see into the lungs of a healthy person with dry lungs, the ability of the same system to see anything in the lung is correlated with fluid in the lung necessary to conduct sound. As such, the assessment of water in the lungs by ultrasound is a search for a particular kind of artifact. If the lung is very moist due to edema the characteristic artifact is B-Lines. B-Lines appear as bright vertical lines that extend from the pleura to the bottom of the ultrasound image. It has been shown that the count of the lines indicates the state of the severity of the edema.

Due to the anatomy of the lung the assessment of B-lines is restricted to the screened region. Therefore, assessment of all of the lung requires moving the probe to multiple locations to achieve a full assessment.

The B-lines measurement is based on the maximum count of B-lines in the image of each region. The B-lines tool saves images from a complete breathing cycle and then finds the image that demonstrates the most B-lines.

The algorithm counts the number of B-lines for each frame and displays the best frame resulting from the loop. The count is displayed on the frame.

By storing the loop the best results are saved in the measurements report.

The quality indicator is represented by the color of the area of measurement placed by the system on the lower part of the image, displayed in green / yellow / red to represent ideal / average / unacceptable image quality respectively.

The Auto B-Lines tool described in this section applies to the analysis of a lung image acquired in a loop, where the probe's position remains stationary over the lung's area of interest.

The Auto B-Lines tool may also be applied to a panoramic sweeping mode, where the probe is swiped over a large area of the lung, comprised of several rib-spaces. The tool is then applied to the whole sweep, analyzing each rib-space separately.

Details about this application are provided in the Lung Sweep section ('Lung Sweep' on page 7-52).

Auto B-Lines Tool workflow

Auto B-Lines Tool is only supported on the 3Sc-RS, M5Sc-RS, 9L-RS, 12L-RS, L4-12t-RS, L4-20t-RS, 8C-RS and C1-5-RS probes with Lung presets.

NOTE: *The Auto B-Lines tool is not available for Neonatal Lung presets.*

For the linear probes, the B-lines tool works within a depth equal to or less than 8 cm in adult lung presets, and a depth equal to or less than 3 cm for Pediatric Lung presets.

When using the C1-5-RS probe in Lung Sweep, the B-lines tool works within a depth equal to or less than 12 cm.

If the B-Lines button is selected in a non supported depth, a warning message appears.

1. Select any probe supporting the Auto B-Lines tool.
2. Select the probe on the top bar of the screen and choose an **Application** (Shock, Lung or eFAST).

The system moves to the default layout of the application.

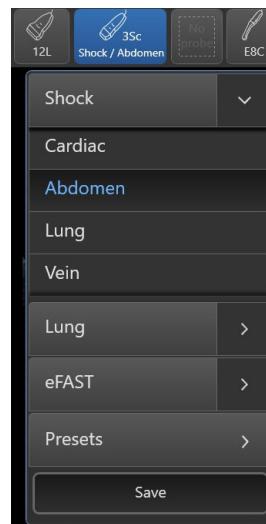


Figure 7-26. Application selection

3. Choose the **Lung** assessment.

The system adjusts the imaging preset and the available measurements associated with the assessment chosen.



Figure 7-27. Assessment selection: Lung

4. Scan the patient in the intercostal window position to view the lung in the B-mode screen.
5. While scanning, tap B-Lines on the left lower corner of the screen.

The system displays B-mode screen with the area of measurement and quality indicator on the bottom of the B-mode screen.

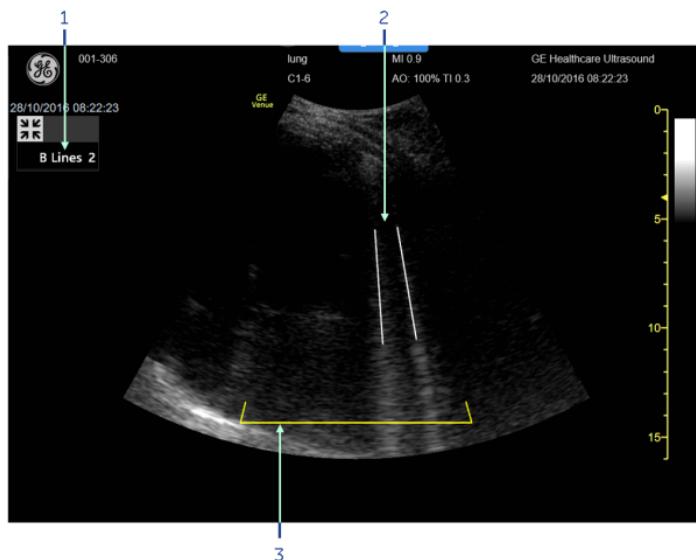


Figure 7-28. Tool selection button

6. View the line indications appearing and stabilizing automatically over the B-lines if visible.
 - The color of the area of measurement marker (Figure 7-29, item 3) is the Quality Indicator which relates to the quality of the image (green = High quality, yellow = medium quality, red = low quality).
 - The B-lines in the image are marked by white lines on the image (Figure 7-29, item 2).
 - The B-Lines count value is indicated (Figure 7-29, item 1).

7. After few seconds, when the area of measurement is green, Freeze the image to assess the loop.

The system shows the frame with the highest number of B-Lines measured in the cine loop.



1. B Lines count
2. B Lines detection marks
3. Area of measurement marker

Figure 7-29. Typical B-lines tool screen

8. Tap **Store** to store the image and the B-line's number.

The system archives the 2D single frame Image of the selected measurements and display number of B-Lines in the results box. Additionally, the measurements are archived in the worksheet.

In case B-lines appear wide and "fused", as often found in the case of lung consolidation, a special graphic horizontal line appears across the joined B-line (Figure 7-30, item 4).

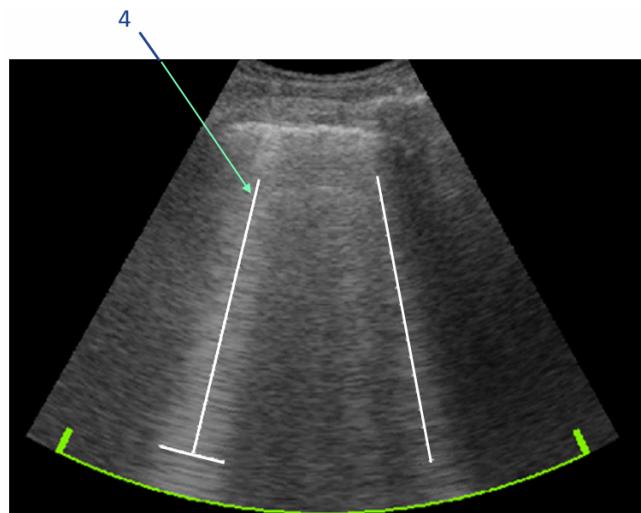


Figure 7-30. Marks over a fused B-line

Lung Diagram

Introduction

When performing lung assessment exam, it is possible to:

- Scan various zones of the lungs, either sequentially in a given order, or at any desired order.
- Label and store images belonging to each of the lung zones.
- View a summary review screen, at any time during or after the exam, showing the stored images superimposed over the lung anatomical diagram, in the location matching the zone from which they were acquired.

Scanning with the Lung diagram

1. Select a lung assessment under Shock, eFAST or Lung application (Figure 7-13).
A scanning screen appears with a lung diagram navigation control on the bottom left (Figure 7-31).
The navigation control contains an anatomical diagram of the lungs with a set of buttons representing the various lung zones.
One of the buttons is framed in blue to represent the current lung-zone being scanned.
2. Tap any other button to label the correct lung zone being scanned.
You can turn on the Auto B-Lines tool to measure the B-Lines ('Auto B-Lines Tool' on page 7-40).
You can add Findings, comments or do any measurements before storing the image or loop.

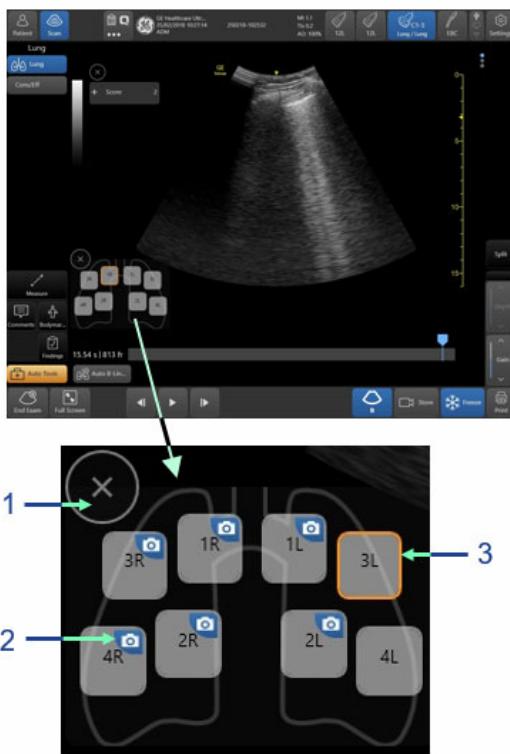


Figure 7-31. Lung navigation control

- If **Auto lung zone increment** has been configured (Figure 7-32) The active button advances by default to the next zone following **Image store**.
- You may still tap on any other button to select any desired lung zone.
- If **Auto lung zone increment** is OFF, select the current lung zone manually.
- Continue to store images for the various lung zones.

NOTE: *More than one image or loop may be stored for each of the zones.*

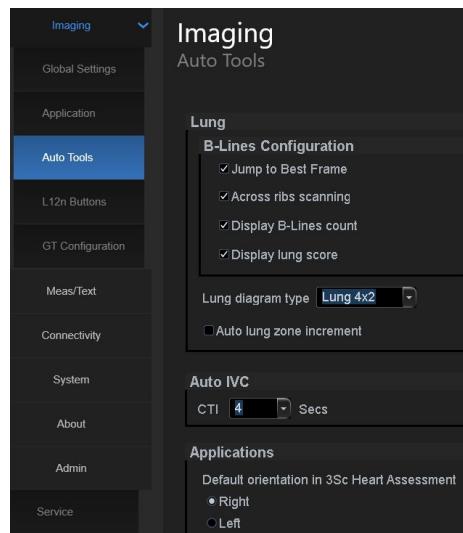


Figure 7-32. Auto Tools configuration tab

Lung Review

To display the Lung review:

1. Tap **Review**.



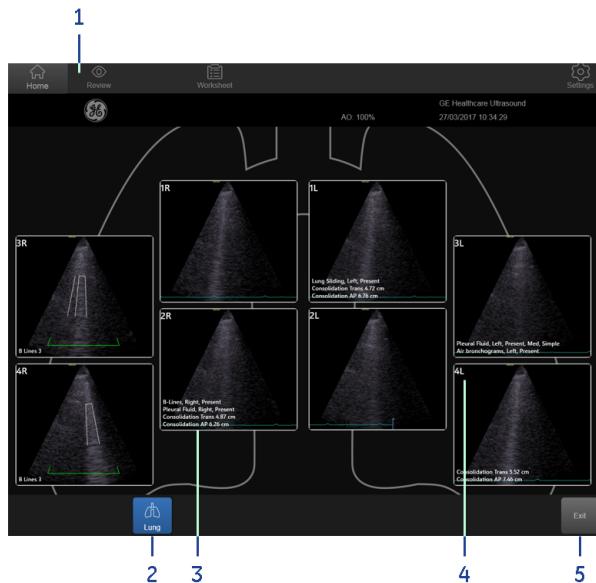
Figure 7-33. Review button

2. Tap the Lung icon at the bottom of the screen.



Figure 7-34. Lung review

A Lung review screen appears (Figure 7-35).



1. Review button
2. Lung review button
3. Different Findings and measurements belonging to the lung zone
4. Lung zone name
5. Exit button: return to main scanning mode

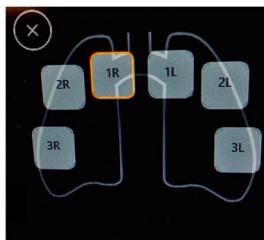
Figure 7-35. Lung Review display

NOTE: If more than one image is stored in a particular lung segment, a graphic indicator appears: < . . . >. You may perform horizontal swiping in order to view other images from the same segment.

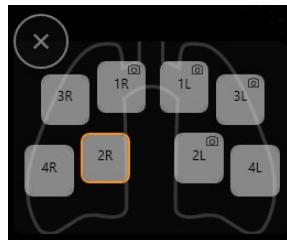
NOTE: Double-tap any image on the lung-review screen to view the image in large format on the scanning screen.

Selecting a different Lung diagram

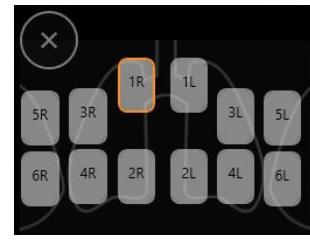
The user can select a lung diagram layout. The following Lung diagram configurations are supported:



3x2 diagram



4x2 diagram



6x2 diagram

Figure 7-36. Lung diagrams

You may configure the system to use any one of the two available diagrams.

- Tap **Utils > Configure > Imaging > Auto Tools**

Select the required diagram as shown on Figure 7-36 above.

NOTE: *The lung diagram selected in config is the only diagram available in both the scan screen and review screen. It is not possible to switch diagrams after images are stored in the current exam.*

Lung scoring

Introduction

When performing lung assessment exam, as described above, it is possible to view various patterns related to different levels of lung aeration, on various zones of the lungs, and express these aeration levels as a score.

The patterns for each lung-zone may be divided into 4 levels corresponding to increasing loss of aeration.

Score	Description
0	Normal tissue showing horizontal A-lines patterns beyond the pleural line. Up to 2 well-separated B-Lines may appear.
1	3 or 4 B-lines

Score	Description
2	5 or more B-lines, or coalescent B-lines
3	Presence of lung consolidation

A cumulative lung score is later calculated by summing up the individual scores assigned to each of the lung-zones, providing a single total score for the lung exam.

NOTE: *Lung zones that were not scored are considered a score of 0 when the total lung score is calculated.*

Performing a lung exam with lung scoring

1. Scan the various zones of the lungs, either sequentially in a given order, or at any desired order, as discussed in previous section.

Calculating the segment score automatically:

2. Activate the B-Lines tool.
3. View the number of acquired B-lines.
4. View the value appearing by the **Score:** field. Notice that it is populated automatically as 0, 1 or 2 according to the table above.
5. To approve the B-lines count and score simply store the image.

Entering the segment score by adding Findings:

6. Freeze the image.
7. In case consolidation is visualized, you may activate **Findings** and tap **Consolidation**.

The label **Consolidation Present** appears on the image, and the **Score** value changes to 3.

8. Approve the image, the findings and the score by storing this image.

Entering the segment score manually:

9. Freeze the image.
10. Tap on the score label.

An edit box appears. Select a value between 0 and 3.

NOTE: *The manually entered score overrides any score generated automatically from the B-count.*

Lung review display

To activate the lung summary review screen, tap **Review** (1), then tap **Lung review** (2).

The cumulative score for the exam appears on the upper area of the screen. The scores of the individual segments are visible in yellow font over each segment.

NOTE: *When more than one image is stored to a particular zone, the score for that zone will be the highest score from different scores given to the individual images belonging to that zone.*

NOTE: *When an image is deleted, its score is also removed. This may modify the score given to a particular zone, and as a result also modify the total cumulative lung score.*

Lung scoring configuration

Lung Scoring is an optional feature. Be sure to obtain a licence password in order to operate it.

Once installed the user may disable or enable this feature at will through the configuration menu.

Lung Consolidation assessment

When performing a lung study, the default assessment is **Lungs**. This assessment based on an imaging preset which is set-up towards enhancing the visibility of any possible B-Lines.

In case consolidation is detected, the tissue visualization may be improved by selecting the **Cons/Eff** (consolidation / effusion) assessment.

NOTE: *It is recommended to use the **Cons/Eff** assessment when scanning lung consolidation or pleural effusion.*

NOTE: *It is recommended to use the **Lungs** assessment when looking for B-Lines in the lungs.*

NOTE: *The Auto B-Lines tool is made available only while in the **Lungs** assessment.*

Lung Sweep

Overview

The Lung-Sweep tool allows the user to generate dynamic panoramic views of the entire lung and generates an extended snapshot of the lung images through the rib spaces. The “build-up” panoramic view is done in real time and each lung segment (Anterior, Axillary, Posterior) may be displayed separately on the screen. The user can select which side of the lung to scan and view, and switch between the sides by tapping a **Lung** control symbol.

Using this tool, the user obtains comprehensive insight into the lung parenchymal changes through multiple planes.

In addition, the Lung-Sweep tool may be combined with the Auto B-Lines tool ('Auto B-Lines Tool' on [page 7-40](#)). This allows the user to obtain insight into the quantity of B-Lines appearing at each rib-space separately, along the panoramic view of the lung segment.

When the tool is enabled, user may perform a sagittal sweep and scan in a linear motion with the probe sweeping over some section of the rib-cage where the lung is visualized. If the user performs a transverse sweep, the tool does not perform any special reconstruction.

The system then performs a panoramic reconstructions of the acquired data, by joining adjacent loops into a single wide-view rectangular image (Figure 7-37).

Upon ending the sweep, the tool will separate the data acquired between the rib-spaces (Figure 7-37, part A, items 1 through 5), and “stitch” the acquired data into a set of adjacent cine-loops which were acquired along the rib-cage. The loops are positioned adjacent to each other. All the rib-spaces are playing simultaneously and allow to see transient effects such as B-Lines in each section of the lungs.

The tool provides panoramic visualization and documentation of the extent of pathologies such as B lines, consolidation, pleural effusion or bronchograms.

In case the Auto B-Lines tool is activated, either before the scan, or later on a frozen panoramic view, the loop that is captured for each of the rib-spaces in the panoramic scan pauses to display the frame which contains the maximum number of B Lines for that loop, and the B-Lines count appears beneath each loop.

A complete probe contact is important for a successful sweep. Therefor the lung sweep tool includes a skin-contact quality indicator: A green Quality Indicator bar indicates proper contact, yellow indicates sub-optimal contact, and red indicates poor contact. The relative locations of the green/yellow/red sections depend on the detected skin-contact section within the current live frame (Green marks the portion of the frame with skin contact and yellow/red the portion of the frame that is disturbed by lack of optimal contact). If the quality indicator is not all green, a message appears: **Improve probe contact** (Figure 7-38, item 10).

The lung sweep should be slow enough to achieve high quality sweeps. In case the user scans too fast, a message appears: **Slow down** (Figure 7-38, item 10).

Notes

- Lung Sweep is available with linear and convex probes.
- The Lung Sweep tool is designed for caregivers trained on performing Lung Ultrasound exams.
- During acquisition and during panoramic playback the user should pay attention to proper display of the ribs and their shadows.

General Measurements and Calculations

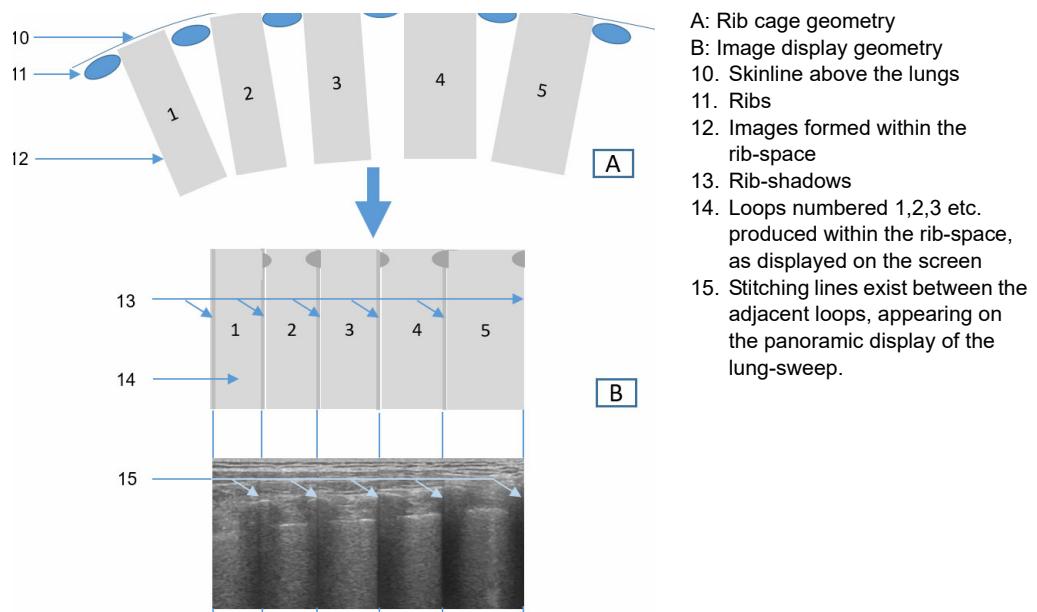
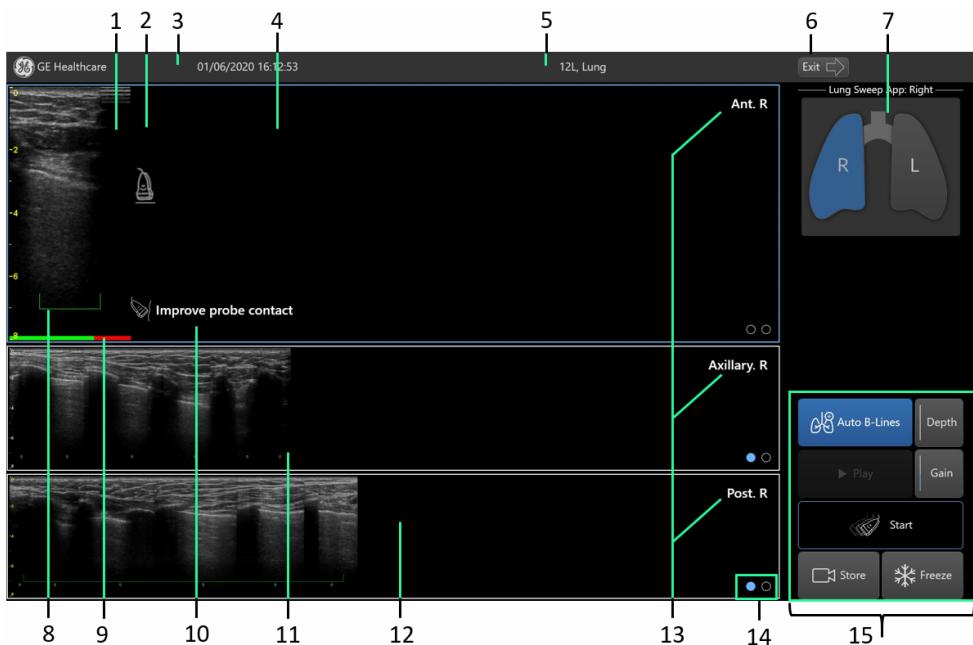


Figure 7-37. Rib-cage sagittal sweep



1. Initial scanning area
2. Visual tip
3. Header with date, time, patient ID and name
4. Active lung-sweep. Default is anterior segment
5. Probe and preset names
6. Exit Button to exit Lung sweep
7. Lung side selector
8. Auto B-Lines ROI
9. Quality Indicator bar for probe contact
10. Sweep prompts
11. Axillary lung segment
12. Posterior lung segment
13. Label of each lung segment
14. Circles indicating stored images
15. Control buttons area

Figure 7-38. Lung sweep main screen

To prepare for Lung sweep

1. Select a linear probe.
2. Select a lung preset.
3. Tap **Lung-sweep** on the Auto-Tools area.
4. Adjust Depth and Gain on the live image.

Alternatively:

1. Remain in the standard B-Mode screen.
2. Scan the lung anatomy which you are intending to study.

NOTE: *Do not activate virtual convex.*

3. Optimize your B-mode image.
4. Tap **Lung sweep** (located in the Auto-Tools area).

To exit Lung sweep

- Tap **Exit** (Figure 7-38, item 6).

To start Lung sweep

1. Prepare for Lung sweep ('To prepare for Lung sweep' on *page 7-55*).
2. Select the lung side (left/right) to scan by tapping the lung selector (Figure 7-38, item 7).
3. Select the lung zone to scan by tapping on one of the three bands (Anterior, Axillary or Posterior zones).
The selected band becomes wider and is marked by a blue band (Figure 7-38, item 4).
4. If a live image isn't seen, tap **Un-Freeze**.
A live image appears on the left. You may adjust image depth or Gain with the controls on the Control area (Figure 7-38, item 15).
5. Tap **Start**, or alternatively lift and place the probe quickly back on the lungs to start the sweep acquisition.
6. Perform a slow sagittal sweep over the rib cage to produce a panoramic view over the scan area.
7. Lift the probe up in the air when you reach the end of the lung area of interest. Alternatively tap **Stop**.
The panoramic reconstruction stops and the image is replaying the loops.
The final result of lung sweep is a panoramic view containing several looping images separated by the rib-shadow separation.
8. Tap **Pause** or **Play** to see the loops in still view or in looping motion respectively.

Using Lung Sweep with Auto B-Lines tool

If you are interested to use the Auto B-Lines tool to study the amount of B-Lines in the lung.

1. Perform Lung Sweep ('To start Lung sweep' on *page 7-56*).
2. Tap **Auto B-Lines** either before or after completing the lung sweep.
A U-shaped ROI marker appears to indicate the region where B-Lines are being monitored.
If you are just preparing to begin the sweep, the U-shaped ROI appears under the initial scan.

Upon performing the sweep, the ROI travels with the motion of the probe. The detected B-lines is marked with intermittent graphic lines.

When the sweep stops, the ROI widens to mark the whole effective area of the sweep. The color of the wide ROI is set accordingly to the worst Quality Indicator (Figure 7-39, item 3) that was displayed during the sweep.

3. Tap **Pause**.

Each of the running loops stops and displays the still image where the maximum number of B-Lines has been detected.

NOTE: *The Auto B-Lines tool is not available on Pediatric Lung preset named: **Lung/Ped Lung**. It is recommended to use the Auto B-Lines tool on adult lungs only.*

NOTE: *While using a linear probe in Lung Sweep, the B-lines tool works within a depth equal to or less than 8 cm for adult lung presets, and a depth equal to or less than 3 cm for Pediatric Lung presets. When using the C1-5-RS probe in Lung Sweep, the B-lines tool works within a depth equal to or less than 12 cm. If the B-Lines button is selected in a non supported depth, a warning message appears.*

NOTE: *The Auto-B-Lines tool is not available when using the ML6-15-RS probe.*

Lung sweep notes:

- **Quality Indicator:** Complete probe contact is important for a successful sweep. A green Quality Indicator bar (Figure 7-38, item 9) indicates proper contact, yellow - sub-optimal contact, and red - poor contact.
- **Automatic start sweep:** Lift and place the probe quickly back on the lungs and begin the sweeping motion to start the sweep acquisition.
- **Automatic stop sweep:** As soon as you reach the end of the lung sweep, simply lift up the probe. The sweep stops automatically. There is no need to tap the **Stop** button.
- **Sweep speed:** Your lung sweep should be slow enough to achieve high quality sweeps. In case you are sweeping too fast, a **Slow Down** prompt message appears next to the sweep.
- **Sweep direction:** The probe has an indentation to mark the scan direction. Prepare to sweep in the direction where the probe has no indentation.

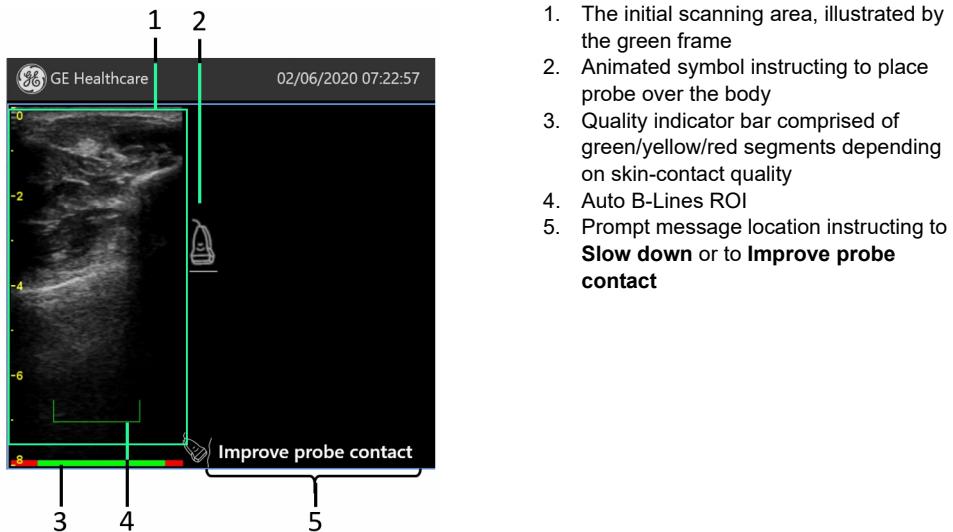


Figure 7-39. Lung sweep quality indicator

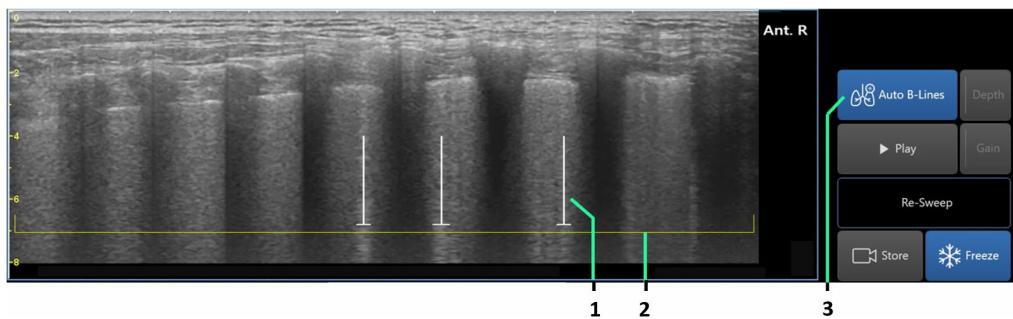


Figure 7-40. Lung sweep with B-Lines indicators for each rib-space

To change a lung sweep segment

After acquiring a lung sweep on a particular segment you'd like to retain, store it as follows: .

1. Tap **Store**.
A circular indicator appears when the sweep is stored.
2. Tap on a different segment to make it active.

You may now acquire a lung sweep into the new lung segment.

After completing and saving two or more different sweep zones, you may:

- review each of the zones by tapping it.
- play a loop by tapping **Play**.



If you switch into a different lung zone without storing the panoramic view of the previous zone, the sweep of the previous zone will un-freeze without ability to review it.

To store a number of lung sweeps per segment

You may store more than one sweep to a particular lung segment.

- A circular indicator appears for each of the stored panoramic sweeps.
- Tap on a circle or swipe left or right to switch to a different panoramic sweep.

NOTE: You may exit from Lung sweep page and activate Review page. The stored lung sweeps may be reviewed through the standard exam review screen.

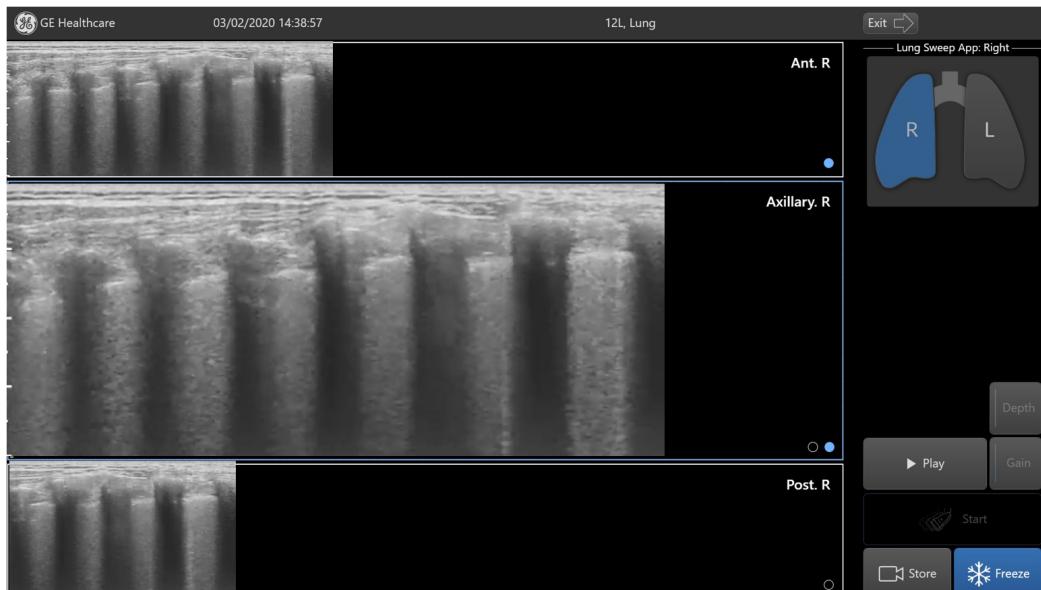


Figure 7-41. Lung Sweep screen with stored panoramic lung sweeps



HINTS

- When reviewing the panorama playback, the user should pay attention to proper display of all the rib shadows. That's a good indication of proper acquisition and reconstruction. If the rib shadows don't seem to be reasonably presented the acquisition may need to be repeated.
- When sweeping the probe backwards to erase a portion of the sweep, move slowly, while maintaining good gel contact, and ensure that the old and new portions of the sweep merge together correctly. During playback, all ribs-spaces should appear properly positioned.
- For optimal results with the Lung Sweep tool use depth between 5 cm to 14 cm and avoid very high or very low gain settings.
- If the panoramic display seems incorrect in terms of how the ribs and pleural spaces are displayed, the user may review the original cine-loop by tapping the **Exit** and **Cine-play** buttons.

eFAST navigation tool

Introduction

The eFAST exam is performed to identify the presence of free fluid/blood in the following areas:

- RUQ (perihepatic space)
- LUQ (perisplenic space)
- Pericardium
- Pelvis
- Bilateral lungs

In addition, it assists in identifying pneumothorax in the anterior lung portions.

When performing eFAST exam, using the eFAST navigation tool, it is possible to:

- scan the anatomical zones mentioned above, either sequentially or at any desired order.
- store images to a specific body zone, by tapping the relevant organ.
- label each zone with the relevant finding, given while scanning.
- view a summary on the review screen, at any time during or after the exam, showing the stored images superimposed on the body anatomical diagram, in the location matching the zone from which they were acquired.

Scanning with the eFAST diagram

To scan with the eFAST navigation tool, select the **eFAST** application, under the relevant probe.

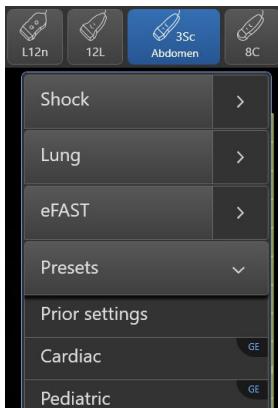


Figure 7-42. Application selector

A scanning screen appears, with a body diagram navigation control on the bottom left. The navigation control contains an anatomical diagram of the body, with a set of buttons representing the various zones that are included in the eFAST exam. One of the buttons is framed in orange to represent the current body-zone being scanned.

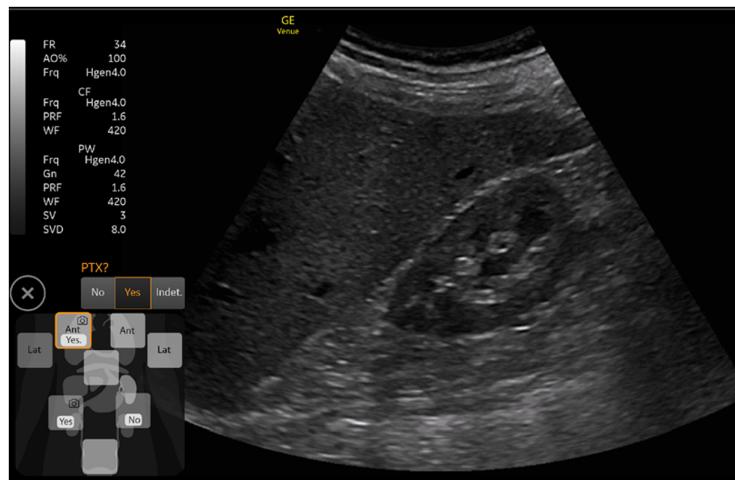
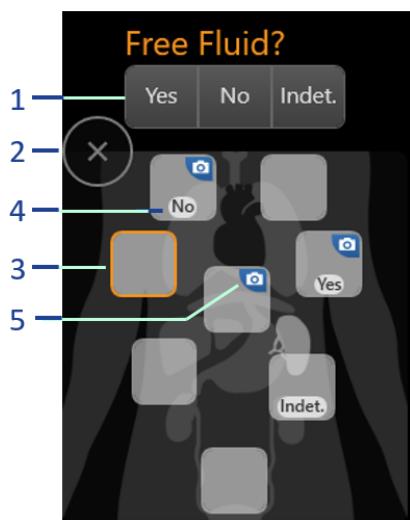


Figure 7-43. Scanning with eFAST



1. Free fluid or PTX Finding selector (Yes, No, Indet.)
2. Tap X to minimize eFAST naviagtion controls
3. An orange frame indicates the currently selected anatomical-zone.
4. Operator-activated finding selector (Yes, No, Indet.)
5. The camera symbol indicates that at least one image or loop was stored for this particular zone.

Figure 7-44. eFAST Navigation tool

Once the zone button is selected, a prompt appears over the diagram, specifically relating to the finding in that zone, presenting three possible choices:

- Yes
- No
- Indeterminate - indet.

Except for anterior lung zones, in all zones the prompt question is **Free fluid?**.

In the anterior lung zones, the question is **PTX?**.

After selecting one of the above 3 prompt choices, the selection appears in the relevant zone, and the prompt disappears.

NOTE: You may change your choice at any time, by selecting that zone again.

NOTE: You may remove your choice by tapping the same choice.

NOTE: You may move to a different zone without selecting a choice, by tapping any zone button.

Important eFAST notes:

- Following Image store, if **Auto eFAST zone increment** has been configured, the active button advances by default to the next zone.

General Measurements and Calculations

You may still tap any other button to select any desired body zone.

- If **Auto eFAST zone increment** is OFF, select the current body zone manually and continue to store images of the various body zones.
- A camera icon indicates storing images to the current zone.

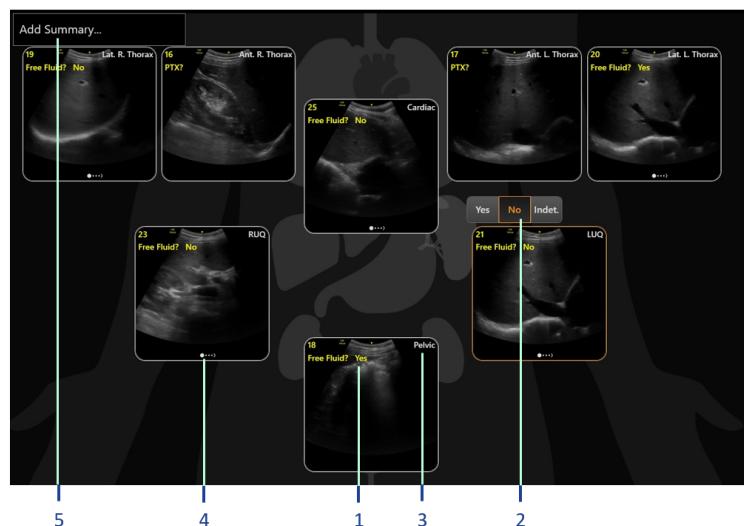
NOTE: *More than one image or loop can be stored for each zone.*

eFAST Review

To display the eFAST review:

1. Tap **Review**.

The eFAST Review screen appears.



1. The finding/question & answer that you marked, during the scanning, for this specific zone.
2. You may edit/change the answer you marked previously during scanning, now in the review screen. This is done by tapping the area of the finding and answer.
3. The name of each body zone appears here as a fixed label.
4. Symbol indicating that more than one image is stored in this zone.
5. A brief summary can be typed here..

Figure 7-45. eFAST review screen

NOTE: *If more than one image is stored in a given body zone, a graphic indicator appears. Swipe horizontally to view other images of the same zone.*

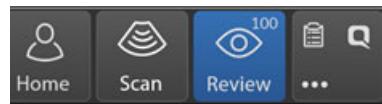
NOTE: Double-tap any image on the eFAST-review screen to view the image in large format on the scanning screen.

Tap **Store** [item 2] at the bottom of the screen to capture the entire display.



[item 1] Tapping **eFAST Review** deselects the button and goes to the General review screen, showing all images taken during this exam.

Tap **Scan** on the top of the screen to return to the scanning screen.



Selecting a different body diagram

Two different body diagrams are currently supported:

- eFAST diagram - 8 body zones:
 - Two anterior lung zones (right & left)
 - Two lateral lung zones (right & left)
 - RUQ (perihepatic space)
 - LUQ (perisplenic space)
 - Heart (subcostal view - pericardium)
 - Pelvic
- FAST diagram - 4 body zones:
 - RUQ (perihepatic space)
 - LUQ (perisplenic space)
 - Heart (subcostal view - pericardium)
 - Pelvic

NOTE: You can configure the system to use any of the available diagrams. The default diagram is eFAST.

Renal Diagram

Introduction

The Renal exam in combination with the Renal Diagram is performed to identify and report the presence hydronephrosis in the kidneys.

When performing a renal exam, using any probe with an available renal preset, it is possible to use the renal Diagram, in order to:

- scan the right and left kidneys as well as the bladder, either sequentially or at any desired order.
- store images to a specific organ, by using a renal anatomical diagram on the scanning screen.
- label the right or left kidney with the relevant finding, selected from a fixed menu while scanning, or later, during the review.
- view a summary review screen, at any time during or after the exam, showing the stored images superimposed over the body anatomical diagram, over the organ from which they were acquired.
- view the findings on the review screen, with ability to modify any finding through the review screen or while in the scanning screen

Scanning with the Renal Diagram

To scan with the use of the Renal Diagram, select the **Renal** preset, under the relevant probe.

A scanning screen appears, with a renal diagram navigation control on the bottom-left.

NOTE: *During renal preset application, by default, the screen automatically expands into a Simple screen ('Using the Simple Screen mode' on page 3-58) to display a larger image and a minimized number of control buttons. This may be configured by the user who wishes to remain in advanced screen mode.*

The Renal Diagram contains an anatomical diagram of the lower abdomen, with a set of 3 organ-related buttons representing the

left kidney, right kidney and bladder. One of the buttons is framed in orange, indicating the currently scanned organ.

When a kidney is selected a **Hydronephrosis?** prompt question appears over its diagram, relating to the finding of that kidney. Five Finding selector buttons appear, representing five possible choices:

- NL – Normal
- Mild
- Mod – Moderate
- Sev – Severe
- Indet. - Indeterminate

After selecting one of the above prompt choices, the selection appears in the relevant zone, and the prompt button disappears.

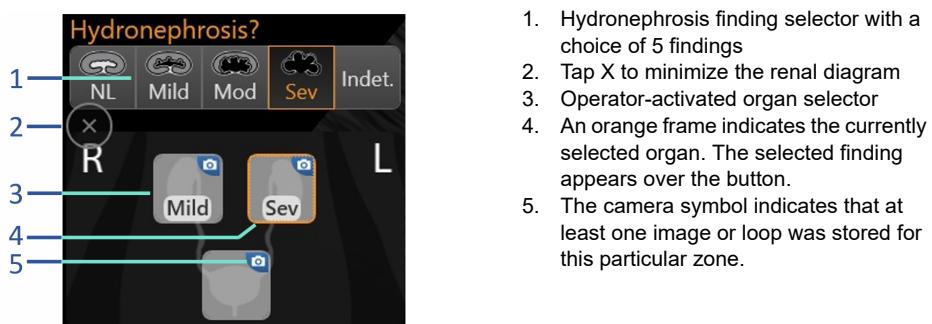


Figure 7-46. Renal navigation diagram

Notes and tips

- You may change your choice (**NL, Mild, Mod, Sev, indet.**) at any time, by selecting that organ again.
- You may remove your choice by tapping the same choice.
- You may move to a different organ without selecting a choice, by tapping any zone button.
- When the zone button for bladder is selected, no prompt words nor finding selector buttons shall appear.
- Following Image store, if **Auto zone increment** has been configured for the renal diagram, the active button advances by default to the next zone. You may still tap any other button to select any desired body zone.
- If **Auto zone increment** is **OFF**, select the current body zone manually and continue to store images of the various body zones.

General Measurements and Calculations

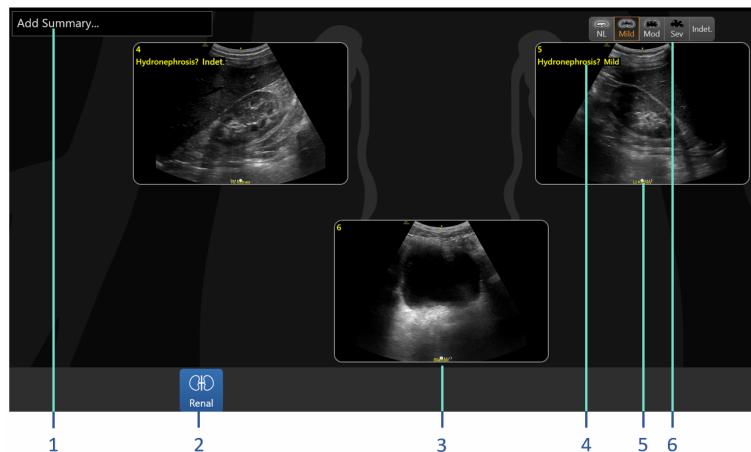
- A camera icon indicates storing images to the current zone.
- More than one image or loop can be stored for each zone.

Renal Review

To review the renal study:

- Tap **Review**.

The Renal Review screen appears.



1. A brief summary can be typed here.
2. Renal review screen enabling
3. Symbol indicating that more than one image is stored for this organ
4. The finding marked for this specific zone
5. The name of each body zone or organ as a fixed label
6. You may edit/change the finding you marked previously, or during scanning, in the review screen. This is done by tapping the area of the finding and selecting an answer.

Figure 7-47. Renal review screen

NOTE: *If more than one image is stored in a given body zone, a graphic indicator appears. Swipe horizontally to view other images of the same zone.*

NOTE: *Double-tap any image on the renal-review screen to view the image in large format on the scanning screen. Tap Store at the bottom of the screen to capture the entire display.*

Tapping **Renal review** (Figure 7-47, item 2) deselects the button and goes to the General review screen, showing all images taken during this exam. Tap **Scan** on the top of the screen to return to the scanning screen.

Shoulder Diagram

Introduction

Shoulder diagram is a tool that is meant to aid the user during a shoulder assessment by allowing the user to document findings and assign them to specific anatomical zones on the left or right shoulder.

The diagram contains a left and right side that the user can swipe between. Each side displays an anatomical diagram of the shoulder containing the following zones:

- IS: infraspinatus tendon
- SSP: supraspinatus tendon
- GHJ : glenohumeral joint
- ACJ: AC joint
- LHB: Biceps tendon
- SSC: Subscapularis tendon

Shoulder Diagram allows the user to:

- Scan the zones of the right and/or left shoulders sequentially if auto increment is enabled, or in any desired order if auto increment is disabled.
- Store images and/or cine loops to a specific zone, on the left or right shoulder diagram.
- Label each zone with the relevant finding, by selecting a finding from the pop-up findings menu that appears above the diagram once a zone is selected. This may be done both while scanning or later during the review. The finding are stored along with the zone's name on the image.
- View the findings on the review screen, with ability to modify any finding through the review screen or while in the scanning screen.
- View a summary on the review screen, at any time during or after the exam, showing the stored images superimposed on the anatomical shoulder diagram, in the location matching the zone and side from which they were acquired.

Scanning with the Shoulder Diagram

Shoulder diagram can be used with any probe with a shoulder preset, in regular B-mode with or without Color or PDI modes.

To scan with Shoulder Diagram, select the Shoulder preset under the relevant probe. A scanning screen appears with an anatomical shoulder diagram navigation control on the bottom-left.

NOTE: *The diagram may be closed or reopened using a minimize button on the diagram.*

Shoulder Diagram contains an anatomical diagram of the left and right shoulders. To switch sides, swipe between sides or tap the R L buttons at the bottom of the diagram.

The diagram contains titles left (L) and right (R) to distinguish between the left and right sides. The annotation of the scanned zone is displayed on-screen with an indication of "Left" or "Right", and is saved with the stored image.



Pay attention to the side that is being scanned and ensure that the findings are stored to the correct side of the shoulder diagram to avoid error and inaccuracy.

The selected zone is framed in orange. Verify it reflects the zone being currently scanned.

A Findings menu appears above the diagram relating to the finding of the selected zone.

Upon selecting one of the above prompt choices, the selection appears in the relevant zone, and the prompt button disappears.

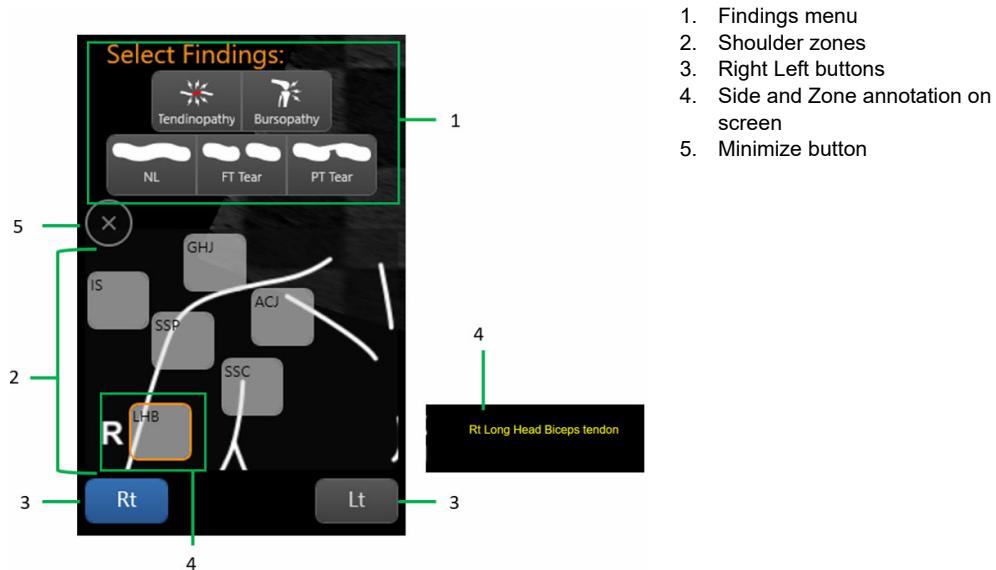


Figure 7-48. Shoulder diagram

NOTE: If there is already an existing finding in the specific zone, selecting a different finding button replaces the old selection with the newly selected marker.

NOTE: Tap any zone button to move to that zone without selection.

To store an image to a zone, tap store while in the desired selected zone. If auto zone increment has been configured, the diagram advances by default to the next zone following image store.

NOTE: In auto increment mode, the user may still tap any other button to select another desired body zone.

NOTE: The predefined order of zones while in auto increment is: LHB, SSC, SSP, IS, GHJ, ACJ. The predefined order of sides is: Right side, Left side.

If Auto zone increment is OFF, select the current body zone manually and continue to store images and findings in the various zones.



HINTS

- The user may change the previously selected finding at any time by selecting that zone again.
- The user may remove the selected finding by tapping the finding.
- The user can move to a different zone without selecting a choice, by tapping a different zone button.
- The camera symbol indicates that at least one image or loop is stored to the zone.
- More than one image or loop can be stored for each zone. If more than one image or loop is stored in a zone, a graphic indicator appears. Swipe horizontally to view other images of the same zone.
- The Follow-up tool may be used with diagrams ('Follow-up tool' on page 4-20).
- The user may use the Bilateral feature to compare the left and right shoulders ('Bilateral feature' on page 4-24)

Shoulder review screen

To review the shoulder diagram tap Review and shoulder Review screen appears.

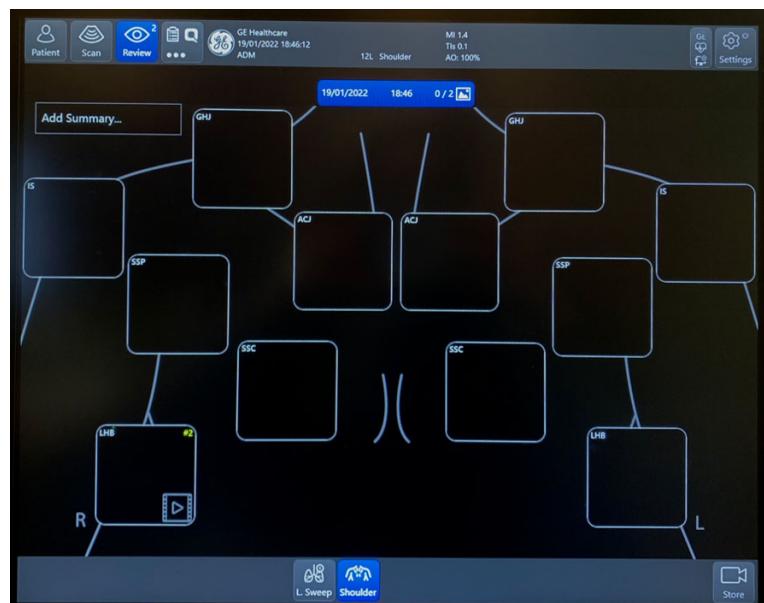


Figure 7-49. Shoulder review screen

NOTE: *Double tap any image on the review screen to view the image in large format on the scanning screen.*

Tap Store at the bottom of the screen to capture the entire display.

Tapping Shoulder review again deselects the button returns the user to the general review screen, which contains all the images stored during this exam.

Tap Scan on the top of the screen to return to the scanning screen.

Reference Image

The Reference Image assists in acquiring the correct view and orientation while performing a shoulder ultrasound using Shoulder Diagram ('Shoulder Diagram' on page 7-69), or the cNerve tool ('cNerve Tool' on page 7-84).

This tool provides an ultrasound reference image of the anatomy for each scanned shoulder diagram zone or selected nerve block. The tool enables you to acquire a live image similar to the reference image.

NOTE: *The reference image can be a still image or a cineloop.*

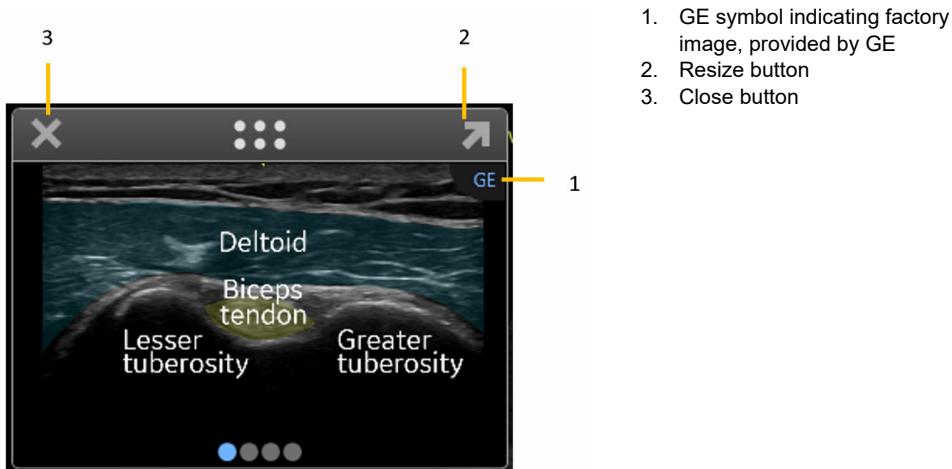


Figure 7-50. Reference image

Scanning with Reference Image

Reference image is available while using Shoulder Diagram or cNerve tool. The **Reference image** window appears above the diagram (Figure 7-50).

Choose the desired zone to be scanned on the Shoulder Diagram, or select the desired nerve block in cNerve tool.

At least one default reference image/cine is available for each diagram zone or cNerve tool nerve block.

While scanning, expand and reduce the Reference Image box by tapping the resize button at the top of the reference image box. To close the reference image tap x on the top-left corner of the reference image box. You can also drag the reference image box to any other location on the screen.

Using the Reference Image as a guide, find the correct view. You may swipe to see all the reference images for the selected zone on the shoulder diagram. Images and cineloops are stored just as when not using Reference Image.

NOTE: *The stored scanned image or cineloop does not include the Reference Image box.*

Adding a reference image

In Config, under diagrams, the reference images are displayed in a 2x2 view. You can add your own reference images or cineloops. Each zone may contain up to 4 images/clips.

Each image can be cropped, flipped or deleted. Select **Restore factory settings** to restore the reference images provided by GE.



External Reference Images can be:

- added in JPEG, MP4, or WMV file formats.
- uploaded only from a USB, not from any other system partitions.



The file size of each image/cineloop must be equal to or less than 50 MB.

The user can delete reference images.

The user may configure the default reference image for each diagram zone or Nerve Block to be a different image than the GE default image.

NOTE: *To distinguish between Factory and User Reference Images, the factory reference images are marked with "GE" in the corner of the image (Figure 7-49).*

NOTE: *To return to factory reference images, go to config and choose "restore to factory images".*

NOTE: *The user can crop the uploaded reference image.*

Notes on Reference Image

- The reference image or cineloop is not dependent on the probe type.
- If the current reference image is a cineloop, a cine control appears under the reference clip and the user can pause/play the current reference cine. The user can also jump through to certain points in the cine.
- For shoulder reference image, the default factory reference image in each zone is the same image, only mirrored appropriately for the left and right sides.

Real-time EF

Overview

Real-Time Automated Ejection Fraction (Real-Time EF) is a semi-automatic measurement tool used to calculate the global EF (Ejection Fraction).

The Real-Time EF tool is used as an optional decision support tool.

NOTE: *Real-Time EF should only be used by qualified institutions and personnel in accordance with the instructions.*

The Real-Time EF tool can be operated while in live scanning or while reviewing a stored loop of an adult or pediatric heart (excluding Neonates) in apical 4-chamber view. This tool is intended to produce the following:

- Track and produce a tracking contour of the myocardial tissue of the LV chamber, while viewed in live or in re-play mode.
- Derive LV minimal volume and LV maximal volume within a heart-cycle, derived from the tracking contour.
- Derive heartrate from the tracking contour.
- Using the Simpson MOD (method-of-disks), the tool calculates maximal and minimal volumes of the LV for each valid heart-cycle and assign them correspondingly to EDV (End-diastolic volume) and ESV (End Systolic Volume).
- The result for the Ejection Fraction value is calculated and presented on screen based on the EDV and ESV derived from each valid heart cycle, while in live scan or in re-play mode.
- The user may configure the EDV and ESV to be shown on screen.
- All of the parameters listed above appear on the Worksheet, including any parameters that are configured to be hidden on the scan-screen.

NOTE: *The Real-Time EF tool does not need to receive an ECG signal from the patient. The tool determines the timing for calculation of EDV, ESV as well as the deriving the heart-rate, (in BPM) from analyzing the geometry and movement of the cardiac image. In*

case ECG is connected, the HR value is derived directly from the ECG signal.

NOTE: *If an ECG was connected, the Real-Time EF tool displays the ECG graph in freeze.*

NOTE: *Below is a list of calculations provided by the Real-time EF tool:*

- Left ventricle Ejection Fraction (LVEF) [%] = $(\text{LVEDV}-\text{LVESV}) \times 100 / \text{LVEDV}$
- Left ventricle End systolic volume (LVESV) [ml]. From a 4-chamber view by Simpson's method of disks (MOD)
- Left ventricle End diastolic volume (LVEDV) [ml]. From a 4-chamber view by Simpson's method of disks (MOD)
- Heart rate (HR) [BPM]

Accuracy



CAUTION

Real-Time EF can not provide accurate results when used in cardiac scanning along with contrast agents.

NOTE: *The Real-time EF is recommended for use on adult and pediatric cardiac scanning using the 3Sc-RS, M5Sc-RS, 6S-RS probes with Adult Cardiac preset, Pediatric Cardiac preset and Cardiac assessments. Real time EF is not available for Neonatal Cardiac presets.*

The measurement accuracies of the Real-Time EF measurement values are as follows:

- The Real-Time EF value result (measured in %) is +/-10 percent points of the experts' manual measurement value, using Simpson's method based on 4CH view only, in 75% of the cases (for example: if the correct value is 50% the algorithm output may be in the range 40%-60%).
- The ESV and EDV must be within 25% from the expert's manual measurement in at least 75% of the cases.

NOTE: *The above accuracy is maintained for heart rates ranging between 35 - 164 bpm.*

NOTE: *The heart-rate calculated from the Real-Time EF tool is accurate in at least 75% of the cases within a +/- 10% range.*

NOTE: *Real-Time EF can not provide accurate results when used in cardiac scanning along with contrast agents.*

The measurements provided by the Real-Time EF tool were compared to the average of 3 experts who manually performed

the same measurements on the same verification dataset.
Please see Table 7-1 below for the Bland-Altman analysis for all the measurements.

Table 7-1: Bland-Altman Analysis on measurements provided by the Real-Time EF tool

Measurement	Bias	Standard deviation (Std)	Lower limit	Upper limit	Tested range min	Tested range max	Linearity*
EF [%]	1.4	6.66	-14	16	20	73	0.97
HR [bpm]	0.2	4.99	-23	20	35	164	1.00
LVESV [ml]	-0.6	9.79	-33	29	6	165	1.02
LVEDV [ml]	7.3	15.8	-47	45	15	245	0.92

* Y = [Linearity] * X , where X is the manual measurement and Y is the auto measurement

Acquisition

1. Select a supported probe with a cardiac preset.

NOTE: *ECG does not have to be connected for the Real-Time EF tool to function.*

2. Scan the heart in an apical 4-chamber view.
3. While scanning in B-mode, activate the Real-Time EF tool by tapping **Real-Time EF** on the bottom-left of the display, as shown in Figure 7-51.

A tracking contour appears, delineating the contour of the LV myocardial tissue on the live image.



Figure 7-51. Real-Time EF button

General Measurements and Calculations

NOTE: While in live scanning mode, the user can flip the contour side, allowing the user to correct the tracking if the user scans backwards, and not with the marker to the left shoulder.

NOTE: The Real-Time EF tool starts providing measurements after at least three full heart cycle have been acquired.

The color of the tracking contour serves as a quality indicator which is updating in real-time.

The Real-Time EF tool calculates an internal, composite quality-grade based on the tool's assessment of several properties of the image, in real-time, including:

- The apical 4-chamber view geometry
- Contrast resolution of the tissue
- Ventricle completeness
- Temporal stability, or repetitiveness of the real-time image
- EF result consistency

The grade is mapped to a scale of Green/Yellow/Red colors of the tracking contour, with green representing high grade, yellow – medium grade, and red – low grade. For example:

- Green contour means that the image is a good apical 4-chamber view, with clear image quality and a stable, repetitive view.
- Yellow: The image may not be a proper 4-chamber view., or the scan was not stable for the last second.
- Red: The image is far from A4C view, or very poor image quality, or the view is highly unstable. The contour is still presented after being red for 2 sec and then disappears (user configurable). In such a case, tracing of the LV is unavailable, and an EF calculation isn't performed.

NOTE: The user may configure the Real-Time EF tool to display the red contour at all times without disappearing (Show default contour in Figure 8-9).

In addition to the EF calculation, the tool is providing the following calculation results, which update once per second:

- left ventricle volume (LVESV)
- left ventricle volume (LVEDV)
- Heart-Rate (HR)

The appearance or hiding of some of the parameters is dependent on user's configuration.

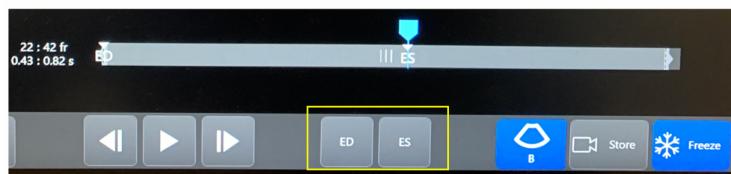


Figure 7-52. ED and ES frame buttons

Freezing

At any time while EF is on display, tap **Freeze** to stop the scanning and view the EF result for the last complete heart-cycle. The image freezes and displays the last valid cycle (a green or yellow contour).

NOTE: You may navigate between the **ED** and **ES** frames by tapping the **ES** and **ED** buttons (Figure 7-52). Upon tapping these buttons, the system displays the selected frame.

NOTE: A complete heart cycle is marked by the system as between two detected **ED** points.

At this time tap **Store** to store viewed frame with all related EF measurements, into the Worksheet.

Alternatively, tap the **Run** cine symbol to loop the last heart cycle. This allows you to inspect how the LV trace is delineating the endocardial borders. If the delineation is visually correct, tap **Store** to store the complete loop and store the results into the Worksheet.

If the tracing is not optimal and there is no result, you may try to select a different cycle, or decide to unfreeze and continue scanning. No result is saved in this case.

When you tap **Freeze** when no EF is on display the system selects the last heart cycle for which an EF value was displayed. Tap **Last Res** (Last Result) to view the whole buffer view. Tap **Last Res** again to return to the last valid cycle view.

NOTE: If the buffer is longer than 4 seconds and results are displayed, the system displays the last results in a 4 sec portion of the buffer.

Storing while in Live Scan

If you prefer to store the EF results during live scanning, you may do so.

At any time while a real-time EF live scan appears on display, tap **Store**. As a result, the last valid heart-cycle, showing a green or yellow trace, is saved to the clipboard while the calculated EF values is stored to the Worksheet.

You may configure the “preview before store” so that the loop is only stored upon a second tap on **Store**. You may also configure the system to perform Prospective store. Cineloop storage configuration is detailed in the next chapter ('Global settings' on page 8-9).

Last Result

If you lose the 4-chamber view while scanning, the system automatically displays the last valid cycle (a green or yellow contour). **Last acquired 4CH EF** and the last valid acquired EF value appear on-screen.

Approving the measurements

Measurements performed by the Real-Time EF semi-automatic tool are NOT automatically stored to the exam's database. You should view the calculated results on the screen. If the results are valid you may approve them by tapping **Store**. As a result, the image or loop, with the associated measurements results are stored to the exam's database.



Real-Time EF is a semi-automatic tool. Even if the indicator is green, there is the possibility of a wrong result. User discretion by a trained individual is needed when approving results. Unapproved measurements are not saved.

NOTE: *You can manually edit the results in the worksheet. The system adds an indication that the result was manually edited.*

Avoiding the semi-automatic results

If you do not approve the results provided by the Real-Time EF tool, do not tap **Store**.

You have two alternatives:

- If you wish to perform manual measurements, simply turn off the Real-Time EF tool, then proceed to perform manual measurements on the displayed frame or loop, of the ejection fraction, or any other type of available measurement.

- If you wish to avoid any measurements on the current image/loop, simply tap **Freeze** to resume live scanning.

Performing Real-Time EF on a stored loop

It is possible to apply the Real-Time EF tool to a stored cardiac loop and calculate the EF later:

1. Select from Archive an adult cardiac 4-ch loop that was generated with a supported probe.
2. Let the loop replay endlessly and verify that the loop-length is longer than 2.5 seconds.
3. Tap **Real-Time EF**.

The EF value and all related measurements appear.

NOTE: *The cine loop always runs on the last four seconds when used with Real-Time EF.*

NOTE: *If the selected loop is shorter than 2.5 seconds EF calculation is not possible. A prompt appears to select a longer loop.*

Selecting a different heart-cycle

Whenever the cardiac loop is replaying and the cine memory contains previous heart-cycles, it is possible to skip among the different heart cycles using the left/right symbols, or by tapping the **Next/Previous** cycle select buttons, or using the cine scrolls to move between frames and cycles.

This allows you to find the most representative heart-cycle and store it, as explained earlier.

Using the ECG signal

Whenever the ECG is connected and turned on, the ECG trace appears on the image, as in any regular cardiac imaging. The ECG trace may be adjusted as needed for amplitude or position.

In this case, the heart-rate is taken from the ECG signal itself.

To exit Real-Time EF

- Select a scanning mode other than B-Mode.
- or -
- Tap **Real-Time EF** (Figure 7-51)
- or -
- Tap **Measurement**.

cNerve Tool

Overview

The cNerve tool is a machine learning enabled tool intended to facilitate the tracking of nerves during the scouting stage of a nerve block procedure. The scouting stage of a nerve block procedure, is the process of scanning the anatomy in order to orient and find the desired approach, prior inserting the needle to inject the anesthetic material.

cNerve tool is available for the following nerve block scouting procedures:

- Popliteal Sciatic via the Popliteal crease approach
- Brachial Plexus via the Interscalene or Suprascapular approach
- Femoral via the Femoral crease approach

During live scanning or while reviewing a stored clip, cNerve highlights the nerve block site with a yellow-colored overlay on and around the nerve in the supported nerve block locations, differentiating it from the surrounding anatomy. cNerve displays a distribution map of the areas on the body impacted by the selected nerve block procedure.

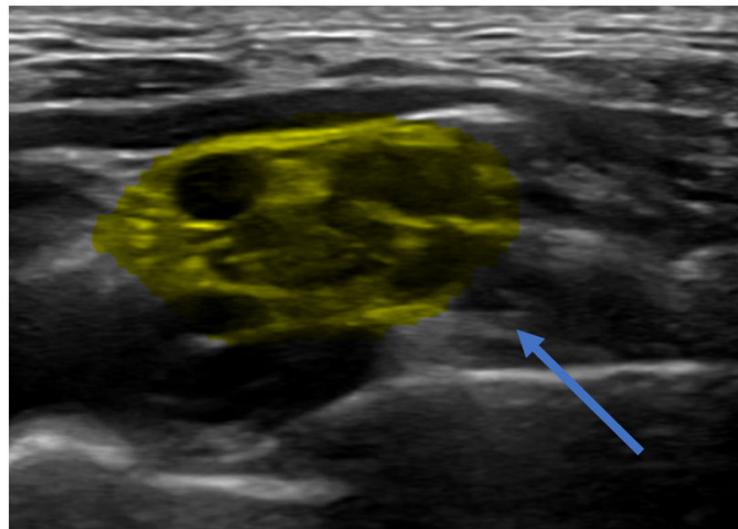


Figure 7-53. Yellow color overlay on the detected nerve in an ultrasound image using the cNerve tool



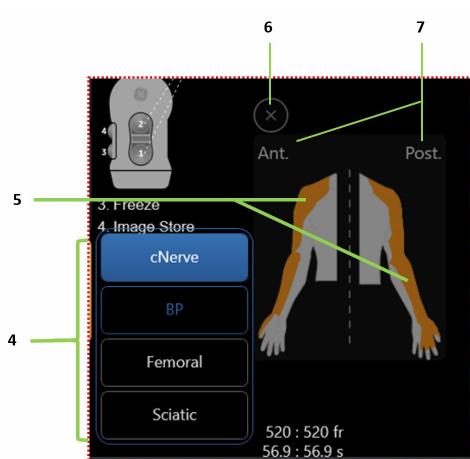
cNerve tool should only be used by trained users. cNerve tool is intended for user guidance and must be used with discretion.



cNerve is intended for use ONLY during the nerve scouting process and should not be used during the procedure itself.

NOTE: *The cNerve tool is intended for adults only.*

General Measurements and Calculations



1. Transparent yellow cNerve overlay
2. Nerve Marker button
3. Illustrative anesthesia distribution map of the anterior and posterior (front and back) anatomy, corresponding to the selected nerve block.
4. cNerve Button with drop down menu of nerve block scouting procedure buttons, with the selected procedure (Brachial Plexus in this case) in blue. The name of selected procedure button is also found at the bottom center of the image on the screen.
5. Orange zones on anatomical image representing the areas that are affected by the selected nerve block.
6. Minimize button, so that the user can hide the distribution map.
7. Anterior and Posterior labels to indicate the front and back views of the body.

Figure 7-54. A screenshot of the cNerve tool in action with an enlargement of the nerve block buttons and the distribution map

Operator profile

The cNerve tool is intended for use by, or under the supervision of, an appropriately trained physician or anesthetist who is qualified to perform Ultrasound Guided Regional Anesthesia.

NOTE: *Qualification criteria may vary by region, for example, the American Institute of Ultrasound Medicine (AIUM) requires*

Physicians to meet specified training guidelines in order to perform ultrasound-guided regional anesthesia procedures.

Functionality

The cNerve tool can be used in **B-mode** or in conjunction with the **Color** or **PDI** modes.

cNerve can be used with the following supported linear probes that include nerve presets: L4-12t-RS, L4-20t-RS, 12L-RS, ML6-15-RS, and 9L-RS.

NOTE: *While scanning live in B-mode and using cNerve, color mode can be activated. The cNerve overlay is simultaneously displayed.*

Using cNerve

1. Choose a supported probe.
2. Select one of the nerve presets in live **B-mode**, with or without **Color** mode.



cNerve cannot be used with needle mode. While in Needle Mode the cNerve tool is always deactivated and not available.

NOTE: *cNerve can be accessed and used from any nerve preset on supported probes, for any of the supported nerves.*

3. Position the probe over the target nerve block landmark from the correct approach. For example: for Popliteal Sciatic, prepare to scan in the Popliteal crease region.
4. To activate the tool, tap **cNerve** in the **Auto Tools** region on the system display. A menu with three buttons appears, each button represents a nerve block. Listed from top to bottom: **BP**, **Sciatic** and **Femoral**.



cNerve is currently NOT compatible with the presence of a needle in the image. Upon tapping cNerve the warning message: **Do not use cNerve while a needle is present in the image** appears at the top of the screen.

5. The default active nerve block button is automatically selected and highlighted in blue and the title of the selected nerve is displayed at the bottom of the screen.
6. If the default selected nerve block is not the desired nerve block, tap the correct nerve block. You may toggle between

nerves by tapping **BP**, **Sciatic** or **Femoral**. The system immediately begins to track for the selected nerve block, and the title of the selected nerve block is displayed on the screen.



WARNING

Make sure the correct nerve in the cNerve tool is selected, otherwise Nerve detection is affected. Selection of the wrong nerve can lead to faulty or misleading detection which may cause malpractice and resultant health risks.

NOTE:

*If you tap Needle Mode while in cNerve, the system exits cNerve and enters Needle Mode, and the warning message: **Do not use cNerve while a needle is present in the image** appears at the top screen. Exit Needle Mode to reenter cNerve.*

cNerve adjustment

The color saturation of the overlay on the nerve can be adjusted using the **Nerve marker** button, found on the upper-left corner of the screen. Tap **Nerve Marker** and a slider appears: Minimum saturation renders the yellow overlay indistinguishable from the background and maximum saturation renders the yellow overlay almost opaque.

Distribution map

The tool also displays a generic, illustrative distribution map for each nerve block procedure button. The distribution map is found on the bottom left of the screen next to the **cNerve** button. The distribution map indicates the anterior and posterior views of the affected anatomy corresponding to the selected nerve block. The orange zones on the anatomical image represent the specific areas that are affected by the selected nerve block.

To hide the distribution map, tap the minimize button on the upper left corner of the distribution map. To reopen the distribution map, tap the **Distrib.** button that appears in the distribution map's place upon minimizing it.

Exiting cNerve

To exit the cNerve tool: tap **cNerve**, tap a button on the probe (if applicable), or tap **B-Mode**.

Storing and exporting clips while using cNerve

The user can store a clip with the nerve overlay. Clips may be stored while in scanning, pause, freeze or while in playback.

The clip can also be exported with the cNerve overlay.

Using cNerve on recorded clips

If the cNerve tool wasn't activated when the clip was stored, the cNerve tool can be used on the stored clip. Tap **cNerve** while in replay to activate the tool, and the tool displays list of nerves.

The User can remove the nerve marking from the screen while reviewing a recorded clip by deselecting the cNerve button.

NOTE: *If the cNerve tool was already activated when the clip/image was stored, the cNerve button is automatically selected during replay. The menu listing the nerves becomes active, with the selected nerve block button highlighted in blue, and the title of the nerve at the bottom of the screen. The nerve overlay appears while the clip/image is played/viewed. You cannot select a nerve different than the one that was selected while recording the clip.*

Worksheet

The worksheet function enables the user to review, edit, delete or print data. All measurements and calculations taken during the examination can be viewed at any time using the worksheet.

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, tap **Worksheet** on the top of the screen.

The system displays the worksheet for the current study (Figure 7-55).

		GEMS - Ultrasound 11/05/06 17:14:04			3S RS	MI 1.0	
Parameter	Value	Mth	m1	m2	m3	m4	m5
M-Mode Measurements							
Generic							
LV Study							
IVSd	1.38 cm		Av	1.05	1.72		
LVIDd	5.50 cm		Av	5.50			
LVPWd	1.72 cm		Av	1.09	2.34		
IVSs	1.72 cm		Av	1.72			
LVIDs	3.55 cm		Av	3.55			
LVPWs	2.65 cm		Av	2.65			
EDV(Teich)	147.42 ml		Av	147.4			
ESV(Teich)	52.62 ml		Av	52.62			
EFT(eich)	64.31%		Av	64.31			
%FS	35.46%		Av	35.46			
SV(Teich)	94.80 ml		Av	94.80			

1. Measurement type
2. Measurement parameter
3. Value: Avaraging, Max, Min or Last
4. Measured/calculated values
5. Value type
6. Measurement type selection

Figure 7-55. Typical Worksheet screen

To select method

1. Average of taken measurements
2. Maximum measurement
3. Minimum measurement
4. Last taken measurement

Excluding or including measurements

GE Healthcare		Patient Name				11w5d:LMP	
07/31/08 10:30:26AM	ADM	Patient ID					
Origin LMP	LMP 05/10/2008	BBT		GA 11w5d		EDD(LMP) 02/14/2009	
Fetus B/3		CUA	18w1d+/-1w0d			EDD(CUA) 12/31/2008	
FetusPos		PLAC		Ref.Physician			Page 1/1
B Mode							
BPD(Hadlock)	<input checked="" type="checkbox"/>	5.87 cm	3.21	2.94	11.47	Avg.	24w0d 22w2d-25w5d
HC(Hadlock)	<input checked="" type="checkbox"/>	11.37 cm	11.52	12.66	9.92	Avg.	15w4d 14w2d-16w5d
OFD(HC)		4.13 cm	4.55	4.42	3.42	Avg.	
AC(Hadlock)	<input checked="" type="checkbox"/>	10.46 cm	10.53	10.38		Avg.	16w3d 14w5d-18w0d
FL(Hadlock)	<input checked="" type="checkbox"/>	2.25 cm	2.29	2.21		Avg.	16w5d 15w3d-18w1d
2D Calculations							
EFW(AC,BPD,FL,HC)-Hadlock		163.50g+/-24.52g	(6oz+/-1oz)				
EFW(Hadlock)-GP		>97%					
CI(Hadlock)		> 142.23 (70.00-86.00)	FL/AC(Hadlock)		21.49 (-)		
FL/BPD(Hohler)		38.27 (-)	FL/HC(Hadlock)		> 19.77 (15.84-18.04)		
HC/AC(Campbell)		1.09 (1.08-1.27)					

Figure 7-56. OB B-Mode Worksheet

To return to scanning, do one of the following:

- Select Worksheet
- Press Esc
- Select the Exit button

To view a different worksheet, select the worksheet key for the desired worksheet.

To view worksheet data for a particular mode, select the key for 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. Tap on the field you wish to edit. The field is highlighted.
2. 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. Tap on the field you wish to edit. 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.



HINTS

Some fields on the worksheet are view-only, and others you can change or select. To easily see which fields can be changed or selected, move the cursor. As the cursor moves over a field that you can change or select, the field is highlighted.

To delete all Worksheet values

Delete all worksheet values on a worksheet as follows:

1. When the Worksheet is displayed on the monitor, tap **Clear**. A confirmation prompt appears.
2. Select **OK** to delete all.

NOTE: Select **Cancel** to cancel the deletion.

Using the Worksheet

1. Press **Worksheet** on the Control Panel.
2. Select the Measurement type.
3. To browse through the measurements, select **Page Up** or **Page Down** or adjust **Page Change**.

To select value type

1. Select the relevant cell in the Mth (Method) column.
A pop-up menu appears, listing the available options:



1. Average of the measurements taken
2. Maximum measurement
3. Minimum measurement
4. Last measurement taken

2. Select the required option.

The value is updated accordingly.

To exclude or include measurements

One or more measurement values from a set of measurements for a parameter can be excluded when doing average calculation.

1. Place the cursor over the measurement to exclude.
2. Tap **Update Menu**.
3. Select **Exclude value/Include value** from the context menu.

To delete measurements

1. Place the cursor over the measurement to delete.
2. Tap **Update Menu**.
3. Select:
 - **Delete value** to delete the current value
 - **Delete set** to delete the current set of values
 - **Delete all** to delete all values from the Worksheet

To change a measurement value

1. Select the measurement to change.
2. Enter a new value.

NOTE: *Changed measurements are marked with an asterisk (*).*

Obstetrics Measurements

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.

When you take measurements, you can select the calculation before you take the measurement or after you take it. If you select the calculation before you take the measurement, the Results Window shows the estimated fetal age 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. The measurements steps in this section tell you to select the calculation before you make the measurement.

NOTE: *Calculation formulas are listed in the Advanced Reference Manual.*

The following pages describe how to make OB measurements.

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: *The Obstetrics measurements can be configured in Settings > Measure > Measure.*

NOTE: *Operators may choose other measurement types based on their regional preferences.*



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 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 and trained personnel following good clinical practice.

NOTE: *The following instructions assume that you first go to Home > Preset Information > OB1/OB2/3, press Scan and then Freeze.*

NOTE: *Only 5 measurements are allowed at the same time.*

NOTE: *For distance measurement and ellipse measurement that are mentioned in the following description, please refer to 'Distance measurements' on page 7-11.*

Gestational Sac (GS)

To calculate the gestational sac, make one or three distance measurements in two scan planes.

GS (1 Caliper)

To make a GS (1 Caliper) measurement:

1. Tap **Measure**, then select **GS (1 Caliper)**.
2. Make a distance measurement. The system displays the GS value in the Results Window.

GS (3 Calipers)

To make a GS (3 Calipers) measurement:

1. Tap **Measure**.
2. Select **GS (3 Caliper)**.
3. Make a distance measurement to get one distance value.
4. Repeat steps 1 and 3 twice to get two additional distance values.

The system displays the GS value in the Results Window.

Crown Rump Length (CRL)

To measure crown rump length, make one distance measurement:

1. Tap **Measure**, then select **CRL**.
2. Make a distance measurement. The system displays the CRL value in the Results Window.

Biparietal Diameter (BPD)

To measure biparietal diameter, make one distance measurement:

1. Tap **Measure**, then select **BPD**.
2. Make a distance measurement. The system displays the BPD value in the Results Window.

Abdominal Circumference (AC)

To measure abdominal circumference, make two diameter measurements or one ellipse measurement.

AC (Diameter)

To measure abdominal circumference, make two diameter measurements.

1. Tap **Measure**.
2. Select **AC (Diameter)**.
3. Make a distance measurement to get one distance value.
4. Repeat steps 1 and 3 to get the other distance value.

Then the system displays the AC (Diameter) value in the Results Window.

AC (Ellipse)

To measure abdominal circumference, make one ellipse measurement.

1. Tap **Measure**, then select **AC (Ellipse)**.
2. Make an ellipse measurement and the system displays the AC (Ellipse) value in the Results Window.

Femur Length (FL)

To measure femur length, make one distance measurement:

1. Tap **Measure**, then select **FL**.
2. Make a distance measurement. The system displays the FL value 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. Tap **Measure**, then select **AxT**.
2. Make a distance measurement of the antero-postero trunk diameter (APTD).
3. Make a distance measurement of the transverse trunk diameter (TTD).

The system displays the AxT value in the Results Window.

Spine length (SL)

To measure spine length, make one distance measurement:

1. Tap **Measure**, then select **SL**.
2. Make a distance measurement. The system displays the SL value in the Results Window.

Cardio-Thoracic Area Ratio (CTAR)

To calculate cardio-thoracic area ratio, make two ellipse measurements.

1. Tap **Measure**, then select **CTAR**.
2. Make an ellipse measurement of the cardiac area.
3. Make an ellipse measurement of the thoracic area.

The system displays the CTAR value in the Results Window.

Amniotic Fluid Index (AFI)

To calculate the amniotic fluid index, make one or four distance measurements.

AFI (1 Caliper)

To make a AFI (1 Caliper) measurement:

1. Tap **Measure**, then select **AFI (1 Caliper)**.
2. Make a distance measurement. The system displays the AFI value in the Results Window.

AFI (4 Calipers)

To make a AFI (4 Calipers) measurement:

1. Tap **Measure**.
2. Select **AFI (4 Calipers)**.
3. Make a distance measurement to get one distance value.
4. Repeat steps 1 and 3 three times to obtain three additional distance values.

Then the system displays the AFI value in the Results Window.

Cervical Length (CL)

To measure cervical length, make one distance measurement:

1. Tap **Measure**, then select **CL**.
2. Make a distance measurement. The system displays the CL value in the Results Window.

Humerus Length (HL)

To measure humerus length, make one distance measurement:

1. Tap **Measure**, then select **HL**.
2. Make a distance measurement. The system displays the HL value in the Results Window.

Head Circumference (HC)

To measure HC (Hadlock), make a diameter measurement or ellipse measurement.

HC (Diameter)

To measure HC (Hadlock), make a diameter measurement:

1. Tap **Measure**.
2. Select **HC (Diameter)**.

3. Make a distance measurement to get one distance value.
4. Repeat steps 1 and 3 to obtain the other distance value.

Then the system displays the HC (Diameter) value in the Results Window.

HC (Ellipse)

To measure HC (Hadlock), make an ellipse measurement:

1. Tap **Measure**, then select **HC (Ellipse)**.
2. Make an ellipse measurement. The system displays the HC (Ellipse) value in the Results Window.

Fetal Trunk Cross-Sectional Area (FTA)

To measure fetal trunk cross-sectional area, make an ellipse measurement:

1. Tap **Measure**, then select **FTA**.
2. Make an ellipse measurement. The system displays the FTA value 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.

The system displays each measurement and the estimated fetal weight in the OB Worksheet.

NOTE: *For a description of any of the required measurements, refer to that measurement.*

NOTE: *The EFW can be configured in Settings > Measure > Obstetrics.*

OB Worksheet

The OB Worksheet lists patient information, and all measurement and calculation data.

To view the OB Worksheet tap **Worksheet**.

The OB Worksheet has three sections of information:

- Patient information
- Measurement information
- Calculation information

Patient information

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 the Settings > 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 informations

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, or last. To change the method:
 - a. Tap the **Method** field
 - b. Select from the list
- 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 tap **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 'Worksheet' on *page 7-90*.

OB Worksheet controls

Table 7-2: OB Worksheet controls

Control	Description
Report	View report sheet.
Clear	Clear the all the information in OB Worksheet except Patient ID, Name and Age.
Reset	Reset the worksheet.
Store to	Set store destination.
Store	Store the worksheet.
Print	Print the worksheet.

OB Worksheet information

Table 7-3: Patient information

Field	Description
ID, Name, Age	Patient ID, Patient name and patient age.
LMP	Last Menstrual Period; the LMP can be entered and edited in the patient screen.
EDD (LMP)	Estimated Delivery Date by LMP; the system fills in the date after you enter the LMP.
GA (LMP)	Gestational Age by LMP; the system fills in the age after you enter the LMP.
EDD(CUA)/ EDD(AUA)	Estimated Delivery Date by CUA/AUA.

Table 7-3: Patient information

Field	Description
CUA/AUA	Select the ultrasound age calculation method in this field. CUA: Composite Ultrasound Age, regression calculation; AUA: Average Ultrasound Age, an arithmetic average.
Fetus#	Number of fetuses; default is 1; can be 1, 2 or 3.
A/B/C	The first/second/third fetus.

Table 7-4: 2D Measurements information

Field	Description
CUA/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, last) to determine this value. Average for USA and Europe; Last for Osaka, Tokyo and ASUM.
m1, m2	Up to two measurement values for each item. If you make more than two measurements, the system uses the last two.
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. Average for USA and Europe; Last for Osaka, Tokyo and ASUM.
GA	Gestational Age
GA Range/GP/SD	The typical range of gestational age/growth percentile/standard deviation for this measurement.

Table 7-5: OB Calculation information

Field	Description
EFW	Estimated fetal weight; lists the parameters used to calculate EFW. This is followed by the calculation result. NOTE: EFW is configured in Settings > Measure > Obstetrics.
EFW-GP	Lists the source used to calculate EFW-GP (growth percentile). This is followed by the growth percentile.
CI	Cephalic Index.
FL/AC, FL/HC, FL/BPD, C/AC	Ratios for the measurements

Table 7-5: OB Calculation information

Field	Description
AFI	Amniotic Fluid Index

Table 7-6: MM Measurements information

Field	Description
Value	The measured value. If more than one measurement was made for an item, the system uses the specified method (average, last) to determine this value. AVG for USA and Europe; LAST for Osaka, Tokyo and ASUM.
m1, m2	Up to two measurement values for each item. If you make more than two measurements, the system uses the last two.
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 AVG, MAX, MIN or LAST.

Image Management

Searching for an existing patient

1. Tap **Patient** to enter patient entry screen.
2. Tap **End exam** in case an exam is open.
3. Tap the **Local Archive** tab to open the list of patients.
NOTE: *To find a patient more easily, type some characters into any of the filter fields (such as Patient ID, last or first names). A shorter, filtered list appears.*
4. Tap the patient's name.
The selected patient's name turns blue.
5. Review previous exams, or open a new exam, as explained below.

Reviewing previous exams of an existing patient

1. Search and select the patient ('Searching for an existing patient' on page 7-106).
2. Tap **Review exams**, located at the bottom-right of the screen.
A review screen opens with tabs representing the time and date of each existing exam.
3. Select any tab to bring up images of the relevant exam.
You can view the stored images in different ways ('Using image review' on page 7-117).

Beginning a new exam for an existing patient

1. Search and select the patient ('Searching for an existing patient' on page 7-106).
2. Tap **Begin exam**, located at the bottom-right of the screen.

Editing patient information

To edit patient information:

1. Search and select the patient ('Searching for an existing patient' on page 7-106).
2. Tap **Begin exam**, located at the bottom-right of the screen.
3. Tap **Patient**.
4. Tap the **Current patient** tab.
5. Edit the patient's info as necessary.

Deleting existing patient/image



CAUTION

Before deleting a patient or image from the Patient Screen, make sure you have already saved the patient data. GE is not responsible for any patient information loss.

Deleting an existing patient

1. Select **Manage archive** in the Patient page.
2. Search and tap the checkbox of the patient to delete. Multiple patients can be selected for deletion.
3. Tap **Delete**. A confirmation dialog box appears.
4. Select **OK** to delete or **Cancel** to exit.

Deleting an existing image/video

1. Select a patient from the patient list.
2. Tap the image/video to delete.
3. Tap **Delete**. A confirmation dialog box appears.
4. Select **OK** to delete or **Cancel** to exit.

Image storage

Storing images and loops

Images and loops can be stored to the local archive. To store an image or loop:

1. While scanning, tap **Freeze**.
2. Scroll through the Cine Loop and select the desired image/loop.

3. Tap **Store** to save the image/loop.
4. Activate the Cineloop replay and adjust the borders as necessary ('Storing loops or images' on *page 4-17*).
5. Tap **Store** while the loop is playing to store that loop.

Performing screen captures

1. Insert a USB memory device.
2. Tap **Settings**.
3. Tap **Capture** on the vertical bar.

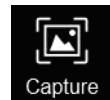


Figure 7-57. Capture button

The current screen is captured and stored as a .png formatted image into the memory device, to a dedicated folder named **Screenshots**.

The name of the captured file contains the date and time stamp.

In case a USB memory device is not inserted, the captured images will be stored into the internal disk at location:
D:\Logs\Screenshots.

Storage device status

View storage device status

After the selected storage device is detected by the system, there is an icon on the screen.

When the storage device is full

When storing images, videos or saving a patient, a warning message appears: Storage space is almost full, saving image/video/ patient failed.

NOTE: *Change the storage device at once and save images/videos again.*

When the storage device is not available

NOTE: *Make sure the selected storage device is functioning properly, or please check it in Utility ('Tools' on page 8-39).*

NOTE: *Make sure the selected storage device is connected properly.*

View images/video on PC

To view archived images/videos on a PC:

NOTE: *It is recommended to view videos by QuickTime. If you do not have QuickTime on your PC, you can download it free from www.apple.com.*

1. Tap the storage device status icon, tap Eject SD or Eject USB, then remove the storage device from the system.



DO NOT disconnect the USB Memory Stick from Venue Go without properly ejecting the device; this may result in loss of data.

2. Connect the storage device to a PC.
 - For USB Memory Stick, connect to the USB port of a PC.
3. Find the patient images and videos in the patient folder.
 - PatientID@_@_LastName@_FirstName@_UserName@_StudyDate
 - For those registering with Patient ID and 2nd ID, the folder name is:
PatientID@_2ndID@_LastName@_FirstName@_UserName@_StudyDate.
 - For those registering with auto Patient ID, the folder name is AutoID@_@_@_UserName@_StudyDate.
 - For those scanning without patient registration, the folder name is
EAutoID@_@_@_UserName@_StudyDate.

NOTE: *In case of emergency, you can scan without entering patient information. In these cases, the system automatically generates the ID.*

4. View patient images and videos on a PC.

Connectivity

Overview

You can set up the connection and communication protocols for the ultrasound system. This page gives an overview of each of the connectivity functions.

To set up your institution's connectivity, you must login with administrative privileges.

- **DICOM Worklist:** Search and Retrieve Patient Information
- **DICOM Image Store:** Transfer DICOM images or videos to DICOM image server.
- **Network QuickSave:** Transfer images and CINE loops to network shared folder.

DICOM Worklist

1. Select Home, then select Worklist. The patient list used last time displays.

NOTE: *The worklist server can be configured in Utility ('Connectivity' on page 8-33).*

2. Press Refresh, the patient list which meets the search criteria in the worklist server displays.

NOTE: *The Search Criteria may be configured in Utility > Connectivity > DICOM.*

3. Select the desired patient, press **Select EM** or **Select**. The patient information is automatically populated.

- or -

Enter Patient ID, Patient Name, Accession, Modality and/or Date to search the patient. Press Select, the patient information is automatically populated.

NOTE: *Only when the patient is an emergency one, can the operator press Select EM.*

4. Tap **Scan** to begin an exam.

DICOM Image Store

DICOM Image Store allows the system to send ultrasound images in a format that can be interpreted by PACS.

NOTE: *All still images can be sent to DICOM image server.*

NOTE: *Video may be sent to DICOM image server only if Enable MultiFrame DICOM is selected.*

NOTE: *The multiframe video is limited to 3 seconds.*

NOTE: *The DICOM image server can be configured in Utility ('Connectivity' on page 8-33).*

1. Select **Review**. The patient gallery displays on the screen.
2. Select the desired image or video, select (PACS) in the lower right corner. The image or video will be sent to the DICOM image server.

- or -

Select the desired patient, select (PACS) on the right side. The images and videos of the patient will be sent to the DICOM image server.

NOTE: *The transfer status can be viewed in Spooler ('Spool' on page 7-111).*

NOTE: *When using Educational workflow, data is not sent to PACS upon ending the exam or when using direct store ('Educational workflow' on page 4-8).*

Spool

To monitor/control DICOM jobs, tap **Settings**, then **Logs** at the bottom of the menu (Figure 7-58). Tap **Spooler** to view the DICOM jobs spooler page.

You can view, refresh, resend, and delete images from DICOM spool by selecting a job, then specifying the action to be performed on this job.

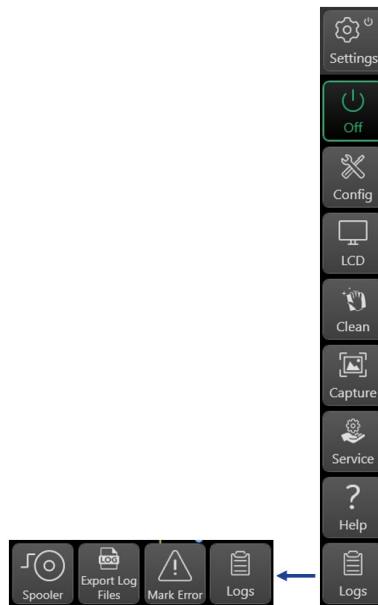


Figure 7-58. Logs settings menu

Table 7-7: Job status

Status	Description
Ready	The image transfer is ready.
Start	The image transfer has started.
Finished	The image transfer has finished successfully.
Failed	Unsuccessful job attempt.

NOTE: *Venue Go automatically deletes jobs in the DICOM spooler after finishing the transmission retries with a failed status ('Dataflow' on page 8-33).*

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).

The image archive is set by the selected dataflow ('Dataflow' on page 8-33).

**CAUTION**

Do not use the internal hard drive for long-term image storage. External storage media or network-based server solution is recommended for image long-term archive.

Storing an image

Images are displayed chronologically on the clipboard.

1. While scanning in any mode, tap **Freeze**.
2. Use the cine controls, or swipe left anywhere over the B-mode image to scroll through the cineloop and select the required image.
3. Tap **Store**.

The image is stored and a thumbnail is displayed on the clipboard (Figure 3-43). A sequential number is given to the stored image.

Storing a cineloop

A cineloop is a sequence of images recorded over a certain time frame. The stored cineloops appear chronologically on the clipboard. Cineloops can be stored at any time during the scanning session.

The system can be configured to perform either:

- **Retrospective storage:** while scanning tap Store to store the last elapsed defined number of seconds.
- **Prospective storage:** while scanning tap Store to start storage of the forthcoming defined number of seconds.

The user can also configure the system to preview the cineloop before storage or save the cineloop directly as described in the sections below.

See ‘Global settings’ on page 8-9 for configuration of cineloop storage.

Direct storage of a cineloop

Depending on whether the system has been configured to enable or disable the Preview Loop before store function (‘Global settings’ on page 8-9), the following procedures enable the cineloop to be stored directly.

Storing cineloop without preview

The function **Preview Loop before store** is disabled.

- While scanning, tap **Store**.
 - If **Retrospective storage** is selected, the last elapsed defined number of seconds are stored.
 - If **Prospective storage** is selected, the forthcoming defined number of seconds are stored.

A thumbnail is displayed on the clipboard and scanning resumes immediately.

NOTE: *Cineloop storage length can be set by selecting Loop Length and adjusting for length of time. This setting remains for the duration of the exam unless changed.*

Storing cineloop with preview

The function **Preview Loop before store** is enabled.

1. While scanning, tap **Store**.
 - If **Retrospective storage** is selected, the last elapsed defined number of seconds are displayed on the screen (but not stored).
 - If **Prospective storage** is selected, the forthcoming defined number of seconds are displayed on the screen (but not stored).

NOTE: *At this point, tapping Store before the predefined time has elapsed freezes the scan and replays the frames recorded so far.*

2. If desired, select and adjust the cineloop length to store using the cineloop controls ('Using Cine' on page 6-6).
3. Tap **Store** to save the cineloop.

A thumbnail is displayed on the clipboard and scanning resumes immediately.

Review stored images

Images of the current exam may be reviewed by two methods:

- Directly from the clipboard
- Using the Image Review function

Clipboard image review

Stored images belonging to the currently opened exam appear in small "thumbnail" format on a vertical column called the **clipboard**.

1. Tap the **Review** button.
A vertical column appears displaying recently stored images.
The images are numbered sequentially.
A "film" symbol appears on some images to indicate that they represent a cineloop.
2. Swipe vertically if needed to scroll the images and view previous thumbnails.
3. Double-tap on any thumbnail to retrieve it and view it in full size.

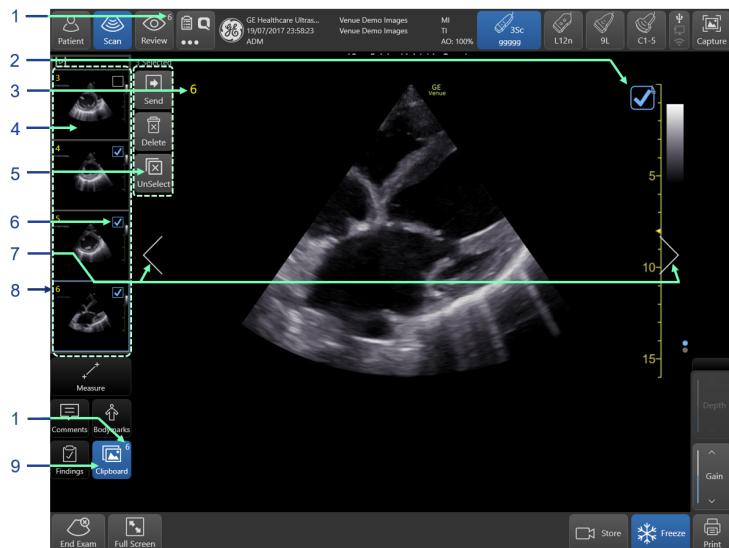
You may now be able to perform some postprocessing on the retrieved image should you wish it.

NOTE: *When retrieving an image from clipboard, the retrieved image replaces the current image on display. You may need to store the current image, or use split screen to avoid losing it.*

4. Tap once on any thumbnail to display it in a medium-sized preview format.
This allows you to do a quick review of some of the stored images. Cineloops appear as still frames.
5. Tap the preview image to view it in full size.

Image handling controls in the clipboard area

Some additional details related to Clipboard operation are listed below.



1. Total images in the current exam
2. Reviewed image selection box
3. Reviewed image serial number
4. Clipboard zone with up to 4 consecutive images
5. Send, Delete, or deselect all images
6. Clipboard image selection box
7. Review next/previous image
8. Clipboard images serial number
9. Turn clipboard ON/OFF

Figure 7-59. Elements of Clipboard images and controls

- When an image is recalled from the clipboard, its serial number appears on the left upper corner [3].
- You may select one or more images by tapping selection box [6] to set a checkbox.
- You may tap left or right navigation arrows [7] to view the next/previous image.
- A blue frame marks the main image currently displayed.
- The checkmarks appearing on the clipboard match the checkmarks set on the main image and in the Review screen.
- The number of selected images appears above the control buttons [5].

- After selecting one image or more, a control menu box [5] appears, allowing you to **Delete** all selected images, send all selected images by tapping **Send to...** to some storage media. You may also deselect all by tapping **Unselect all**.

Using image review

A typical example of a review screen appears in Figure 7-60.

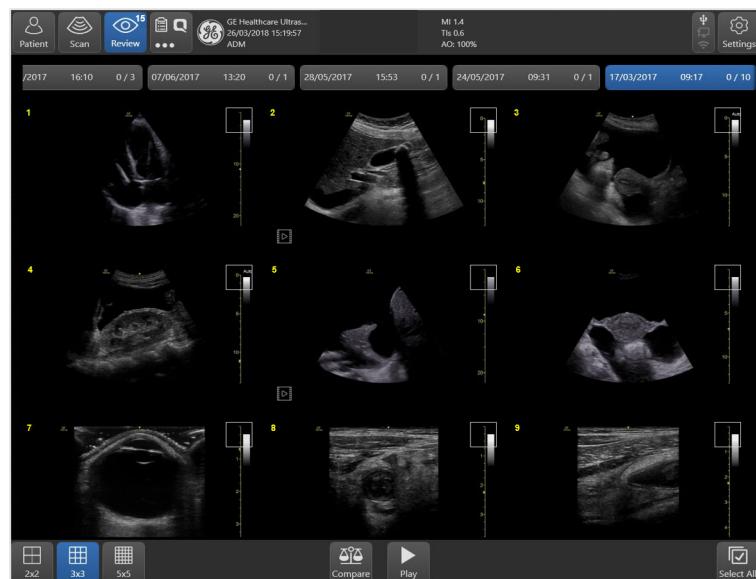


Figure 7-60. A typical review screen

Viewing current exam

- After saving some images during the current exam tap **Review**.
A dedicated **Review screen** appears, containing the stored images in sequential order.
Images may be scrolled up or down by swiping.
- Change the size of the images by tapping **2x2**, **3x3** or **5x5**.
- Double-tap any image to close the review screen and retrieve the image in full size, where cineloops may be replayed and image may be post-processed.
A blue frame marks the last image that was recalled into full view.

4. Tap any image to select it. A selected image is indicated by a checkmark next to it.
 - Selected images may be deleted using Delete button.
 - Selected images may be sent to various devices like a memory stick or a printer.

Viewing images of previous exams

1. Tap **Review**.
In case more than one exam exists for the current patient, a tab appears for each exam, which includes date of exam and number of images in the exam.
2. Tap the tab representing the required exam.
Images of the selected exam appear on the review screen.

Comparing images of different exams

1. Tap **Review**.
2. Tap **Compare**.
The review screen divides into two panes. Each pane shows a set of tabs representing different exams. Each pane may be scrolled independently up or down.
3. To compare, select a different exam for each pane.
4. Tap an image on each pane. A blue border appears on each of the selected images.
5. Tap **Analyze**. Both images appear on the main scanning screen in split-screen mode.

Comparing images from the same exam

1. Tap **Review**.
2. Tap **Compare**.
3. Select the same exam date for each pane.
The same set of images appears on both panes.
4. Select images and analyze as explained above.

Viewing exams in Archive of previous patients

1. Tap **Home**.
2. Tap **Local Archive**.
3. Locate and tap on the patient's name you wish to review.
4. Tap **Review Exam**.
5. Review the images as described above.

Saving images and cineloops to a standard format

Images and cineloops can be saved to a removable media or a shared network folder in the following standard formats:

- Still images: JPEG, MPEG, DICOM and RawDICOM (Raw data + DICOM) and HDF
- Cineloops: AVI, MPEG, DICOM and RawDICOM (Raw data + DICOM)

To send image to removable media

1. Select the required exam as explained above.
2. Tap **Review**.
3. Tap on images to place a checkmark on all images of interest.
4. Tap **Send To**.
5. Select destination for the appropriate USB HD Memstick or USB DVD device.
6. Select the file types (DICOM, RawDICOM, JPEG, AVI or WMV).
7. Define folder name, as required.
8. Tap **Send**.

NOTE: *If the image or cineloop is saved as DICOM or RawDICOM the file name is automatically generated to follow the DICOM standard.*

Q-View – communication with Q-Path Reporting server

In addition to storing and processing patient data on a local device, the user can store and access the patient data on a remote server which is outsourced to another company. The user can edit and print the report on the remote server.

The patient data can be stored on the outsourced server through DICOM.

Contact the reporting vendor for DICOM service properties, such as IP Address, AE Title, Encrypted Port number and Unencrypted Port number.

Q-View configuration

1. Tap **Config.**, select **Connectivity** and then select the **Reporting** tab.
2. Under **QView Settings**, enter details such as IP-Address, Name, AE Title, and Port no.

3. Select the Q-View tab and enter URL, User name and Password.
4. Perform an exam and store images.

If the system is configured to send images in Direct-store mode to the Qpath server the Qview button appears on the upper row (Figure 7-61).



Figure 7-61. Shortcuts buttons

Tapping it at any time while the exam is open shall switch into the Qpath viewer.

Within a short time, the system initiates a connection to the Q-Path server and grants access to the Q-Path reporting package.

To review a past exam in Qview:

1. Tap **Home**.
2. Select **Local archive**.
3. Tap a patient name.
4. Tap the Qview button at the bottom of the screen.

The connection to Qpath server is established. If the selected patient exists on that server, the record is displayed.

ViewPoint Reporting (Option)

Introduction

ViewPoint Reporting is an exam report package option for your Venue Go system that allows you to fill out an exam specific report form directly on the system during the exam.

Fill out the report form by using the touch screen on the convenient user interface and toggling between the report and exam screen at any time during the exam.

NOTE: Availability of the ViewPoint Reporting option is region dependent. This option may not be available in your region.

Overview

The ViewPoint Reporting package requires a connection to a ViewPoint 6 workstation. For every new exam, a new report form is sent from the ViewPoint workstation to Venue Go. The user may select and fill up multiple form-types.

ViewPoint contains a collection of different report form types detailed for different types of patient exams. To begin, select the most suitable report-type for the current exam. If required, multiple report types may be selected in order to cover a different portion of the current exam. After ending the exam, the multiple reports are consolidated into a single report.

Upon ending the exam, the completed exam report is communicated back to the ViewPoint 6 workstation. A final report may be viewed, edited, produced, or sent further to the institute's EMR system from the ViewPoint 6 workstation.

NOTE: *In the ViewPoint 6 workstation you may edit or add to the exam report's data.*

If a network connection is not available when ending the exam, a warning message appears to indicate that the report cannot be sent. To produce a ViewPoint exam report, **do not end the exam on your system**. Remain in the current exam while you reconnect the network.

NOTE: *Exams cannot be saved into the ViewPoint workstation without a network connection. When an exam ends before a network connection is reestablished it is deleted.*

To fill out a ViewPoint exam form on the system

NOTE: *Connectivity between Venue Go and ViewPoint must be established to use ViewPoint.*

1. Produce a new patient by adding a unique patient ID and proceed with patient scanning ('Beginning a new patient' on page 4-3).
2. Tap **VP Report** at any time during the exam to open a new form.

A list of available report types appears.

NOTE: *VP Report is found on the top left of the screen.*

3. Select the report which is most suitable for the current examination.

The selected report opens to display different fields that are grouped into sections such as:

- Indications

- Views
 - Findings
 - Interpretation
4. Tap the relevant section title to record your findings into the report.
 5. If the open exam report is not relevant or was opened by mistake, tap **Delete** to delete it. Tap **VP Report** again to open a new form.
 6. Alternate between filling in the form, scanning or other activities on the system by tapping **VP Report**.

The exam report may be accessed and edited on the system until the end of the current patient exam. End the exam only when the report has been completed as best as required.

NOTE: *Upon ending the patient exam you will no longer be able to toggle back to the exam report and will have to open a new empty report. Make sure you are done with the report before ending the exam.*

Upon ending the exam, the report is communicated to the ViewPoint 6 workstation.

A final report may be produced, stored, or sent further to the institute's EMR system from the ViewPoint 6 workstation.

NOTE: *If the exam is performed for educational purposes, you may mark it with the **Educational** checkbox in the patient information tab on the report. The final report generated by the ViewPoint station indicates the exam as Educational.*

Quick Report

Configured on ViewPoint, Quick Report allows you to automatically fill in default or initial "no finding" values, based on the status of the patient. The Quick Report button appears in the Report screen.

Upon tapping Quick Report, the answers to the fields are automatically marked, as dictated by the initial values provided by the ViewPoint resources.

NOTE: *The answers supplied by the automatic filling of Quick Report are marked with a circled capital A, to distinguish them from manually entered answers.*

When Quick Report is activated,

- if an initial value was not provided for a particular answer, that answer remains unfilled.
- if the initial values are completely missing, an error message appears.

NOTE: Upon tapping Quick Report the automatic answers are added only into the currently viewed exam type, unless a field is duplicated on other report types being filled in for the exam ('Working with multiple reports' on page 7-123). If the field is defined as duplicate, the automatic answer is entered in all the reports relevant to the current exam.

NOTE: In case an answer has already been entered manually by the user, Quick Report does not modify the answer.

If an answer has been entered automatically by Quick Report, you can modify it and tap a different answer to override the automatic answer.

Working with multiple reports

There are scenarios where filling in multiple reports may be beneficial. You may choose to add additional exam report forms, which are edited separately.

After the first form has been opened to add another report:

1. Tap **Add Report**.
A list of available exam reports appears.
2. Tap the relevant exam report to open a second report.
At the top of the report on the screen, there are two tabs containing the names of the two open reports. The newly selected report may be edited as usual.
3. To switch between the report forms, tap the tab with name of the form you wish to access.
The selected report form appears, and may be edited.
4. Repeat the described method to open additional report forms.

NOTE: The number of tabs at the top of the form reflects the number of forms open for the exam. The form type is indicated in the tab name.

5. To delete an irrelevant report, or one that was opened by mistake, tap its exam report tab, and then tap **Delete**.

NOTE: Make sure you are in the relevant exam report before tapping delete!

ViewPoint Configuration

1. Tap **Config.**, select **Connectivity** and then select the **Reporting** tab.
2. Under **ViewPoint Settings**, enter details such as IP-Address, Host Name, Certificates, and Port.

NOTE: Check the **Jump to Report on EndExam** box to configure ViewPoint to automatically jump back to the report upon tapping **End Exam**.

3. Tap **Save**.

USB media encryption

The user may format a USB memory device or a USB HD device and then use BitLocker s/w to encrypt the device.

NOTE: *BitLocker is a full disk encryption feature included with Windows 7 and later. It is designed to protect data by providing encryption for entire volumes.*

Using the encrypted device

1. Insert an encrypted device into any USB socket.
A pop-up window appears.
 2. Enter the password.
The device becomes available, and the volume opens.
 3. Export any number of exams into the device.
- When device is removed it will only be readable again after repeating the steps and entering the PW.

DICOM TLS Support

Before establishing a DICOM Associate connection between two computers, each computer should "authenticate" the other computer. This ensures that both computers are legitimate, and are qualified to have access to the information that may be transferred. This is accomplished through mutual authentication (Figure 7-62).

Transport Layer Security (TLS) and its predecessor, Secure Sockets Layer (SSL), both frequently referred to as "SSL", are cryptographic protocols that provide communications security over a computer network.

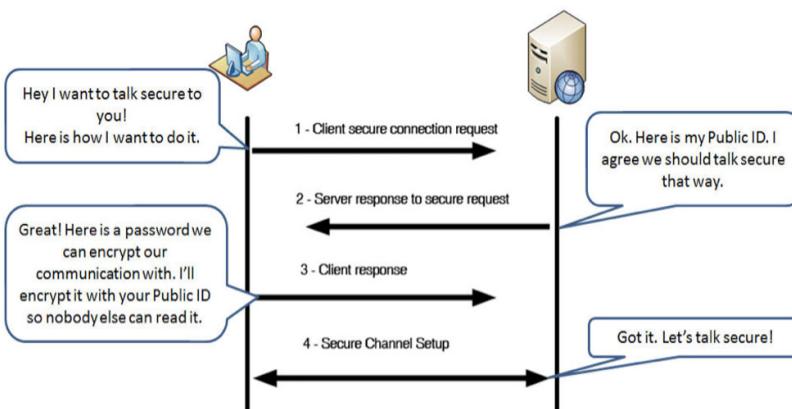


Figure 7-62. TSL protocol in a schematic diagram

SSL/TLS Technical specifications

- The system supports Secure Sockets Layer 3.0 client protocol and Transport Layer Security 1.0 client protocol.
- Peer authentication is not supported.
- The following are the supported cipher suites:
 - TLS_RSA_WITH_RC4_128_MD5
 - TLS_RSA_WITH_RC4_128_SHA
 - TLS_RSA_WITH_3DES_EDE_CBC_SHA
 - TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA
 - TLS_RSA_WITH_DES_CBC_SHA
 - TLS_DHE_DSS_WITH DES_CBC_SHA
 - TLS_RSA_EXPORT1024_WITH_RC4_56_SHA
 - TLS_RSA_EXPORT1024_WITH DES_CBC_SHA
 - TLS_DHE_ESS_EXPORT1024_WITH DES_CBC_SHA
 - TLS_RSA_EXPORT_WITH_RC4_40_MD5
 - TLS_RSA_EXPORT_WITH_RC2_CBC_40_MD5
 - TLS_RSA_WITH_NULL_MD5
 - TLS_RSA_WITH_NULL_SHA

Current implementation supports Modality Worklist and DICOM Storage services only.

Using TLS DICOM on the system

1. Enter the Connectivity – Dataflow Configuration page.
2. Check the Enable Encryption flags on both DICOM Worklist and DICOM Storage 2 tabs (Figure 8-21 and Figure 8-23).

No other changes or client installations are needed on the Venue Go.

NOTE: *If the server is not configured to support secure DICOM services, Venue Go does not present the appropriate UI in the connectivity pages below.*

Chapter 8

Customizing Your System

*Describes how to create system, user, and exam
presets.*

Preset list

Selecting probes and presets

Every probe can be operated by different presets, which are either originally supplied, or are customized by the user. All the probe-related presets appear on a preset list and can be selected or modified by the user. Details about selecting probes, presets or applications is described in 'Selecting the probe and preset' on page 4-15.

Generating a new user preset

Introduction

Any new preset is always based on an existing preset available on the system.

The general steps are:

1. Select the probe and preset which is closest to your needs.
2. Modify scanning parameters in the various scanning modes, as needed.
3. Store your new preset by either giving it a new name and saving it as a new preset, or by updating and modifying the same preset you have selected in step 1.

NOTE: *Factory presets can not be modified, so if you select such a preset in step 1 you need to store your new settings under a new name.*

All preset buttons containing a small GE label (Figure 8-1) are designated as **factory presets** which are part of the general software, and can not be modified by the users.

All user-generated presets appear on buttons containing a label showing the name of the original factory presets on which they are based. In the example below the preset **Special** is based upon factory preset **Abdomen**.



Factory preset button

User preset button

Figure 8-1. Factory and user preset buttons

To generate a new preset while in the main scanning screen

1. Activate the system with the desired probe and preset ('Selecting the probe and preset' on page 4-15).
2. Modify any of the scan settings in order to change the imaging quality of the current scan to suit your needs.
3. Tap the active (blue) probe symbol (Figure 4-8, item 1). The list of relevant presets appears.
4. Tap **Save** (Figure 4-8, item 7). A window appears allowing you to save the new preset.

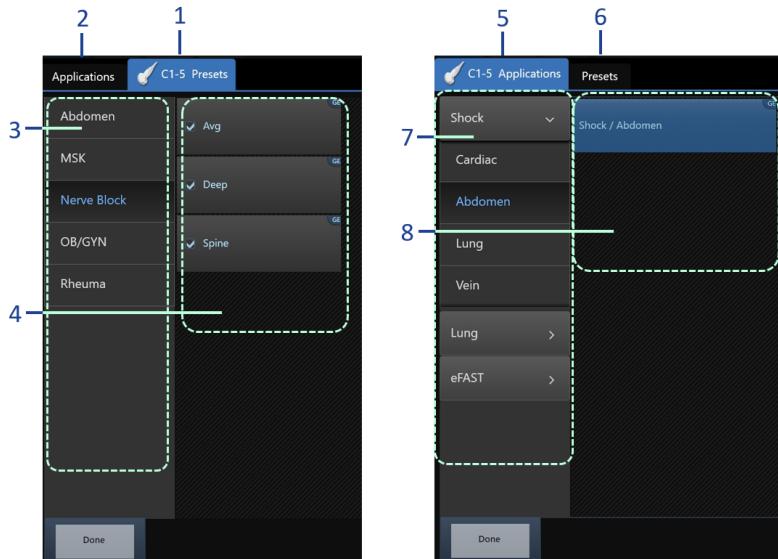
If the currently selected preset is a factory preset, the field appears empty. Provide a new name for your new preset.

If the currently selected preset is one of your own presets its name appears in the dialog box. Tapping **Save** overwrites previous preset with new settings. You may also type a new name to produce a new imaging preset.

Configuring a preset list

The contents and order of the Preset list for each connected probe can be configured to best suit the user's requirements.

1. Select the desired probe.
2. Select **Patient**.
The **Probe selection** screen is displayed ('Selecting the probe and preset' on page 4-15).
3. Tap **Config.** at the bottom of the preset list.
The **Preset config.** screen appears (Figure 8-2)



1. Preset tab is set active, showing the currently selected probe
2. Application tab is not active.
3. Preset groups column is displayed when preset tab is selected (Nerve Block group is selected in this example).
4. Presets belonging to the currently selected preset group (Nerve Block in this example). This may include some user-generated presets.
5. Application tab is set active, showing the currently selected probe
6. Preset tab is not active.
7. Application groups column is displayed when Application tab is selected (Shock application is open in this example).
8. Presets belonging to the currently selected Application (Shock in this example). This may include some user-generated presets.

Figure 8-2. Preset config screen

4. Tap any preset.

A menu appears (Figure 8-3).

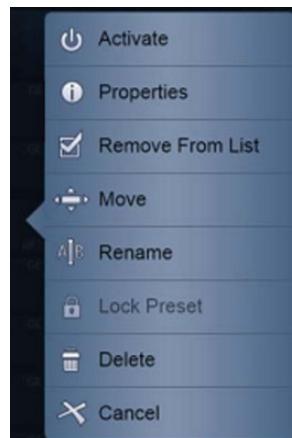


Figure 8-3. Preset config menu

The following editing actions are available:

- Rename the selected preset.
- Delete the selected preset.

NOTE:

Only non-active unprotected user defined application presets can be renamed or deleted.

- Move the selected preset up/down in the Application menu.
- Remove/add the selected preset from/to the Application menu.
- Lock/Unlock the selected preset (administrator rights required).
- Activate the selected preset.

Deleting an application preset

Unprotected user defined application presets can be deleted by any user with operator rights. Protected application presets can only be deleted by user with Hospital admin rights ('System users' on page 8-53). Factory application presets cannot be deleted.

1. Tap **Patient**.

The **Probe selection** screen is displayed on the right of the screen.

2. Tap **Config** for the probe with the preset to delete.

3. Locate the Application preset to delete and tap it.

The **Preset config** menu appears (Figure 8-3).

4. Tap **Delete**.

A confirmation prompt appears.

5. Tap **OK** to confirm deletion.

NOTE:

Any preset name which contains the GE tab on its top-right corner (see "Cardiac" example in Figure 8-4) is a factory preset which cannot be modified.



Figure 8-4. Factory preset

Generating a new user preset

1. Tap **Patient**.

The **Probe selections** screen is displayed on the right-hand side of the screen.

To generate a new user-preset based, for example, on the factory-preset "Cardiac":

1. Activate the system using factory preset **Cardiac**.
2. Modify any imaging setting in any imaging mode.
3. Activate the **Probe Selection** screen.
4. Tap **Save** at the bottom of the preset list of the selected probe.
5. Provide an unique name for the new preset.
6. Tap **Save**.

The new preset appears on the **Preset** list and is available for use.

NOTE: *The new user-preset button contains the name Cardiac on its upper-right corner (Figure 8-5). This allows you to identify the source for the new user-preset.*



Figure 8-5. User preset

Updating a user preset

1. Activate the Preset list of the currently active probe, and select a user preset.
2. Scan and modify the setting of image parameters.
3. Tap the selected probe's symbol.
4. Tap **Save** (at the bottom of the preset list).
A window appears with the name of the current preset.
5. Tap **Save** to update the user preset, or rename the preset and tap **Save** to generate a new user-preset.

To arrange the application presets list

1. Tap **Patient**, then tap **Config** at the bottom of the column of the requested probe.
The Preset Config screen appears (Figure 8-2).
2. Tap any preset.

- The Preset Config menu appears (Figure 8-3).
3. Select **Remove from list** to clear the checkbox and remove this preset from the preset list.
- NOTE:** *This removes the preset from the list, but does not delete the preset from the Preset config. page.*
4. Select **Move** and tap a new position to move the selected preset to a new position on the list.
 5. Tap **Done** to exit the Preset Config page.

Configuration

Overview

To access **Config.** screens, tap **Settings > Config.** (Figure 8-6).



Figure 8-6. Settings menu

The Config. Menu page (Figure 8-7), or the last Config page used, appears.

Config. menus provide the following functionality:

- General: configure general system settings
- Settings: configure system settings
- Image: configure image settings
- Measure: configure measurement settings
- System: View product information, software option and configure log export storage device
- Connectivity: configure system connectivity settings
- About: software/hardware version and system patents

Imaging

Global settings

1. Tap **Settings/Config.** and log on if required.
2. Select **Imaging/Global Settings.**

The following tab appears:

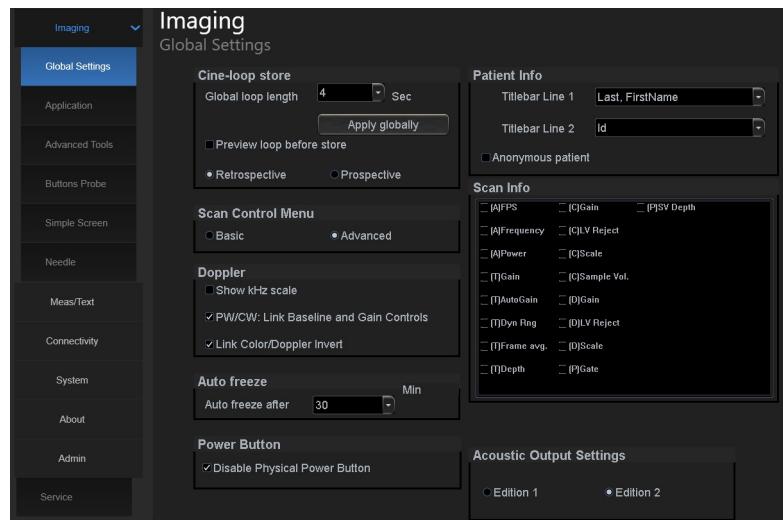


Figure 8-7. Imaging - global setting

The following settings can be configured.

Cine-loop store

Global Loop Length

A default cine-loop length of 4 sec. is assigned globally to all presets. This value is displayed in the field besides it.

You may select a different cine length and tap Apply Globally to change the default global length.

Preview loop before store

When selected, it enables review of cineloops before storage.

Retrospective/Prospective store

- **Retrospective:** store the last elapsed defined number of seconds.
- **Prospective:** store the forthcoming defined number of seconds.

Scan Control Menu

The number of pages for scan-control buttons available in the scan control area (Figure 3-41, item 12) may be set to:

- **Basic:** Limited to 2 pages for the more important controls
- **Advanced:** Contains more pages to include all of the scan-controls available for the particular scan mode.

The number of available scan control pages is indicated by the number of dots appearing (Figure 3-41, item 13).

Doppler

- **Show KHz scale:** when selected, displays the KHz scale on the left side of the Doppler spectrum.
- **PW/CW: Link baseline and gain controls.** When selected, baseline and gain settings are preserved when toggling between PW and CW Doppler modes.
- **Link Color/Doppler invert:** When selected, the Doppler timeline scale inverts along with the color map scale. When not selected, the inversion of Doppler timeline scale and color map scale are independent.

Patient info

- **Title bar Line 1 & 2:** selects from the drop-down menu the patient information to display on the Title bar.
- **Anonymous patient:** when checked, no patient information is displayed on the Title bar.

Scan info

Select the scan information to be displayed on the upper left corner of the image area.

Acoustic Output Setting

Acoustic output setting can be set to display values according to 1st or 2nd edition methods.

Auto Freeze

Freeze 2D image in Doppler: the last 2D or color flow image is displayed when entering Doppler mode.

Auto freeze after: sets the time after which the system enters in freeze when not in use.

Power Button

NOTE: *Excessive electromagnetic interference from other equipment in close vicinity to the Venue system may cause the Power On/Off switch to trigger unexpectedly, bringing up the System Exit Window.*

To avoid spurious system-exit messages caused by outside interferences, it is advised to select the **Disable physical Power button** checkbox. When set, the system's physical power button is disabled, and the system can be turned OFF only by tapping **Power** in the **Settings** menu.

NOTE: *If the **Disable physical Power button** checkbox is selected, and the physical power button is pressed, a prompt appears: "Physical Power button is disabled in Config. Use power button in the Settings menu".*

Application presets

In addition to the various imaging presettings of the different scanning modes, there are other settings that can be stored for each user preset. These can be found on the **Imaging Application config** page as follows:

1. Tap **Settings/Config.** and log on if required.
2. Select **Imaging/Application.**

The following tab appears:

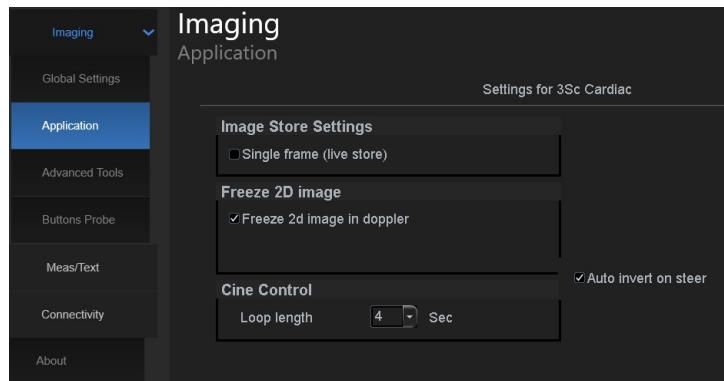


Figure 8-8. Imaging - application

The application preset created is probe-dependent. Select the desired probe before creating a new application preset. The name of the current probe and preset appear on to (Figure 8-8).

1. Adjust the settings as desired (see below).
2. Tap **New**.
A Dialogue window appears.
3. Enter a name for the new application.
4. Tap **Save**.

The following settings can be configured.

Image store settings

Single frame (live store):

- Store cineloop
- Store single frame image only

Auto invert on Linear steer

In Color flow, the color bar is inverted, changing the direction of the color ROI direction.

Cine control

Loop length default setting. This value affects only the current preset.

NOTE: *This value overrides the Global Loop length value set in the Imaging global setting page.*

Advanced tools

1. Tap **Settings/Config.** and log on if required.
2. Select **Imaging/Advanced tools.**

The following tab appears.

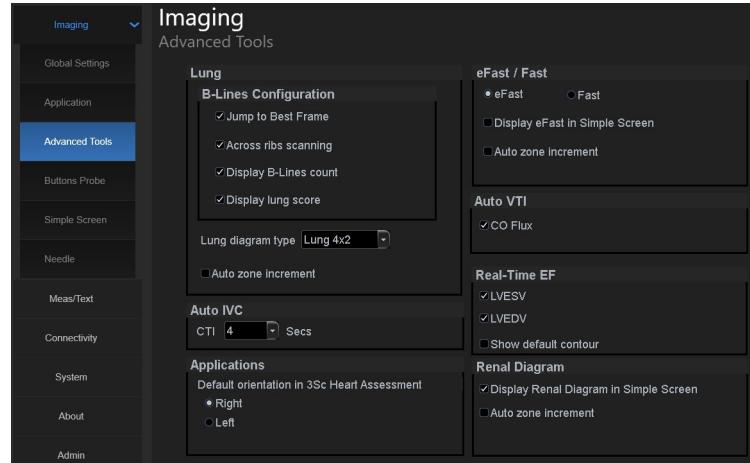


Figure 8-9. Imaging - advanced tools

B-Lines configuration

It is possible to configure:

- Jump to best frame
- Across ribs scanning
- Display B-lines count
- Display Lung score
- Select lung diagram
- Lung-zone auto-increment

Auto IVC configuration

Is is possible to configure:

- CTI length
- Default orientation in 3Sc heart assessment

Button Probe

1. Tap **Settings/Config.** and log on if required.
2. Select **Imaging/Buttons Probe.**

The following tab appears.

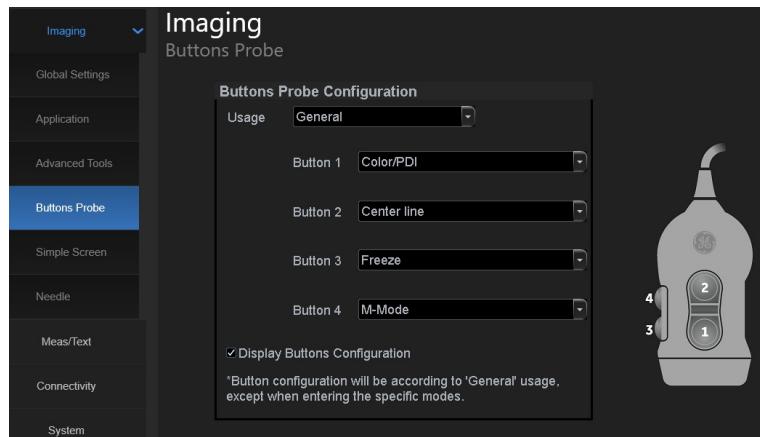


Figure 8-10. Imaging - Buttons Probe

The system allows to configure the 4 programmable buttons located on the L4-12t-RS or L4-20t-RS probes.

Select the functionality from the drop-down menu for each of the buttons. Their number on the menu matches the numbers written on the probe.

Display Buttons Configuration setting allows to view a small picture of the probe and the buttons labels while scanning with it.

Enable/disable

Press both buttons 3 and 4 simultaneously to disable the four probe control buttons.

Enable the four buttons by repeating the same action.

Simple screen

1. Tap **Settings/Config.** and log on if required.
2. Select **Imaging > Simple Screen.**

The following tab appears:

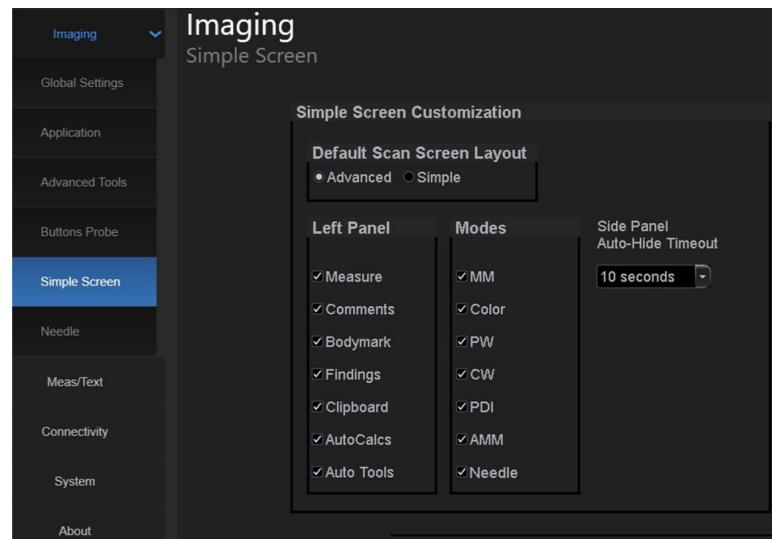


Figure 8-11. Imaging – Simple Screen Configuration

3. Configure the following full screen features:
 - Select default screen layout: **Simple** or **Advanced Screen**.
 - Check or un-check to include or exclude control buttons on the bottom or left control panel. These features apply only to Full Screen mode.
 - Select the length of time for **Auto-hide** timeout for the left or right control panels. Use **Never** for the panel to remain permanent or until it is swiped out by the user.

Needle

The biopsy guide lines can be configured in various settings.

1. Tap **Settings/Config.** and log on if required.
2. Select **Imaging/Needle**.

The following tab appears:

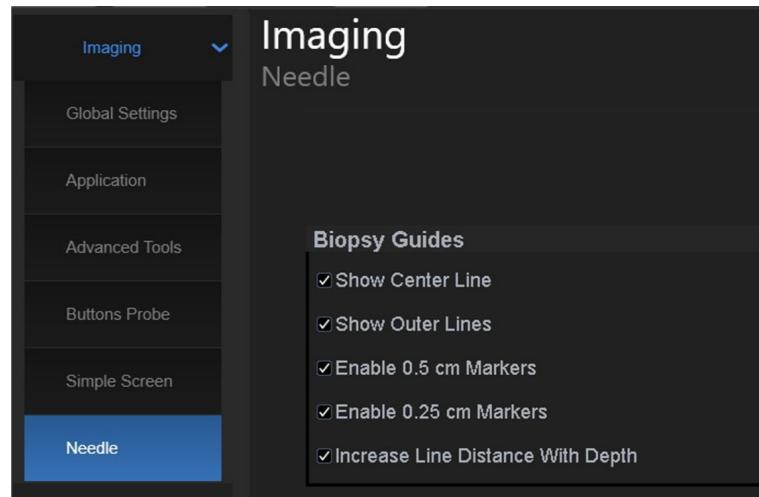


Figure 8-12. Biopsy guides settings

Measurement menu

1. Tap **Settings/Config.** and log on if required.
 2. Tap the **Meas/Text/Measurement** menu tab.
- The following tab appears:

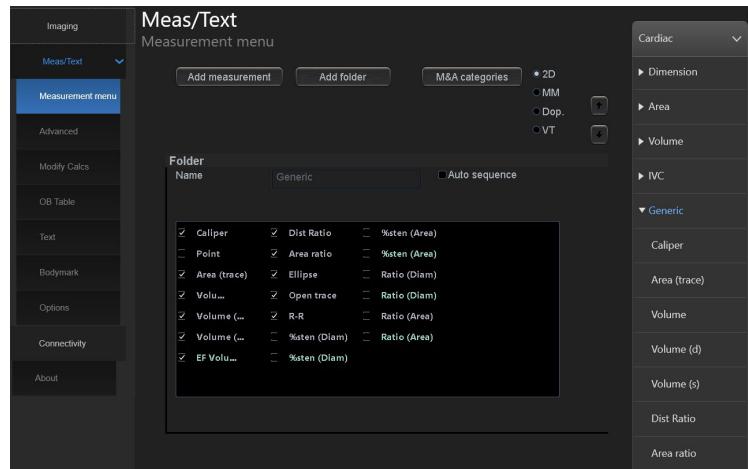


Figure 8-13. Meas/Text - measurement menu

3. Tap the **Measurement menu** tab.

The Measurement menu sheet is displayed.

Display of the Measurement categories

1. Press **M&A categories** in the *Configuration* window.
The M&A categories are displayed in a pop-up window.
2. Check the categories to be displayed.

Uncheck the categories to hide.

To select a Measurement category in the *Measurement* menu:

1. Select the heading of the *Measurement* menu.
The measurement categories are displayed in a sub-menu.
2. Select the Measurement category to display.

Moving an item in the Measurement menu

1. Select an entry in the *Measurement* menu.
1. Press  or  to move the selection up or down inside the *Measurement* menu.

Deleting an item in the Measurement menu

Only user-created items can be deleted.

1. Select an entry to delete in the *Measurement* menu.
2. Press  to delete the item.

Display/hide a folder or a measurement in the Measurement menu

The Measurement menu (Folders and Measurements) can be configured to display only the entries (folders and measurements) of interest.

To hide a folder or a measurement:

1. Uncheck the actual folder or measurement in the *Folder* or *Measurement* field in the *Configuration* window.

To display a hidden folder or measurement:

1. Check the actual folder or measurement in the *Folder* or *Measurement* field in the *Configuration* window.

Auto-sequence of measurements within a folder

1. In the *Measurement menu* sheet, select a folder in the *Measurement* menu.
2. Check **Auto sequence**.

When performing the first measurement in the folder, the next measurement is automatically selected.

Creating a user-defined folder

1. If the folder is to be inside another folder, select the actual folder in the *Measurement* menu.
2. Press **Add folder**.
The *Measurement* menu is updated.
3. Enter the folder name in the *Name text* field.

Changing or adding measurement parameters

You can make changes to measurement parameters and you can add measurement parameters.

Changing measurement parameters



Please remember that you are responsible for confirming the correctness and accuracy of the user input formula that you add.

To change a measurement parameter:

1. In the **Selection** menu, select the measurement.
2. To change the name of the parameter, tap on the parameter name and tap twice. Type a name for the parameter.

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, tap an empty line at the bottom of the Parameter list.
The system adds a parameter named (Name).
5. To change the name of the parameter, tap the name twice. Type a name for the parameter.
6. Tap the **Result** field.
The **Edit Formula** window appears.

7. To create a formula:
 - a. In the **Value Type** field, select a value.
 - b. Do one of the following:
 - Type a formula in the **Formula** field.
 - Select formula components from the Operators, Parameters, and Functions drop-down lists. When you select a component, the system displays it in the **Formula** field.
8. To test the formula, select **Check**.
If there are no problems, the system displays "Syntax OK!". If there are any problems with the formula, the system displays an error message in place of the Formula field label.
9. When the formula is correct, select **OK** to save it.
The Edit Formula window closes. The formula is displayed in the Tool result field.

Formula unit conversion

When you create a formula, the system changes the calculation result into an output unit as defined in the following table:

Unit	Conversion (coefficient value)	
Time		
	s	x1
	ms	x1000
	min	x0.0167
	h	x0.00027778
Ratio		
	%	x100
Frequency		
	bpm or BPM	x1.0
Angle		
	rad	x1.0
	deg	x57.2958
	grad	x63.6620
Distance		

Unit		Conversion (coefficient value)
	cm	x100
	m	x1
	dm	x10
	mm	x1000
	inch	x39.37
	feet	x3.281
	pixels	x1
Velocity		
	m/s	x1
	dm/s	x10
	cm/s	x100
	mm/s	x1000
	inch/s	x39.37
Acceleration		
	m/s ²	x1
	dm/s ²	x10
	cm/s ²	x100
	mm/s ²	x1000
	inch/s ²	x39.37
Area		
	m ² or m ^{^2}	x1
	dm ²	x100
	cm ² or cm ^{^2}	x10000
	mm ² or mm ^{^2}	x1000000
	Inch ²	x1550
Volume		

Unit	Conversion (coefficient value)
m ³	x1
dm ³	x1000
cm ³	x1000000
l	x1000
dl	x10000
cm	x100000
ml	x1000000
gallon	x264178
quart	x1056.71
Volume Flow	
m ³ /s	x1
dm ³ /s	x1000
cm ³ /s	x1000000
l/s	x1000
dl/s	x10000
cl/s	x100000
ml/s	x1000000
m ³ /min	x60
dm ³ /min	x60000
cm ³ /min	x60000000
l/min or L/min	x60000
dl/min	x600000
cl/min	x6000000
ml/min	x60000000
ml/m ²	x1000000
Pressure	

Unit		Conversion (coefficient value)
	mmHg	x1
	Pa	x133.322
	kPa	x0.133322
	bar	x0.00133322
Pressure/Time		
	mmHg/s	x1
Mass		
	kg	x1
	g	x1000
	ounce	x35.273962
	pound	x2.2046226
Other		
	mmHg	x1

For example, when a Volume formula is created:

$$\text{Vol [ml or cm}^3\text{]} = 0.523598 \cdot \{\text{D1}\} \cdot \{\text{D2}\} \cdot \{\text{D3}\}$$

(D1, D2, and D3 indicate a measurement result.)

In this case, the measurement (D1, D2, and D3) is a distance measurement, so the measured data is a meter [m] unit according to the above table.

To change into a milliliter, the system multiplies each measurement value by 100. As a result, it multiplies a formula by 1,000,000.

The standard unit of volume is a cube meter, so the system multiplies the result by 1,000,000.

The system multiplies the calculation result by the coefficient and converts it. To get a correct result, when you define the formula, you must convert the coefficient itself, such as the coefficient of 10^8 .

For example, if you want to define the following formula:

$$\text{efg[g]} =$$

$$10^{(1.5662 - 0.0108 \cdot \{\text{P1}\} + 0.0468 \cdot \{\text{P2}\} + 0.171 \cdot \{\text{D1}\} + 0.00034 \cdot \{\text{P1}\} \cdot \{\text{P1}\} - 0.003685 \cdot \{\text{P2}\} \cdot \{\text{D1}\})}$$

D1[cm]: Distance

P1[cm]: Perimeter

P2[cm]: Perimeter

The system defines the standard value of each measurement as a meter [m]. If the unit of each measurement value of this formula is defined as centimeter [cm], you must define the formula as follows:

```
efw[g] = 10^(1.5662-0.0108*{P1}*100 + 0.0468*{P2}*100 +
0.171*{D1}*100 + 0.00034*{P1}^2*100*100 -
0.003685*{P2}^2*{D1}*100*100)
```

(This converts each measurement value to a centimeter [cm], since the system standard unit is a meter [m].)

The output unit of this formula is a gram. Since the standard unit of the system is defined as a kilogram [kg], the system multiplies the output by 1,000.

Because the output of this formula is defined as a gram, it is necessary to define the formula as follows.

```
efw[g] = 10^(1.5662-0.0108*{P1}*100 + 0.0468*{P2}*100 +
0.171*{D1}*100 + 0.00034*{P1}^2*100*100 -
0.003685*{P2}^2*{D1}*100*100)/1,000
```

As shown, you can obtain an exact calculation result.

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.
4. Type the parameter name.
5. Double tap on the = Calculated symbol under Tool Result.
The Edit Formula window displays.
6. Select **OK**.
7. In the Measurement menu section, select **Edit Calc**.
The **Modify User CALC** window appears.
8. In the **User Defined** list, select the calculation that you want modified, then select **OK**.
The Measure tab for user-defined calculations displays.
9. Double tap the equals sign symbol under Tool Result for the desired parameter.
10. 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.

Advanced

1. Tap **Settings/Config.** and log on if required.
2. Tap the **Meas/Text/Advanced** tab.

The following tab appears:

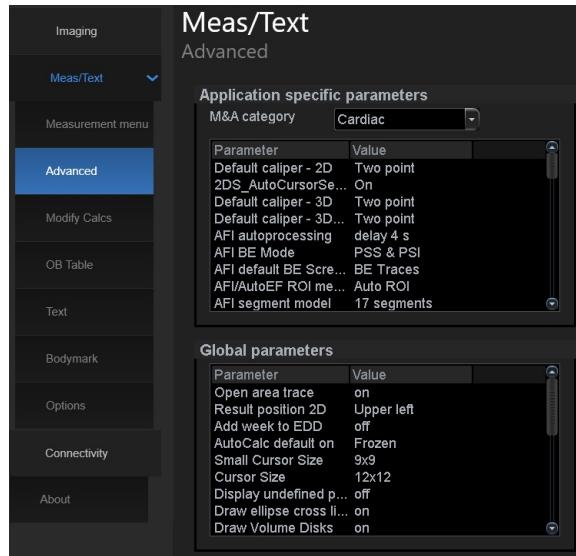


Figure 8-14. Meas/Text - Advanced

The Advanced sheet enables further configuration of the Measurement function. The settings are divided into application specific parameters and global parameters.

1. If configuring application specific parameters, select an application from the M&A category pull-down menu.
2. Select the configuration value next to the parameter to configure.
A pull-down menu is displayed.
3. Select a new value from the pull-down menu.

Modify Calcs

1. Tap **Settings/Config.**, and log on if required.
2. Tap the **Meas/Text/Modify Calcs** tab.

The following tab appears:

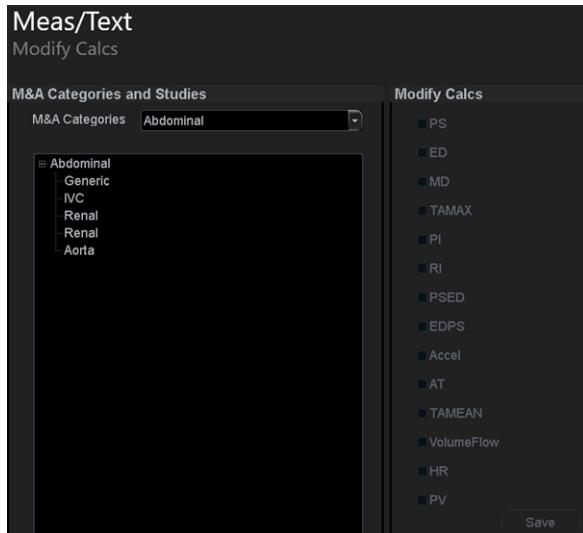


Figure 8-15. Meas/Text - Modify calcs

The Modify calculation sheet is used to configure the calculations to be performed when doing Doppler vascular measurements.

The following example describes how to configure the Carotid Doppler calculations.

1. In the Modify calculations sheet, select **Vascular** next to M&A Categories.
The Vascular measurement category appears.
2. Select **Carotid**.
The available calculations are displayed.
3. Check the desired calculations to be performed.
4. Select **Save**.

OB Tables

OB Table Settings

1. Tap **Settings/Config.** and log on if required.
2. Tap the **Meas/Text/OB Table** tab.

The following tab appears:

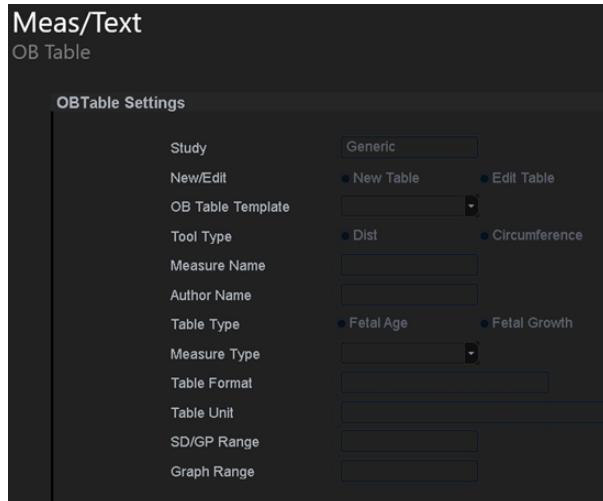


Figure 8-16. Meas/Text - OB Tables

The OB table sheet enables the creation and edition of user-defined OB tables.

The following example describes how to create a fetal age OB-2/3 table based on Bi Parietal Diameter measurements.

1. In the Measure/Text category, select the Measurement menu.
2. In the Measurement menu sheet, select 2D mode.
3. Select the OB table sheet.
4. In the Measurement menu, select the category Obstetrics and the OB-2/3 measurement study.
5. In the OB table sheet, check New table.
6. Enter or select the following:
 - **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:** when creating a new OB table, select Template (1 - 7) which you want to use as the basis of the user programmable OB Table. When editing an existing user OB table, select the desired OB table to edit.
- **Tool type:** Select the type of measurement (e.g. Distance).
- **Measure Name:** type the name of measurement that will display in the Measurement menu (e.g. My BPD Measure).
- **Author Name:** Type the author's name (e.g. My Name).
- **Table Type:** If necessary, select the table type (e.g. Fetal Age).
- **Measure type:** select the desired measurement (e.g. BPD).

7. Select **Edit Table**.

The OB Table spreadsheet is displayed, showing the table template selected.

8. Enter the Min, Max and Interval values in the Parameters field. The system automatically fills in the MEAS column.
9. Enter the input values for the MEAN and SD columns.
10. Select **Exit** to save.

Normal values

Normal values can be defined by the user for all parameters. A Normal value can be either a range or a threshold. Normal values entered are grouped by measurement category (e.g. Cardiac, Pediatrics, etc.).

To define a normal value

1. In the Measurement menu, browse to the measurement of interest. The parameters for the selected measurements are displayed in the Measurement menu sheet.
2. Select [xx] in the Normal value column.
The Normal value window appears.
3. In the Normal value window:
 - Select the Normal value type (Range, Above or Below).
 - Type in the Normal value.
 - Optionally, enter a reference for the Normal value.
4. Select **OK**.

The Normal value is displayed in the Measurement menu sheet.

Text Annotation and Bodymark configuration

Text Annotation and Bodymark configuration enable the user to:

- Create new application specific text and bodymark libraries.
- Edit existing application specific text and bodymark libraries.
- Delete user-defined libraries.

A library is a list of up to 30 text inputs (two pages).

To access to the Annotation and bodymark configuration screen:

1. Tap **Settings/Config** and log on as administrator if required.
2. Select the **Meas/Text** category and **Text** or **Bodymark** subgroup.

To edit an existing library

1. In the Library field, select the library to edit.
2. To change or add a pre-defined text, select the text entry or a blank location and do one of the following:

Annotation library:

- Type text.
- Select a text from the **Copy from** existing list.

Bodymark library:

- Select a bodymark from the **Bodymark available** field.

3. Tap **Save library**.

NOTE: If a factory library is edited, the original library can be restored by pressing Reset.

Toggling pre-defined annotations

It is possible to assign up to three related texts to one location enabling the user to toggle between the text entries when pressing the button on the Touch panel (e.g. pressing the toggling annotation Left inserts the text "Left" and toggle the button to the annotation Right). Annotation buttons with toggle functionality are marked with a circular arrow.

To create a toggling annotation:

- Enter up to three text entries separated by a colon in the desired location (e.g. "Left:Right").

To create a library

1. In the User-defined library field, type a name for the library to be created, then select **Create**.
2. Enter pre-defined texts as described in step 2 above.
3. Press **Save library**.



Figure 8-17. Meas/Text - Annotation settings

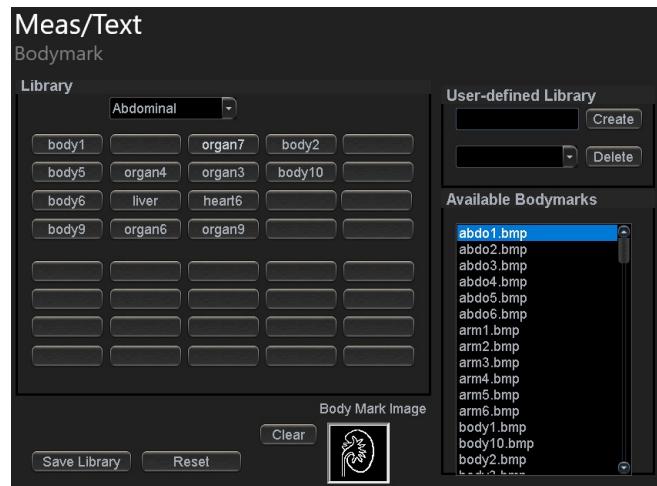


Figure 8-18. Meas/Text - Bodymark settings

Options

1. Tap **Settings/Config.**, and log on if required.
2. Tap the **Meas/Text/Options** tab.

The following tab appears:

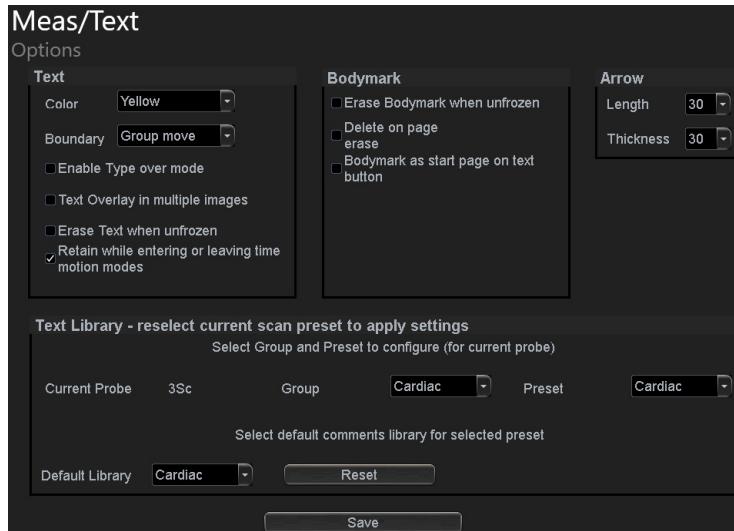


Figure 8-19. Meas/Text - Options

Text, Bodymark and arrow default options can be specified from the Option category.

Table 8-1: General options

Control	Description
Text color	Select the color for annotation text.
Text boundary	Select Group Move or Word Wrapping
Enable type over mode	When selected, the user can place the cursor in an existing annotation and start typing to insert new text.
Text overlay in multiple images	When selected, if in dual mode, hides annotations in both images when toggling Text 1/Text 2. If unchecked, hides annotations in the active image only.
Erase text when unfrozen	Deletes annotations when unfreezing the image.
Retain while entering or leaving time motion modes	Delete or retain text annotation when entering or leaving time motion modes.
Erase Bodymark when unfrozen	Deletes bodymark when unfreezing the image.

Table 8-1: General options

Control	Description
Delete Bodymark on page erase	The Bodymark inserted is deleted when applying Page erase.
Bodymark as start page on text button	Sets the Bodymark Touch panel as default page when pressing Text on the Control panel.
Arrow length	Select the default arrow length.
Arrow thickness	Select the default arrow thickness.
Text and bookmark library	Set availability for up to six libraries for the current application and the default library. Reset reloads the factory default setting.

Connectivity

Dataflow

Communication between the Venue Go system and other information providers on the network takes the form of dataflows. Each dataflow defines the transfer of patient information and images from an input source to the unit, and from the unit to one or several output sources. Input/output devices cannot be added/removed to/from the pre-defined dataflows. However, the settings for the devices can be adjusted.

Dataflow settings

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **Dataflow** tab.

The Dataflow tab is displayed.

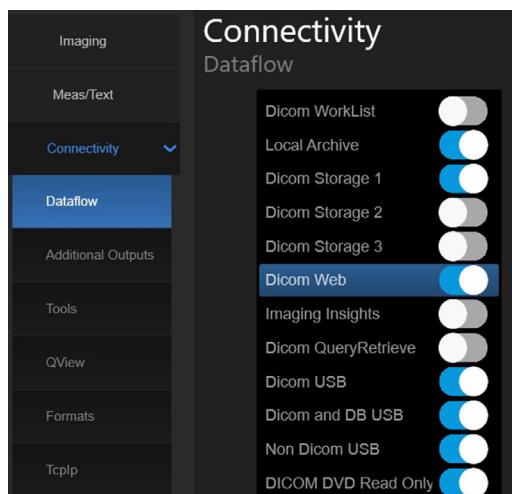


Figure 8-20. Connectivity - Dataflow

- You can select or de-select any of the listed features by sliding a switch.

Customizing Your System

- You can tap the name of any feature to open different settings, allowing you to configure that feature.

Tap **Dicom Worklist** to configure it.

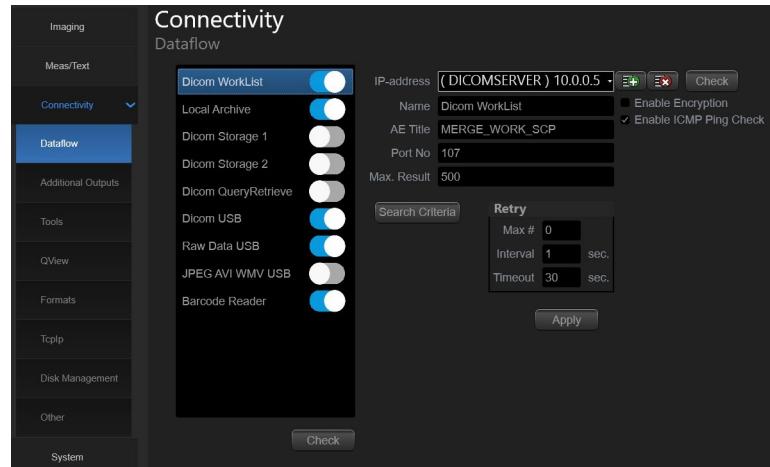


Figure 8-21. Connectivity - Dataflow/DICOM worklist

Tap **Local Archive** to configure it.



Figure 8-22. Connectivity - Dataflow/Local archive

Tap **Dicom Storage** to configure it.

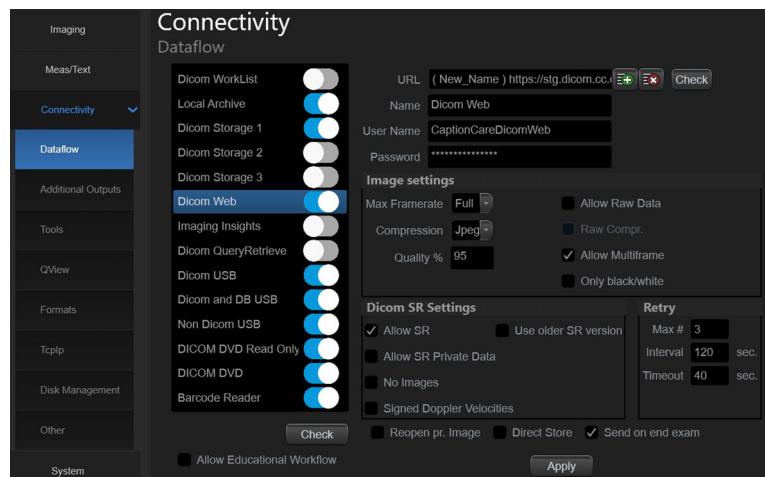


Figure 8-23. Connectivity - Dataflow/DICOM Storage

Tap **Dicom Query Retrieve** to configure it.

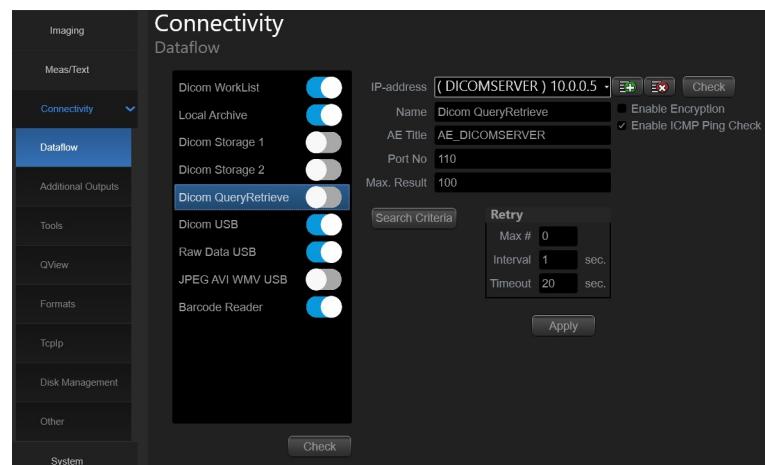


Figure 8-24. Connectivity - Dataflow/DICOM Query retrieve

Tap **Dicom USB Storage** to configure it.



Figure 8-25. Connectivity - Dataflow/DICOM USB Storage

Tap **Dicom and DB USB** to configure it.

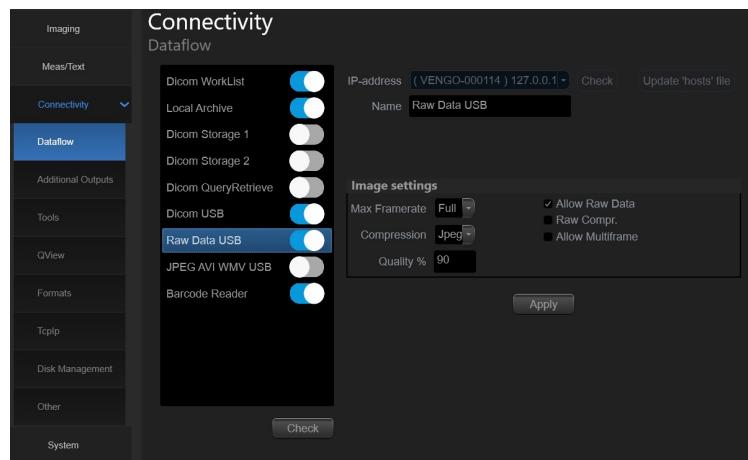


Figure 8-26. Connectivity - Dicom and DB USB

Tap **Non-Dicom USB** to configure it.

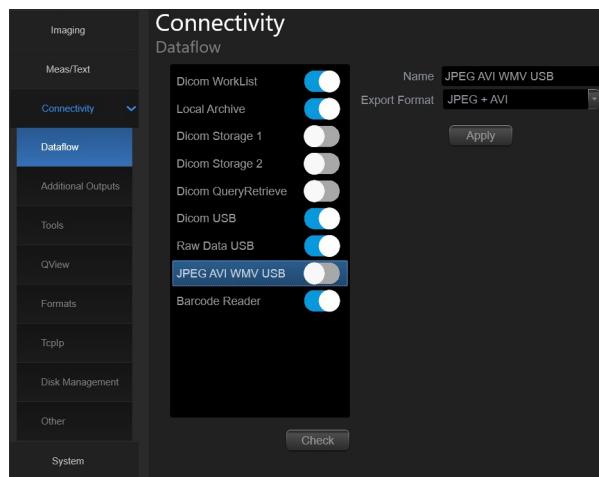


Figure 8-27. Connectivity - Non-Dicom USB

Tap **Barcode Reader** to configure it.

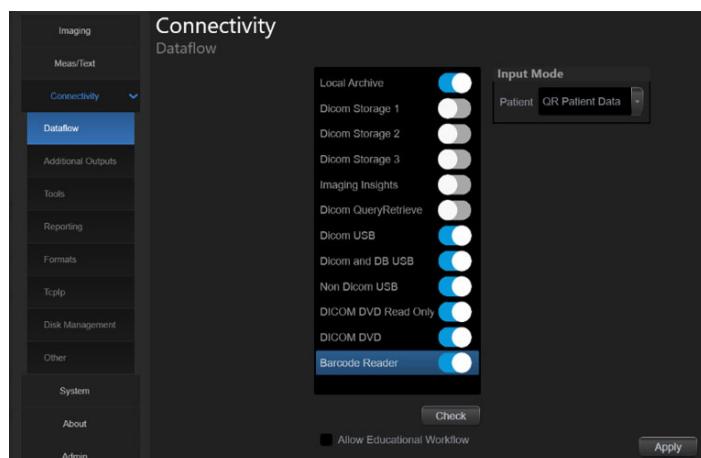


Figure 8-28. Connectivity - Dataflow/Barcode Reader

NOTE: The barcode reader can be set up for multi-field entry ('Barcode' on page 8-45).

General settings	Definition
Name	Free text: give a descriptive name for the device.
IP address	Select from drop-down menu (if available)
Database Location	Automatically selected according to the IP address

Customizing Your System

General settings	Definition
File destination	Automatically selected according to the IP address
Type	Choose between R (Read), R/W (Read/Write), W (Write) and No Media .
MPPS	Modality Perform Procedure Step: send information (typically to a HIS) that a scheduled exam has been started, performed or interrupted.

Image settings	Definition
Allow raw data	<input checked="" type="checkbox"/> Save data in both raw and DICOM format. <input type="checkbox"/> Save data in DICOM format only.
Raw Compression	Enables compression of raw data images upon storage and export. Raw compression is active only if the setting <i>Allow raw data</i> is checked.
Max Frame rate	Select 25, 30 or Full (original acquisition) from the pop-up menu.
Compression	Select compression type or no compression.
Quality	Set picture quality from 1 to 100%. A low picture quality level allows high data compression, while a high picture quality restrains the compression.
Allow Multiframe	<input checked="" type="checkbox"/> Allow cineloop storage.

Connection settings	Definition
Retry	Set maximum number of connection retries, time interval between tentative and time-out.

DICOM settings	Definition
AE Title	The Application Entity Title is set during DICOM configuration. Refer to the network specifications.
Port	The Port no. is allocated during DICOM configuration. Refer to your network specifications.
Verification	Verify the connection to another DICOM application.
Storage commitment	Send a request to a PACS, asking it to permanently archive image(s).
MPPS	Modality Perform Procedure Step: send information (typically to a HIS) that a scheduled exam has been started, performed or interrupted.
URL	Web storage server address
Username & password	Web storage server logon credentials

Additional outputs

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **Additional outputs** tab.

The following tab is displayed.

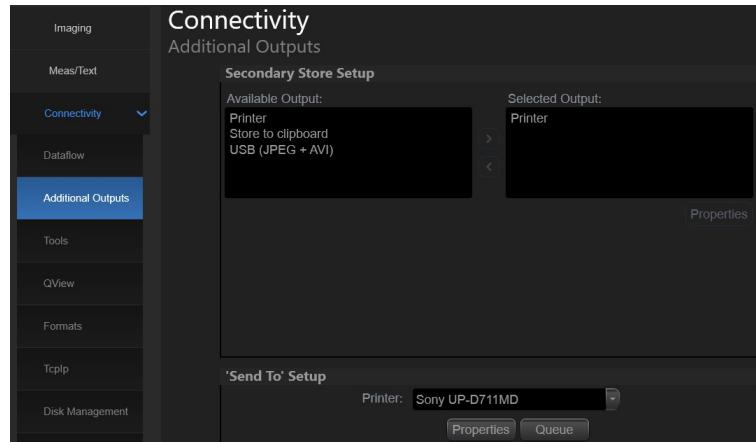


Figure 8-29. Connectivity - Additional Outputs

The following items may be configured:

- Output buttons Print button
- Image Frames
- Capture Format
- Printer setup

Tools

Formatting removable media

To format removable media:

1. Insert the media into the drive.
2. Tap **Settings/Config.** on the display.
3. If required, log on to the system.
4. Select the category **Connectivity** and select **Tools**.

The following tab appears.

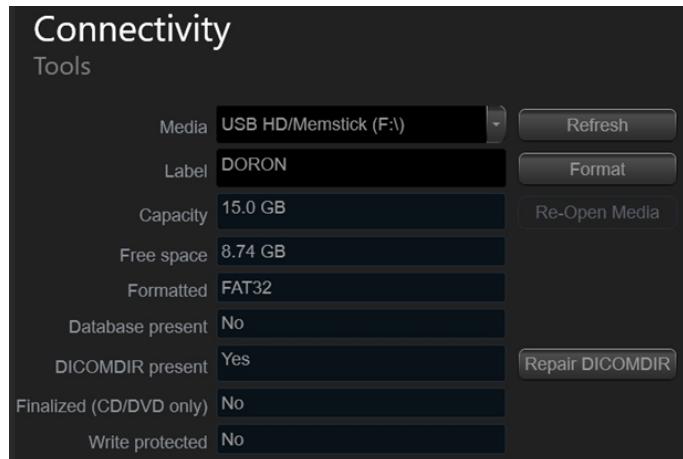


Figure 8-30. Connectivity - Tools

5. Select the removable media from the Media drop-down menu (USB device, DVD, or hard-drive).

NOTE: *Select Refresh if the media does not appear on the list.*

6. Enter a name for the removable media in the Label field.

NOTE: *Only the following characters and signs can be used when labelling a media: A - Z, a - z, 0 - 9, "_" and "-". Do not use more than 11 characters or signs. Do not use space.*

7. Select **Format**.

A confirmation prompt appears.



CAUTION

The formatting process will erase any data present on the media.

8. Select OK to continue.

9. Wait for the display of the Information window indicating that the formatting process is completed.

10. Select OK.

11. Eject the media as described below.

NOTE: *Removable media used during Disk space management, Backup, Export, or Save as do not need to be formatted in advance as the formatting process is part of these procedures if required.*

QView

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **QView** tab.

The following tab is displayed.

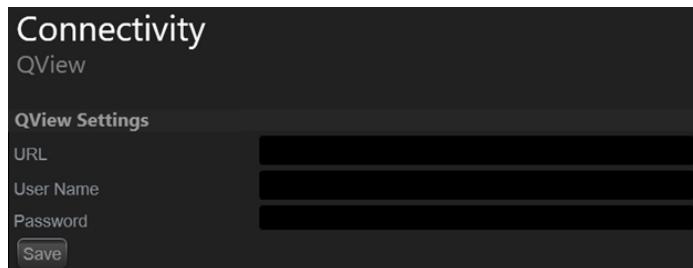


Figure 8-31. Connectivity - QView

This tab allows you to enter the QView server URL, and to use your user name and password to access the QView site.

Formats

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **Formats** tab.

The following tab is displayed.

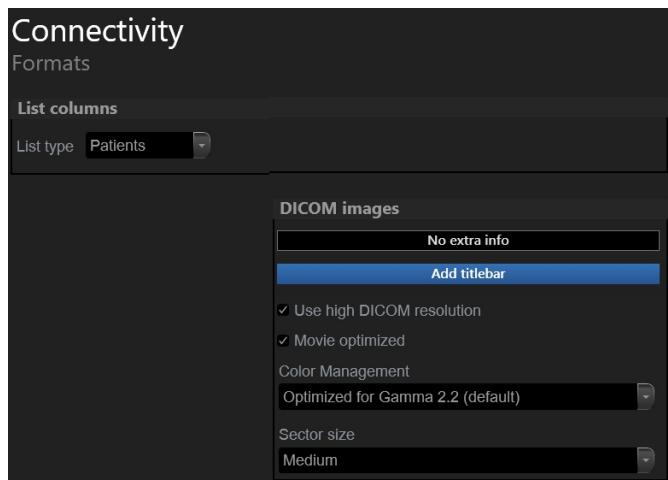


Figure 8-32. Connectivity - Formats

The following settings related to patient management can be adjusted:

List type:

- Patients
- Worklist
- Exams

DICOM Images

Select between:

- **No extra info**
- **Add visible patient info in the DICOM images:** displays patient information (name, date of birth and ID) on DICOM images.
- **Add title bar:** adds the Title bar to the DICOM images.
- **Use high DICOM resolution:** when enabled, DICOM images are stored using a higher pixel density. Use this setting when exporting to systems accessed by high definition DICOM viewing stations.

NOTE: *Using high DICOM resolution will double the file size of the DICOM data when using standard compression settings. Such files will consume more disk space and also slow down storage, recall and transfer of files.*

- **Movie optimized:** temporal filtering on DICOM images for enhanced image representation on DICOM workstations.
- **Color management:** provides a selection of gamma settings for optimized representation of the images on DICOM workstations.
- **Sector Size:** Small, medium, Large

TCP/IP Connectivity Configuration

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **TCPIP** tab.

The following tab is displayed.

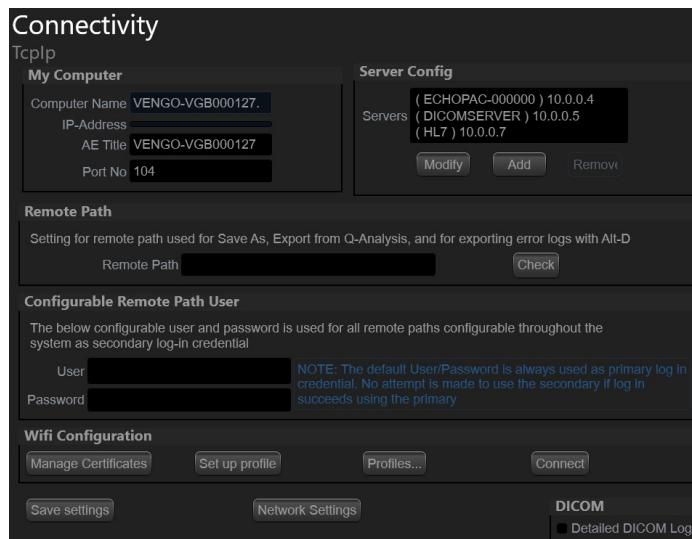


Figure 8-33. Connectivity - TCP/IP

To be able to use the network functions when connected to a hospital network, the system must have a proper network address.

My Computer

Computer name

Type the name of the Ultrasound system in the Computer Name field. (no spaces in name).

IP address

Type the IP-Address. In this case, uncheck the "Enable DHCP" box and enter the IP address, Subnet Mask, and Default Gateway.

Remote Path section

Default remote path setting

The user can define a default remote path for a network shared folder (\server-name\share-name). The default remote path can then be selected as a destination archive for the following operations:

- Export of system error log file
- Save as function for images

To define a default remote path:

1. Tap **Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **TCP/IP** subgroup. The TCP/IP sheet is displayed.
3. In the **Remote Path** section, enter a remote path of a shared folder on the network.
4. To check the connection, tap **Check**.
5. In the Configurable Remote path user section enter the user name and password required to access the shared folder.

Disk Management

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **Disk Management** tab.

The following tab is displayed.

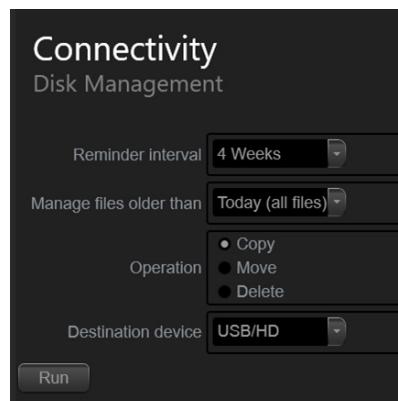


Figure 8-34. Connectivity - Disk management

Database maintenance configuration

1. Tap **Settings/Config.** and log on as administrator if required.
2. Select the **Connectivity** category and **Other** tab.

The following tab is displayed.

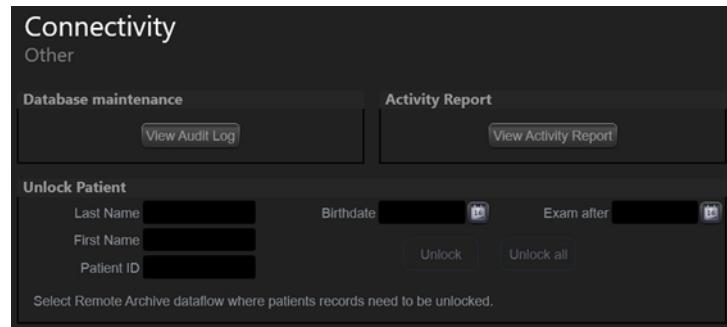


Figure 8-35. Connectivity - Other

This tab allows you to:

- maintain the database
- view the activity report
- lock/unlock patients

Barcode

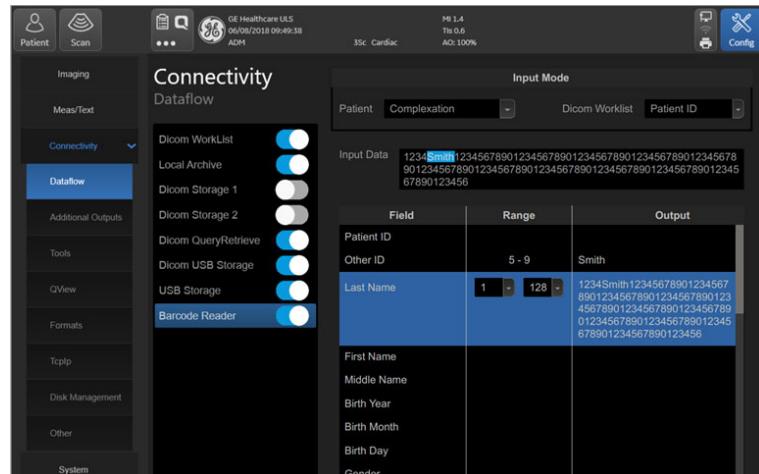


Figure 8-36. Barcode configuration tab

Input mode

Off

Enter the Patient ID manually, using the touch keyboard.

Patient ID

Scan the Barcode as the Patient ID or enter the Patient ID using the touch keyboard instead of the barcode.

Complexation

Scan the Barcode to input the Patient demographics or enter the Patient demographics using the keyboard instead of the barcode.

To enter the Patient demographics using the keyboard instead of the barcode, select **Cancel**.

1. Enter a string in the Input Data field by scanning from a barcode or typing with the keyboard.
2. Scan a sample barcode. The following items can be included in the barcode:
 - Patient ID
 - First and last names
 - Birth year, month and day

NOTE: *The birth year has 4 digits, month 2 digits and day 2. They should always be provided together.*

- Gender

3. Configure the Start and End position for each item.

NOTE: *If the barcode does not contain the information of any item, configure the Start and End position as “0“.*

System

Settings

General system settings

1. Press **Settings/Config.** on the Touch panel and log on as administrator if required.
 2. Select the **System** category and **Settings** subgroup.
- The **Settings** tab is displayed.

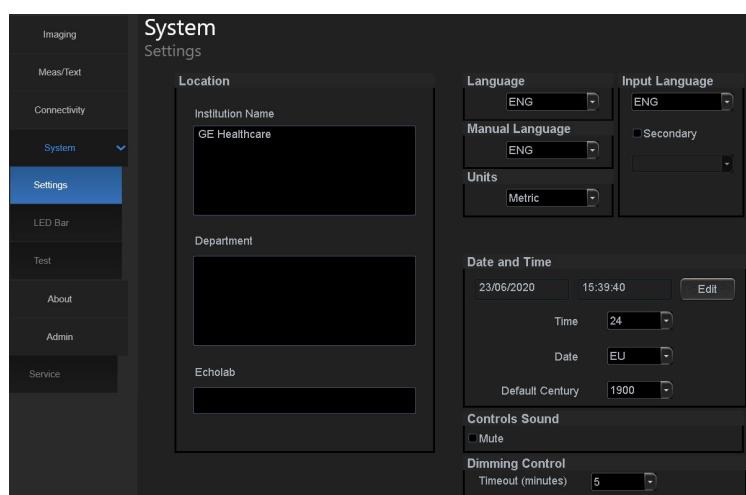


Figure 8-37. System - Settings

Location

- **Hospital:** enter the hospital name. This information is displayed on the scanning screen's *Title bar* and on the image properties of all saved images.
- **Department:** enter the department name. This information is displayed on the image properties of all saved images.

Date and Time

Changes will be effective only after rebooting the system.

- **Date:** select the correct date from the pop-up window.
- **Time:** Select either hour, minute or second, and then press the arrow head buttons to set the time.
- **Time Format:** select the desired format (24 or 12 AM/PM) from the pop-up menu.
- **Date Format:** select the desired format (EU or US) from the pop-up menu.

Language and unit settings

Changes will be effective only after rebooting the system.

- **Language:** select the desired language for the system from the drop-down menu.
- **Manual Language:** select the desired language for the Online manual from the drop-down menu. If not available the English manual will be displayed as default.
- **Input Language:** select the default alphanumeric keyboard language configuration on the Touch panel.

To define a secondary language configuration for the alphanumeric keyboard on the Touch panel, check the **Secondary** option and select a language from the drop-down menu.

After reboot of the system, press **Lang** on the alphanumeric keyboard on the Touch panel to toggle between the two language configurations.

- **Units:** select the desired units (Metric or US) from the drop-down menu.

LED bar

1. Press **Settings/Config.** on the Touch panel and log on as administrator if required.
2. Select the **System** category and **LED Bar** subgroup.

The LED Bar tab is displayed.

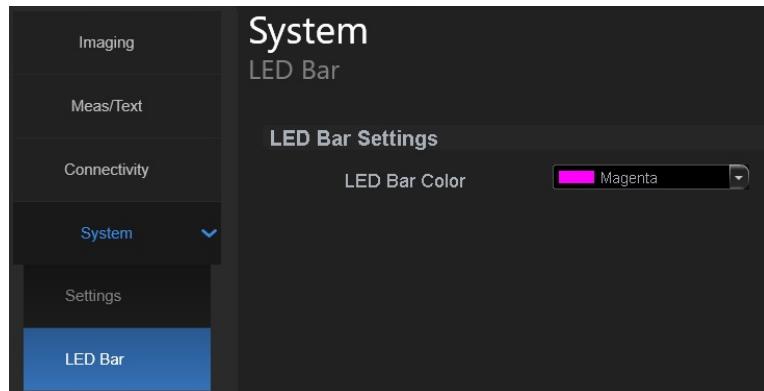


Figure 8-38. LED bar settings

The Venue Go system contains a “System identification and power status stripe indicator” (Figure 3-4), whose color can be configured by the user. In the LED bar tab select any color in the pull-down menu to customize the color of the stripe indicator. This allows you to distinguish between the different systems in your department.

About - System configuration information

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **About** category.
3. Select any of the following tabs to find information about the system's configuration:
 - System version
 - Firmware version
 - HW version
 - Probes

NOTE: *If the current system has been upgraded from an earlier version, an Electronic Label (e-Label) appears on the System Version tab. The e-Label includes UDI and LOT numbers in addition to the part-number identifying the specific upgrade.*



Figure 8-39. System version with electronic label after upgrade (graphic for reference purposes only)

Admin

General

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **General** tab.

This tab allows you to modify the number of days for periodic shutdown reminder.

Backup

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **Backup** tab.

The following tab appears.

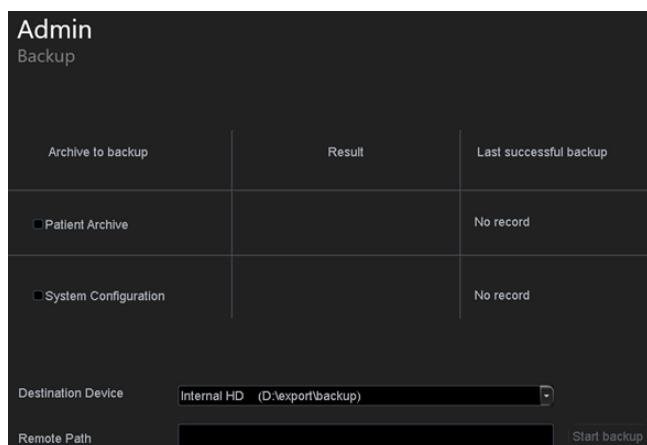


Figure 8-40. Admin - Backup

Restore

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **Restore** tab.

The following tab appears.

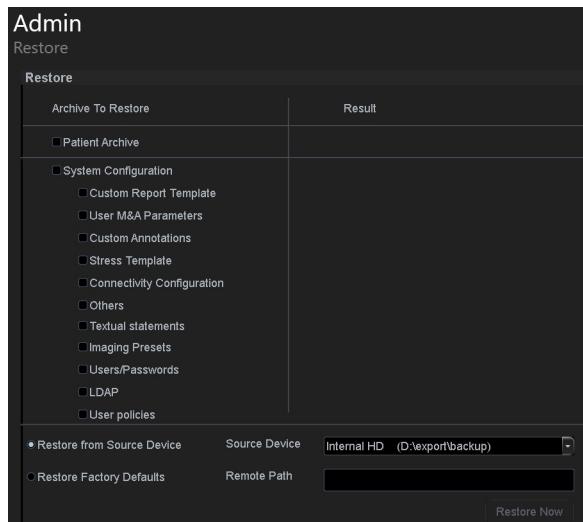


Figure 8-41. Admin - Restore

Users

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **Users** tab.

The following tab appears.

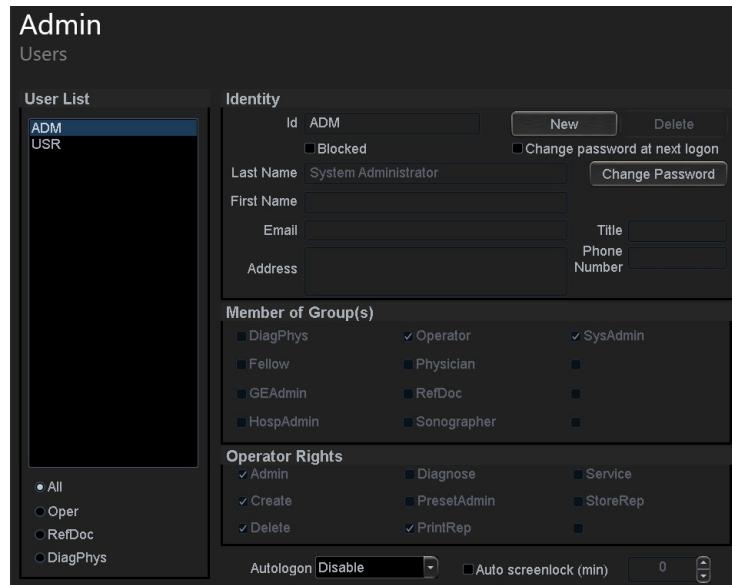


Figure 8-42. Admin - Users

System users

The ultrasound unit requires operator registration.

The users are divided in groups with different rights as shown below.

Group	Right (see definition below)							Service
	Create	Delete	Diagnose	Preset admin	Print report	Store report	Admin	
Cardiologist	+	+			+	+		Activated with a Dongle
Physician	+				+			
Sonographer	+				+			
Fellow	+				+			
Sys Admin	+	+			+		+	
Hosp admin					+	+		
GE admin	+	+			+		+	
Diagnosing physician			+					
Referring doctor								

The rights associated to the user groups are:

Right	Definition
Create	Create and update patient record, examination, user and referring members. Transfer patient records and examinations. Move examinations.
Delete	Delete patient record, examination, user and referring members.
Diagnose	Make the Diagnosing physician available in the <i>Patient info and exam</i> screen. Sign off report.
Preset admin: Protect Application presets	Make application presets protected. Delete protected application presets.
Admin	• System administration
Service	• Access to the service platform

1. Press **Utility/Config** on the Touch panel and log on as administrator if required.
2. Select the **Admin** category and **Users** subgroup.
The *Users* sheet is displayed.

Creating a user or a referring member

1. Press **New**.
2. Enter the user's information.
3. Select the type of user/referring member in *Member of Group(s)*.



To be able to login on the system, the group Operator MUST be selected.

Editing a user configuration

1. Select the actual user in the *User list*.
2. Make the desired changes.
3. Press **Config** or any active scanning key to exit the Configuration management package.

Deleting a user

1. Select the actual user in the *User list*.
2. Press **Delete**.

The user is removed from the *User list*.

Auto logon and auto screen lock

Auto logon

1. Select the desired logon setup from the pull down menu:
 - **Disabled**: No default user is selected when logging on.
 - **Last user**: The last user is selected automatically when logging on.
 - **A specific user**: Select one of the users to be the default user when logging on.

Auto screen lock

1. Set the time span (from 10 min.) for the system to automatically get locked when not in use. When the system is locked, the current user may either log on again or the system may be restarted by a different user.

Adding operator's initials to the title bar

1. Log-in as administrator.
2. Tap **Config.** and select the **Admin/Users** tab.
3. Enter a user ("JD" in Figure 8-43). Make sure you remember the password defined on this screen.

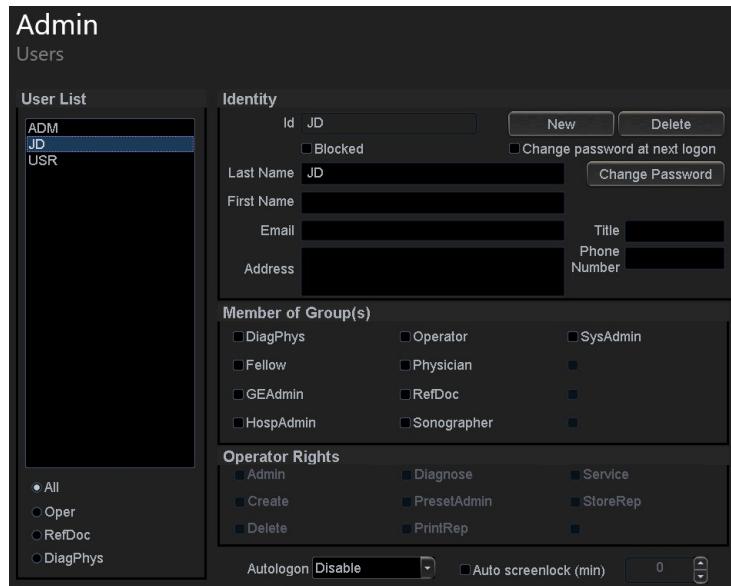


Figure 8-43. Admin/Users tab

4. Enter Home screen.
5. Tap **Login**.
The Operator Login window appears.
6. Enter your initials ("JD" in this example) and your password, then tap Log on.
Your initials appear above the Login button.
7. Tap **Begin/Resume Exam**.
Your initials appear on top. They appear on all the stored images.



Session Management

1. Log-in as administrator.
2. Tap **Config.** and select the **Admin/Session Management** tab.

The following tab appears:

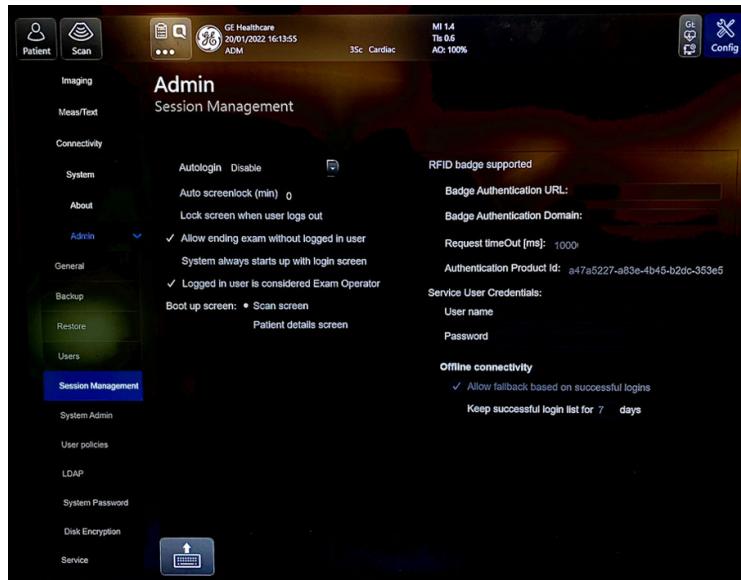


Figure 8-44. Session Management tab

Auto logon

1. Select the desired logon setup from the pull down menu:
 - **Disabled:** No default user is selected when logging on.
 - **Last user:** The last user is selected automatically when logging on.
 - **A specific user:** Select one of the users to be the default user when logging on.

Auto screen lock

1. Set the time span (from 10 min.) for the system to automatically get locked when not in use. When the system is locked, the current user may either log on again or the system may be restarted by a different user.

To support RFID Badge login

1. Select the Checkbox to turn on RFID badge login option.
2. Enter the Authentication server ID in the **Authentication Product Id box**.
3. Add information for authentication server: **Badge Authentication URL** and **Badge authentication domain**.

LDAP Credentials

Username and **Password** for accessing the LDAP server in case of RFID badge workflow.

Enabling offline user Login without network connection

If network connection failed, and the authentication server cannot be reached, Venue Go can be configured to switch to offline mode. In this mode successful user logins (name, password and date of login) are stored locally. Once connection is restored, Venue Go syncs back with the authentication server.

System admin

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **System admin** tab.

The following tab appears.

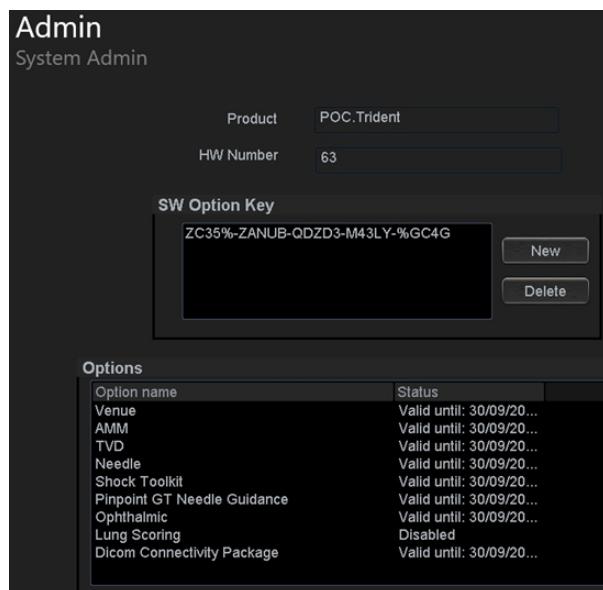


Figure 8-45. Admin - System Admin

User policies

User Policies can be enabled to enforce user account policies for all users on the system. The rules can be configured to set requirements for user name length, password complexity and for blocking of users. By default, user policies are disabled.

To configure user policies

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **User Policies** tab.

The following tab appears:

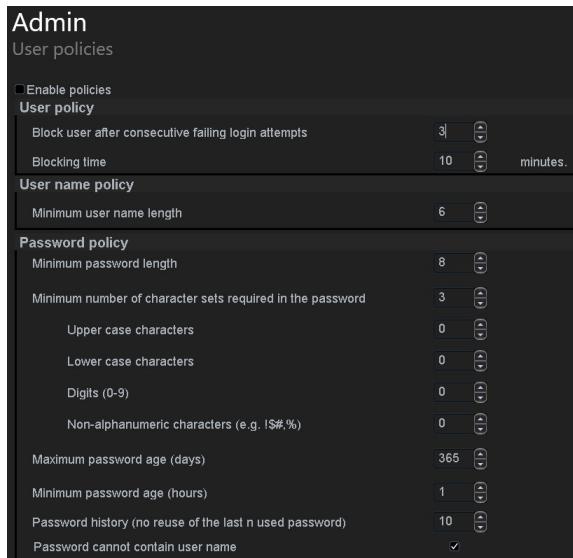


Figure 8-46. Admin/User Policies tab

This tab allows a user with administrative rights to configure User-name policies and password policies.

LDAP

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **LDAP** tab.

The following tab appears:

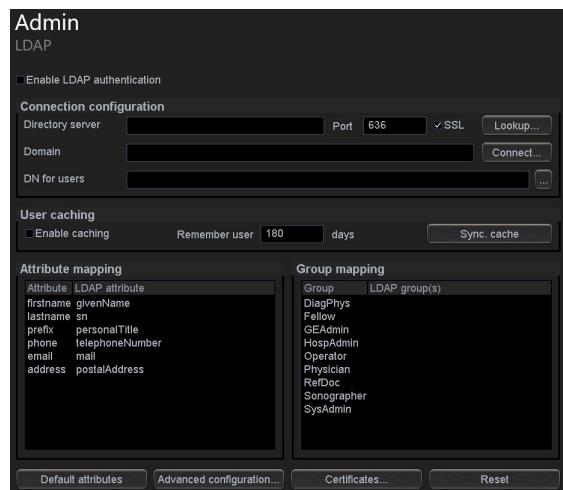


Figure 8-47. Admin/LDAP tab

This tab allows a user with administrative rights to configure LDAP. LDAP (Lightweight Directory Access Protocol) is a network protocol used to look up information on the server.

LDAP is used to look up encryption certificates, pointers and other services on a network, and provide “single sign-on” where one password for a user is shared between many services.

The system can be configured to use authentication services from a Microsoft Active Directory server or from another LDAP compatible directory server.

Item	Definition
Connection configuration	Set directory server, domain, and DN for users.
User caching	Set number of days user login details are retained without needing to log in with network access. When disabling this option, the cached user data is deleted.
Field mapping	Map LDAP attributes to system user attributes.
Group mapping	Map LDAP groups to system groups. An LDAP group can be mapped to zero or more system groups. Several LDAP groups can be mapped to the same system group.

To define LDAP properties:

1. Enter the configuration properties.
2. Tap **Connect** to test the connection, and enter a valid user name and password for the LDAP server in the dialog that appears.
3. Define group mapping for the LDAP user groups that shall have access to the system.

The user is assigned one or more system groups, according to the group mapping and the LDAP groups the user is a member of.

If the Directory Server does not support anonymous connection for the authentication service, two-step authentication is needed. Then valid user credentials for a user with access to the Directory Server must be entered here.

NOTE: User credentials are stored on the system.

System password

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **System password** tab.

The following tab appears.

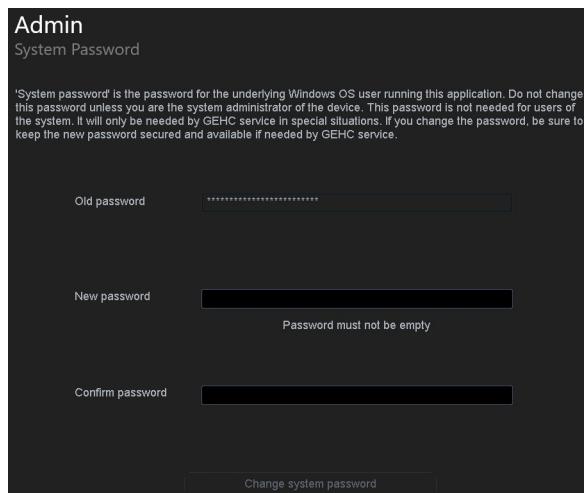


Figure 8-48. Admin/System password

NOTE: *DO NOT change the password unless you are the system administrator.*



Please consult with GE Healthcare service representative before making any changes.

Disk encryption

1. Tap **Settings/Config.** and log on as administrator, if required.
2. Select the **Admin** category and **Disk encryption** tab.

The following tab appears.

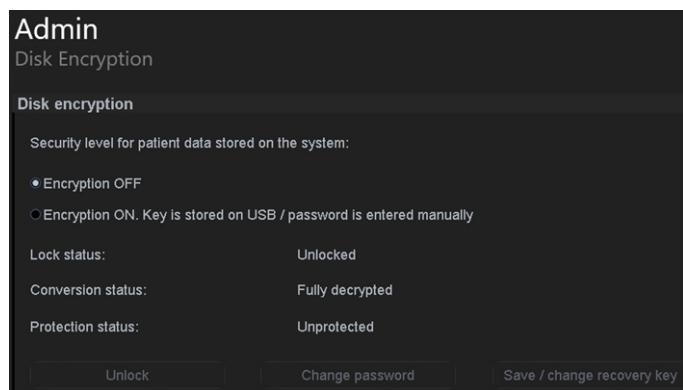


Figure 8-49. Admin - Disk Encryption

Disk encryption can be enabled for patient data stored on the system. By default, disk encryption is disabled.

When enabling disk encryption, you are prompted to choose an encryption password, as well as a storage location for the recovery key.

NOTE: *While the system is undergoing encryption, it cannot be used. We highly recommend performing disk encryption overnight, or when the system is not needed for an extended period.*

NOTE: *Should the system power down during disk encryption, or otherwise cease to function, a prompt appears when restarting the system to continue disk encryption.*

When starting up the system, the encrypted disk must be unlocked for the users to access images, local archive, and other patient information. The disk can be unlocked in one of the following ways:

- Enter the previously selected encryption password.
- Insert a USB memory stick with the stored recovery key in the system at start-up, or when the **Unlock** dialog appears.
- Enter the recovery key manually.



WARNING

Without the Encryption Password or Recovery Key it isn't possible to access patient information, images, or local archive. GE has no access to this information or the ability to undo encryption in the event that the Encryption Password and Recovery Key are lost. Maintaining the Encryption Password and Recovery Key are solely the user's responsibility.

Chapter 9

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

Intended Use/Indications for use

The ultrasound probes described in this manual are intended for image acquisition for medical diagnostic purposes, including measurements on the acquired images, and extracting tissue samples with guided and freehand biopsy when applicable. Defined intended uses (applications) dependent on probe type are discussed in this chapter ('Probe Discussion' on page 9-52).

Contraindications

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.

To avoid injury to the patient, select the Ophthalmic preset when performing an eye exam. The system does not exceed the lower acoustic energy limits for ophthalmic use only if the Ophthalmic preset is selected. Be sure to use the appropriate probes and presets for eye scanning ('Probe Discussion' on page 9-52).

Use of the ultrasound probes described in this manual outside the described conditions or intended use, and disregarding safety related information is considered abnormal use. The manufacturer is not liable for injury or damage caused by abnormal use. Any abnormal use voids equipment warranty.

User qualification for probes

Probes must be used with by qualified users with adequate experience. Under all circumstances the necessary safety precautions and sterility measures must be respected.

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.

Supported probes

Table 9-1: Phased Array Sector probes

Probe	Technical data	
3Sc-RS	Frequency:	1.1 – 4.7 MHz
	Footprint:	18.4 x 23.7 mm
	Field of View (FOV):	120 degrees
6S-RS	Frequency:	1.8 – 8.6 MHz
	Footprint:	16.8 x 23.5 mm
	Field of View (FOV):	115 degrees
M5Sc-RS	Frequency:	1.3 – 5.1 MHz
	Footprint:	18.1 x 27.5 mm
	Field of View (FOV):	120 degrees
12S-RS	Frequency:	2.7 – 12.5 MHz
	Footprint:	13.2 x 17.6 mm
	Field of View (FOV):	105 degrees

Table 9-2: Linear Array probes

Probe	Technical data	
9L-RS	Frequency:	2.4 – 10.5 MHz
	Footprint:	14.1 x 53.0 mm
	Field of View (FOV):	44.2 mm
L8-18i-RS	Frequency:	2.4 – 16.8 MHz
	Footprint:	11.1 x 34.8 mm
	Field of View (FOV):	25.2 mm
12L-RS	Frequency:	3.4 – 12.6 MHz
	Footprint:	12.7 x 47.1 mm
	Field of View (FOV):	38.4 mm
L4-12t-RS	Frequency:	3.4 – 12.6 MHz
	Footprint:	12.7 x 47.1 mm
	Field of View (FOV):	38.4 mm
ML6-15-RS	Frequency:	4.0 – 18.9 MHz
	Footprint:	16.0 x 60.7 mm
	Field of View (FOV):	50.4 mm
L10-22-RS	Frequency:	7.0 – 22.2 MHz
	Footprint:	12.8 x 1.5 mm
	Field of View (FOV):	12.8 mm
L4-20t-RS	Frequency:	3.0 – 17.4 MHz
	Footprint:	11.6 x 48.4 mm
	Field of View (FOV):	38.4 mm

Table 9-3: Curved Array (Convex) probes

Probe	Technical data	
C1-5-RS	Frequency:	1.4 – 5.7 MHz
	Footprint:	17.2 x 69.3 mm
	Field of View (FOV):	67 degrees
8C-RS	Frequency:	3.1 – 12.9 MHz
	Footprint:	12 x 22 mm
	Field of View (FOV):	128 degrees

Table 9-4: Intracavitory probe

Probe	Technical data	
E8C-RS	Frequency:	2.2 – 12.5 MHz
	Footprint:	16.9 x 21.2 mm
	Field of View (FOV):	128 degrees

Table 9-5: Transesophageal (TEE) probe

Probe	Technical data	
6Tc-RS	Frequency:	1.8 – 8.8 MHz
	Footprint:	8.5 x 42.7 mm
	Tip (L x W x H):	45 x 14 x 12 mm
	Field of View (FOV):	90 degrees

For modes of operation and other supported probe features, see Table 9-23 *on page 9-59*.

For probe intended use and presets, see Table 9-21 and Table 9-22 *on page 9-53*.



Probes for transvaginal and transrectal applications require special handling.

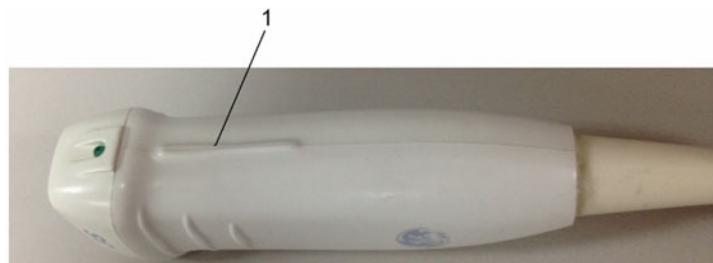
Transvaginal/transrectal examinations and probe insertions should be performed only by personnel with adequate training. Refer to the user documentation enclosed with these probes.



For ophthalmic use or any use where the probe is directly applied to the eye, the ophthalmic preset must be selected.

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.



1. Orientation Mark

Figure 9-1. Orientation Marking on Probe (Example)

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.



1. Name of the probe in use
2. Orientation marker on display - matching orientation marker on the probe

Figure 9-2. Displayed Probe Information

Probe Usage

For details on connecting, activating, deactivating, disconnecting, transporting and storing the probes, see 'Probes' on page 3-50.

Operator Profile

Qualified physicians or sonographers with at least basic ultrasound knowledge.

The operator must have read and understood the user manual.

Environmental Conditions

Probes can be used in a clinical environment.

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

Probes should be operated, stored, or transported within their probe specific parameters.

Operational probe environmental parameters are dependent on probe type and/or probe/console limits. Probe specific storage and transport conditions are defined on the individual environmental label picked on the probe box.

Reporting

In case a serious incident occurred in relation to GE Healthcare ultrasound probes, this should be reported to GE Healthcare and the competent Authority.

Inspecting probes

Perform Before Each Use

1. Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage.
Visually inspect probe housing, connection, operating elements, display facilities, labels, accessories.
2. Test probe functionality in modular combinations and common operability of system and accessories.

Perform After Each Use

Inspect the probe's lens, cable, casing, and connector. Look for any damage that would allow liquid to enter the probe. If any damage is found, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.

NOTE: *Keep a log of all probe maintenance, along with a picture of any probe malfunction.*

Environmental Requirements

Probes can be used in clinical environment. Ensure that the probe face temperature does not exceed the normal operation temperature range.

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 9-6: Probe Environmental Requirements

	Operational	Storage	Transport
Temperature	10° - 40°C 50° - 104°F	-5° - 50°C 23° - 122°F	-5° - 50°C 23° - 122°F
Humidity	30 - 85% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

NOTE: *The recommended storage temperature range of 6Tc-RS probe is between 0° and 45°C.*

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.

Always use sterile, legally marketed probe sheaths for intra-cavitory and 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 biopsy instructions for specific probes.

Reordering. To reorder sheaths, please contact your local distributor or the appropriate support resource.



Devices containing latex may cause severe allergic reaction in latex sensitive individuals. Refer to FDA's March 29, 1991 Medical Alert on latex products.



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.



DO NOT use an expired probe sheath. Before using probe sheaths, verify whether the term of validity has expired.

Endocavitory Probe Handling Precautions

If the disinfection solution comes out of the endocavitory probe, DO NOT use the probe until it has been inspected and released for further use by a GE service representative.



Sterile/sanitary sheaths are to be used on the probe during its actual use with patients. Wearing gloves protects the patient and operator.

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.



CAUTION

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.



CAUTION

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-cavitory and intra-operative procedures.

Probe Care and Maintenance

Planned maintenance



CAUTION

Improper handling can lead to early probe failure and electric shock hazards.

DO follow the specific cleaning and disinfection procedures provided in this chapter and the cleaner/disinfectant manufacturer's instructions.

Failure to do so voids probe warranty.



CAUTION

Transesophageal, endocavity and intraoperative probes require special handling. Refer to the user documentation enclosed with these probes.

It is recommended to keep a maintenance log and note all probe malfunctions. Follow the maintenance schedule below to ensure optimum operation and safety.

Inspecting the probe



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 (Figure 9-3), and visually inspect the housing, connection, operating elements, display facilities, labels, and accessories.



CAUTION

Inspect the probes for sharp edge or rough surfaces that could injure sensitive tissue.

Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage.

2. Look for damage that might allow liquid into the probe.
3. Carry out a visual inspection of housing, connection, operating elements, display facilities, labels, accessories, and refer to the probe user manual as needed.
4. Test probe functionality in modular combinations and common operability of system and accessories ('Probe check' on page 3-55).

1. Casing
2. Strain relief
3. Seal
4. Lens

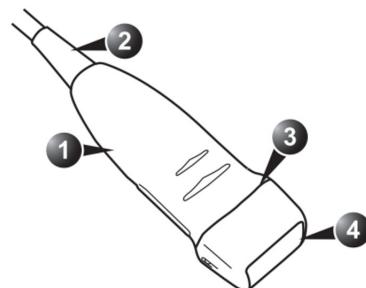


Figure 9-3. Probe parts

After each use

- Remove protective sheath from the probe and gently remove all coupling gel and gross contamination from the probe by wiping with a soft, lint-free cloth ('Probe Pre-Treatment at the Point of Use (Required for All Probes)' on page 9-16).
- Inspect the lens, the probe housing and the cable (Figure 9-3).
- Look for damage that might allow liquid into the probe.
- Clean the probe (details begin on page 9-16).
- Disinfect the probe (details begin on page 9-23).

Cleaning and disinfecting probes

This section contains information concerning Ultrasound Probe reprocessing procedures.



Each probe must be cleaned and disinfected before initial use.



Transesophageal, endocavity and intraoperative probes require special handling. Refer to the user documentation enclosed with these probes.

Probe Care Cards

The Probe Care Card contains a list of chemicals that have been tested for compatibility with GE Ultrasound probes. The reprocessing instructions provided in this document have been validated with the chemicals specified in Table 9-9 on *page 9-15*.

The Probe Care Card is supplied with every probe and may also be downloaded from

Table 9-7: Website links

Support Documentation Library website:
http://www3.gehealthcare.com/en/Support/Support_Documentation_Library
Ultrasound Probe Website:
http://www.gehealthcare.com/transducers
GEHC chemicals compatibility:
https://cleaning.gehealthcare.com/

With the exception of the chemicals listed in Table 9-9, the chemicals listed in Table 9-19, Table 9-11 through Table 9-18, and on the GE website have been tested for compatibility only.

Therefore, only those agents listed in Table 9-9 are recommended due to validated efficacy, and any reprocessing performed using chemicals not listed in Table 9-9 must be validated.

Adequate cleaning and disinfection between patient cases are necessary to prevent transmission of disease. All probes must be thoroughly cleaned prior to disinfection. The level of disinfection required is based on patient contact.

- Probes that contact mucosal or non-intact skin require cleaning followed by high-level disinfection, either soaking or use of a trophon EPR and trophon2.

- Probes that contact intact skin require cleaning followed by intermediate-level disinfection (wipe or spray).
- Verify probe compatibility using Table 9-11 through Table 9-18 as well as the Ultrasound Probe Website listed above.

Table 9-8: Description of Pictogram on Probe Care Cards

Pictogram	Description	Standard
	"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.	ISO 7000-0434A
	"CAUTION" - Dangerous voltage (the lightning flash with arrowhead) is used to indicate electric shock hazards.	IEC 60417-6042
	Biohazard - Patient/user infection due to contaminated equipment. Usage • Cleaning and care instructions • Sheath and glove guidelines	ISO 7000-0659
	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.	N/A- by GE Healthcare
	Do not immerse the probe into any liquid beyond the level specified for that probe. Refer to the user manual of the ultrasound system.	N/A- by GE Healthcare
	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.	N/A- by GE Healthcare
	"Consult accompany document" - Refer to the ultrasound system user manual for important probe care and cleaning instruction.	ISO 7010-M002

**CAUTION****CREUTZFIELD-JACOB DISEASE**

This device is not indicated for neurological use. Neurological contact on patients with this disease MUST BE avoided. If a device/probe becomes contaminated, there is no adequate means to disinfect it. In this case, the contaminated device/probe MUST BE discarded in accordance with local biologic waste hazard procedures.

Chemicals used for Efficacy Validation

The table below lists the products and intended use (clean, Intermediate-Level Disinfection, High-Level Disinfection) that were validated.

Table 9-9: Chemicals used for Efficacy Validation

Product type	Trade name	Manufacturer	Minimum contact time	Active ingredient	Validated for probe
Cleaning (Wipe)	Oxivir® Tb	Diversity	N/A	Hydrogen Peroxide	3Sc-RS, 12L-RS, E8C-RS, 9L-RS, C1-5-RS, 8c-RS, L4-12t-RS, L8-18i-RS, ML6-15-RS, L10-22, 12S-RS, L4-20t-RS, 5MSc-RS
Enzymatic Detergent (Soak)	Enzol® (cidezyme®)	Advanced Sterilization Products® (J&J)	1-Minute Soak	Proteolytic Enzymes	3Sc-RS, 12L-RS, E8C-RS, 9L-RS, C1-5-RS, 8c-RS, L4-12t-RS, 6S-RS, L8-18i-RS, ML6-15-RS, L10-22, 12S-RS, L4-20t-RS, 5MSc-RS
	MetriZyme™	Metrex™			
	Polystica® 2X Concentrate Presoak & Cleaner	Steris			
Intermediate-level Disinfectants (Wipe)	Oxivir® Tb	Diversey	10-minute exposure	Hydrogen Peroxide	3Sc-RS, 12L-RS, E8C-RS, 9L-RS, C1-5-RS, 8c-RS, L4-12t-RS, L8-18i-RS, ML6-15-RS, L10-22, 12S-RS, L4-20t-RS, 5MSc-RS

Table 9-9: Chemicals used for Efficacy Validation

Product type	Trade name	Manufacturer	Minimum contact time	Active ingredient	Validated for probe
High-level Disinfectant (Soak)	Cidex® OPA	Advanced Sterilization Products (J&J)	10-Minute Soak	Ortho-phthalaldehyde	3Sc-RS, 12L-RS, E8C-RS, 9L-RS, C1-5-RS, 8c-RS, L4-12t-RS, 6S-RS, L8-18i-RS, ML6-15-RS, L10-22, 12S-RS, L4-20t-RS, 5MSc-RS
	McKesson OPA/28	McKesson			

Probe Pre-Treatment at the Point of Use (Required for All Probes)

The pre-treatment step is for removal of gel and gross contamination.

NOTE: *Manual cleaning is required to ensure the probes are cleaned to the extent necessary for further processing.*

1. After each use, remove protective sheath from the probe and remove the coupling gel by wiping from the strain relief to the lens with a soft, low-lint cloth.



CAUTION

DO NOT use abrasive paper products when cleaning or wiping a GE Ultrasound probe. The use of abrasive wipes can damage the soft lens (acoustic window). To extend the life of the probe lens, pat dry only.

2. Wipe the cable with one of the wipes listed in the probe compatibility website from the strain relief to the connector. Wipe the cable with a low-lint cloth dampened with potable water to remove chemical residue. Dispose of the cloth, wipe and gloves in the clinical trash.

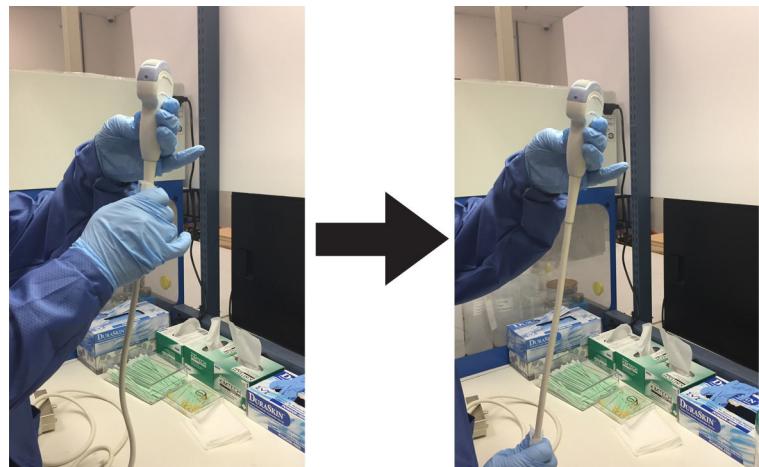


Figure 9-4. Cleaning the Probe Cable

NOTE:

Use of wipes listed on the Ultrasound Probe website may result in discoloration of the cable.



WARNING

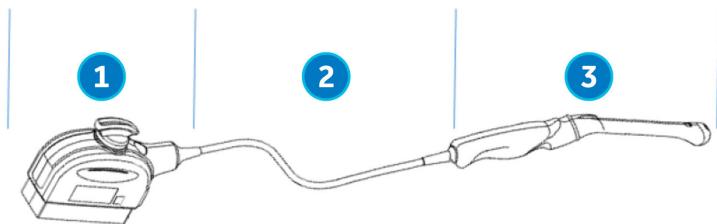
Use caution when cleaning the connector. This cable connector should only be cleaned with a slightly dampened cloth or wipe. Exposure to excessive moisture results in damage to the probe and possibly the ultrasound console. DO NOT wet the connector/console interface surface or labels.

3. After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe.



DANGER

If the probe is damaged, do not place it into any liquid (e.g. for disinfection) and do not use it until it has been inspected and repaired/replaced by a GE Service Representative.



1. Cleaning only portion
2. Cleaning only or cleaning and disinfection portion
3. Cleaning followed by appropriate level of disinfection

Figure 9-5. Inspect the Lens, Cable, and Probe House After Each Use

Probe Manual Cleaning Instructions

Manual cleaning is required to ensure the probes are cleaned to the extent necessary for further processing. Choose the most appropriate method, either the wipe or enzymatic soak.

Cleaning with Wipes

1. Hold the probe at the proximal end near the strain relief cable. **DO NOT** suspend or hold the probe by the cable as this may damage the probe.
2. Dispense a cleaning wipe from the wipe canister.
3. Gently wipe the probe with a cleaning wipe from the cable strain relief to the distal end. Gently wipe the probe's lens.

NOTE: *Pay special attention to lens, edges, and grooves.*

4. Turn the probe and continue wiping until the entire surface of the probe has been cleaned. As the wipe becomes visibly soiled, discard the wipe into clinical trash and dispense fresh wipes as needed.
5. Wrap a clean wipe around a soft nylon bristle brush to access crevasses, such as biopsy notches, on the surface of the probe.
6. Visually inspect the probe for any remaining soil and, if necessary, repeat steps 3 through 5 until the probe is visibly clean.

Cleaning with Enzymatic Detergent

1. Ensure the probe has been disconnected from the console. Replace gloves and fill a sink or basin with warm potable water (30 - 40°C) to a level allowing immersion of the probe up to the immersion line shown in Figure 9-8.
2. Prepare the cleaning solution in accordance with the detergent manufacturer's instructions.
3. Immerse the probe in the prepared cleaning solution up to the immersion line and ensure no air bubbles are trapped on the surface.



CAUTION

Do not submerge probe beyond the immersion line (Figure 9-8).

NOTE:

For E8C-RS see Figure 9-13 on page 9-27 for special immersion instructions.

4. Brushing with a clean, soft, nylon bristle brush from the base of the cable strain relief to the distal tip is critical to ensure cleaning and disinfection efficacy.



Figure 9-6. Cleaning the probe using a brush



CAUTION

Do not use the brush on the probe lens.

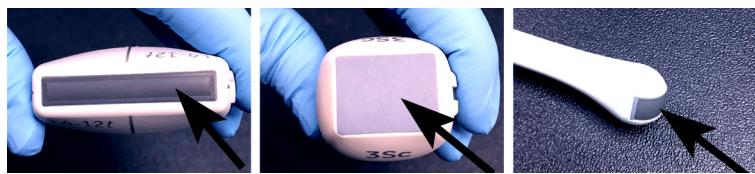


Figure 9-7. Probe Lens Examples

5. Continue brushing the probe for not less than the minimum contact time listed on the detergent manufacturer's label.
6. Visually inspect the probe for soil. Repeat Steps 3 through 5 until all visible soil has been removed from the surface of the probe.
7. Rinse the probe under running warm potable water (30 - 40°C) for not less than 2 minutes. Scrub the surface of the probe with a clean, soft, nylon bristle brush from the base of the cable strain relief to the distal tip.



DO NOT use the brush on the probe lens.

8. Visually inspect the device in a well-lit area to ensure all surfaces are free from residual cleaning solution. Repeat Step 7 if visible cleaning solution is observed.
9. Thoroughly dry the probe using a clean, low-lint, soft cloth or wipe. Pat dry lens.



DO NOT use a twisting motion or abrasive paper products when wiping the probe as this may damage the soft lens. To extend the life of the probe lens, pat dry only.

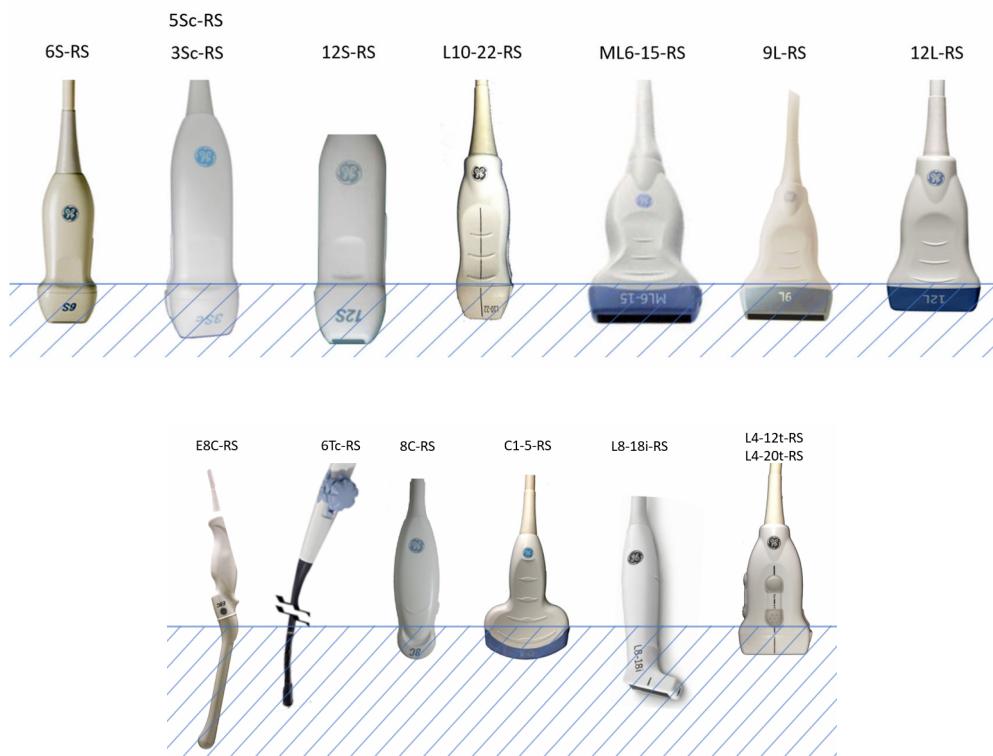


Figure 9-8. Probe immersion levels

Table 9-10: Description of Pictogram for Probe Immersion Levels

Pictogram	Description
	Fluid level

NOTE: For probe immersion levels for 6Tc-RS probe please refer to the user documentation enclosed with the probe.

Cable and Connector Manual Cleaning



CAUTION

Use caution when cleaning the connector. This cable connector should only be cleaned with a slightly dampened cloth or wipe. Exposure to excessive moisture will result in damage to the probe and possibly the ultrasound console. DO NOT wet the connector/console interface surface or labels.

1. The cable and connector surfaces can be cleaned with the cleaners or wipes listed in the Probe Care Card.

NOTE:

Use of wipes listed on the Ultrasound Probe website may result in discoloration of the cable.

2. Wipe the cable with a low-lint cloth dampened with potable water to remove chemical residue.

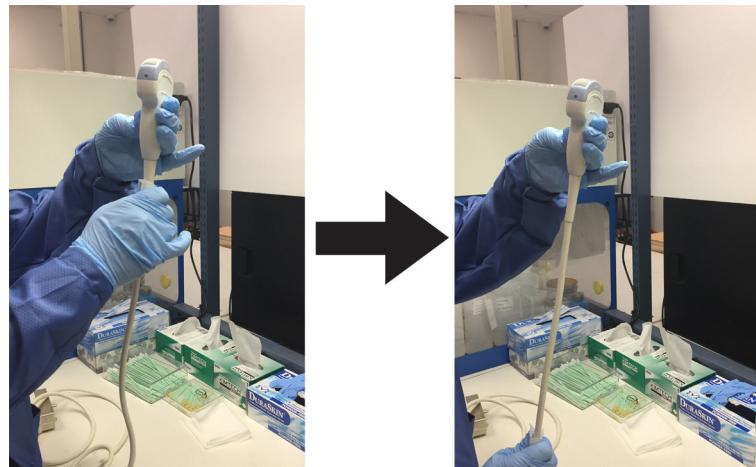


Figure 9-9. Cleaning the Probe Cable

Probe Intermediate-Level Disinfection (ILD)

For Intermediate-Level Disinfection of intact skin contacting probes, choose either the spray or wipe method.

NOTE: *Probes that contact only intact skin may be disinfected in this manner. All probes that contact non-intact skin or mucous membranes (e.g., endocavitory, Transesophageal) require High-Level Disinfection.*



CAUTION

After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe.



DANGER

If the probe is damaged, DO NOT place it into any liquid (e.g., for disinfection) and DO NOT USE until the probe has been inspected and repaired/replaced by a GE Service Representative.

Probe ILD - Disinfectant Spray

1. Put on a new pair of gloves and spray enough disinfectant solution to saturate a new disposable low-lint wipe or cloth.
2. Holding the probe near the strain relief, apply the dampened cloth to the patient contacting lens. Wipe the probe from the lens to the strain relief, slightly rotating the probe after each wiping pass.
3. After the probe has been completely wiped, dampen a second wipe with disinfectant and starting at the probe lens begin wiping the probe in a rotating motion moving down towards the strain relief. Spray disinfectant directly on the recessed areas and ridges to saturate.

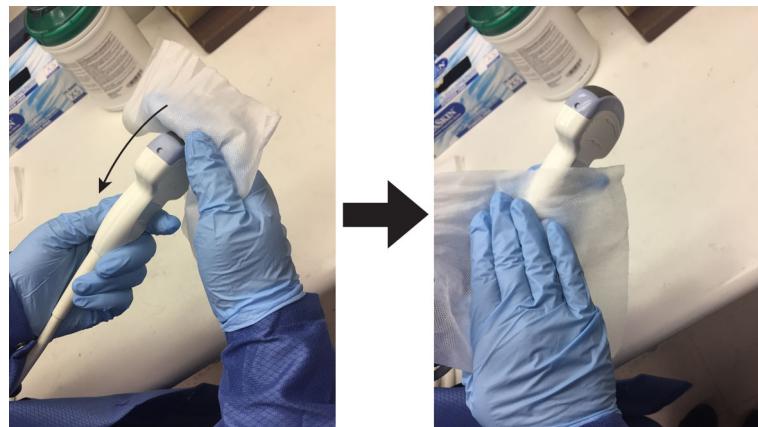


Figure 9-10. Disinfecting the Probe Moving from Lens to Strain Relief

4. Once the probe has been completely wiped, dampen a third wipe with disinfectant and continue wiping the probe as needed to ensure the surface remains wet for the required exposure time. Use as many wipes as needed and re-spray disinfectant on recessed areas and ridges, to ensure all surfaces remain wet for the minimum required contact time listed in the disinfectant manufacturer's instructions for use.
5. Thoroughly dry all surfaces of the probe using a soft, low-lint wipe or cloth, changing wipes/cloths when necessary to ensure the probe is completely dry. Pat dry lens. Visually inspect the probe to ensure all surfaces are dry. Repeat drying steps if any moisture is visible.
6. If the probe is not immediately reused, store the probe in a manner that protects and keeps the probe from being recontaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

Probe ILD - Disinfectant Wipe

1. Replace gloves. Holding the probe near the strain relief, apply the wipe to the patient contacting lens. Wipe the probe from the lens to the strain relief, slightly rotating the probe after each wiping pass.
2. After the probe has been completely wiped, use a second wipe and starting at the probe lens begin wiping the probe in a rotating motion moving down towards the strain relief. Wring the wipe above recessed areas, seams, and ridges to drip disinfectant directly onto these less accessible surfaces.

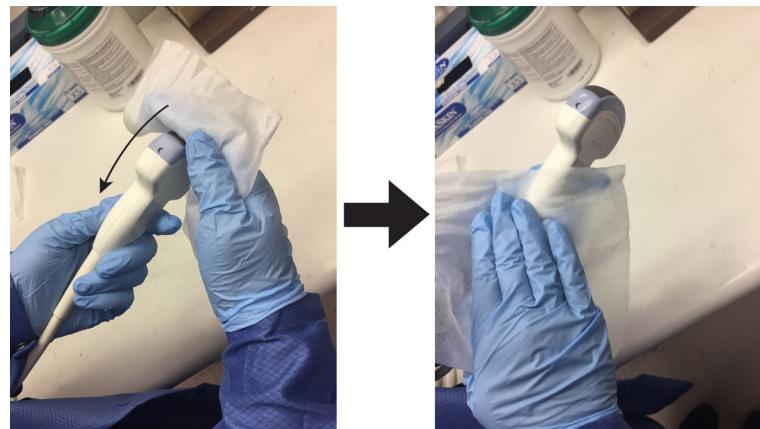


Figure 9-11. Disinfecting the Probe Moving from Lens to Strain Relief

NOTE: *Probes that contact only intact skin may be disinfected in this manner. All probes that contact mucous membranes (e.g., endocavitory, Transesophageal) require High-Level Disinfection.*

3. Once the probe has been completely wiped, use a third wipe and continue wiping the probe as needed to ensure the surface remains wet for the required exposure time. Use as many wipes as needed and drip additional disinfectant on recessed areas and ridges, to ensure all surfaces remain wet for the minimum required contact time listed in the disinfectant manufacturer's instructions for use.

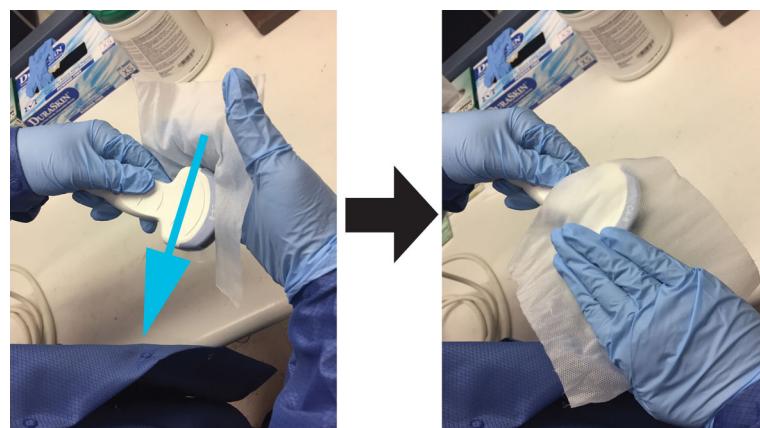


Figure 9-12. Disinfecting the Probe

4. Thoroughly dry all surfaces of the probe using a soft, low-lint wipe or cloth, changing wipes/cloths when necessary to ensure the probe is completely dry. Pat dry lens. Visually

- inspect the probe to ensure all surfaces are dry. Repeat drying steps if any moisture is visible.
5. If the probe is not immediately reused, store the probe in a manner that will protect and keep the probe from being recontaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

Probe High Level Disinfection (HLD)

High-Level Disinfection is required for devices that contact intact mucous membranes or non-intact skin. High Level Disinfection can be performed using either a disinfectant soaking method or an automated system such as trophon EPR and trophon2.



If the probe is damaged, DO NOT place it into any liquid (e.g., for disinfection) and DO NOT USE until the probe has been inspected and repaired/replaced by a GE Service Representative.



After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe.

NOTE: *All semi-critical probes* that contact mucous membranes require High-Level Disinfection.*

*Semi-critical probes are probes that contact mucous membranes or non-intact skin.

NOTE: *Handles of semi-critical probes that are not submerged during High-Level Disinfection require Low or Intermediate-Level Disinfection to avoid cross contamination.*

Probe HLD - Soak

1. Ensure the probe has been disconnected from the console. Replace gloves and fill a sink or basin with High-Level Disinfectant diluted in accordance with the disinfectant manufacturer's instructions to a level allowing immersion of the probe up to immersion line shown in Figure 9-8.



CAUTION

Ensure no liquid comes into contact with the probe connector pins or labels.

NOTE:

Over-exposing ultrasound probes to high-level disinfectants may damage the ultrasound probe. NEVER exceed the disinfectant manufacturer's maximum exposure time.

2. Immerse probe in the disinfectant up to the immersion line shown in Figure 9-8 and ensure no air bubbles are trapped. Ensure the probe remains in the disinfectant for at least the minimum contact time listed in the disinfectant manufacturer's instructions for use.

For probe E8C-RS with serial numbers listed below or greater, refer to Figure 9-13 for the soaking level. E8C-RS: 782439WX4 or greater (example 782440WX4, 782441WX4). The prefix number, i.e. 782439, indicates serial number sequence.



1. Serial number location

Figure 9-13. E8C-RS probe immersion level



CAUTION

Ensure that the probe is suspended. The probe face should not be resting against the tank/basin surface and should be in full contact with the liquid. Carefully place the probe in the basin, taking care not to damage the transducer lens.



Figure 9-14. Probe suspended in disinfectant basin

3. Thoroughly rinse the probe by immersing it in a large volume of critical (purified) water for a minimum of 1 (one) minute. Remove the probe and discard the rinse water. Do not reuse the water. Always use fresh volumes of water for each rinse. Repeat Step 3 two additional times, for a total of 3 (three) rinses.



WARNING

Failure to properly rinse probes with water following disinfection may cause skin irritation.

4. Thoroughly dry all surfaces of the probe using a soft, low-lint wipe or cloth, changing wipes' cloths when necessary to ensure the probe is completely dry. Pat dry lens. Visually inspect the probe to ensure all surfaces are clean and dry. Repeat drying steps if any moisture is visible.
5. If the probe is not immediately reused, store the probe in a manner that will protect and keep the probe from being re-contaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

The instructions provided above have been validated to properly prepare GE Ultrasound probes for re-use. It remains the responsibility of the processor to ensure that the processing is performed as specified in this document. This may require verification and routine monitoring of the process.

Compatible Chemicals

The table below lists the chemicals that were tested for compatibility with the probes.



WARNING

The chemicals listed below are compatible with Venue Go probes and will not cause degradation, but have not been proven to effectively clean or disinfect the probes. If you are interested in using an alternate chemical from the compatibility tables, please contact your GE representative. Alternate chemicals require validation by GE prior to use to ensure efficacy.

NOTE: *The tables in this manual indicate the status when this manual was published. Please visit the website for the latest information.*

A full list of chemicals tested for compatibility is available at the GE Probe website (Table 9-7).

Table 9-11: Chemicals Compatible with Non-TEE probes, part 1

Material name	Manufacturer	Probes						
		3Sc-RS	12L-RS	E8C-RS	9L-RS	C1-5-RS	8C-RS	M5Sc-RS
AniosClean Excel D	Laboratoires Anios	+	+	+	+	+	+	+
Aniosyme DD1	Laboratoires Anios	+	+	+	+	+	+	+
Aniosyme X3	Laboratoires Anios	+	+	+	+	+	+	+
Bodedex Forte	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Cidezyme/Enzol	Advanced Sterilization Products	+	+	+	+	+	+	+
Cygnus Simple2 Multi-Tiered Enzymatic Detergent (bottle or sponge kits)	Cygnus Medical	+	+	+	+	+	+	+
Eco-Zyme Multi-Tiered Enzymatic Detergent	Pro-Line Solutions Inc.	+	+	+	+	+	+	+
EmPower	Metrex	+	+	+	+	+	+	+
Endozime	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime Sponge	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime AW Triple Plus with APA	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime SLR	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime SLR Sponge	The Ruhof Corporation	+	+	+	+	+	+	+
Enzyclean II Dual Enzyme Detergent	Micro-Sceintific (Weiman)	+	+	+	+	+	+	+
gigasept AF	Schulke & Mayr GmbH	+	+	+	+	+	+	+
gigazyme	Schulke & Mayr GmbH	+	+	+	+	+	+	+
gigazyme X-tra	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Intercept Detergent	Medivators	+	+	+	+	+	+	+
Matrix	Whiteley Medical	+	+	+	+	+	+	+
Metrizyme	Metrex	+	+	+	+	+	+	+
Prolystica 2X Concentrate Enzymatic Presoak and Cleaner	STERIS Corporation	+	+	+	+	+	+	+
Pure Enzymatic Detergent	EndoChoice	+	+	+	+	+	+	+
Revital-Ox Enzymatic Detergents	STERIS Corporation	+	+	+	+	+	+	+

Probes and Biopsy

Table 9-11: Chemicals Compatible with Non-TEE probes, part 1

Material name	Manufacturer	Probes						
		M5Sc-RS	8C-RS	C1-5-RS	9L-RS	E8C-RS	12L-RS	3Sc-RS
Sekusept MultiEnzyme	Ecolab	+	+	+	+	+	+	+
Septanios MD	Laboratoires Anios	+	+	+	+	+	+	+
Simple2 Multi-Tiered Enzymatic Detergent (bottle or sponge kits)	Cygnus Medical	+	+	+	+	+	+	+
Soft Soap	All manufacturers	+	+	+	+	+	+	+
Valsure Enzymatic Cleaner	STERIS Corporation	+	+	+	+	+	+	+

Table 9-12: Chemicals Compatible with Non-TEE probes, part 2

Material name	Manufacturer	Probes						
		L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	L8-18i-RS	6S-RS	L4-12t-RS
AniosClean Excel D	Laboratoires Anios	+	+	+	+	+	+	+
Aniosyme DD1	Laboratoires Anios	+	+	+	+	+	+	+
Aniosyme X3	Laboratoires Anios	+	+	+	+	+	+	+
Bodedex Forte	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Cidezyme/Enzol	Advanced Sterilization Products	+	+	+	+	+	+	+
Cygnus Simple2 Multi-Tiered Enzymatic Detergent (bottle or sponge kits)	Cygnus Medical	+	+	+	+	+	+	+
Eco-Zyme Multi-Tiered Enzymatic Detergent	Pro-Line Solutions Inc.	+	+	+	+	+	+	+
EmPower	Metrex	+	+	+	+	+	+	+
Endozime	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime Sponge	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime AW Triple Plus with APA	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime SLR	The Ruhof Corporation	+	+	+	+	+	+	+
Endozime SLR Sponge	The Ruhof Corporation	+	+	+	+	+	+	+
Enzyclean II Dual Enzyme Detergent	Micro-Sceintific (Weiman)	+	+	+	+	+	+	+

Table 9-12: Chemicals Compatible with Non-TEE probes, part 2

Material name	Manufacturer	Probes							
		L4-20t-RS	12S-RS	12S-RS	ML6-15-RS	L10-22-RS	L8-18i-RS	6S-RS	L4-12t-RS
gigasept AF	Schulke & Mayr GmbH	+	+	+	+	+	+	+	+
gigazyme	Schulke & Mayr GmbH	+	+	+	+	+	+	+	+
gigazyme X-tra	Schulke & Mayr GmbH	+	+	+	+	+	+	+	+
Intercept Detergent	Medivators	+	+	+	+	+	+	+	+
Matrix	Whiteley Medical	+	+	+	+	+	+	+	+
Metrizyme	Metrex	+	+	+	+	+	+	+	+
Prolystica 2X Concentrate Enzymatic Presoak and Cleaner	STERIS Corporation	+	+	+	+	+	+	+	+
Pure Enzymatic Detergent	EndoChoice	+	+	+	+	+	+	+	+
Revital-Ox Enzymatic Detergents	STERIS Corporation	+	+	+	+	+	+	+	+
Sekusept MultiEnzyme	Ecolab	+	+	+	+	+	+	+	+
Septanios MD	Laboratoires Anios	+	+	+	+	+	+	+	+
Simple2 Multi-Tiered Enzymatic Detergent (bottle or sponge kits)	Cygnus Medical	+	+	+	+	+	+	+	+
Soft Soap	All manufacturers	+	+	+	+	+	+	+	+
Valsure Enzymatic Cleaner	STERIS Corporation	+	+	+	+	+	+	+	+



WARNING

The chemicals listed below are compatible with Venue Go probes and will not cause degradation, but have not been proven to effectively clean or disinfect the probes. If you are interested in using an alternate chemical from the compatibility tables, please contact your GE representative. Alternate chemicals require validation by GE prior to use to ensure efficacy.

Probes and Biopsy

Table 9-13: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 1

Material name	Manufacturer	Probes							M5Sc-RS
		3Sc-RS	12L-RS	E8C-RS	9L-RS	C-15-RS	8C-RS		
Liquid/Spray									
Accel INTERVention RTU	Diversey (Sealed Air)	+	+	+	+	+	+	+	+
Accel TB RTU	Diversey (Sealed Air)	+	+	+	+	+	+	+	+
Acryl-Des	Schulke & Mayr GmbH	+	+	+	+	+	+	+	+
Acrylan	Antiseptica Chem. Phar. Produkte	+	+	+	+	+	+	+	+
Alchohol 70% Ethanol on a wipe	All manufacturers	+	+	+	+	+	+	+	+
Alchohol 70% Isopropanol on a wipe	All manufacturers	+	+	+	+	+	+	+	+
Bacillol 30 Foam	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+	+
Bacillol AF	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+	+
Bacillol plus	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+	+
Biguacid-S	Antiseptica Chem. Phar. Produkte	+	+	+	+	+	+	+	+
CaviCide	Metrex	+	+	+	+	+	+	+	+
CaviCide 1	Metrex	+	+	+	+	+	+	+	+
CaviCide AF	Metrex	+	+	+	+	+	+	+	+
Cidalkan	Alkapharm	+	+	+	+	+	+	+	+
Clinell Universal Spray	GAMA Healthcare Ltd.	+	+	+	+	+	+	+	+
Clorox broad spectrum quaternary disinfectant cleaner	Clorox Professional Products Company	+	+	+	+	+	+	+	+
Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Liquids and Spray	Clorox Professional Products Company	+	+	+	+	+	+	+	+
Hibitane (5% Chlorhexidine gluconate)	All manufacturers		+	+	+	+	+	+	+
Mikrozid sensitive liquid	Schulke & Mayr GmbH	+	+	+	+	+	+	+	+
Optim 33TB RTU	SciCan	+	+	+	+	+	+	+	+
Oxivir Tb RTU	Diversey (Sealed Air)	+	+	+	+	+	+	+	+
PCS 1000 Oxidizing Disinfectant/Disinfectant Cleaner	Process Cleaning Solutions Ltd.	+	+	+	+	+	+	+	+
PI-Spray	Pharmaceutical Innovations, Inc.	+	+	+	+	+	+	+	+

Table 9-13: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 1

Material name	Manufacturer	Probes						
		3Sc-RS	12L-RS	E8C-RS	9L-RS	C1-5-RS	8C-RS	M5Sc-RS
PI-Spray II	Pharmaceutical Innovations, Inc.	+	+	+	+	+	+	+
Protex disinfectant spray	Parker Laboratories	+	+	+	+	+	+	+
SurfaSafe	Laboratoires Anios	+	+	+	+	+	+	+
Surfa'Safe Premium	Laboratoires Anios	+	+	+	+	+	+	+
T-Spary	Pharmaceutical Innovations, Inc.	+	+	+	+	+	+	+
T-Spary II	Pharmaceutical Innovations, Inc.	+	+	+	+	+	+	+
Transeptic Spray	Parker Laboratories Inc.		+	+	+	+		
Tristel Duo for Ultrasound	Tristel Solutions Limited	+	+	+	+	+	+	+
Wipes								
Accel INTERVention Wipes	Diversey (Sealed Air)	+	+	+	+	+	+	+
Accel TB Wipes	Diversey (Sealed Air)	+	+	+	+	+	+	+
Anios Quick Wipes	Laboratoires Anios	+	+	+	+	+	+	+
Asepti-Wipe II	Echolab	+	+	+	+	+	+	+
Bacillol 30 Tissues	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Bacillol AF Tissues	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Bactinyl Lingettes desinfectantes inodores	Laboratoire Garcin-Bactinyl	+	+	+	+	+	+	+
CaviWipes	Metrex	+	+	+	+	+	+	+
CaviWipes 1	Metrex	+	+	+	+	+	+	+
CaviWipes AF	Metrex	+	+	+	+	+	+	+
Cidalkan Wipes	Alkapharm	+	+	+	+	+	+	+
Cleanisept Wipes	Dr. Schumacher GmbH	+	+	+	+	+	+	+
Cleanisept Wipes forte	Dr. Schumacher GmbH	+	+	+	+	+	+	+
Clinell Clorox Wipes	GAMA Healthcare Ltd.	+	+	+	+	+	+	+
Clinell Universal Sanitising wipes or Clinell Universal wipes	GAMA Healthcare Ltd.	+	+	+	+	+	+	+
Clorox Healthcare Bleach Germicidal wipes	Clorox Professional Products Company	+	+	+	+	+	+	+

Probes and Biopsy

Table 9-13: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 1

Material name	Manufacturer	Probes						
		3Sc-RS	12L-RS	E8C-RS	9L-RS	C1-5-RS	8C-RS	M5Sc-RS
Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Wipes	Clorox Professional Products Company	+	+	+	+	+	+	+
Clorox Healthcare Multi-Surface Quat Alcohol Cleaner Disinfectant Wipes	Clorox Professional Products Company	+	+	+	+	+	+	+
Dispatch hospital cleaner disinfectant towels with bleach	Clorox Professional Products Company	+	+	+	+	+	+	+
General purpose disinfectant wipes	Total Solutions	+	+	+	+	+	+	+
Intercept Wipes	Medivators	+	+	+	+	+	+	+
Matrix Wipes	Whiteley Medical	+	+	+	+	+	+	+
Mikrobac tissues	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Mikrozid sensitive wipes	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Mikrozid universal liquid and Mikrozid universal wipes	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Optim 33TB Wipes	SciCan	+	+	+	+	+	+	+
Oxivir Tb Wipes	Diversey (Sealed Air)	+	+	+	+	+	+	+
PCS 1000 Oxidizing Disinfectant/Disinfectant Cleaner Wipes	Process Cleaning Solutions Ltd.	+	+	+	+	+	+	+
Protex disinfectant wipes	Parker Laboratories	+	+	+	+	+	+	+
Protex ULTRA Disinfectant Wipes	Parker Laboratories	+	+	+	+	+	+	+
Reynard Neutral Detergent Wipes	Reynard Health Supplies	+	+	+	+	+	+	+
Reynard Premier Detergent Wipes	Reynard Health Supplies	+	+	+	+	+	+	+
Sani-Cloth Active	PDI	+	+	+	+	+	+	+
Sani-Cloth AF Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Sani-Cloth AF3 Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Sani-Cloth Bleach Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Sani-Cloth HB Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+

Table 9-13: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 1

Material name	Manufacturer	Probes						
		3Sc-RS	12L-RS	E8C-RS	9L-RS	C1-5-RS	8C-RS	M5Sc-RS
Sani-Cloth Plus Germicidal Disposable Cloth	PDI	+	+	+	+	+	+	+
Sani-Cloth Prime Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Septiwipes	Dr. Schumacher GmbH	+	+	+	+	+	+	+
Shodokku Super wipes	Hakujuji	+	+	+	+	+	+	+
Sofuraito disinfecting wipes	Asahi Kasei Chemicals Corporation	+	+	+	+	+	+	+
SONO Ultrasound Wipes	Advanced Ultrasound Solutions Inc.	+	+	+	+	+	+	+
Sukitto-Cloth wipes	Osaki Medical Corporation	+	+	+	+	+	+	+
Sukitto-Cloth wipes refill	Osaki Medical Corporation	+	+	+	+	+	+	+
Super Sani-Cloth Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Tristel Pre-Clean Wipes	Tristel Solutions Limited	+	+	+	+	+	+	+
Tristel Rinse Wipes	Tristel Solutions Limited	+	+	+	+	+	+	+
Tristel Sporicidal Wipe - Activated Wipe	Tristel Solutions Limited	+	+	+	+	+	+	+
Tristel Trio Wipes System	Tristel Solutions Limited	+	+	+	+	+	+	+
Trophon Companion Cleaning Wipes	Nanosonics Limited	+	+	+	+	+	+	+
Trophon Companion Drying Wipes	Nanosonics Limited	+	+	+	+	+	+	+
Tuffle 5	Vernacare Ltd.	+	+	+	+	+	+	+
V Wipes	Whiteley Medical	+	+	+	+	+	+	+
Wet Wipe Chlorine Disinfection	Wet Wipe A/S	+	+	+	+	+	+	+
Wet Wipe PHMB Disinfection	Wet Wipe A/S	+	+	+	+	+	+	+
Wet Wipe Triamin Disinfection	Wet Wipe A/S	+	+	+	+	+	+	+
Wet Wipe Universal	Wet Wipe A/S	+	+	+	+	+	+	+
Wip'Anios Excel	Laboratoires Anios	+	+	+	+	+	+	+
Wip'Anios Premium	Laboratoires Anios	+	+	+	+	+	+	+

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Table 9-14: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 2

Material name	Manufacturer	Probes						
		L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	L8-18i-RS	6S-RS	L4-12t-RS
Liquid/Spray								
Accel INTERVention RTU	Diversey (Sealed Air)	+		+	+	+	+	+
Accel TB RTU	Diversey (Sealed Air)	+		+	+	+	+	+
Acryl-Des	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Acrylan	Antiseptica Chem. Phar. Produkte	+	+	+	+	+	+	+
Alchohol 70% Ethanol on a wipe	All manufacturers	+	+	+	+	+	+	+
Alchohol 70% Isopropanol on a wipe	All manufacturers	+	+	+	+	+	+	+
Bacillol 30 Foam	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Bacillol AF	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Bacillol plus	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Biguacid-S	Antiseptica Chem. Phar. Produkte	+	+	+	+	+	+	+
CaviCide	Metrex	+	+	+	+	+	+	+
CaviCide 1	Metrex	+	+	+	+	+	+	+
CaviCide AF	Metrex	+	+	+	+	+	+	+
Cidalkan	Alkapharm	+	+	+	+	+	+	+
Clinell Universal Spray	GAMA Healthcare Ltd.	+	+	+	+	+	+	+
Clorox broad spectrum quaternary disinfectant cleaner	Clorox Professional Products Company	+	+	+	+	+	+	+
Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Liquids and Spray	Clorox Professional Products Company	+		+	+	+	+	+
Hibitane (5% Chlorhexidine gluconate)	All manufacturers	+		+	+	+	+	+
Mikrozid sensitive liquid	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Optim 33TB RTU	SciCan	+		+	+	+	+	+
Oxivir Tb RTU	Diversey (Sealed Air)	+		+	+	+	+	+
PCS 1000 Oxidizing Disinfectant/Disinfectant Cleaner	Process Cleaning Solutions Ltd.	+	+	+	+	+	+	+
PI-Spray	Pharmaceutical Innovations, Inc.	+		+	+	+	+	+

Table 9-14: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 2

Material name	Manufacturer	Probes						
		L4-12t-RS	6S-RS	L8-18i-RS	ML6-15-RS	L10-22-RS	12S-RS	L4-20t-RS
PI-Spray II	Pharmaceutical Innovations, Inc.	+	+	+	+	+	+	+
Protex disinfectant spray	Parker Laboratories	+	+	+	+	+	+	+
SurfaSafe	Laboratoires Anios	+	+	+	+	+	+	+
Surfa'Safe Premium	Laboratoires Anios	+	+	+	+	+	+	+
T-Spray	Pharmaceutical Innovations, Inc.	+		+	+	+	+	+
T-Spray II	Pharmaceutical Innovations, Inc.	+	+	+	+	+	+	+
Transeptic Spray	Parker Laboratories Inc.	+			+	+	+	+
Tristel Duo for Ultrasound	Tristel Solutions Limited	+	+	+	+	+	+	+
Wipes								
Accel INTERVention Wipes	Diversey (Sealed Air)	+		+	+	+	+	+
Accel TB Wipes	Diversey (Sealed Air)	+		+	+	+	+	+
Anios Quick Wipes	Laboratoires Anios	+	+	+	+	+	+	+
Asepti-Wipe II	Echolab	+	+	+	+	+	+	+
Bacillol 30 Tissues	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Bacillol AF Tissues	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Bactinyl Lingettes desinfectantes inodores	Laboratoire Garcin-Bactinyl	+	+	+	+	+	+	+
CaviWipes	Metrex	+	+	+	+	+	+	+
CaviWipes 1	Metrex	+	+	+	+	+	+	+
CaviWipes AF	Metrex	+	+	+	+	+	+	+
Cidalkan Wipes	Alkapharm	+	+	+	+	+	+	+
Cleanisept Wipes	Dr. Schumacher GmbH	+	+	+	+	+	+	+
Cleanisept Wipes forte	Dr. Schumacher GmbH	+	+	+	+	+	+	+
Clinell Clorox Wipes	GAMA Healthcare Ltd.	+	+	+	+	+	+	+
Clinell Universal Sanitising wipes or Clinell Universal wipes	GAMA Healthcare Ltd.	+	+	+	+	+	+	+
Clorox Healthcare Bleach Germicidal wipes	Clorox Professional Products Company	+	+	+	+	+	+	+

Probes and Biopsy

Table 9-14: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 2

Material name	Manufacturer	Probes						
		L4-12t-RS	6S-RS	L8-18t-RS	ML6-15-RS	L10-22-RS	12S-RS	L4-20t-RS
Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Wipes	Clorox Professional Products Company	+		+	+	+	+	+
Clorox Healthcare Multi-Surface Quat Alcohol Cleaner Disinfectant Wipes	Clorox Professional Products Company	+	+	+	+	+	+	+
Dispatch hospital cleaner disinfectant towels with bleach	Clorox Professional Products Company	+	+	+	+	+	+	+
General purpose disinfectant wipes	Total Solutions	+	+	+	+	+	+	+
Intercept Wipes	Medivators	+	+	+	+	+	+	+
Matrix Wipes	Whiteley Medical	+	+	+	+	+	+	+
Mikrobac tissues	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Mikrozid sensitive wipes	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Mikrozid universal liquid and Mikrozid universal wipes	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Optim 33TB Wipes	SciCan	+		+	+	+	+	+
Oxivir Tb Wipes	Diversey (Sealed Air)	+		+	+	+	+	+
PCS 1000 Oxidizing Disinfectant/Disinfectant Cleaner Wipes	Process Cleaning Solutions Ltd.	+	+	+	+	+	+	+
Protex disinfectant wipes	Parker Laboratories	+	+	+	+	+	+	+
Protex ULTRA Disinfectant Wipes	Parker Laboratories	+	+	+	+	+	+	+
Reynard Neutral Detergent Wipes	Reynard Health Supplies	+	+	+	+	+	+	+
Reynard Premier Detergent Wipes	Reynard Health Supplies	+	+	+	+	+	+	+
Sani-Cloth Active	PDI	+	+	+	+	+	+	+
Sani-Cloth AF Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Sani-Cloth AF3 Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Sani-Cloth Bleach Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Sani-Cloth HB Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+

Table 9-14: Chemicals Compatible with Non-TEE probes (Liquid/Spray and Wipes), part 2

Material name	Manufacturer	Probes						
		L4-12t-RS	6S-RS	L8-18t-RS	ML6-15-RS	L10-22-RS	12S-RS	L4-20t-RS
Sani-Cloth Plus Germicidal Disposable Cloth	PDI	+	+	+	+	+	+	+
Sani-Cloth Prime Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Septiwipes	Dr. Schumacher GmbH	+	+	+	+	+	+	+
Shodokku Super wipes	Hakujuji	+	+	+	+	+	+	+
Sofuraito disinfecting wipes	Asahi Kasei Chemicals Corporation	+	+	+	+	+	+	+
SONO Ultrasound Wipes	Advanced Ultrasound Solutions Inc.	+	+	+	+	+	+	+
Sukitto-Cloth wipes	Osaki Medical Corporation	+	+	+	+	+	+	+
Sukitto-Cloth wipes refill	Osaki Medical Corporation	+	+	+	+	+	+	+
Super Sani-Cloth Germicidal Disposable Wipe	PDI	+	+	+	+	+	+	+
Tristel Pre-Clean Wipes	Tristel Solutions Limited	+	+	+	+	+	+	+
Tristel Rinse Wipes	Tristel Solutions Limited	+	+	+	+	+	+	+
Tristel Sporicidal Wipe - Activated Wipe	Tristel Solutions Limited	+	+	+	+	+	+	+
Tristel Trio Wipes System	Tristel Solutions Limited	+	+	+	+	+	+	+
Trophon Companion Cleaning Wipes	Nanosonics Limited	+	+	+	+	+	+	+
Trophon Companion Drying Wipes	Nanosonics Limited	+	+	+	+	+	+	+
Tuffle 5	Vernacare Ltd.	+	+	+	+	+	+	+
V Wipes	Whiteley Medical	+	+	+	+	+	+	+
Wet Wipe Chlorine Disinfection	Wet Wipe A/S	+	+	+	+	+	+	+
Wet Wipe PHMB Disinfection	Wet Wipe A/S	+	+	+	+	+	+	+
Wet Wipe Triamin Disinfection	Wet Wipe A/S	+	+	+	+	+	+	+
Wet Wipe Universal	Wet Wipe A/S	+	+	+	+	+	+	+
Wip'Anios Excel	Laboratoires Anios	+	+	+	+	+	+	+
Wip'Anios Premium	Laboratoires Anios	+	+	+	+	+	+	+


WARNING

The chemicals listed below are compatible with Venue Go probes and will not cause degradation, but have not been proven to effectively clean or disinfect the probes. If you are interested in using an alternate chemical from the compatibility tables, please contact your GE representative. Alternate chemicals require validation by GE prior to use to ensure efficacy.

Table 9-15: Chemicals Compatible with Non-TEE probes (Liquids, Powder), part 1

Material name	Manufacturer	Probes						
		3SC-RS	M5Sc-RS	12L-RS	E8C-RS	9L-RS	C1-5-RS	8C-RS
Liquid								
Aidal Plus (Only HLD, not sterilization)	Whiteley Medical	+	+	+	+	+	+	+
Anioxy-Twin	Laboratoires Anios			+	+	+	+	+
Anioxyde 1000	Laboratoires Anios			+	+	+	+	+
Bacillocid rasant	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Cidex	Advanced Sterilization Products	+	+	+	+	+	+	+
Cidex OPA	Advanced Sterilization Products	+	+	+	+	+	+	+
Cidex Plus	Advanced Sterilization Products	+	+	+	+	+	+	+
Gigasept FF neu	Schulke & Mayr GmbH	+	+	+	+	+	+	+
Gigasept PAA Concentrate	Schulke & Mayr GmbH			+	+	+	+	+
McKesson OPA 28	McKeeson	+	+	+	+	+	+	+
Metricide 14	Metrex	+	+	+	+	+	+	+
Metricide 28	Metrex	+	+	+	+	+	+	+
Merticide Plus 30	Metrex	+	+	+	+	+	+	+
Metricide OPA Plus	Metrex	+	+	+	+	+	+	+
Opal	Whiteley Medical	+	+	+	+	+	+	+
Opaster'Anios	Laboratoires Anios	+	+	+	+	+	+	+
Rapicide High-Level Disinfectant and Sterilant (glutaraldehyde, use as HLD only)	Medivators Inc.	+	+	+	+	+	+	+
Rapicide OPA 28	Medivators Inc.	+	+	+	+	+	+	+

Table 9-15: Chemicals Compatible with Non-TEE probes (Liquids, Powder), part 1

Material name	Manufacturer	Probes						
		8C-RS	C1-5-RS	9L-RS	E8C-RS	12L-RS	M5Sc-RS	3Sc-RS
Revital-Ox Resert High Level Disinfectant	STERIS Corporation				+	+	+	+
Steranios 2% (use as HLD only)	Laboratoires Anios	+	+	+	+	+	+	+
Wavicide-01	Medical Chemical Corporation	+	+	+	+	+	+	+
Powder								
Gigasept Pearls	Schulke & Mayr GmbH			+	+	+	+	+
Rely+On PeraSafe	The Chemours Company			+	+	+	+	+
Sekusept Aktiv	Ecolab			+	+	+	+	+
Sekusept Easy	Ecolab			+	+	+	+	+

Table 9-16: Chemicals Compatible with Non-TEE probes (Liquids, Powder), part 2

Material name	Manufacturer	Probes						
		L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	L8-18t-RS	6S-RS	L4-12t-RS
Liquid								
Aidal Plus (Only HLD, not sterilization)	Whiteley Medical	+	+	+	+	+	+	+
Anioxy-Twin	Laboratoires Anios	+		+	+	+	+	+
Anioxyde 1000	Laboratoires Anios	+		+	+	+	+	+
Bacillocid rasant	BODE Chemie GmbH (HARTMANN)	+	+	+	+	+	+	+
Cidex	Advanced Sterilization Products	+	+	+	+	+	+	+
Cidex OPA	Advanced Sterilization Products	+	+	+	+	+	+	+
Cidex Plus	Advanced Sterilization Products	+	+	+	+	+	+	+
Gigasept FF neu	Schulke & Mayr GmbH	+		+	+	+	+	+
Gigasept PAA Concentrate	Schulke & Mayr GmbH	+		+	+	+	+	+
McKesson OPA 28	McKeeson	+	+	+	+	+	+	+
Metricide 14	Metrex	+	+	+	+	+	+	+

Probes and Biopsy

Table 9-16: Chemicals Compatible with Non-TEE probes (Liquids, Powder), part 2

Material name	Manufacturer	Probes						
		L4-20t-RS	12S-RS	12S-RS	L10-22-RS	ML6-15-RS	L8-18i-RS	6S-RS
Metricide 28	Metrex	+	+	+	+	+	+	+
Merticide Plus 30	Metrex	+	+	+	+	+	+	+
Metricide OPA Plus	Metrex	+		+	+	+	+	+
Opal	Whiteley Medical	+	+	+	+	+	+	+
Opaster'Anios	Laboratoires Anios	+	+	+	+	+	+	+
Rapicide High-Level Disinfectant and Sterilant (glutaraldehyde, use as HLD only)	Medivators Inc.	+	+	+	+	+	+	+
Rapicide OPA 28	Medivators Inc.	+	+	+	+	+	+	+
Revital-Ox Resert High Level Disinfectant	STERIS Corporation	+		+	+	+	+	+
Steranios 2% (use as HLD only)	Laboratoires Anios	+	+	+	+	+	+	+
Wavicide-01	Medical Chemical Corporation	+	+	+	+	+	+	+
Powder								
Gigasept Pearls	Schulke & Mayr GmbH	+		+	+	+	+	+
Rely+On PeraSafe	The Chemours Company	+		+	+	+	+	+
Sekusept Aktiv	Ecolab	+		+	+	+	+	+
Sekusept Easy	Ecolab	+		+	+	+	+	+

Table 9-17: Gels Compatible with Non-TEE probes, part 1

Material name	Manufacturer	Probes						
		8C-RS	3Sc-RS	M5Sc-RS	12L-RS	E8C-RS	9L-RS	C1-5-RS
Aquasonic 100	Parker Laboratories Inc.	+	+	+	+	+	+	+
Clear image	Sonotech Inc.	+	+	+	+	+	+	+
Haiyin	Wuxi Huasheng Medical Appliance			+	+	+	+	+
Kendall Life Trace Ultrasound Gel	Covidien/Medtronic	+	+	+	+	+	+	+
Scan	Parker Laboratories Inc.	+	+	+	+	+	+	+

Table 9-17: Gels Compatible with Non-TEE probes, part 1

Material name	Manufacturer	Probes						
		8C-RS	C1-5-RS	9L-RS	E8C-RS	12L-RS	M5Sc-RS	3Sc-RS
Sonogel	Sonogel Vertriebs GmbH	+	+	+	+	+	+	+
Wavelength Multi-Purpose Ultrasound Gel	National Therapy Products Inc.	+	+	+	+	+	+	+

Table 9-18: Gels Compatible with Non-TEE probes, part 2

Material name	Manufacturer	Probes						
		L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	L8-18i-RS	6S-RS	L4-12t-RS
Aquasonic 100	Parker Laboratories Inc.	+	+	+	+	+	+	+
Clear image	Sonotech Inc.	+	+	+	+	+	+	+
Haiyin	Wuxi Huasheng Medical Appliance	+	+	+	+	+	+	+
Kendall Life Trace Ultrasound Gel	Covidien/Medtronic	+	+	+	+	+	+	+
Scan	Parker Laboratories Inc.	+	+	+	+	+	+	+
Sonogel	Sonogel Vertriebs GmbH	+	+	+	+	+	+	+
Wavelength Multi-Purpose Ultrasound Gel	National Therapy Products Inc.	+	+	+	+	+	+	+

The table below lists the chemicals that were tested for compatibility with the probes.



The chemicals listed below are compatible with Venue Go probes and will not cause degradation, but have not been proven to effectively clean or disinfect the probes. If you are interested in using an alternate chemical from the compatibility tables, please contact your GE representative. Alternate chemicals require validation by GE prior to use to ensure efficacy.

Table 9-19: Automated Disinfectants Compatible with non-TEE probes

Chemical name	Manufacturer	Probes													
		L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	L8-18i-RS	6S-RS	L4-12t-RS	9L-RS	C1-5-RS	8C-RS	E8C-RS	12L-RS	M5Sc-RS	3Sc-RS
trophon EPR	Nanosonics Limited	+	+	+	+	+	+	+	+	+	+	+	+	+	+
trophon2	Nanosonics Limited	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Covering the Transducer using a Sterile, Protective Sheath



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-cavitory and intra-operative procedures.

1. Place an appropriate amount of gel inside the protective sheath and/or on the transducer face.

NOTE: Failure to use imaging gel may result in poor image quality.

2. Insert transducer into sheath, making sure to use proper sterile technique. Pull cover tightly over transducer face to remove wrinkles and air bubbles, taking care to avoid puncturing the sheath.



1. Secure the Sheath with a rubber band.
2. The probe sheath should extend past the end of the probe to the probe's cable.

Figure 9-15. Applying the Sheath

NOTE: No gel was applied to the probe in this photo.

3. Secure the sheath in place.

NOTE: *Failure to use a sheath that fully covers the transducer to the cable strain relief may lead to cross-contamination of the transducer.*

4. Inspect the sheath to ensure there are no holes or tears. If the sheath becomes compromised, stop the procedure and replace immediately.

Coupling 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 is performed.



Do not apply gel to the eyes. If there is gel contact to the eye, flush eye thoroughly with water.



Only use GE-recommended gels. Use of unapproved gels may result in damage to the probe and void the warranty.

Refer to the Probe Care Card enclosed in the probe case or to the Internet link below for the latest list of compatible coupling gels, cleaners and disinfectants:

[https://www.gehealthcare.com/products/ultrasound/
ultrasound-transducers](https://www.gehealthcare.com/products/ultrasound/ultrasound-transducers)

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

Intra-operative 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.

Planned Maintenance

The following maintenance schedule is suggested for the system and probes to ensure optimum operation and safety.

Table 9-20: 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 Basic User Manual.

This ensures that employees in the transportation industry as well as the people who receive the package are protected from any risk.

Probe Safety

Handling precautions



WARNING

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.

Abnormal Use

The use of the equipment outside the described conditions or intended use, and disregarding safety related information is considered abnormal use. The manufacturer is not liable for injury or damage caused by abnormal use. Any abnormal use will void the warranty of the equipment.

Abnormal use includes usage that a probe is not intended for. Probe-specific intended uses and contraindications are detailed above ('Supported probes' on page 9-3).

Be sure to use the appropriate probes and presets for a given application: Indications for use, applications, interventional guidance types and presets, are dependent on probe type ('Probe Discussion' on page 9-52).

Electrical shock hazard



Electrical
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 (Figure 9-8). Never immerse the probe connector or probe adapters 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 intercavitory 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.

6Tc-RS Probe Thermal Safety

Maintaining a safe thermal environment for the patient has been a design priority at GE. It is generally agreed that in order to avoid damage to body tissues, for long term exposures, tissue contact probe tip temperatures should be less than 42-43° C. The ultrasound scanner incorporates an elaborate thermal safety system which informs the physician of the operating temperature of the probe, and prevents the operative temperature from exceeding given limits. Whenever the 6Tc-RS probe is plugged into the system and selected, the probe tip temperature is displayed on the system monitor.

If the temperature sensor is not working properly when you plug the probe into the system, the probe is rejected and scanning is not possible.

If the probe temperature is over 43° C (including probe temperature measurement error), the system shuts down probe transmission.

High temperature protection levels

Probe temperature is always displayed on the system monitor.

- When the temperature of the probe tip reaches 41.0° C, the temperature display turns red and the system enters **Freeze** mode. A prompt appears. Select **OK** to continue scanning or **Cancel** to remain in **Freeze** mode.

Tap **OK**. The temperature display turns white and the system resumes scanning.

- When the temperature reaches 42.7° C, the system freezes unconditionally, and the temperature display turns red.
- When the temperature has decreased by 0.5° C below the limit (42.7° C), the same prompt appears. Select **OK** to continue scanning or **Cancel** to stop.

Tap **OK**. The system reloads the probe and resumes scanning.



WARNING

Only operators specifically qualified for Transesophageal probes are allowed to operate the 6Tc-RS probe.



CAUTION

Probes for Transesophageal applications require special handling. Transesophageal examinations and probe insertions should be performed only by personnel with adequate training. Refer to the user documentation enclosed with these probes.

After the probe has been selected, the scan plane positioning system automatically calibrates. This calibration cycle lasts 10 to 15 seconds. After the calibration is complete, the probe temperature sensor is activated, and the probe temperature is displayed.



Figure 9-16. 6Tc-RS probe temperature display

In case probe initialization fails (no response from the scan plane button after initialization), re-select the probe to repeat the initialization routine.

Biological hazards



CAUTION

Transesophageal, endocavity and intraoperative probes require special handling. Refer to the user documentation enclosed with these probes.



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-cavitory and intra-operative procedures.



CAUTION

According to local regulations, the use of a sterile sheath is mandatory when performing intra-cavity procedures in China.

To reorder sheaths, please contact your local distributor or the appropriate support resource.

Adequate cleaning and disinfection are essential to prevent disease transmission. It is the responsibility of the user to verify

that the reprocessing instructions provided in this manual are followed.



c CAUTION

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.

Endocavitory Probe Handling Precautions



c CAUTION

Sterile/sanitary sheaths are to be used on the probe during its actual use with patients. Wearing gloves protects the patient and operator.



c CAUTION

If there is disinfectant leaking from the probe, DO NOT use the probe until it has been inspected and released for further use by a GE service representative.



c CAUTION

Disinfectant Exposure to Patient: contact with a disinfectant to the patient's skin or mucous membrane may cause an inflammation. If this happens, refer to the disinfectant's instruction manual.

Disinfectant Exposure from Probe Handle to Patient: DO NOT allow the disinfectant 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 disinfectant comes into contact with the patient, refer to the disinfectant's instruction manual.

Disinfectant Exposure from Probe Connector to Patient: DO NOT allow the disinfectant to contact the patient. Only immerse the probe to its specified level. Ensure that no solution has entered the probe's connector before scanning the patient. If disinfectant comes into contact with the patient, refer to the disinfectant's instruction manual.

Probe Discussion

Introduction

The Venue Go supports the following types of probes:

- **Curved Array (Convex).** Curved Array (Convex) probes, including 'micro' convex, are usually designated by the prefix/suffix "C"; the endocavitory probe is designated by the prefix/suffix "E".
- **Linear Array.** Linear Array probes are designated by the prefix/suffix "L".
- **Phased Array Sector.** Phased Array Sector probes are designated by the prefix/suffix "S".



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.

Table 9-21: Probes and Applications

Applications	Probes											
	M5SC-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS						
Ophthalmic	+	+	+	+	+					+		+
Fetal/Obstetrics	+				+	+				+		+
Abdominal, including GYN, Urology and prostate	+	+	+	+	+	+	+	+	+			+
Pediatric/Neonatal	+	+	+	+	+	+	+	+	+	+	+	+
Small Organs, including breast, testes and thyroid and Small Parts	+	+	+	+						+		+
Neonatal Cephalic	+	+	+	+			+	+	+		+	+
Adult Cephalic					+			+				+
9L-RS												
12L-RS												
L4-12t-RS												
L8-18I-RS												
L4-12t-RS												
L4-12t-RS												

Table 9-21: Probes and Applications

Applications	Probes									
	M5SC-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS	8C-RS	6Tc-RS	3Sc-RS	C1-5-RS
Pediatric Cardiac	+									
Adult Cardiac	+	+	+							
Vascular/Peripheral Vascular	+	+	+	+					+	
Musculoskeletal Conventional	+	+	+	+	+				+	
Musculoskeletal Superficial	+	+	+	+	+				+	
Thoracic/Pleural, Including detection of fluid and pleural motion/sliding	+	+	+	+	+	+	+	+	+	
Transesophageal							+			
Transrectal									+	
Transvaginal									+	
Intraoperative (vascular)					+					
Interventional guidance										
Vascular Access	+	+	+	+					+	+
Non-vascular access	+	+	+	+	+	+	+	+	+	+
Tissue biopsy	+	+	+	+	+	+	+	+	+	+
Fluid drainage	+	+	+	+	+	+	+	+	+	+

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes										
Abdomen			3Sc-RS	6S-RS	8C-RS	6Tc-RS	3Sc-RS	6S-RS	C1-5-RS	L8-18i-RS	L4-12t-RS	12L-RS	9L-RS
	Abdomen	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+				+	+					
	Renal	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+				+	+					

Probes and Biopsy

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes																
			M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS	8C-RS	6Tc-RS	3Sc-RS	6S-RS	C1-5-RS	12L-RS	L4-12t-RS	L8-18i-RS	9L-RS		
	Aorta	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+														+		
	Bladder	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+	+	+	+	+	+				+					+	+	
	Ped Abd	Pediatric Interventional guidance ¹	+	+	+	+	+	+	+	+	+	+					+	+	
Artery																			
	Vasc Access	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+											+	+	+
	Upper	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+											+	+	+
	Lower	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+											+	+	+
	Carotid	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+											+		+
	TCD	Adult Cephalic							+			+							+
Cardiac																			
	Cardiac	Cardiac (Adult)							+										+
	Cardiac_E	Cardiac (Adult)							+										
	Pediatric	Cardiac (Pediatric)							+	+	+								+
	Neonatal	Cardiac (Pediatric/Neonatal)							+										+
	TEE	Transesophageal (TEE)								+									
MSK																			
	MSK/Sup	Musculoskeletal Conventional & Superficial Interventional guidance ¹									+								
	MSK/Avg	Musculoskeletal Conventional & Superficial Interventional guidance ¹									+								

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes													
			M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS	8C-RS	6Tc-RS	6S-RS	3Sc-RS	C1-5-RS	L8-18i-RS	12L-RS	L4-12t-RS
	MSK/Deep	Musculoskeletal Conventional & Superficial Interventional guidance ¹							+							
	Shoulder	Musculoskeletal Conventional & Superficial Interventional guidance ¹	+	+	+		+							+		+
	Knee	Musculoskeletal Conventional & Superficial Interventional guidance ¹	+	+	+									+		+
	Hip	Musculoskeletal Conventional & Superficial Interventional guidance ¹	+	+	+		+							+		+
	Elbow	Musculoskeletal Conventional & Superficial Interventional guidance ¹		+	+									+		+
	Wrist/Hand	Musculoskeletal Conventional & Superficial Interventional guidance ¹		+	+	+								+	+	+
	Ankle/Foot	Musculoskeletal Conventional & Superficial Interventional guidance ¹		+	+	+								+	+	+
	Plantar	Musculoskeletal Conventional & Superficial Interventional guidance ¹		+	+									+		+
Neonatal																
	Neo Abd	Pediatrics / Neonatal Interventional guidance ¹	+	+	+	+			+		+		+		+	+
	Neo Head	Neonatal Cephalic Interventional guidance ¹	+	+	+	+			+		+		+		+	+
	Neo Hip	Pediatrics / Neonatal Interventional guidance ¹	+	+	+	+					+		+		+	+
	Neo Lung	Pediatrics / Neonatal Interventional guidance ¹	+	+	+	+					+		+	+	+	+
	Neo Cardiac	Pediatrics / Neonatal Interventional guidance ¹														+

Probes and Biopsy

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes													
			M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS	8C-RS	6Tc-RS	6S-RS	3Sc-RS	C1-5-RS	L8-18i-RS	12L-RS	L4-12t-RS
Nerve																
	Nerve/Sup	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>			+				+			+				
	Nerve/Avg	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>			+				+			+				
	Nerve/Deep	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>							+							
	Interscalene/ BP	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>	+	+	+							+				+
	Popliteal/ Sciatic	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>	+	+	+							+				+
	Adductor	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>	+	+	+		+					+				+
	TAP	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>	+	+	+		+					+				+
	QL	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>	+	+	+		+					+				+
	Femoral	Interventional guidance ¹ <i>Note: Vascular access is not supported on 8C-RS.</i>	+	+	+							+				+
	Spine	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+				+									
OB/GYN																
	Gyn	Abdominal (including Gynecology and Urology) Interventional guidance ¹					+	+			+					+

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes												
			M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	8C-RS	6Tc-RS	6S-RS	3Sc-RS	C1-5-RS	L8-18i-RS	12L-RS	9L-RS
	OB1	Fetal/Obstetrics Interventional guidance ¹	+												+
	OB2/3	Fetal/Obstetrics Interventional guidance ¹	+												+
	Gyn	Transvaginal Interventional guidance ¹													+
	OB1	Transvaginal Interventional guidance ¹													+
	OB2/3	Transvaginal Interventional guidance ¹													+
Small parts*															
	Ophthalmic	Ophthalmic	+	+	+	+	+	+						+	+
	Intracavity	Transrectal, Transvaginal Interventional guidance ¹												+	
	Testicular	Small organs (including breast, testes, thyroid) Interventional guidance ¹	+	+	+	+								+	+
	Thyroid	Small organs (including breast, testes, thyroid) Interventional guidance ¹	+	+	+	+								+	+
	Breast	Small organs (including breast, testes, thyroid) Interventional guidance ¹	+	+	+	+								+	+
Vein															
	Vasc Access	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+								+	+
	Upper	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+								+	+
	Lower	Vascular/Peripheral vascular, Interventional guidance ¹	+	+	+	+								+	+
Rheuma															

Probes and Biopsy

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes										M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS		
			9L-RS	12L-RS	L4-12t-RS	L8-18i-RS	C1-5-RS	3Sc-RS	6S-RS	6Tc-RS	8C-RS	ML6-15-RS	L10-22-RS	E8C-RS	M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS
	Sup	Musculoskeletal Conventional & Superficial Interventional guidance ¹	+	+	+	+						+	+					
	Avg	Musculoskeletal Conventional & Superficial Interventional guidance ¹	+	+	+	+	+						+	+				
	Deep	Musculoskeletal Conventional & Superficial Interventional guidance ¹	+	+	+		+						+					+
Derma																		
	Sup	Musculoskeletal Superficial Interventional guidance ¹						+							+	+		+
	Avg	Musculoskeletal Superficial Interventional guidance ¹						+							+	+		+
	Deep	Musculoskeletal Superficial Interventional guidance ¹												+				+
Shock																		
	Cardiac	Cardiac (Adult & Pediatric) Interventional guidance ¹	+	+	+			+	+	+				+				+
	Cardiac_E	Cardiac (Adult) Interventional guidance ¹							+									
	Abdomen	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+	+	+			+	+	+				+				+
	Lung	Thoracic/Pleural Interventional guidance ¹	+	+	+			+	+	+				+				+
	Vein	Vascular/Peripheral Vascular Interventional guidance ¹	+	+	+			+	+	+				+				+
Lung																		
	Lung	Thoracic/Pleural Interventional guidance ¹	+	+	+	+	+	+	+	+				+				+
	Cons/Eff	Thoracic/Pleural Interventional guidance ¹	+	+	+	+	+	+	+	+				+				+

Table 9-22: Probes, Presets, and Applications

Group	Preset	Applications	Probes														
			M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS	8C-RS	6Tc-RS	6S-RS	3Sc-RS	C1-5-RS	L8-18i-RS	L4-12t-RS	12L-RS	9L-RS
	Ped lung	Pediatrics/Neonatal Interventional guidance ¹	+				+		+		+						
	Neo lung	Pediatrics/Neonatal Interventional guidance ¹	+	+	+	+		+	+		+						
eFAST																	
	Abdomen	Abdominal (including Gynecology and Urology) Interventional guidance ¹	+	+	+			+	+								
	Cardiac	Cardiac (Adult & Pediatric) Interventional guidance ¹	+	+	+			+	+	+		+					
	Cardiac_E	Cardiac (Adult & Pediatric) Interventional guidance ¹							+								
	Lung	Thoracic/Pleural Interventional guidance ¹	+	+	+			+	+	+		+					

* For Ophthalmic presets, use only MM, CMM and PW modes.

¹ For details about interventional guidance types see Table 9-21.

Table 9-23: Probe features and operation modes

Modes of operation/ Features	Probes											
	M5Sc-RS	L4-20t-RS	12S-RS	L10-22-RS	ML6-15-RS	E8C-RS	8C-RS	6Tc-RS	6S-RS	3Sc-RS	C1-5-RS	L8-18i-RS
B Mode (2D imaging)	+	+	+	+	+	+	+	+	+	+	+	+
M Mode	+	+	+	+	+	+	+	+	+	+	+	+
PW (Pulse wave Doppler)	+	+	+	+	+	+	+	+	+	+	+	+
CW (Continuous Wave Doppler)	+	+	+									+
Color Doppler	+	+	+	+	+	+	+	+	+	+	+	+
Color M-Mode	+	+	+	+	+	+				+	+	+
PDI (Power Doppler)	+	+	+	+	+	+	+	+	+	+	+	+

Probes and Biopsy

Table 9-23: Probe features and operation modes

Modes of operation/ Features	Probes															
	M5Sc-RS	6Tc-RS	E8C-RS	8C-RS	L8-18i-RS	L4-12t-RS	L4-20t-RS	L10-22-RS	ML6-15-RS	12L-RS	C1-5-RS	9L-RS	12S-RS	6S-RS	3Sc-RS	
Combined Modes 1*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Combined Modes 2*	+	+	+											+	+	
Coded Harmonic Imaging	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Coded Pulse	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Features																
AMM	+	+	+												+	+
PDI+											+	+				
TDI	+	+	+												+	+
Virtual Apex	+	+	+												+	+
Virtual Convex					+		+	+	+	+	+	+				
Auto IVC	+				+											+
Auto VTI	+															+
Auto B-lines	+			+	+	+				+	+	+			+	+
Real-Time EF	+	+														+
Lung sweep						+	+	+	+	+	+	+				
Cnerve						+		+	+	+	+	+				
Follow-up	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Bilateral						+	+	+	+	+	+	+				
Scribble	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Biopsy	+				+	+	+				+	+			+	+
Needle						+	+	+	+	+	+	+				
Venue View						+		+	+	+	+	+				
ECG	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Combined Modes 1*: B/M, B/Color M, B/PWD, B/Color/PWD, B/Power/PWD

Combined Modes 2*: B/M, B/Color M, B/PWD or CWD, B/Color/PWD or CWD, B/Power/PWD

Application list configuration

The Application list for each connected probe can be configured to best suit the user's requirements.

The *Application* list is configured from the *Probe selection* screen on the Touch panel.

1. Tap **Home**.
The *Probe selection* screen is displayed.
2. Tap **Preset config** for the probe with the application list to configure.
3. Tap an application preset to adjust. The *Preset config* menu is displayed (Figure 9-17).

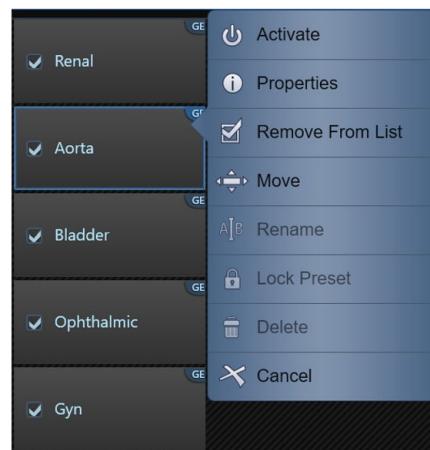


Figure 9-17. Preset config menu

4. The following can be done:
 - Rename the selected preset
 - Delete the selected preset ('Deleting an application preset' on page 8-5).
 - Move the selected preset up/down in the *Application* menu
 - Remove/add the selected preset from/to the *Application* menu.

Biopsy Discussion

Introduction

Indications for use/intended use

The different needle guidance systems described in this chapter, also named Biopsy brackets, are intended for directing instruments such as catheters, electrodes and needles into a targeted anatomical location of a patient relative to the imaging instrument for percutaneous procedures.

The brackets and disposable guides provide physicians with a tools for performing needle-guided (or catheter) procedures with the use of diagnostic ultrasound transducers.



Prior to use, healthcare workers should be trained in ultrasonography.

User qualification for biopsy

Biopsies must only be performed by physicians with adequate experience. Under all circumstances the necessary safety precautions and sterility measures must be respected.

Use of a protective cover

Protective cover or sheath is placed over the probe during a needle-guided procedure.

The cover allows use of the probe in scanning and needle guided procedures, for body surface, endocavity, and intraoperative diagnostic ultrasound, while helping to prevent transfer of microorganisms, body fluids, and particulate material to the patient and healthcare worker during reuse of the transducer (both sterile and non-sterile covers). The cover also provides a means for maintenance of a sterile field (sterile covers only).

NOTE: CIVCO Poly Ultrasound Transducer Covers are furnished sterile and non-sterile; single use patient / procedure, disposable.

Ultra-Pro II™ In-Plane Ultrasound Needle Guides - Multi-Angle

CIVCO's Ultra-Pro II™ In-Plane Needle Guidance System utilizes a two-part system consisting of custom reusable bracket and the disposable snap-on needle guide called Ultra-Pro II. Multi-angle brackets offer different angles for needle placement. The Ultra-Pro II guide features a large tab for enabling quick-release function, allowing easy detachment of the needle from the transducer. Easy-to-read gauge size on the inserts make it simple to identify and alter gauge size during usage. The guide features a large funnel for instrument insertion capabilities for shallow and deep access during procedures such as tissue biopsy, fluid aspiration and catheter placement. The bracket will accept a range of sizes including: 8.5FR, 14-23GA (19 GA not available). Brackets should be cleaned and disinfected according to your CIVCO User's Guide. Accurate needle path with on-screen guidelines offer physicians real-time visualization of the needle path. Easy-to-use "quick-release" feature for detachment of guide provides physician flexibility during puncture procedures.

- For probe C1-5-RS use Civco p/n H40432LE / 742-357. This is a non-sterile multi-angle bracket. Center line crossing depth: 4.0, 6.0 and 8.5cm, with Ultra-Pro II™ needle guide.
- For probes 12L-RS and L4-12t-RS, use Civco p/n H40432LC. This is a non-sterile multi-angle bracket. Center line crossing depth: 1.5, 2.5 and 3.5 cm, with Ultra-Pro II™ needle guide.
- For probe 3Sc-RS use Civco p/n H46222LC In-Plane Ultrasound needle guide. This is a non-sterile multi-angle bracket. Center line crossing depth: 4.2, 5.7 and 8.2 cm, with Ultra-Pro II™ needle guide.
- For probe M5Sc-RS use Civco p/n H45561FC In-Plane Ultrasound needle guide. This is a non-sterile multi-angle bracket. Center line crossing depth: 4.0, 5.5 and 8.0 cm, with Ultra-Pro II™ needle guide.

“Infinity Plus™” type Biopsy bracket

CIVCO's Infinity Plus™ Needle Guidance System utilizes a two-part system consisting of custom reusable bracket and the disposable snap-on needle guide. The Infiniti Plus needle guide allows needles to be positioned in the scan plane. The

open-channel design of the single-use guide offers multiple angle capabilities for shallow and deep access during procedures such as tissue biopsy, fluid aspiration and catheter placement. The needle guides accept 12-, 14-, 16-, 18-, 20-, 21/22- and 25-gauge instruments. Sterile procedure kits include: Infiniti Plus needle guide (small- or large-gauge configuration), transducer cover, gel packet and colored elastic bands. Brackets should be cleaned and disinfected according to your CIVCO User's Guide.

"Infinity™" type biopsy brackets are supplied by Civco Co. for the following probes:

Probe 12L-RS and L4-12t-RS use Civco p/n H48392LT / 742-429T.

Probe 9L-RS uses Civco p/n H45281BL / 742-416.

"AccuSITE™" type Out-of-Plane Biopsy bracket

CIVCO's AccuSITE Needle Guidance System utilizes a two-part system consisting of custom reusable bracket and the disposable snap-on needle guide called AccuSITE. The AccuSITE needle guide is placed on the side of the probe allowing out-of-plane (OOP) access. AccuSITE allows shallow access and improves first-time success rates in procedures such as central line placement. AccuSITE features a large colored tab for simple quick-release function, allowing easy detachment of the needle from the transducer. Easy-to-read, color-coded gauge sizes and depths make it simple to identify the proper depth. The guide features a large funnel for instrument insertion and accepts 18, 20 and 21/22 gauge sizes. Each gauge size offers depth range including: .5cm, 1cm, 1.5cm, 2cm, 2.5cm, 3cm, 3.5cm. Brackets should be cleaned and disinfected according to your CIVCO User's Guide.

AccuSITE™ Needle guidance system By Civco Co. is an out-of-plane biopsy bracket, available for the 12L-RS probe.

Use Part-Number H48392LL for: Civco product: AccuSITE Starter kit – GE-12L-RS.

Instructions for Use (IFU) for using the bracket is to be found within the biopsy kit.

Verza™ Ultrasound Needle Guidance - multi-angle, in-plane

CIVCO's Verza™ needle guidance system utilizes a two-part system consisting of custom reusable bracket and a disposable

snap-on needle guide. Multi-angle brackets offer five different angles for needle placement.

Verza features easy-to-read gauge sizes, angle indicator and repeatable quick-release for secure instrument detachment. Accurate needle path with on-screen guidelines offer physicians real-time visualization of the needle path.

Verza is sold in a convenient sterile procedure kit with telescopically-folded CIV-Flex cover, gel packet and colored elastic bands. Verza accepts a full range of interventional devices including: 12F, 10F, 9F, 8F, 7F, 14G, 15G, 16G, 17G, 18G, 20G, 21G, 22G and 25G.

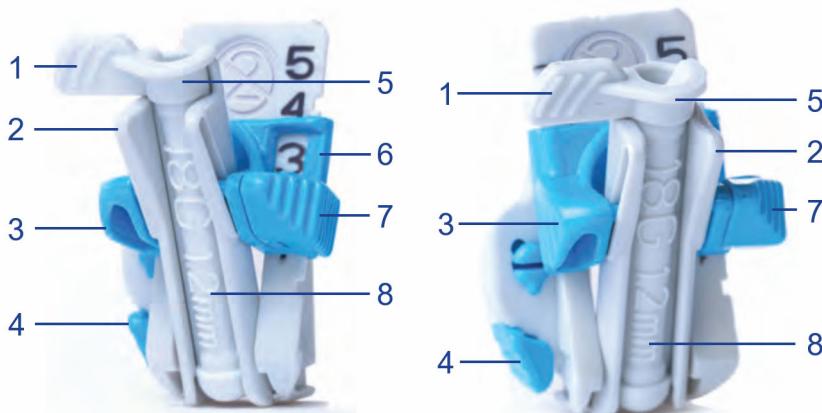
The Verza guidance system is intended for use with pediatric and adult patients.

Use Part-Number **H45201BLF** for CIVCO's VerzaTM needle guidance system **p/n 642-507** User Guide for using the bracket is to be found within the biopsy kit.



CIVCO's VerzaTM needle guidance system should be ONLY be used, handled, cleaned and disinfected, as described in the CIVCO Verza User's Guide describing its use with probe L4-20t-RS.

Below is an illustration of the Verza snap-on needle guide wth its main features.



- | | |
|------------------------|---------------------------|
| 1. Quick-Release Tab | 5. Insert Funnel |
| 2. Guide Body Chute | 6. Angle Indicator Window |
| 3. Angle selector Grip | 7. Angle selector Lock |
| 4. Guide Locking Lever | 8. Gauge Insert |

Figure 9-18. Verza snap-on needle guide

GE Reusable Biopsy Kit for E8C-RS probe



CAUTION

The disposable and reusable biopsy kits listed below are available for the E8C-RS probe:

- Tap **Disposable** to bring up guidelines for disposable biopsy guides.
- Tap **Reusable** to bring up guidelines for reusable biopsy guides.

A stainless-Steel reusable biopsy kit for the E8C-RS directs instruments according to on-screen guidelines. See the kits instructions for use for details and reprocessing guidelines.

Reusable biopsy kit for the E8C-RS item number H40412LN.

Protek Disposable Biopsy kit

Directs instruments according to on-screen biopsy guidelines. Each kit contains a disposable needle guide, 3.5 cm x 20 cm latex probe cover, sterile gel and bands. Each box contains 24 sterile procedure kits for ultrasound guided biopsy.

For the E8C-RS Probe use PROTEK p/n E8333JB.

CIVCO Disposable Endocavity Needle Guide

Directs instruments according to on-screen biopsy guidelines. Each kit contains a sterile endocavity needle guide with a 3.5 cm x 20 cm latex cover and accepts 16-18GA instruments.

For the E8C-RS Probe use CIVCO p/n E8385MJ.

Probe biopsy reprocessing

Manual cleaning

NOTE: *Efficacy of this manual cleaning process has been shown using ENZOL® Enzymatic Detergent.*

1. Remove the biopsy guide and protective sheath(s) from the probe.
2. Whenever possible, the biopsy guide should be rinsed immediately after use. If the biopsy guide cannot be cleaned immediately after use, maintain moisture by placing them in a clean container. Cover the container with a towel dampened with purified water. Devices may remain in this condition for a maximum of 4 hours.
3. Remove all visible soil. Flush the biopsy guide using potable water (30 - 40 °C) for not less than 2 minutes.
4. Prepare an enzymatic detergent safe for use with metal instruments according to the manufacturer's recommendations, using potable water.
5. Submerge the biopsy guide in the prepared solution and soak for no less than 2 minutes.
6. After the 2-minute soak, while the biopsy guide is submerged in the detergent water, vigorously scrub the device with a soft nylon bristle brush.
7. Use a round nylon cleaning brush to clean the biopsy lumen. Use a syringe to flush detergent water through the lumen. Scrub the device for a minimum of 2 minutes.
8. Remove the device from the detergent water and rinse thoroughly in running potable water (30 - 40 °C) taking care to remove any visible detergent. Rinse the device for a minimum of 1 minute.
9. Visually inspect the device for any residual soil or detergent. Repeat steps 6 through 8 until the device is visibly clean.

High-level Disinfection

NOTE: *High-Level disinfection efficacy of this manual process has been shown using Cidex OPA® ortho-Phthalaldehyde Solution.*

1. Fill a sink or basin with high-level disinfectant prepared in accordance with the disinfectant manufacturer's instructions to a level allowing immersion of the biopsy guide.
2. Immerse the devices in the disinfectant solution and agitate to ensure all air bubbles are removed from the surface of the device.
3. Allow the devices to soak in the disinfectant solutions for least the minimum contact time listed in the disinfectant manufacturer's instructions for use.
4. Thoroughly rinse the device by immersing in a large volume of critical (purified) water for a minimum of 1 minute.
5. Repeat Step 4 two additional times, for a total of 3 (three) rinses using fresh volumes of water for each rinse.
6. Thoroughly dry the biopsy guide using a sterile, lint-free wipe. Visually inspect the biopsy guide to ensure all surfaces are clean and dry.

Autoclave Sterilization

NOTE: *Sterilization efficacy testing was performed using worst-case parameters for time, temperature and load density. Parameters listed in the tables are the minimum required to ensure a Sterility Assurance Level (SAL) of 10⁻⁶ or better.*

1. Place the cleaned and disinfected biopsy guide in an approved autoclave pouch.
2. Autoclave using the following parameters:

Table 9-24: Autoclave parameters

Parameter	Cycle type 1	Cycle type 2
Sterilizer	Pre-vacuum	Pre-vacuum
Preconditioning Pulses	3	3
Temperature (Minimum)	132 °C	121 °C
Exposure Time (Minimum)	3 Minutes	20 Minutes
Drying Time (Minimum)	15 Minutes	15 Minutes
Package Configuration	Tyvek Pouch (14 x 25 cm)	Tyvek Pouch (14 x 25 cm)

Preparing for a Biopsy

Preparing Infinity PlusTM or AccuSITETM needle guide attachments



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.

The bracket is packaged non-sterile and is reusable. To avoid possible patient contamination, ensure bracket is properly reprocessed 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.

NOTE: *The "Infinity PlusTM" type Needle Guide allows for free angle puncture, and therefore no guidezone display over the image is required.*

NOTE: *The "AccuSITE" type Needle Guide allows for free angle puncture in the out-of-plane direction. It is recommended to turn on the Centerline graphic cursor ('Centerline' on page 5-15) which represents the path of the needle in the out-of-plane direction.*

To mount the needle guide

1. Attach bracket to transducer by aligning locating features. Ensure bracket is firmly attached.
2. Place an appropriate amount of gel inside cover and/or on transducer face. Poor imaging may result if no gel is used.
3. Insert transducer into sterile cover sheath making sure to use proper aseptic technique. Pull sheath tightly over transducer face to remove wrinkles and air bubbles, taking care to avoid puncturing cover.
4. Secure cover with enclosed rubber-bands.
5. Inspect cover to ensure there are no holes or tears.
6. Select a needle guide for the appropriate gauge size.

7. In case the AccuSITE needle guide is used, be sure to select a needle guide for the appropriate target depth from skinline.
8. Using proper aseptic technique, snap needle guide on to attachment area of bracket.
9. In case the AccuSITE needle guide is used, ensure the door on the needle guide is fully closed.

NOTE: *The “AccuSITE” type Needle Guide supports Quick Release function, as explained in the relevant Civco’s reference manual. To release the needle, depress tab on needle guide toward bracket to activate needle guide quick release function.*

Post procedure

1. Press tab away from bracket to remove needle guide.
2. Remove the probe sheath.
3. Properly dispose of these items in accordance with current facility guidelines.
4. Clean and disinfect the probe ('Cleaning and disinfecting probes' on page 9-12).

The biopsy bracket can be reprocessed per the manufacturer's instructions and reused.

E8C-RS Intracavitory Probe Biopsy Guide Assembly



WARNING

DO NOT use the needle with the catheter (soft tube). There is a possibility of breaking the catheter in the body.



WARNING

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. Failure to follow these instructions could result in repeated biopsies or patient injury.

To prepare the E8C-RS probe for use

NOTE: *Wear protective gloves before proceeding with the following procedure.*

1. Remove the probe from the box and carefully examine it for any damage.

2. When installing the attachment for the first time, remove the filling from the probe head where the biopsy guide attachment will be installed (Figure 9-19).

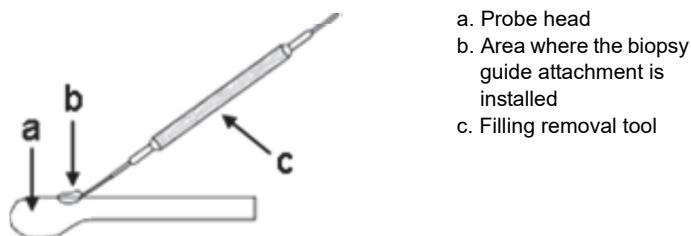


Figure 9-19. Remove the filling

3. Clean and then disinfect the probe.

Installing 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. Fill the probe sheath with acoustic coupling gel (Figure 9-20).

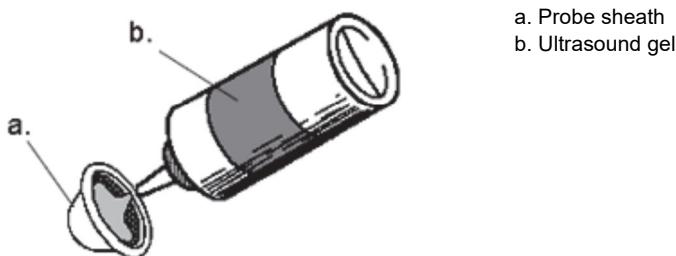


Figure 9-20. Ultrasound Gel Placement

NOTE: *Only use acoustic coupling gel for this purpose.*

3. Place the gel-filled probe sheath on the transducer face and bring it up the probe body so that the adjustment knob of the probe is completely covered with the probe sheath (Figure 9-21).

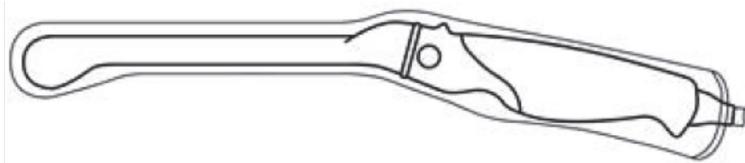
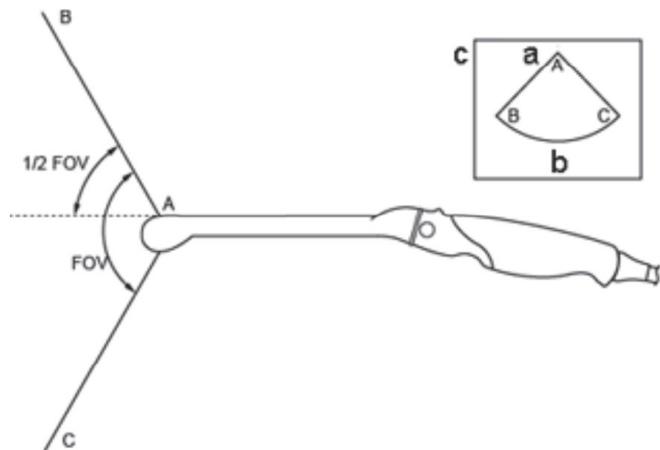


Figure 9-21. Probe sheath application

4. Inspect the sheath for nicks, cuts or tears.
5. Apply gel to outer surface of the probe sheath at the transducer location for scanning.

Figure 9-22 shows the relationship between the displayed image direction during an axial scan compared to the probe and probe position.



- a. Patient's foot side
 - b. Patient's head side
 - c. Display on the monitor
- 1.

Figure 9-22. Scan plane orientation

E8C-RS Probe 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.

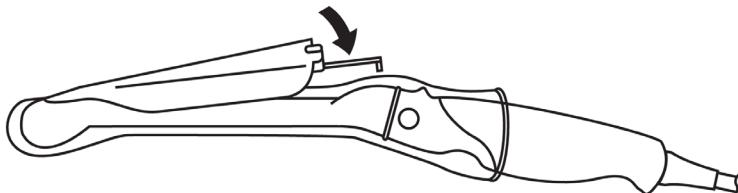
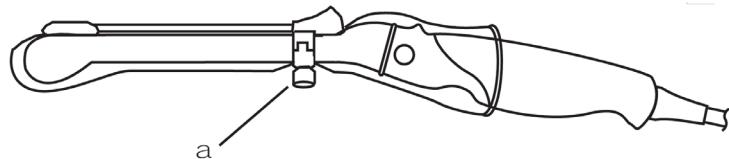


Figure 9-23. Disposable Biopsy Guide



a. Fix with a screw

1.

Figure 9-24. Reusable Biopsy Guide

2. Tap **Disposable** to bring up guidelines for disposable biopsy guides. Tap Reusable to bring up guidelines for the stainless-steel reusable biopsy.
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 the attachment hole.



If the needle guide is not properly seated and secure the needle placement does not occur as intended and patient injury or repeated biopsies may result.

Biopsy Special Concerns

Biopsy safety

General biopsy safety



c CAUTION

All biopsy equipment depicted and described in these Instructions for use has been validated for use with the system and software. If biopsy equipment which is not listed in these Instructions for use is used, the user has the possibility to configure and store the predicted biopsy line. In this case the user has to be aware that the biopsy equipment/probe/system/software combination may not be validated and therefore responsibility for correct configuration and usage lies with the user.



c CAUTION

- Use of legally marketed, sterile probe sheaths is recommended for biopsy procedures.
- Before using a biopsy guide read and follow the biopsy guide independent manuals given by the manufacturer.
- Every time before using a biopsy guide ensure its correct position and optimal fit on the probe.
- Always use a straight needle for each biopsy procedure.
- Before performing a biopsy ensure that the selected and displayed biopsy line corresponds to the biopsy needle guide mounted to the ultrasound probe (left/right).
- The biopsy needle and the biopsy needle guide (and the bore inside) must be sterile.



c CAUTION

For detailed information on a biopsy guide, please contact the manufacturer of the biopsy guide.



Biopsy equipment is not sterile when delivered unless it is clearly labeled! If biopsy equipment is not sterile it is mandatory to clean and sterilize it before usage. For additional details please contact the legal manufacturer of the biopsy equipment.



Ensure the correct position and optimal fit every time before using a biopsy guide!



- Disposable biopsy guides: Single-use components must be disposed as infectious waste!
- Reusable biopsy guides must be sterilized before they are disposed!



Before starting a biopsy procedure with a 3D/4D probe always perform a volume scan first. This is important to ensure proper mechanical alignment and centering of the transducer element before the biopsy is performed.



- The default biopsy lines provided with the system software, must be verified at least once by the user. The procedure must be repeated if probes and/or biopsy guides are exchanged.
- Before performing a biopsy, prepare a water bath of approx. 47°C and make sure that the displayed biopsy line coincides with the needle track. Observe probe specific information on the temperature of the water bath.
- The needle used for water bath alignment must not be used for a biopsy performed on a patient.
- Depending on the needle stiffness/thickness and the elasticity and composition of the different tissue-types in the path of the biopsy needle, the actual needle track can deviate from the predicted biopsy line. The biopsy needle might bend and not follow a straight line.

Freehand biopsy safety



c CAUTION

When performing a freehand biopsy, i.e. without a biopsy guide, it is the user's responsibility to use appropriate equipment. Ensure that the needle (especially the needle tip) is always visible in the ultrasound image during the whole biopsy procedure.



c CAUTION

Always only use basic modes when performing a freehand biopsy.

NOTE: A *water bath alignment verification* is also necessary before performing freehand biopsy procedures.

Reusable biopsy needle guides



c CAUTION

For cleaning and sterilization of biopsy guides refer to the Probe biopsy reprocessing section ('Probe biopsy reprocessing' on page 9-67) and the biopsy guide user manual.

Precautions Concerning the Use of Biopsy Procedures



w 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.



c 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.



CAUTION

Improper cleaning methods and the use of certain cleaning and disinfecting agents can cause damage to the plastic components that degrade imaging performance or increase the risk of electric shock.

See 'Probe Safety' on page 9-47 for more information.



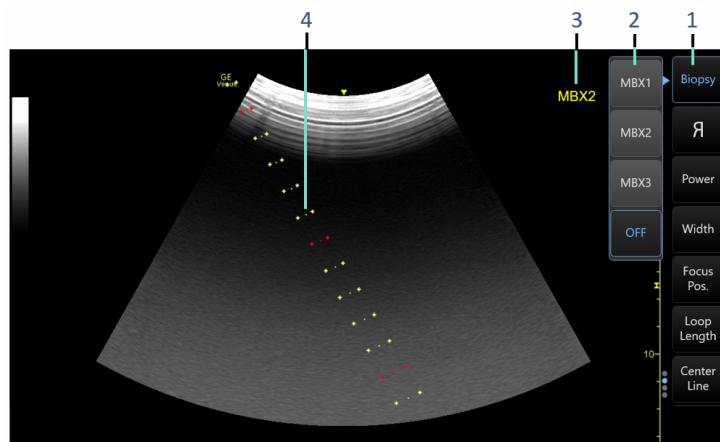
CAUTION

Consult the biopsy needle manufacturer's instructions for acceptable reprocessing of biopsy needles.

Performing a Biopsy

Displaying the Guidezone

Activate the Biopsy Kit by selecting it from the right panel menu (Figure 9-25, item 1).



1. Biopsy Kit ON/OFF button
2. MBX pin setting
3. Image label displaying the current MBX number
4. The Biopsy guidelines (both outer and center-line are configured)

Figure 9-25. Biopsy controls and Guidelines

The available biopsy options appear when Biopsy Kit is selected. There are multi-angled biopsy kits available with the Venue depending on the probe. Select the desired biopsy kit.

The multi-angled biopsy kits, provide several fixed angled pin settings, which the user can select. The different settings are marked as MBX1, MBX2, MBX3, etc.

NOTE: Be sure to match the **Pin** setting on the bracket to the MBX pin setting on the system.

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. Use appropriate needle length to reach target area. Adjust the guide settings on the system and confirm they pass through the target, then match the setting on the system to the pin settings on the guide.

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.



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.



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.

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.

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.

Identify the appropriate biopsy guide bracket by matching the label on the bracket with the probe to be used.

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.

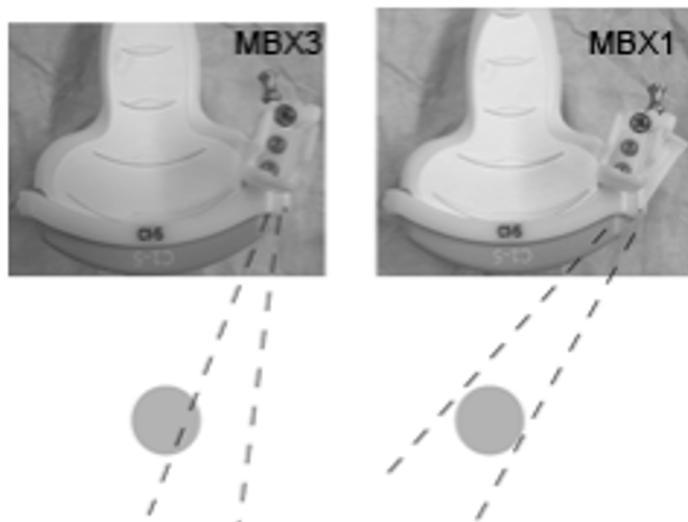


Figure 9-26. Example

2. Pull up the pin (Figure 9-27, a) to freely move the needle guide attachment. Align the knob with the selected position of the needle guide attachment.
3. Push the pin down (Figure 9-27, b) into the desired slot to secure the angle position of the needle guide attachment.



Figure 9-27. Pull up and push down the knob

4. Fit a convex of the biopsy bracket (Figure 9-28, a) in a concave of the probe (b).

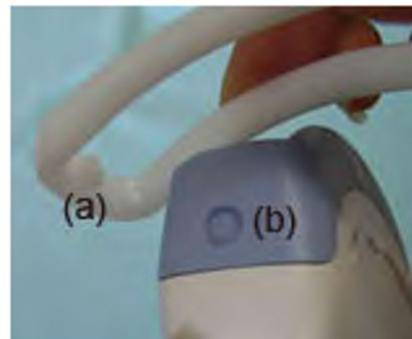


Figure 9-28. Probe/Bracket Alignment 1

5. Hold the side (Figure 9-29, a) and tuck down the needle guide side (b) until it clicks or locks in place.



Figure 9-29. Probe/Multi-angle Bracket Alignment 2

6. Place an adequate amount of coupling gel on the face of the probe.
7. Place the proper sanitary sheath tightly over the probe and biopsy bracket. Use the rubber bands supplied to hold the sheath in place.

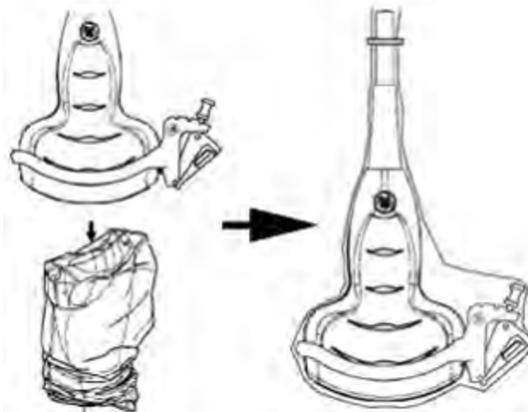


Figure 9-30. Applying Sanitary Sheath

8. Snap the needle guide onto the biopsy guide bracket.

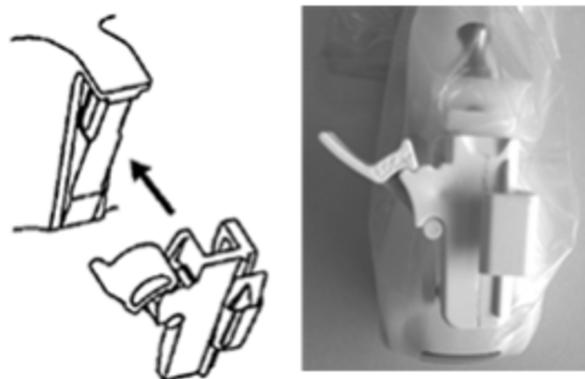


Figure 9-31. Snap the needle guide

9. Push the locking mechanism towards the bracket to secure the lock (a). Make sure the needle guide is firmly attached to the bracket.
10. Choose the desired gauge (size) needle barrel. Twist it back and forth to remove it from the plastic tree.



Figure 9-32. Needle Barrel

11. Place the needle barrel into the needle clip with the desired gauge facing the needle clip and snap into place.



Figure 9-33. Needle Barrel Installation

Removing the biopsy guide

12. Hold the other side and push out the needle clip attachment side (Figure 9-34).



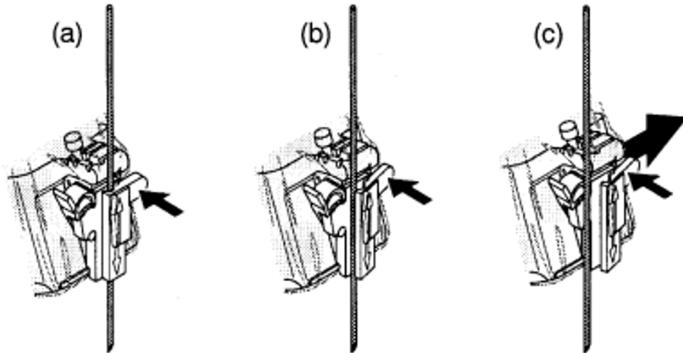
Figure 9-34. Remove the biopsy guide



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.



- 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.

Figure 9-35. Disassembling 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



W WARNING

Biopsy procedures must only be performed on live images.



C 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 Top/Sub 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 ('Cleaning and disinfecting probes' on page 9-12).

The biopsy bracket can be cleaned and disinfected in a recommended disinfecting agent and reused.



C CAUTION

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

When preparing the transducer for intra-operative follow the procedure described below:

1. Apply sterile gel to the transducer face.
2. Using an aseptic technique, place the proper sterile sheath over the probe. The sterile sheath should completely cover the transducer and cable which has first undergone a thorough cleaning and high-level disinfection.
3. Use the rubber bands supplied to hold the sheath in place.
4. Rub a finger over the tip of the probe to ensure all air bubbles have been removed.
5. Remove the probe sheath and dispose of it properly, in accordance with current facility guidelines.
6. Clean and disinfect the probe ('Cleaning and disinfecting probes' on page 9-12).



CAUTION

For surgery/intra-operative procedures, a sterile environment is required. Therefore, both the operator and probe needs to be sterile.

To ensure a sterile environment during the procedure, it is recommended that this job is done by two persons.

- Perform a high level disinfection of the probe.
- The scanner (surgeon, sonographer, etc.) should be sterile and gloved.
- Place an adequate amount of sterile coupling gel on the face of the probe.
- Place the proper sterile sheath over the probe and cord.

NOTE: *Follow your institutions guidelines on post-surgery/intra-operative procedures for probe cleaning and disinfection.*

Chapter 10

User Maintenance

This chapter supplies system data, assistance information, and system care and maintenance instructions.

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.

Measurement/ Assisting Tool	Range	Accuracy	Comments
2D Calipers			
Distance	1 - 10 cm	5%	
	> 10 cm	5%	
Area	1 - 300 cm ²	10%	
Volume (area+distance)	20 - 150 cm ³	10 ml	
M-mode Calipers			
Distance	1 - 10 cm	5%	

Measurement/ Assisting Tool	Range	Accuracy	Comments
dt	0.01 - 1.0 s	5 msec	With optimal sweep speed setting
Spectrum Calipers			
Velocity	0.1 - 1.9 m/s	10%	
dt	0.1 - 1.0 s	5 ms	With optimal sweep speed setting
	1.0 - 5.0 s	1.5%	
Auto VTI			
Auto VTI	10 - 35 cm	20%	Confidence level: 75%
Auto IVC			
Auto IVC	0 - 40 mm	3.5 mm	Confidence level: 75%
Auto B-Lines			
Auto B-Lines	<=1,2,3,4,>=5	1 counting point	Confidence level: 75%

Estimate the overall inaccuracy of a combined measurement and calculation by including the stated inaccuracy from the basic measurement accuracy statements.



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.

Software of Unknown Provenance (SOUP)

The following is a list of software components that are already developed and widely available, which are used on the system as “off-the-shelf” software components. SOUP is software that has not been developed with a known software development process or methodology, or which has unknown or no safety-related properties.

Product	Version	Manufacturer	Manufacturer address
.NET Framework	4.7.2	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7330
AMD Drivers	19.50.23	AMD (Advanced Micro Devices, Inc)	Advanced Micro Devices 2485 Augustine Drive Santa Clara, CA 95054-1549 Tel: +1 408-749-4000
Barcode Reader Driver	3.5.5	Honeywell International Inc.	2 Corporate Center Dr #100 Melville, NY 11747, USA
BEP - chipset	10.1.17	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
BEP - Graphics and Audio Intel Drivers	26.20.100.7870	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
BEP - MEI	1909.12.0.1236	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
BlueTooth framework and drivers	21.20.0.4	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
Boost	1.81	Boost.org	Boost.org
Caption Health	1.11.0	Caption Health	4 W 4th Ave, San Mateo, CA 94402, US
CSD Framework	5.1.0.19	General Electric	Boston, Massachusetts, USA
DirectSkin (Window blinds)	7.0	Stardock Corp.	15090 Beck Rd. Plymouth, MI 48170 USA

Software of Unknown Provenance (SOUP)

Product	Version	Manufacturer	Manufacturer address
DirectX	12	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
Firmware updater - Touch screen EETI – eGelaxUpdateCMD	3.1.3.5	EETI	11F., No.302, Rueiguang Rd., Neihu District, Taipei City 11492, Taiwan
Firmware updater - Touch screen Eizo - FirmwareToolCmd	1	Eizo	Siemensallee 84 Karlsruhe, Germany Baden Wurttemberg
Firmware updater - BMC update tool	1.0	Kontron	Lise-Meitner-Straße 3-5 86156 Augsburg Germany
fo-dicom (Fellow Oak DICOM)	4.01	Fellow Oak	https://github.com/fo-dicom/ fo-dicom
Hl7.Fhir.R4	3.7.0	Health Level Seven International	3300 Washtenaw Avenue, Suite 227 Ann Arbor, MI, 48104 USA
InSite Agent	2.3	GE Healthcare	9900 W Innovation Dr Milwaukee, WI 53226 (414) 774-2653
Intel Libraries (IPP)	6.1.6	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
Intel® Rapid Storage Technology	17.2.0.1009	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
Intel® Serial I/O	30.63.1519.7	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
Intel WiFi 6E AX210		Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
KEAPI Tools	R18	Kontron	Lise-Meitner-Straße 3-5 86156 Augsburg Germany
LCD Control SDK - GETAC	1.0.0.0	GETAC	4F., No.50, Sec 1, Xinhai Rd., Da'an Dist., Taipei City 10647, Taiwan
Merge Toolkit	5.13	IBM	Merge Healthcare Corporate Headquarters 6737 W. Washington Street, Suite 2250 Milwaukee, WI 53214 USA

User Maintenance

Product	Version	Manufacturer	Manufacturer address
Microsoft Silverlight	5.1	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
Microsoft Surface	2.0	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
Microsoft.Owin	4.0.0	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
MS Windows Media 8 Encoding Utility	8.0.0	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
NetGear Wi-Fi driver	1.0.0.39	Netgear	San Jose, California, United States
Open Vino	2021.2	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
pcProx API	7.2.26	RFIDeas	rf IDEAS Global Headquarters 425 N Martingale Rd, Suite 1680, Schaumburg, IL 60173
pdfium	1.0.0	Google	https://www.nuget.org/packages/PDFium.Windows/
Poco C++ Libraries	1.7.4	Boost Software License	
SEMA SDK	3.5.R9	ADLINK Technology Inc.	Ulrichsbergerstrasse 17, 94469 Deggendorf, Germany
SSA	2.4.1.4	GE Healthcare	9900 W Innovation Dr Milwaukee, WI 53226 (414) 774-2653
Sony B/W video printer D898 (MDX898MD)	1.0	Sony Corporation	Sony Corporation of America 25 Madison Avenue New York, NY 10022-3211 Phone: 212-833-6800

Software of Unknown Provenance (SOUP)

Product	Version	Manufacturer	Manufacturer address
Sybase, SQL Anywhere Studio	17.0	Sybase	SAP SE Company: Dietmar-Hopp-Allee 16 Walldorf, Baden-Württemberg, Germany Sybase Headquarters: Dublin, CA 94568 USA
Telexy Qview	1.3	Telexy Healthcare Inc.	1316 Wall st., Everett WA 98201, USA
USB ECG EX1	2.2.7600.16385	Norav Medical	2 Hamada Street Yokneam, 20692, Israel Phone: 972 4 989 3001 Fax: 972 4 989 3004 www.norav.com
Visual Studio Libraries (cvredist)	MS Visual C++ 2008/2010/2012/2015/2017/2019	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
WiFi Intel-Dual-Band-Wireless -AC-8265	20.70.16.4	Intel	2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA
Windows 10 IoT Enterprise	1809	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
Windows Media Player Lib	1.0.0	Microsoft	Microsoft Corporate Office Headquarters HQ: One Microsoft Way Redmond, WA 98052-7329 Corporate Phone Number: 1-425-882-8080 Fax Number: 1-425-706-7329
Zebra CoreScanner Driver 64 bit	3.07.0026	Zebra Technologies Corporation	Corporate and International Headquarters 3 Overlook Point Lincolnshire, Illinois 60069 USA Phone: +1 847 634 6700 Toll-free: +1 866 230 9494 Fax: +1 847 913 8766

Anti-Virus Software Note

Venue Go Security

At GE we're committed to providing technologies to help you excel every day. The Venue Go Ultrasound system is designed with you, your specialty, and your patients in mind offering extraordinary image quality, easy workflow, and expert tools to help you provide the best patient care.

Since the Venue Go is integrated into your data network, GE wants to ensure that you are comfortable with the proactive measures we are taking to secure the product. Below are some activities and measures that we have performed and implemented to help secure the Venue Go.

1. Only communication ports that are needed for the to operate are enabled. All other operating system communication ports are disabled.
Ports remaining opened are:
 - Port 104 is used for DICOM communication only.
 - Ports 137, 138, 139 and 445 are used for QuickSave communication only.
 - Port 2501 is used for Gateway only.
2. All operating system services that are not used by the system application software are disabled to help ensure that the source of security vulnerabilities is minimized.
3. The operating system is locked down to prevent a user from loading software, opening email, or using a web browser and introducing viruses or Trojan horses to the system.
4. The "auto run" feature is disabled on the system. For instance, when an SD card or USB memory stick that has a program that runs automatically is inserted, the system will not open or run the program.
5. Our Engineering team performs a security scan on the system using the same tools that major organizations and hospital IT organizations use to check for vulnerabilities on their networks. Failures that are detected during this test process are corrected as expediently as possible and are deployed to our installed base customers.

We have worked diligently to develop a combination of the safety measures above and the native security advantage of Venue Go to provide a degree of safety against Viruses, Worms, Trojan Horses, etc., especially for a system used in a professional hospital grade networking environment that also typically features its own sufficient safety measures.

Finally, a few points as to why we do not use Anti-Virus software. The main reasons for not doing so:

- Customized OS of Venue Go is natively immune to most viruses. Only few viruses can run on Venue Go system.
- Every virus scanner is constantly active in the background. Due to the software-intensive operating system of the Ultrasound scanner, all computing resources are required for normal operation of this device. Anti-Virus software activities would have a negative impact on the system performance.
- The operating software of a medical Ultrasound system is part of an FDA-cleared medical device that requires a specific release process. Any update of the Anti-Virus software would mean a change of the system software. Such change would require an extensive release and validation process to help ensure that the Anti-Virus update does not have any impact on the system software performance and stability.

System Care and Maintenance

Overview

The ultrasound system requires regular care and maintenance to function safely and properly. Refer to Section 10 of the Venue Go Service Manual for any additional maintenance guidance.

Contact the local Service Representative for parts or periodic maintenance inspections.



W
WARNING

Do not perform system care and maintenance in the patient environment.

Expected Service Life Description

The expected service life for the Venue Go system and probes is identified in Table 10-1.

Table 10-1: Expected service life

Equipment/Accessory	Expected Service Life
Venue Go system	The expected Venue Go service life is at least seven (7) years* from the manufacturing date under the provision of maintenance by authorized service personnel. Physical attributes that indicate End of Life include visible cracks, leaks, pitting, corrosion, electrical failure and mechanical wear and tear. Refer to chapter 10 of the Venue Go Service Manual for more details on physical inspection.
Venue Go probes	The expected Venue Go probe service life meets or exceeds five (5) years from the date the probe is placed in service, under the provision that the customer follows the care instructions provided on the Probe Care Card / Accompanying Venue Go Instructions for Use.

* With respect to cleaning, A 7-year life cycle is equivalent to 10,080 cycles (based on an average chemical agent contact time of 1 minute and 4 cleanings/disinfections per day).

System Care and Maintenance schedule

The maintenance schedule (Table 10-2) should be followed to ensure the system functions safely and properly.

Table 10-2: Venue Go maintenance schedule

Monthly	Weekly	After each Patient
<p>Examine the following components monthly:</p> <ul style="list-style-type: none">• 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 for defects.• Casters for proper locking operation.	<p>Clean the entire system weekly ('Cleaning the system (weekly)' on page 10-15):</p>	<p>Clean and disinfect the following components after each patient (Figure 10-1):</p> <ul style="list-style-type: none">• Cart handle (front, rear, sides, and hook)• Monitor, monitor sides and handle• RS connector levers• Storage bin <p>Disassemble and disinfect the following components after each patient ('To remove the Gel holder cup or the TVTR tray Gel cup holder' on page 10-19):</p> <ul style="list-style-type: none">• Probe and gel cup holders• Probe holder inserts• TV_TR Tray ('Disinfecting instructions' on page 10-21)



WARNING

If any defects are observed or malfunctions occur, do not operate the equipment, and inform a qualified service person. Contact a Service Representative for information.



Electrical Hazard

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.

Instructions on system packaging, storage, and transportation appear in chapter 3 of this manual ('System Positioning/Transporting' on page 3-27).

Reporting of serious incidents

Any serious incident related to the use of this GE Healthcare device, should be reported to both the manufacturer and the health authority/competent authority where the device is installed.

To report to GE Healthcare either contact the local service representative or send an email to: in-box.complaints@ge.com.

Provide the following system information in your message:

- Catalogue number or model designation (stated on the identification plate)
- SystemID/serial number/lot number (stated on the identification plate)
- Date of incident
- Description of incident, including any patient or user impact/injury
- Contact information (facility, address, contact name, title, and telephone number)

Cleaning and Disinfecting the system

The Venue Go ultrasound system is a reusable medical device that involves the risk of contamination by patient and environmental materials through routine handling by health care personnel.

The Venue Go system requires manual cleaning and disinfection on a routine basis to ensure that it is safe and effective for its intended use. Only trained personnel should carry out these procedures.



WARNING

Failure to perform required system care and maintenance can pose health risks, and result in unnecessary service calls.



CAUTION

The following sections cover disinfection and cleansing the ultrasound system. Probe cleaning and disinfection is covered in Chapter 9 ('Probe Care and Maintenance' on page 9-11). Ensure that you follow the probe disinfection procedure provided by GE.



CAUTION

To prevent the risk of system damage when performing cleaning and disinfecting procedures, always observe the following precautions:

- Prior to cleaning, turn OFF power to the system and disconnect the mains cable.
- Only use cleaning materials and solutions as recommended in the procedures described below.
- Never use thinner, benzene, ethanol or methanol alcohol, abrasive cleaners, or other strong solvents, as these may cause damage to the cabinet or LCD panel. Only use isopropyl alcohol, when instructed to do so.
- Do not spray any liquid directly onto the system covers or LCD Display.
- Do not allow any liquid to drip or seep into the system.
- DO NOT scratch or press on the panel with any sharp objects, such as pencils or pens, as this may result in damage to the panel.
- Make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.

Agents approved for console cleaning and/or disinfection

The following compliant cleaners/disinfectants are for cleaning and/or disinfecting the console (Table 10-3).



WARNING

Always consult the cleaner or disinfectant manufacturer's instructions for proper use of their product to avoid harm to the user carrying out the cleaning and/or disinfection and to avoid harm to the system.



WARNING

Wear appropriate Personal protective equipment (PPE) as indicated by training and the cleaner/disinfectant manufacturer.

User Maintenance

NOTE: *Probe cleaners and disinfectants are listed in the Probes chapter (Table 9-9).*

Table 10-3: Chemicals compatible for cleaning and disinfection

Product	Manufacturer	Chemistry	Available in
Cleaners			
Sani-Cloth HB Germicidal Disposable Wipe	Professional Disposables Inc. (PDI)	Quaternary ammonium compound (Quat)	United States
SONO ULTRASOUND WIPES	Advanced Ultrasound Solutions, Inc.	Quat	United States
Cleanisept Wipes	Dr. Schumacher GMBH	Quat	Europe
Sani-Cloth Plus Germicidal Disposable Cloth	Professional Disposables Inc. (PDI)	Quat + Alcohol (~15%)	United States
Mikrozid Sensitive Wipes	Schülke & Mayr GmbH	Quat	Europe
Mikrobac Tissues	BODE Chemie GmbH	Quat	Europe
Cleaner and/or Intermediate Disinfectant (ILD)			
Sani-Cloth AF3 Germicidal Disposable Wipe	Professional Disposables Inc. (PDI)	Quat	United States
Caviwipes 1	Metrex Research, LLC.	Quat + Alcohol (15%)	United States
Sani-Cloth Prime Germicidal Disposable Cloth	Professional Disposables Inc. (PDI)	Quat + Alcohol (~29%)	United States
Super Sani-Cloth Germicidal Disposable Wipes	Professional Disposables Inc. (PDI)	Quat + Alcohol (30-60%)	United States
ALCOHOL (ISOPROPANOL) 70%	Generic	Alcohol (70%)	Global
Tristel Distel	Tristel	Quat + PHMB	Europe
Clinell Universal Sanitising Wipes	GAMA Healthcare	Quat + PHMB	Europe
Sani-Cloth Bleach Germicidal Disposable Wipe	Professional Disposables Inc. (PDI)	Bleach (Chlorine)	United States
Clorox Healthcare Bleach Germicidal Wipes	Clorox Professional	Bleach (Chlorine)	United States, Canada, Europe
Oxiver TB Wipes*	Sealed Air	H2O2 (Hydrogen peroxide)	United States, Canada



CAUTION

*Oxiver TB Wipes may cause wrinkles, blisters and reduce the durability of: the front cover's black paint; the white paint of the rear enclosure and battery cover; the kickstand's silver paint.



CAUTION

All cleaners and disinfectants that are not in Table 10-3 are unapproved by GE for cleaning and/or disinfection of the console. Failure to follow guidelines could result in damage to the device.

NOTE: *The product labels which are located on the bottom of the rear panel may discolor or peel when cleaned with some of the agents listed on Table 10-3. Please use the following cleaning materials: Isopropanol (70% alcohol), Methylated spirit, or distilled water.*

NOTE: *Consult with marketing and sales personnel for chemicals available in areas where Venue Go is used.*

Cleaning the system (weekly)

Cleaning is the physical removal of waste and debris. It is recommended that the entire system be cleaned on a weekly basis.

Venue Go is subjected to Environmental contamination by patient and environmental materials through routine handling by health care personnel. Cleaning must be carried out manually by trained personnel on a weekly basis for the system to function safely and properly.

NOTE: *The components and areas which have no direct or indirect contact with patients require weekly cleaning but do not require daily disinfection.*

NOTE: *Always clean visible debris from surfaces on the system before disinfecting.*

Preparing the system for cleaning

1. Lock the cart's wheels ('Wheels' on page 3-34).
2. Turn Venue Go OFF ('Power OFF' on page 3-45).
3. Perform any additional preparations recommended by the cleaning agent's manufacturer.

Cleaning instructions

1. Put on new gloves.



2. Gather approved cleaning agent(s) (Table 10-3).



CAUTION

If using a spray, do not spray directly onto the system. Spray onto a clean lint-free cloth to use as a wipe.



3. Gently wipe all the surfaces of the system until they are visually clean.

Use a fresh wipe when the wipe becomes visibly soiled.



4. Use a soft nylon brush, such as a clean toothbrush, to access any complex areas as crevasses, screw heads, or notches with small gaps:

- Wet the brush with a wipe or wet the desired surface.
- Gently scrub with the brush until the area is visually clean.
- If the brush becomes visibly soiled, rinse under purified/de-ionized water or clean the brush with a chemical wipe before continuing to clean.



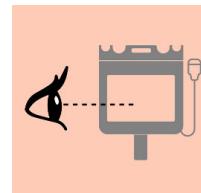
5. Use a cotton swab to access any complex areas such as deep holes or big gaps:
 - Wrap a clean wipe around the swab's cotton side.
 - Gently clean with wipe covered swab until the area is visually clean.



6. Discard the soiled wipes and gloves into the clinical trash.



7. Ensure the device is visually clean.



8. Allow the device components to air dry.
Alternatively, put on new gloves and dry them with a clean lint free cloth.



Disinfection (after each patient)

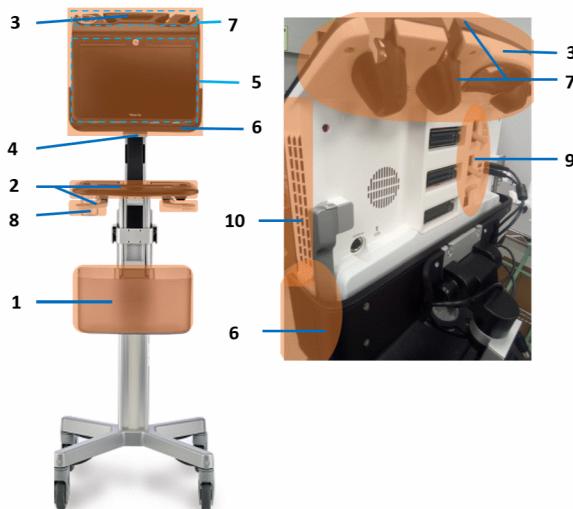
Disinfection must be carried out after each patient, or after prolonged use on a single patient.

Disinfection reduces the number of viable microorganisms on the system to a level determined appropriate for its further handling or use.

Areas requiring disinfection

Specific areas on the Venue Go ultrasound system are at risk of being contaminated with blood, body fluids or biological waste. Disinfect the following parts of the system between patients or during long term single patient use (Figure 10-1).

NOTE: *Disinfection must be carried out manually.*



- | | |
|---|--|
| 1. Storage bin | 6. Monitor cradle |
| 2. Cart handle (front, rear, sides, hooks) | 7. Probe holders (including TVTR tray) |
| 3. Monitor handle | 8. Gel cup holder |
| 4. Monitor lock (outer area) | 9. RS connector Levers |
| 5. Touch screen, touch screen frame and probe cable hooks | 10. Back air vents |

Figure 10-1. Parts/areas of the Venue Go system that must be disinfected between patients (identified with red color)

Prior to disinfection

1. Lock the cart's wheels ('Wheels' on page 3-34).
2. Disassemble the following system parts ('To remove the Gel holder cup or the TVTR tray Gel cup holder' on page 10-19):
 - Gel Cup holders
 - Probe holders
 - Small/Big probe inserts
 - TV-TR tray probe holder
3. Set the touch screen to Cleaning mode by tapping **Clean**



To return to normal operation, swipe the arrow at the center of the screen to the right.



Figure 10-2. Touch panel cleaning mode

4. Perform any additional preparations recommended by the disinfection agent's manufacturer.



WARNING

To avoid inadequate disinfection and resultant health risks, the Probe holders, TV-TR tray, Gel cup holder and big/small probe inserts must be disassembled prior to disinfection.

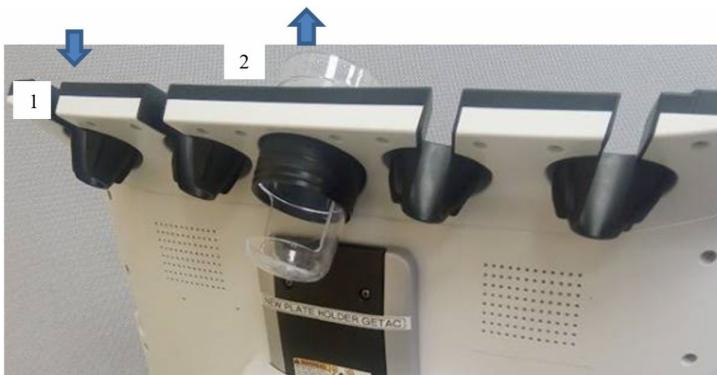
To remove the Gel holder cup or the TVTR tray Gel cup holder



WARNING

To avoid inadequate disinfection, and resultant health risks the Probe holder, TVR tray, Gel cup holder and big/small probe inserts must be disassembled to prior to disinfection.

1. Hold down the probe holder (Figure 10-3, item 1) while pulling the gel cup (gel holder) or TVR tray upward (Figure 10-3, item 2).
2. Pull the probe holder insert up to remove it (Figure 10-3, item 3).



1. Hold down probe holder
2. Pull up Gel cup to remove
3. Remove probe holder

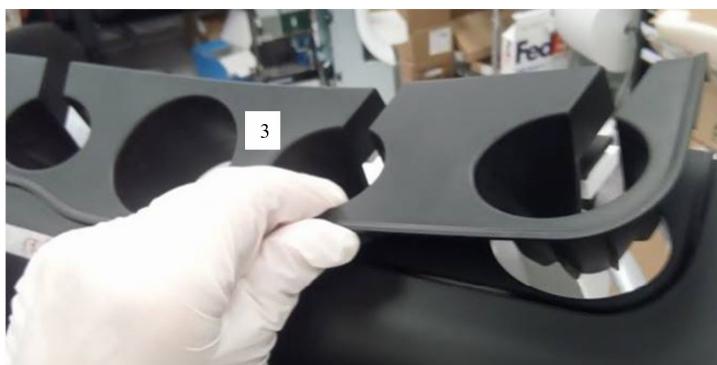


Figure 10-3. Removing the Gel cup holder or the TVTR tray Gel cup holder

Disinfecting instructions

1. Put on new gloves.



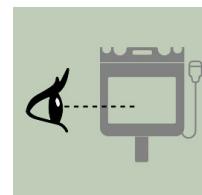
2. Gather approved disinfection agent(s) (Table 10-3).



If using a spray, do not spray directly onto the system. Spray onto a clean lint-free cloth to use as a wipe.



3. Clean any visible debris until the device is visually clean ('Cleaning the system (weekly)' on page 10-15).



4. Verify that the following accessories have been disassembled ('To remove the Gel holder cup or the TVTR tray Gel cup holder' on page 10-19):
 - Gel Cup holders
 - Probe holders
 - Small/Big probe inserts
 - TV-TR tray probe holder

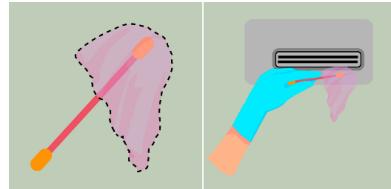


User Maintenance

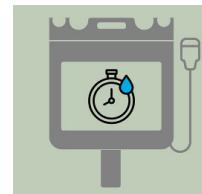
5. Gently wipe the relevant system areas and disassembled parts until visually wet.
Use fresh wipes as necessary.



6. Use a cotton swab to access any complex areas such as deep holes or big gaps:
 - Wrap a clean wipe around the swab's cotton side.
 - Gently scrub with wipe covered swab until the area is visually clean.



7. Ensure the surface stays wet for the time specified by the disinfectant manufacturer.



8. Discard soiled wipes and gloves into the clinical trash.



9. Allow the device components to air dry.
Alternatively, put on new gloves and dry them with a clean lint free cloth.



10. Reassemble system accessories ('To remove the Gel holder cup or the TVTR tray Gel cup holder' on page 10-19).

Cleaning and disinfecting accessories

NOTE: Always consult the accessory user manual for complete instructions.

Printer

To clean the printer:

1. Turn off the power.
2. Wipe the external surfaces of the unit with a soft, clean, dry cloth.
3. Remove stubborn stains with a cloth lightly dampened with a mild detergent solution.

NOTE: Never use strong solvents, such as thinner or benzene, or abrasive cleansers because they will damage the cabinet.

No further maintenance, such as lubrication, is required.

To clean the surface of the print head:

- Run the cleaning sheet (provided with the printer) through the printer.

For more information, see the Printer's Operator Manual.

RFID Reader

To clean the mounted reader use a clean, soft cloth dampened with mild soap and water, gently wiping away any dust or dirt.



CAUTION

Never drip or spray liquid directly onto the device.

NOTE: Always consult the accessory user manual for complete instructions.

To disinfect the mounted reader, gently wipe the reader using one of the wipes or a soft clean cloth moistened with one of the chemicals listed below. Wipe the reader until visually wet using fresh wipes as necessary and allow to air dry.



CAUTION

Only use the approved chemical wipes listed below.

NOTE: *To effectively disinfect the device, the device must be cleaned prior to disinfection using the method listed above or alternatively gently wipe away dust or dirt using one of the chemicals listed below.*

Approved chemicals

- BLEACH 5.25%
- HYDROGEN PEROXIDE 3%
- Clorox Disinfecting Wipes
- Super Sani-Cloth
- Sani-Cloth AF3
- Clorox Dispatch Disinfectant Wipes
- CaviWipes™
- SONO Ultrasound Wipes

Other Maintenance

Battery Replacement and Disposal

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.*

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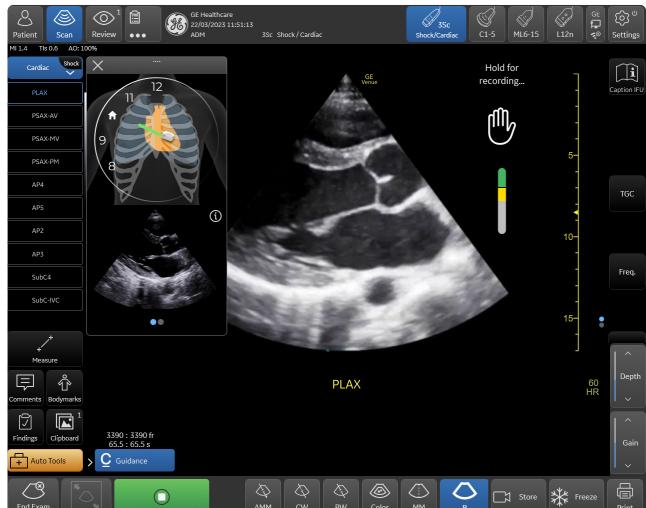


GE HealthCare

Caption Health

Caption Guidance™

Echocardiography Guidance Software



Operator's Manual

Part Number 734-01390 rev 3

Access Caption Guidance
training videos



Caption Health



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Open Source Software

Caption Guidance software incorporates open source software. Further details can be found in the About Screen (under System Version > Third party components).

Accessing the manual

This document can be accessed directly from the software interface within the Caption Guidance experience. From the Caption Guidance scanning screen, click the "Caption IFU" button located on the right hand side of the vertical controls menu.

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Chapter 1

Introduction

About this manual

Caption Guidance software operates within the GE Venue, Venue Fit, and Venue Go systems. It is not designed to be compatible with any other ultrasound systems.

This manual accompanies Caption Guidance and provides information on configuring Caption Guidance and using it to capture diagnostic-quality ultrasound images. This manual is intended for healthcare professionals who have received appropriate training on ultrasound basics and Caption Guidance provided by an authorized trainer using approved training materials.

Report any serious safety incident that occurs in relation to the ultrasound system to Caption Health and to the competent authority of the country in which the user and patient are established.

The following symbols appear on the About Page of the software application:

Table 1. Product Label Symbols

Symbol	Definition
	Consult the instructions for use.
MD	This is a medical device.
GMDN	The global medical device nomenclature number.
CE	Authorized for sale in the European Community.
EC REP	Authorized Representative in the European Community.
AU REP	Authorized Representative in Australia.
UK REP	Authorized Representative in the United Kingdom.
LOT	The product batch code ("lot number").

Symbol	Definition
	The product catalog number ("reference number").
	Federal (United States) law restricts this product to sale by or on the order of a physician.
	The unique device identification number.
	The product manufacturer, including address. The date of manufacture.

NOTE

Caption Health is the manufacturer of Caption Guidance. To directly contact Caption Health regarding this product, to request translated versions of this manual, or to request a paper version of this manual, please reach out to Caption Health Customer Support at support@captionhealth.com. A paper version will be provided at no additional cost and will be provided within 7 calendar days from the time of request.



An electronic version of the IFU can be located at captionhealth.com/user-documents

This manual describes the most extensive configuration of Caption Guidance, with the maximum number of options and accessories available. Some functions described in this manual may not be included in your product's configuration.

Alerts used in this manual

This manual uses the following symbols and text to indicate specific types of information.



WARNING

Indicates a potential hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potential hazardous situation, that, if not avoided, may result in minor or moderate injury.

NOTICE

This symbol indicates information or company policy that relates directly or indirectly to the safety of personnel or protection of property.

NOTE

Indicates supplemental information to the related topic.



Indicates step-by-step instructions.

Intended use/Indications for use

The Caption Guidance software is intended to assist medical professionals in the acquisition of cardiac ultrasound images. Caption Guidance software is an accessory to compatible general purpose diagnostic ultrasound systems. The Caption Guidance software is indicated for use in two-dimensional transthoracic echocardiography (2D-TTE) for adult patients, specifically in the acquisition of the following standard views: Parasternal Long-Axis (PLAX), Parasternal Short-Axis at the Aortic Valve (PSAX-AV), Parasternal Short-Axis at the Mitral Valve (PSAX-MV), Parasternal Short-Axis at the Papillary Muscle (PSAX-PM), Apical 4-Chamber (AP4), Apical 5-Chamber (AP5), Apical 2-Chamber (AP2), Apical 3-Chamber (AP3), Subcostal 4-Chamber (SubC4), and Subcostal Inferior Vena Cava (SubC-IVC).

Contraindications

There are no contraindications for using the Caption Guidance software.

Alerts

The following is important information regarding patient, operator, or equipment safety.



WARNING



Keep the Caption Guidance system outside the MRI scanner room.



CAUTION

Image quality and diagnosis

Product users are responsible for image quality and diagnosis. The images acquired using Caption Guidance are to be interpreted only by qualified

medical professionals. A qualified medical professional must inspect the data being used for analysis and diagnosis and ensure that the data is sufficient and appropriate in anatomical correctness and both spatial and temporal resolution for the measurement being employed.



CAUTION

Probe and product compatibility

Caption Guidance operates with the GE HealthCare 3Sc or M5Sc Shock/ Cardiac probes. Do not operate Caption Guidance with any other probe during AI-assisted scanning.

Additionally, Caption Health, Inc. Caption Guidance software is a software accessory that operates within the GE HealthCare Venue Ultrasound System. It is not designed to operate with any other ultrasound systems. Do not attempt to operate Caption Guidance with other ultrasound systems.

Do not use your system in combination with other products or components unless Caption Health expressly recognizes those other products or components as compatible.

For information about such products and components, contact your GE Healthcare representative. Changes and additions to the system should be made only by Caption Health or by third parties expressly authorized by Caption Health to do so. Such changes and additions must comply with all applicable laws and regulations that have the force of law within the jurisdictions concerned and with best engineering practices.



CAUTION

Caption Guidance accuracy, use, and image saving

Caption Guidance provides real-time guidance and automated capture during cardiac ultrasound (echocardiographic) examinations for the 10 standard echocardiographic views. The accuracy of Caption Guidance in classifying correct echocardiographic views and estimating image quality has been verified and validated, but individual patient variations may introduce errors.

Also, many echocardiographic views are similar to other views. As a result, the automated saving functions of Caption Guidance (AutoCapture and Save Best Clip) may occasionally contain errors. It is important to review saved images independently using experienced clinical judgment prior

to making a diagnosis. This may be especially important with saved clips noted as being saved through the Save Best Clip function, because in these instances Caption Guidance did not detect a clip of sufficient quality to meet the AutoCapture threshold.

It is also possible that some images obtained during scanning may be correct and have sufficient image quality for diagnosis, but Caption Guidance does not recognize this and does not auto-capture these images, and using the Save Best Clip option does not capture these images either. In these instances, manual saves may be necessary.

Making a diagnosis based solely on Caption Guidance, without applying clinical judgment regarding view correctness and quality, is not recommended.



CAUTION

Match manually saved clips to the active view

When you perform a manual clip (**Store** button) save, the system will assign the active view label to the saved clip. Confirm that the view you are saving manually is the view listed in order to avoid a mismatch between the label and the actual view captured.



CAUTION

Prescriptive Guidance instructions

Caption Guidance provides Prescriptive Guidance that gives you suggestions on how to manipulate the probe to capture the desired images. These suggestions have been verified and validated, but individual patient variations may cause the instructions to perform better in some patients than others. It is recommended that you pay attention to the Quality Meter as you scan and make adjustments to the probe position to capture diagnostic-quality studies.

NOTICE

Legal considerations

Do not use the product for purposes other than those intended and expressly stated by Caption Health, Inc. Do not misuse the product, and do not use or operate the product in an incorrect manner. Installation, use, and

operation of this product are subject to the law in the jurisdictions in which the product is used. Install, use, and operate Caption Guidance only in a manner that does not conflict with applicable laws or regulations, which have the force of law. Use of the product for purposes other than those intended and expressly stated by Caption Health, Inc., as well as incorrect use or operation, may relieve Caption Health or its agents from all or some responsibility for resultant noncompliance, damage, or injury.

NOTICE

Other types of studies

Caption Guidance is not intended for transesophageal echocardiography, or any other type of ultrasound study not listed under "Intended Use/ Indications for use."

NOTICE

Ultrasound-system hazards

General ultrasound-system hazards not specific to Caption Guidance are described in instructions of the ultrasound console. Users should consult the instructions of the ultrasound console for general ultrasound-system specific hazards.

NOTICE

Maintain probe contact during AutoCapture

It is important to maintain the probe contact and position during AutoCapture to ensure the capture of a good clip. If you move the probe, remove it from the patient, or otherwise interrupt the recording, the clip will not be recorded.

NOTICE

Storing studies

Caption Guidance is meant for temporary storage of images being acquired. Images should be transferred in line with the capabilities of the ultrasound console/probe instructions for use.

NOTICE

Acoustic output and ALARA

The applicable system transducers, with which Caption Guidance functions as a software accessory, comply with the Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment (UD3-2004). It is important to observe the MI and TI values that are displayed during scanning. When conducting ultrasound studies, follow the ALARA principle: expose the patient to ultrasound energy at a level that is "As Low As Reasonably Achievable." Please read the ultrasound system's User Manual for important information about acoustic output and ALARA.

NOTE

Workflow scanning protocol completion

Caption Guidance provides workflow scanning protocols that guide you through a standard echocardiographic study, including saving clips for multiple views. If you terminate a study prior to scanning and saving clips for all the views, the diagnostic capability of the study may be compromised.

NOTE

PHI protection

DICOM studies contain Protected Health Information (PHI). Caption Guidance can operate within a PACS network and can send patient studies to a DICOM PACS server. Caption Guidance is not intended for long-term storage of studies. This device adheres to HIPAA security and privacy guidelines. When viewing Caption Guidance results in your DICOM Viewer, make certain to observe your institution's guidelines and practices for protecting PHI. Please refer to the ultrasound system's User Manual for important information about PHI protection.

NOTE

Cybersecurity precautions and practices

Malware, computer viruses, ransomware, and other cybersecurity threats are an increasing concern in healthcare IT systems. For information and guidance on implementing proper cybersecurity in the healthcare IT environment, see "Health IT Privacy and Security Resources for Providers" at <https://www.healthit.gov/topic/privacy-security-and-hipaa/health-it-privacy-and-security-resources-providers>.

NOTE

Predetermined Change Control Plan

The Caption Guidance device includes a predetermined change control plan (PCCP) approved by the US Food and Drug Administration (FDA). The PCCP describes a set of pre-specified algorithm changes which may be implemented without further regulatory review including:

- Retraining/optimization/modification of core algorithm(s)
- Real-time guidance of additional 2D TTE views
- Optimization of implementation of core algorithm(s) in software
- Addition of new types of prescriptive guidance for existing views
- Labeling compatibility with new compatible ultrasound systems

The machine learning algorithms used in Caption Guidance are trained, tuned and "locked" prior to release i.e., they do not continuously learn in the field. Caption Health follows its design controls as well as the test methods and acceptance criteria defined in the PCCP to verify and validate new releases of software deployed under the PCCP. Version numbering of the Caption Guidance software is updated in the software interface and accompanying reference information such as the Operator's Manual and Release Notes are provided to customers to communicate product changes implemented under a PCCP. The version history of Caption Guidance for Compatibility with GE Venue systems is provided below:

Software Revision History

Software Version	Release Date	Release Comments/Changes
A-1.0	Consult the instructions for use.	Initial Release per approved PCCP

About Caption Guidance/UDI information

► To display the About Us screen and UDI information

1. Enter the Menu at the top left of the screen.
2. Tap **About** on the left side of the screen, then tap **Caption Guidance**. The **About Caption Guidance screen** appears.

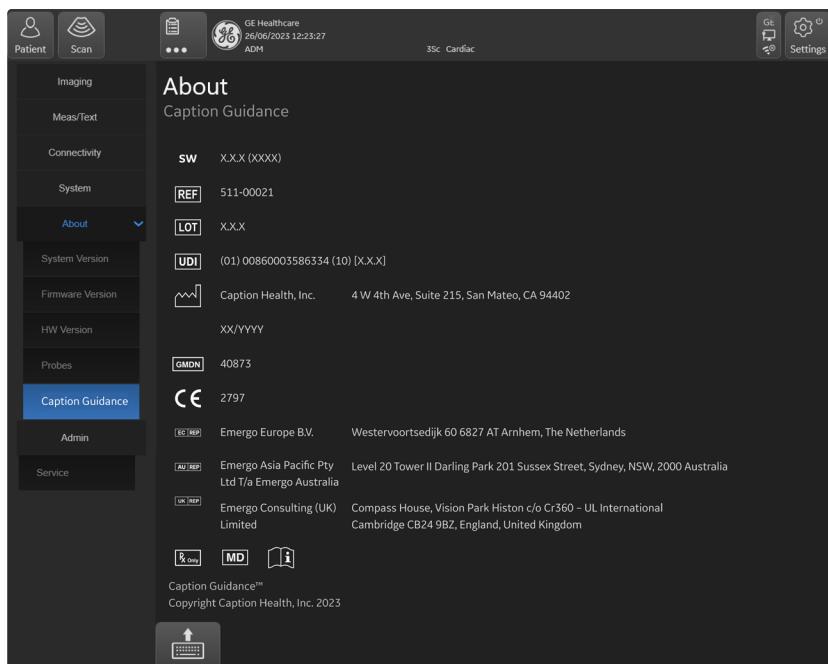


Figure 1. About Us screen. The symbols on this screen are described in the table below.

Specifications

Please refer to your ultrasound system's User Manual for information regarding probe and system specifications. Some of the specifications listed may not be available on your system.

Contacting Customer Support

Caption Guidance software is designed to be compatible with the M5Sc and 3Sc shock/cardiac probe and the GE Venue ultrasound system. It is not designed to be compatible with any other ultrasound systems. GE Healthcare customer service representatives are available to answer questions and provide product support. Please contact your local GE Healthcare representative for assistance or GE Healthcare US support via phone at 1-800-437-1171.

Chapter 2

Clinical Studies & Non-Clinical Testing

Specialist (Sonographer) Study

Use by specialist-users was evaluated in a prospective clinical study, in which 50 patients were scanned by sonographers with the Caption Guidance system (study exam), followed by a reference scan (control exam) on the same patient using the same ultrasound but unassisted by Caption Guidance. Study and control exams were assessed by three (3) expert cardiologists who graded each clip using the ACEP scale. The data from this study was used to provide descriptive supportive evidence of the use of Caption Guidance by users with specialized echocardiography training.

The results of the study indicated that sonographers obtained diagnostic-quality images in a high proportion of clips in both study and control exams, demonstrating comparable (non-inferior) image quality in clips acquired using Caption Guidance compared to unassisted acquisition. Importantly, the high specificity of the AutoCapture feature (97.85% of auto-captured clips were diagnostic) demonstrated that a registered sonographer can confidently rely on the AutoCapture feature when using Caption Guidance.

Pivotal (Nurse) Study

A prospective non-specialist study was subsequently conducted to evaluate use by medical professionals without specialized echocardiography training.

Study Design

A minimum of eight (8) RNs were to be trained and evaluated on their performance to acquire a 10-view 2D-TTE protocol. Participants were scanned by the RN (study exam) and 10 standard views were obtained using a Terason ultrasound system with Caption Guidance software: PLAX, PSAX-AV, PSAX-MV, PSAX-PM, AP4, AP5, AP2, AP3, SubC4, and SubC-IVC. The study continued enrollment until eight RNs had completed scans of 30 patients each. Enrolled patients were stratified into two groups based on cardiac abnormalities to ensure a sufficient number of patients with cardiac abnormalities. In addition, enrolled patients were evenly stratified into

three groups based on BMI to ensure a sufficient distribution of patients by BMI. For the sake of comparison, participants were also scanned by a trained sonographer without Caption Guidance and the same 10 views were obtained (control exam) using the same Terason ultrasound system.

Following the study and control exams, a panel of five (5) expert cardiologist readers independently provided assessments of whether the patient study, in its totality, provided sufficient information to assess 10 clinical parameters. In addition, a panel of eight (8) expert cardiologists also independently provided assessments of diagnostic image quality per clip using the ACEP scale; each clip was graded by five (5) expert cardiologists. The readers were blinded to assessments from other panel members as well as to which site the images were obtained at and whether the images were obtained by an RN or a sonographer. The results from the expert-panel reads were used for the statistical analysis. To reduce possible sources of bias in the design, the RNs, sonographers, and cardiologists were all blinded to results determined by others. Four (4) prospectively defined primary endpoints were evaluated sequentially for the study, all of which assessed whether the patient study exam conducted by the RN, taken as a whole, was of sufficient image quality to make these clinical assessments. Specifically, the endpoints assessed whether, in the judgment of expert cardiologists, the studies permitted qualitative visual assessment of left ventricular (LV) size, LV function, right ventricular (RV) size, and non-trivial pericardial effusion.

Results

The four primary endpoints were satisfied and demonstrated the clinical utility of Caption Guidance for non-specialist users. Specifically, the eight (8) RNs acquired echocardiographic exams of sufficient image quality to make clinical assessments in the proportion of study exams conducted, as shown below.

Table 2. Study results: primary endpoints

Endpoint	Percent of diagnostic quality
Qualitative Visual Assessment of LV Size	98.8% (95% CI: 96.7, 100)
Qualitative Visual Assessment of LV Function	98.8% (95% CI: 96.7, 100)
Qualitative Visual Assessment of RV Size	92.5% (95% CI: 88.1, 96.9)
Qualitative Visual Assessment of Non-Trivial Pericardial Effusion	98.8% (95% CI: 96.7, 100)

NOTE

Secondary endpoints and additional analyses presented below were not evaluated based on a specific hypothesis. Since the evaluation of secondary endpoints and additional analyses did not allow for control of Type I error, the study results are presented as a descriptive demonstration of the use of Caption Guidance for the specific secondary endpoints and additional analyses.

Additional secondary endpoints were evaluated and demonstrated the robustness of the data, including six (6) additional patient-level clinical parameters were evaluated and each had a high proportion of scans considered to be of sufficient image quality to make each of the six (6) additional patient level clinical parameter assessments, i.e., qualitative visual assessment of inferior vena cava (IVC) size, RV function, left atrial (LA) size, aortic valve (AV), mitral valve (MV), and tricuspid valve (TV). Specifically, the eight (8) RNs acquired echocardiographic exams of sufficient image quality to make clinical assessments in the proportion of study exams conducted, as shown below.

Table 3. Study results: secondary endpoints

Endpoint	Percent of diagnostic quality
Qualitative Visual Assessment of RV Function	91.3% (95% CI: 85.7, 96.8)
Qualitative Visual Assessment of LA Size	94.6% (95% CI: 90.7, 98.5)
Qualitative Visual Assessment of AV	91.7% (95% CI: 88.0, 95.3)
Qualitative Visual Assessment of MV	96.3% (95% CI: 93.9, 98.6)
Qualitative Visual Assessment of TV	83.3% (95% CI: 77.0, 89.7)
Qualitative Visual Assessment of IVC Size	57.5% (95% CI: 41.5, 73.5)

In addition to assessing if image quality was sufficient to make assessments, cardiologists also made specific qualitative visual assessments based on the study and control exams (e.g., presence or absence of non-trivial pericardial effusion). The proportion of scans in which the diagnostic decision was the same between study and control exams was very high, further demonstrating the usability of Caption

Guidance. For primary clinical parameters, the range was 92.5% to 99.6%. Similarly, for secondary clinical parameters, the range was 83.2% to 95.2%.

To provide a robust assessment of the performance of Caption Guidance, subjects enrolled in the study included a broad range of patient characteristics representative of the intended use population. In particular, effort was made to include subjects with known cardiac abnormalities at time of enrollment (63.9%), which would be expected to provide a more technically difficult scan. In fact, the standard of care echo revealed a much higher proportion of known cardiac abnormalities (91.4%). In addition, many of the study patients were inpatient or had other challenging characteristics such as high BMI, history of smoking (42.2%), and cardiac implantables (24.6%).

Subgroup analyses were conducted to evaluate the impact of specific baseline and demographic characteristics (i.e., BMI, presence of known cardiac abnormalities, sex, age, scan sequence number within each acquiring nurse, RN user, and study site) on the outcomes of the primary and secondary endpoints. The results demonstrated consistent performance across subgroups.

Furthermore, it was evaluated whether the RN users were able to obtain a high proportion of clips that were considered diagnostic quality. Specifically, the eight (8) RNs acquired echocardiographic clips of diagnostic-image quality for each of the standard views in the following proportion of study exams conducted.

Table 4. Study results: diagnostic-quality clips¹

View	Percent of diagnostic quality
PLAX	92.1% (95% CI: 87.9, 96.3)
PSAX-AV	66.3% (95% CI: 59.0, 73.5)
PSAX-MV	75.8% (95% CI: 70.7, 80.9)
PSAX-PM	92.9% (95% CI: 89.1, 96.7)
AP4	88.8% (95% CI: 81.5, 96.0)
AP5	78.8% (95% CI: 66.9, 90.6)
AP2	71.3% (95% CI: 61.6, 80.9)
AP3	80.0% (95% CI: 70.4, 89.7)
SC4	76.3% (95% CI: 70.2, 82.3)
SC-IVC	59.2% (95% CI: 43.1, 75.2)

The study also demonstrated the safety profile of Caption Guidance. No device-related adverse events were reported in the pivotal study.

The following analysis was performed on the Pivotal Study data to assess the performance of Caption Guidance using objective quantitative metrics:

- **PLAX Sonographer Measurements:** Three (3) registered cardiac diagnostic sonographers independently provided measurements for each of the PLAX clips acquired in the pivotal study: septal wall thickness (diastole), posterior wall thickness (diastole), left ventricular internal diameter (diastole), left ventricular internal diameter (systole), and aortic root. Measurability of study exam clips ranged from 89.17% to 92.08%. The study-control clip variability (RMSD) was found to be comparable to the inter-sonographer measurement variability. The results demonstrate that PLAX clips acquired by nurses were highly suitable for linear measurements in clinical use.

¹ Medical acquisition time per view ranged from 2.04 to 4.03 minutes.

Human Factors Validation Testing Study

A Human Factors Validation Study was performed with a total of 28 participants to demonstrate the usability of the device. The Caption Guidance user interface and training materials were developed through a series of preliminary human factors analyses. The device and training were then implemented and tested during the Human Factors Validation Study.

The study enrolled five (5) user groups:

- Physicians (Hospitalists): 4 users
- Nurse Practitioners and Physician Assistants: 4 users
- Registered Nurses (RNs): 9 users
- Medical Residents: 6 users
- Certified Medical Assistants: 5 users

The human factors usability validation testing on 28 users demonstrated 100% of critical tasks passed across all user types. No use errors were found that could cause harm for the scanner nor the patient. In addition, non-critical tasks that are essential for skills assessment and scanning ability were tested and evaluated, including the AutoCapture rate across 10 views. An average of 76% of views were auto-captured per user across all 5 user groups. The results did not indicate significant differences in performance amongst user types. Given the same level of training, medical professionals across backgrounds that were tested from certified medical assistants to hospitalists performed consistently during independent scans with Caption Guidance on a patient model.

Supplemental human-factors validation was performed to validate the usability of the Prescriptive Guidance icons visual system, using participants with varying levels of TTE scanning experience. This study tested the accuracy of movements made by 16 users while following the on-screen guidance. Correct movements were made 89.9% of the time, which validated the usability of the visual system to help guide users to a better-quality image during scanning.

Software Verification and Validation

Software documentation generated as part of Caption Health's design process include:

1. Software/Firmware Description
2. Device Hazard Analysis
3. Software Requirement Specifications
4. Architecture Design Chart
5. Software Design Specifications
6. Traceability
7. Software Development Environment Description
8. Verification and Validation Documentation
9. Revision Level History
10. Unresolved Anomalies
11. Cybersecurity

A comprehensive risk analysis was generated for the software with detailed description of the hazards, their causes and severity, as well as acceptable methods for control of the identified hazards. Caption Health developed a description, with test protocols including pass/fail criteria and report of results, of acceptable verification and validation activities at the unit, integration, and system level.

Algorithm Performance Testing

Comprehensive non-clinical performance testing of the deep-learning algorithms used in the device was performed to support their clinical performance. Specifically, the performance testing evaluated the performance of the following software functionality:

- Quality Meter
- Save Best Clip
- AutoCapture
- Prescriptive Guidance

40 subjects across varying BMI, age and gender were recruited as part of an in-house study to acquire echocardiographic data to assess the compatibility of Caption Guidance with the Venue family of systems (see Chapter 4 for interfacing third-party components/systems)

The following specific tasks of the algorithm were used as metrics of performance:

1. Relative image quality prediction of the current pose of the probe, as compared to the ideal pose for a specific view of the heart (Table 5).

Table 5. Test results: relative image quality

View	Cohen's Kappa
AP2	0.682 (95% CI: 0.601, 0.757)
AP3	0.731 (95% CI: 0.663, 0.795)
AP4	0.795 (95% CI: 0.736, 0.849)
AP5	0.737 (95% CI: 0.647, 0.818)
PLAX	0.827 (95% CI: 0.763, 0.885)
PSAX-AV	0.839 (95% CI: 0.780, 0.891)
PSAX-PM	0.822 (95% CI: 0.744, 0.891)
PSAX-MV	0.784 (95% CI: 0.716, 0.846)
SC4	0.749 (95% CI: 0.676, 0.816)
SC-IVC	0.808 (95% CI: 0.725, 0.881)

2. Auto-Capture of clinically-acceptable images and clips (Table 6).

Table 6. Test results: Auto-capture functionality

View	PPV	AUC
AP2	0.913 (95% CI: 0.700, 1.060)	0.810 (95% CI: 0.761, 0.857)
AP3	0.910 (95% CI: 0.777, 0.998)	0.864 (95% CI: 0.827, 0.902)
AP4	0.950 (95% CI: 0.740, 1.010)	0.895 (95% CI: 0.860, 0.930)
AP5	0.953 (95% CI: 0.859, 1.008)	0.878 (95% CI: 0.846, 0.910)
PLAX	0.941 (95% CI: 0.818, 1.010)	0.903 (95% CI: 0.872, 0.933)
PSAX-AV	0.867 (95% CI: 0.617, 1.030)	0.871 (95% CI: 0.834, 0.908)
PSAX-PM	0.859 (95% CI: 0.688, 0.992)	0.831 (95% CI: 0.775, 0.887)
PSAX-MV	0.819 (95% CI: 0.670, 0.936)	0.849 (95% CI: 0.811, 0.887)
SC4	0.784 (95% CI: 0.578, 0.934)	0.837 (95% CI: 0.789, 0.886)
SC-IVC	0.769 (95% CI: 0.522, 0.966)	0.902 (95% CI: 0.857, 0.948)

Furthermore, the subject device's algorithm was tested for the performance of providing Prescriptive Guidance (PG), using the following tasks:

1. Frame-level PG prediction of the probe maneuver needed to acquire an image/frame of heart, for a specific view.
2. Clip-level PG prediction of the probe maneuver needed to acquire a diagnostic quality clip for a specific view (Table 7).

Table 7. Test results: PG-clip level

View	PPV
AP2	0.939 (95% CI: 0.893, 0.975)
AP3	1.000 (95% CI: 1.000, 1.000)
AP4	0.950 (95% CI: 0.902, 0.982)
AP5	0.991 (95% CI: 0.973, 1.000)
PLAX	0.756 (95% CI: 0.644, 0.864)
PSAX-AV	1.000 (95% CI: 1.000, 1.000)
PSAX-PM	0.953 (95% CI: 0.910, 0.990)
PSAX-MV	0.993 (95% CI: 0.979, 1.000)
SC4	0.949 (95% CI: 0.877, 1.000)
SC-IVC	1.000 (95% CI: 1.000, 1.000)

Overall, the non-clinical performance testing results provide evidence in support of the functionality of Caption Guidance fundamental algorithms in accordance with Caption Health's PCCP.

Chapter 3

Operator-Safety Considerations

Healthy ergonomic practices

The operation of an ultrasound system may be linked to musculoskeletal disorders (MSDs). In ultrasound imaging, ergonomics may be defined as the physical interaction between the operator, the system, and the probe during exams. It is important for the operator of the system to practice good ergonomic techniques to reduce the risk of injury. This section provides guidelines to help you work more comfortably to possibly reduce the risk of musculoskeletal disorders.

When using an ultrasound system, as with many similar physical activities, you may experience occasional discomfort in your hands, fingers, arms, shoulders, eyes, neck, back, or other parts of your body. If you experience symptoms such as constant or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensation, or stiffness, you should promptly consult a qualified health professional. These may be symptoms of MSD. MSDs can be painful and may result in potentially disabling injuries to the nerves, muscles, tendons, joints, or other parts of the body. Examples of MSDs include carpal tunnel syndrome and tendinitis.

Described here are steps you can take to guard against discomfort while scanning or the risk of MSDs. It is also recommended that you consult the guidelines of professional medical societies concerned with ultrasound.

Rest breaks

- In between exams, take breaks to rest and give your body a chance to recuperate from the strained positions and repetitive movements of examinations.
- While scanning, avoid maintaining the same body position for extended periods of time by moving and varying your head, neck, body, arm, and leg positions.

Body position

- Avoid bending or stooping.
- Adjust the position of the device so that viewing or reaching the Caption Guidance controls does not require strained or awkward body positions.

- Whenever possible, use an adjustable chair with good back support, and adjust the chair height to promote good body posture. If possible, adjust the height of the patient bed to optimize body posture.
- Maintain a comfortable and balanced body position with minimal stress on your joints, minimizing bending and twisting.
- Keep your elbow close to your side and relax your shoulders in a level position. Hand and wrist positions.
- Do not grasp the probe with excessive force; hold it as lightly as possible, but firmly.
- Minimize the amount of pressure applied when pressing the probe against the patient.
- Avoid or minimize bending your wrist.

Exercise and stretching

Targeted exercises and stretching may help you avoid the risk of MSDs. Consult with a qualified health professional to define a program suited to your needs.

Chapter 4

Configuring Caption Guidance

System components

Caption Guidance is a software-only device for assisting medical professionals in performing echocardiographic studies. Caption Guidance is used in conjunction with the following third-party products:

- GE Venue
- GE Venue Go
- GE Venue Fit
- 3Sc Shock/Cardiac probe
- M5Sc Shock/Cardiac probe

NOTE

Your customer service representatives can provide support for setting up Caption Guidance. Please contact your local representative for assistance.

Configuration and setup must be done in compliance with your network security policies. Refer to the ultrasound system's User Manual for more information on network setup.

To ensure proper operation of Caption Guidance for patient scanning, system setup and configuration should be performed by your ultrasound service representative or a qualified biomedical engineer.

Only an authorized IT administrator who logs into the system using their security credentials should configure Caption Guidance to communicate with the PACS server.

Connecting to the network

Refer to the ultrasound system's User Manual for more information on network setup, Including setting up DICOM connections and sending studies to a PACS server.

Starting Caption Guidance

► To Start Caption Guidance

1. Start up your GE Venue ultrasound machine and select the **Scan** button.
2. Select the probe icon. A list of presets will appear. Select **Cardiac** from the list.
3. To enable Caption Guidance software, open **Auto Tools** and select **Guidance**.

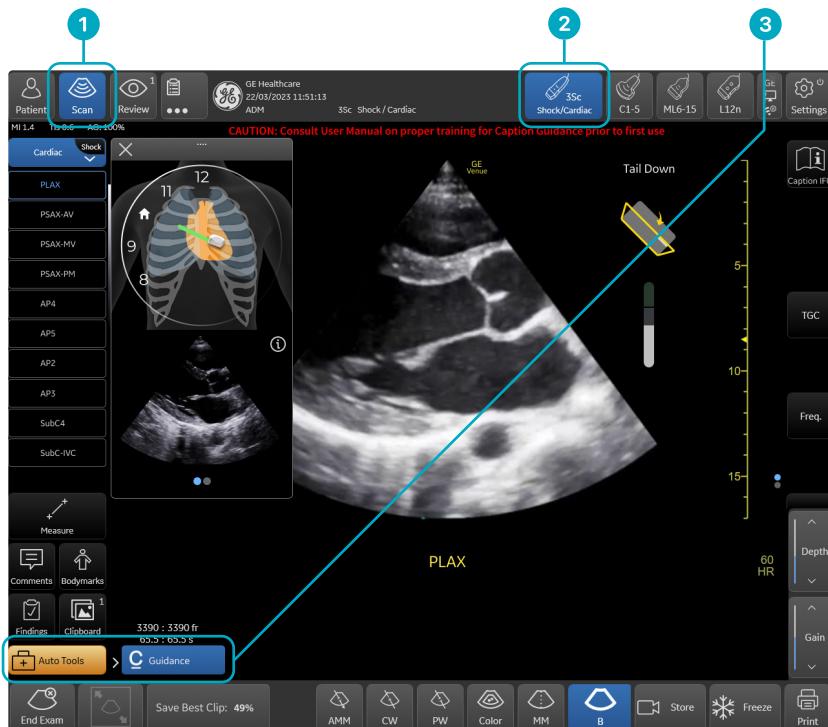


Figure 2. Access Caption Guidance

NOTE

Caption Guidance training is required before first use of the software.

Once trained, you can begin scanning with Caption Guidance on the GE Venue.

Operator's Manual
Chapter 4: Configuring Caption Guidance

The default protocol will appear on the screen. This is a standard 10 view protocol.

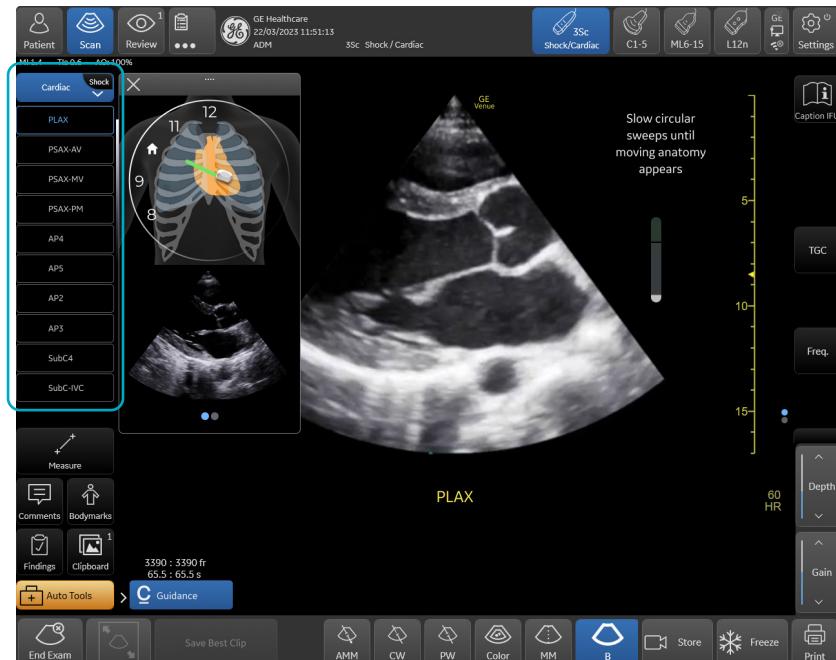


Figure 3. Scanning protocol

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Chapter 5

Setting Up for an Exam

Working with scanning protocols

During a Caption Guidance exam, you follow a protocol that specifies the views you'll acquire for the study. Caption Guidance's default protocol is a standard 10 view protocol (also known as the long protocol) that includes PLAX, PSAX-AV, PSAX-MV, PSAX-PM, AP4, AP5, AP2, AP3, SubC4, and SubC-IVC.

Creating custom scanning protocols

The default protocol can be changed by going into your system settings, selecting **Config** and then selecting **Guidance**. Using the radio buttons, switch the default protocol from long to short and deselect any views you would like to remove from the protocol.

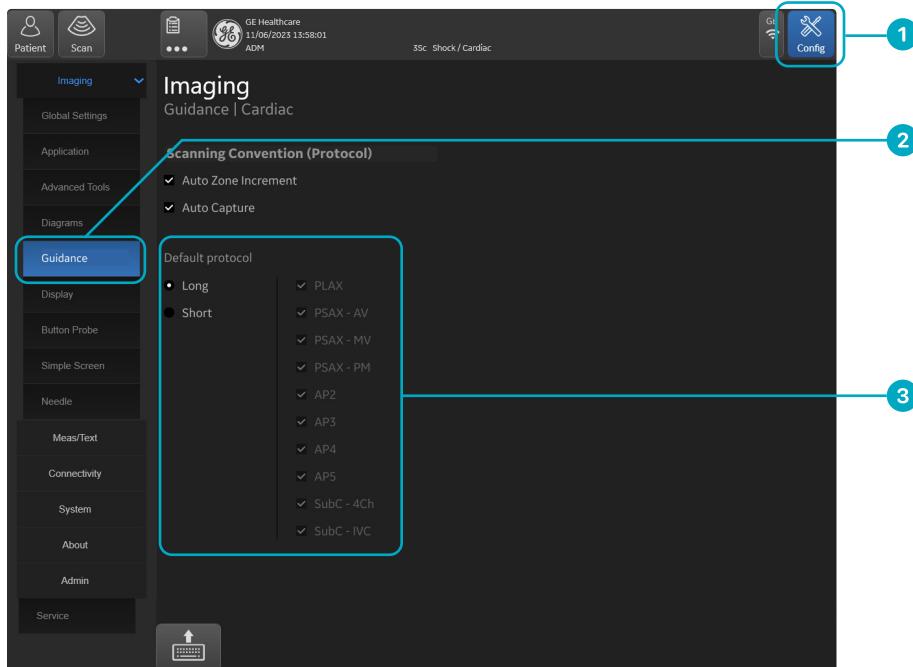


Figure 4. Creating a custom scanning protocol

Turning off AutoCapture

Caption Guidance comes with the AutoCapture feature turned on by default. If, however, you would like to acquire clips manually, you can turn off AutoCapture in the system settings.

For more information on the AutoCapture feature, see "AutoCapture" on page 50.

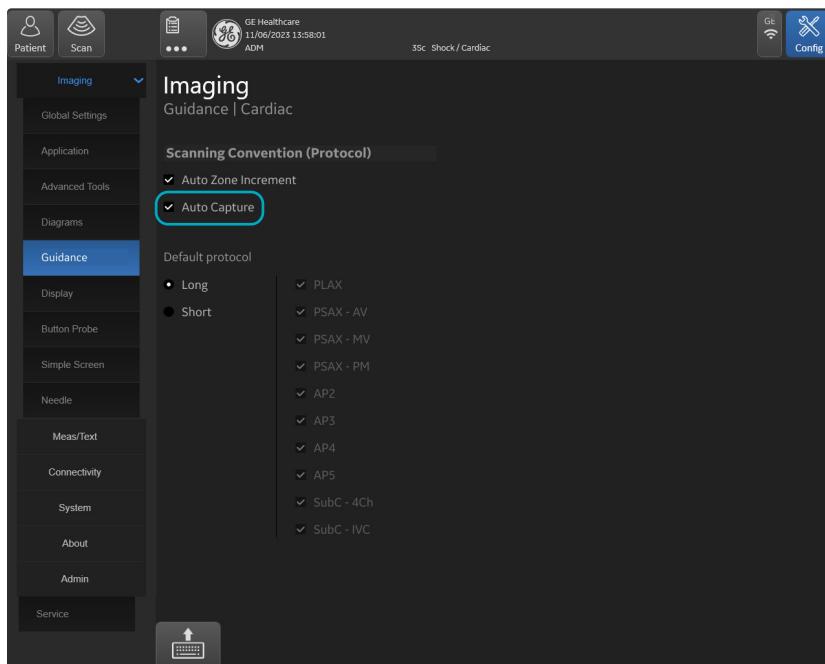


Figure 5. Turn-off AutoCapture



CAUTION

Manual recording should be used only by those users who are able to determine, without the assistance of Caption Guidance, that a clip is of sufficient diagnostic quality.

Turning off Auto Zone Increment

The purpose of Auto Zone is to advance the user to the next view in the protocol after a clip has been successfully captured. If this feature is turned off, the user will need to manually advance to the next view in the protocol.

Caption Guidance comes with Auto Zone increment turned on by default. If, however, you would like to advance through a protocol manually, you can turn off Auto Zone Increment in the systems settings.

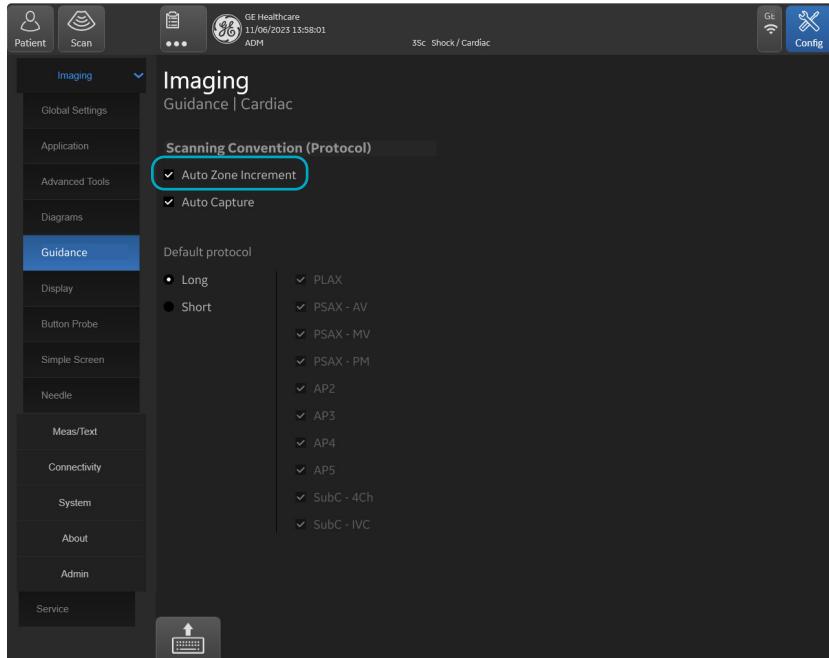


Figure 6. Turning off Auto Zone increment

Selecting the scanning convention

By default, the Venue system is set to scan in the cardiology convention. If the convention is changed to radiology, the radiology convention will be applied to Caption Guidance.

Before scanning, ensure your Venue system is set to the appropriate scanning convention as you will not be able to change the convention once you begin scanning.

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Chapter 6

Scanning with Caption Guidance

NOTE

If you are not familiar with performing an ultrasound exam using Caption Guidance, make sure that you receive the appropriate training before using the system, provided either by Caption Health or by a trained clinician using official Caption Guidance training materials.

Before you perform a Caption Guidance exam, it is vital that you are familiar with the integrated ultrasound system. See the ultrasound system's User Manual for more information before use.

Starting Caption Guidance

► To Start Caption Guidance

1. Start up your GE Venue ultrasound machine and select the **Scan** button.
2. Select the probe icon. A list of presets will appear. Select **Cardiac** from the list.
3. To enable Caption Guidance software, open **Auto Tools** and select **Guidance**.

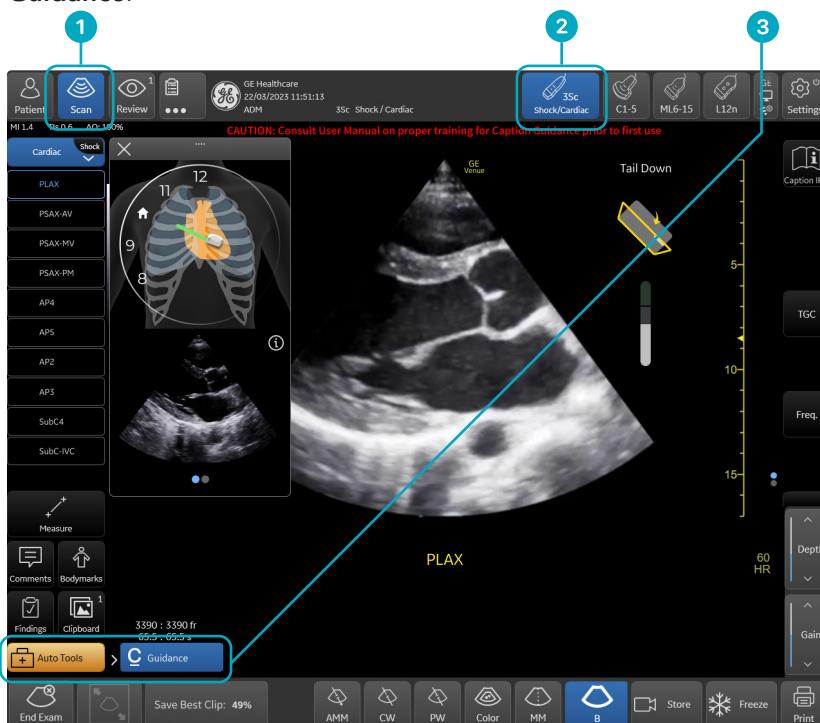


Figure 7. Access Caption Guidance

The last protocol chosen will be the protocol that is loaded for scanning. If this is the first use of Caption Guidance, the default **Long Protocol** will be applied.

The Caption Guidance ultrasound display and controls

The first view you will be prompted to scan is based on the protocol you selected.

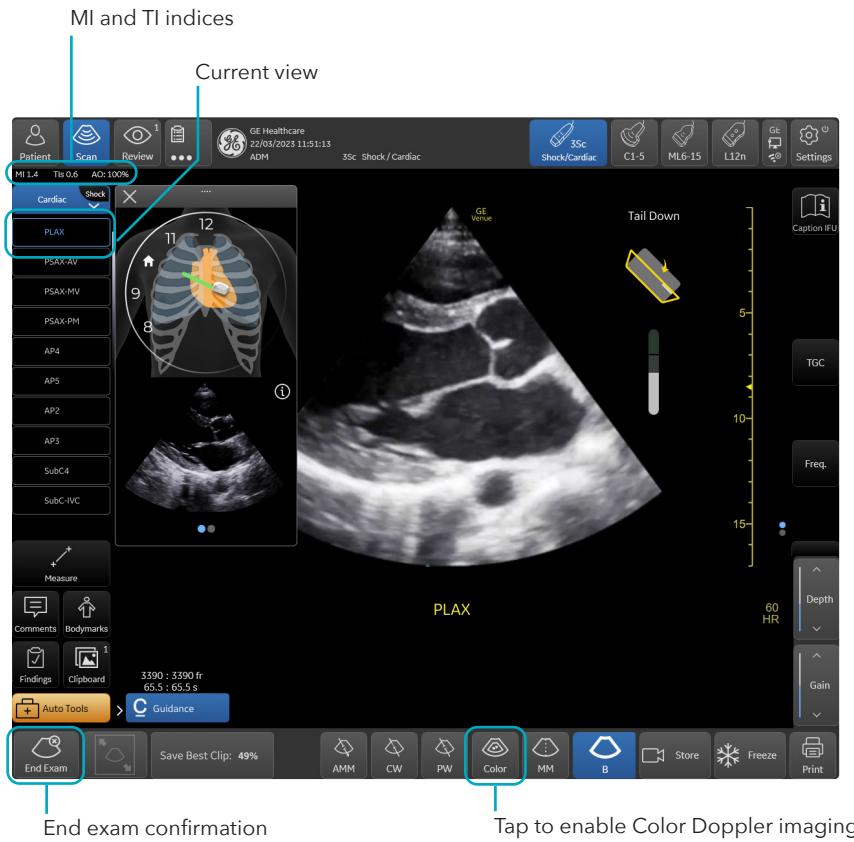


Figure 8. Basic ultrasound display controls

This screen has the following basic features:

- **Details panel** displays the current view in the sequence you are about to record and the following views in the protocol. In this example, you can see the current view is PLAX. Initial probe placement information and a reference image are also shown to guide users to the ideal starting position.

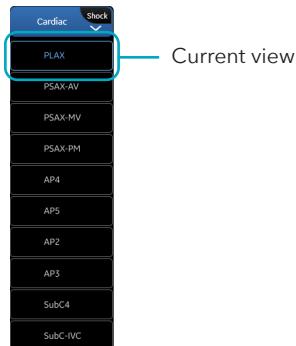


Figure 9. Details panel

- **Color Doppler** allows you to go into Color Doppler mode.
- **MI and TI indices** provide real-time display of the thermal and mechanical acoustic output indices. It is important to observe the MI and TI values during scanning. When conducting ultrasound studies, follow the ALARA principle: expose the patient to ultrasound energy at a level that is "As Low As Reasonably Achievable." Please read your ultrasound system's User Manual for important information about acoustic output and ALARA.
- **Depth** changes the field of view of the image. Changes are in one-centimeter increments. Each view has a default depth setting that provides a good starting point for typical cases. The depth controls are located on the right side of the screen. To adjust the depth, tap the "Depth" button and use the slider to adjust depth as necessary.
- **Gain** controls the overall amplification of the image signal. Setting gain properly, not so high as to introduce extraneous noise or so low as to make targets difficult to distinguish, may optimize the operation of the Quality Meter. Each view has a default gain setting that provides a good starting point for typical cases. The gain controls are located on the right side of the screen. To adjust the gain, tap the "Gain" button and use the slider to adjust depth as necessary.
- **End Study** closes the current study and saves all the clips that have been recorded for this exam. If you have not recorded all the views for the exam, you will be asked to confirm that you want to stop the exam.

NOTE

When you save a study, you cannot reopen it later to add new clips or redo existing ones. You can only update patient information, delete the study, or send it to the DICOM PACS. See the ultrasound system's User Manual for working with saved studies.

Setting up your scan

On the scanning screen, the following features help you set up your scan.

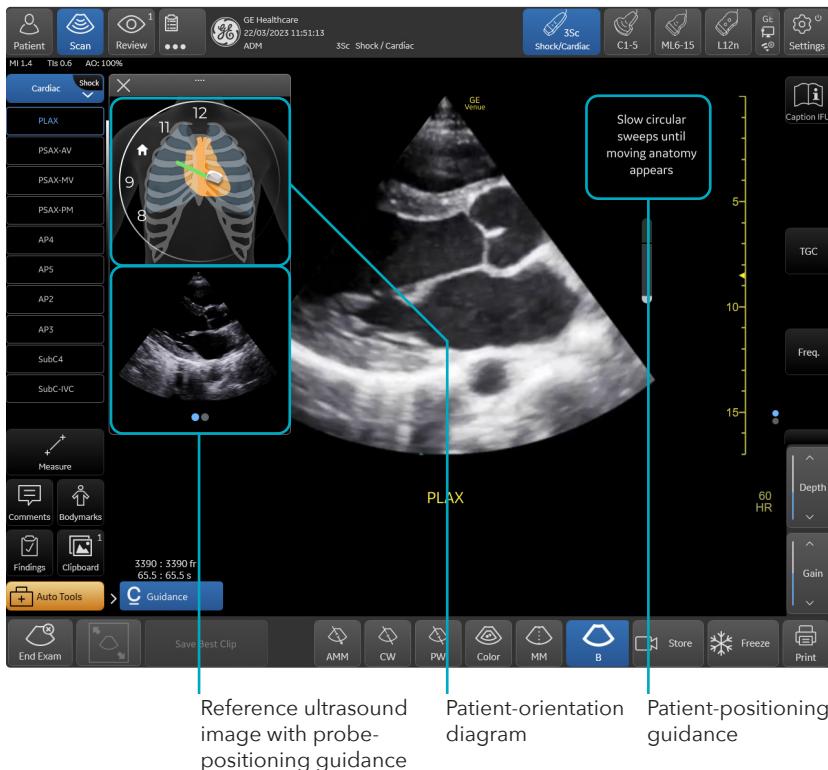


Figure 10. Ultrasound display: features for setting up to scan

- The **reference ultrasound image** is an example of an optimized image for the view you are acquiring. For each view in the protocol, the system displays the reference image.
- **Patient-positioning guidance** appears for the first view in each acoustic window—Parasternal Long-Axis (PLAX), Apical 4-Chamber (AP4), and Subcostal 4-Chamber (SubC4)—and tells you how to position the patient for those views.

- **Probe-positioning guidance** appears on the reference image for the first view in each acoustic window—Parasternal Long-Axis (PLAX), Apical 4-Chamber (AP4), and Subcostal 4-Chamber (SubC4)—and tells you how to position the probe before you start scanning.
- The **probe-orientation diagram** shows where on the patient's body to place the probe and the direction in which to point the indicator for this view. The probe indicator should point in the direction shown by the green line. The “clock” numbers indicate the region in which you may need to explore, because the optimal direction will vary based on the patient.

Starting and optimizing your scan

To optimize your scan, Caption Guidance provides real-time guidance, which is described next.

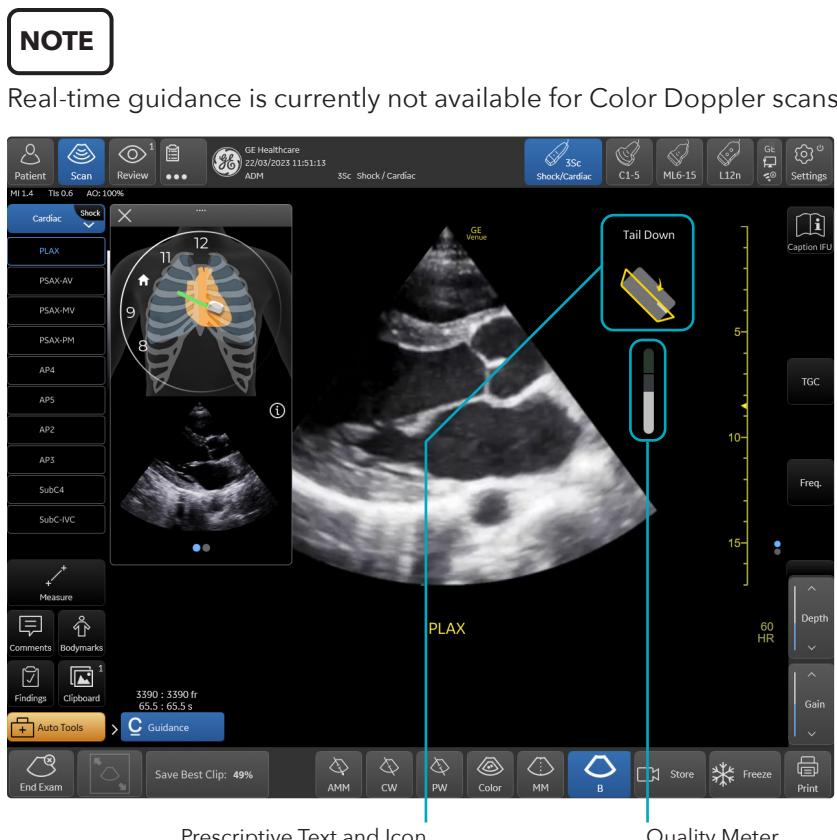


Figure 11. Ultrasound display: real-time guidance

- The **Quality Meter** provides real-time feedback as you scan. The bars indicate how close you are to the optimal probe position and orientation. As you get closer, the meter changes color from gray, to yellow, to green, which indicate the diagnostic-quality threshold. When the meter reaches or exceeds this threshold, Caption Guidance automatically records the clip (provided AutoCapture is turned on; it is on by default).

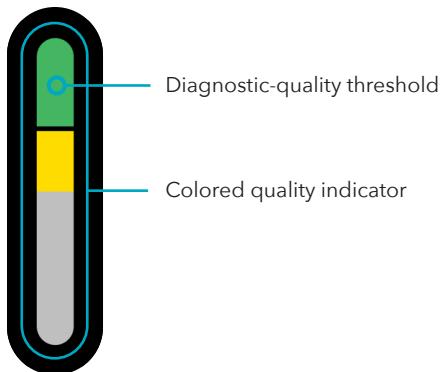


Figure 12. Quality Meter: basic features

- Prescriptive Guidance** may appear while you are scanning. Caption Guidance presents guidance on how to adjust the probe to optimize the image. This guidance appears as text and, in many cases, as an icon on the active-image area of the screen.

When Prescriptive Guidance appears, follow the suggestions until they disappear. If you make the adjustments correctly, Prescriptive Guidance disappears and the Quality Meter rises as the image quality gets closer to diagnostic quality. Yellow bars in the Quality Meter mean that you should make smaller, fine-tuned movements. Green bars mean the image is of diagnostic-quality.

The types of Prescriptive Guidance the system presents are shown in Table 5, below. The icons represent the face of the probe; the white line is the probe indicator.

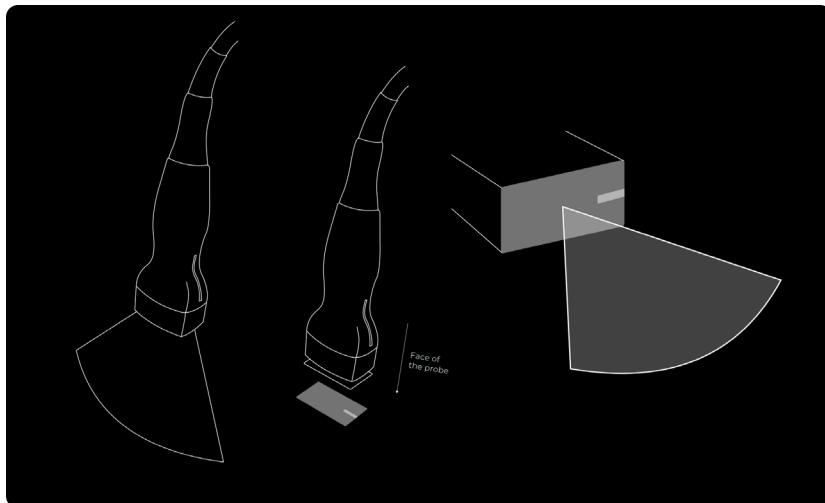


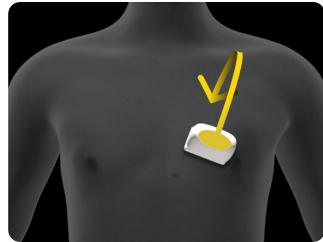
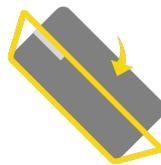
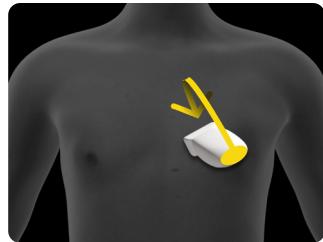
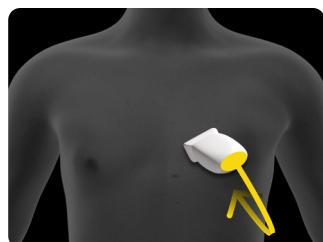
Figure 13. Visualization for Prescriptive Guidance probe movement icons

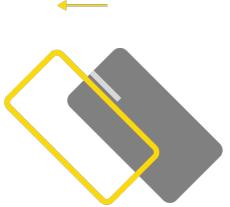
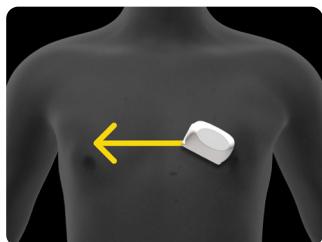
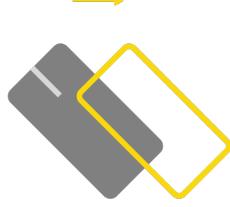
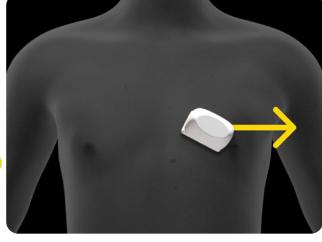
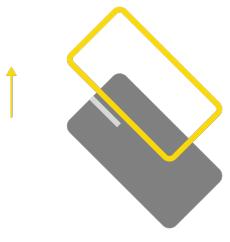
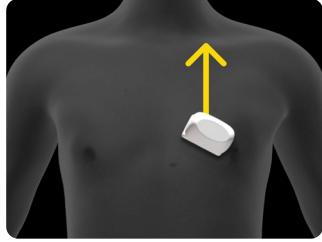
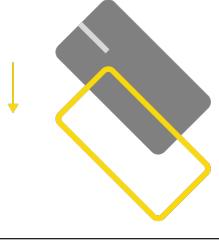
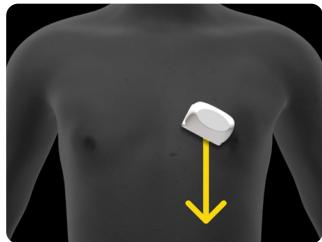
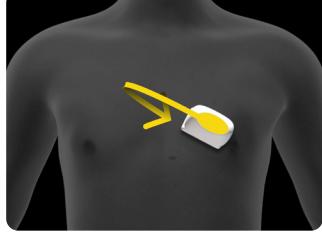
NOTE

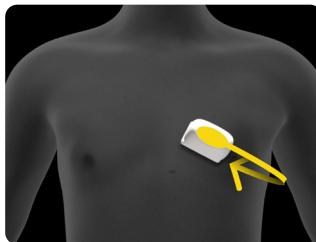
All probe movements are in relation to the patient. For example, when the guidance says, "Tail slowly more lateral," it means to move the tail away from the patient's midline. Tailing is always on the longer, non-indicator axis of the probe face, whereas rocking is always on the shorter, indicator axis.

Table 8. Prescriptive Guidance examples

On-screen	Icon	Movement/Action
Rotate clockwise		

On-screen	Icon	Movement/Action
Rotate counter clockwise		
Tail up		
Tail down		
Tail medial		
Tail lateral		

On-screen	Icon	Movement/Action
Slide medial		
Slide lateral		
Slide up		
Slide down		
Rock towards indicator		

On-screen	Icon	Movement/Action
Rock away from indicator		
Increase depth		Tap the highlighted button and use slider to adjust.
Decrease depth		Tap the highlighted button and use slider to adjust.

If Caption Guidance does not detect any visual structures, it prompts you with a different message, depending on the view. For the PLAX and AP4 views, it says, "Slow circular sweeps until moving anatomy appears," and for the SubC4 view it says, "Slowly increase pressure until moving anatomy appears." See the troubleshooting tips in your training materials. Some techniques to try including rolling the patient, using respiratory prompts such as taking a slow breath in, or resetting the probe to the correct echo region.

Recording a clip

Caption Guidance provides three ways to capture clips: AutoCapture, Save Best Clip, and manual recording. The default method is AutoCapture. Manual recording should be used only by those users who are able to determine, without the assistance of Caption Guidance, that a clip is of sufficient diagnostic quality. Manual recordings are captured by selecting **Store** on the screen and continuing to scan. Select **Store** a second time to

save your clip once you believe you have captured a clip of diagnostic-quality.

AutoCapture

The AutoCapture function automatically records a clip if the image quality exceeds the diagnostic-quality Quality Meter threshold and stays above it for at least 2 seconds. If you maintain the image above the diagnostic-quality Quality Meter threshold for more than 2 seconds, Caption Guidance will capture a longer clip, up to 4 seconds. Recordings will capture 62-124 frames, depending on how long you keep the image quality above the threshold. By capturing 2-4 seconds of frames, Caption Guidance will capture at least one complete heart cycle, provided the heart rate is not lower than 30 beats per minute.

You can turn AutoCapture on and off in the settings of the system. See Chapter 5: Setting up for an exam.

After Caption Guidance has recorded the clip, it progresses you to the next view to acquire in the protocol.

► To record a clip using AutoCapture

1. Position the patient according to the positioning guidance.
2. Position the probe on the patient according to the probe-position and acoustic-window guidance, with the probe indicator pointing in the direction of the green line and clock ranges.
3. As you scan, watch the screen and follow any Prescriptive Guidance suggestions that appear, such as rotating the probe or changing the depth (see Table 2 for an explanation of Caption Guidance's Prescriptive Guidance).

The Quality Meter will rise and fall (while changing color) based on the optimal position and orientation of the probe for the view being scanned. Your goal is to reach the diagnostic-quality threshold, indicated by the break in the Quality Meter bar and the bar turning green in color.

If the Quality Meter turns yellow, it means that you are getting close to the optimal position and should make smaller, more finely tuned movements.

When the Quality Meter turns green, that means the ultrasound image has exceeded the diagnostic-quality threshold and Caption Guidance immediately starts recording the clip. A hand icon and

"Hold for recording" appears at the top of the screen; the **Record** button turns green, indicating that recording is in progress; and the ring around the button turns white as the recording progresses.

When the AutoCapture progress ring changes to a circle with square inside, it means that the image quality has been above the threshold long enough for the clip to be saved (at least 2 seconds), however you are encouraged to hold the image above the threshold for an additional 2 seconds, if possible.

NOTICE

To ensure a diagnostic-quality clip, maintain probe contact and position during recording for at least 2 seconds. If you move the probe or otherwise interrupt the recording, the clip will not be recorded.

When the clip has been recorded, you will hear a "beep" and the **Record** button displays a checkmark while Caption Guidance processes the clip.

When done processing, Caption Guidance proceeds to the next view in the workflow protocol. "Hold for recording..." appears at the top of the screen to indicate that Caption Guidance is processing the saved frames for storage. At this time, you may move the probe.

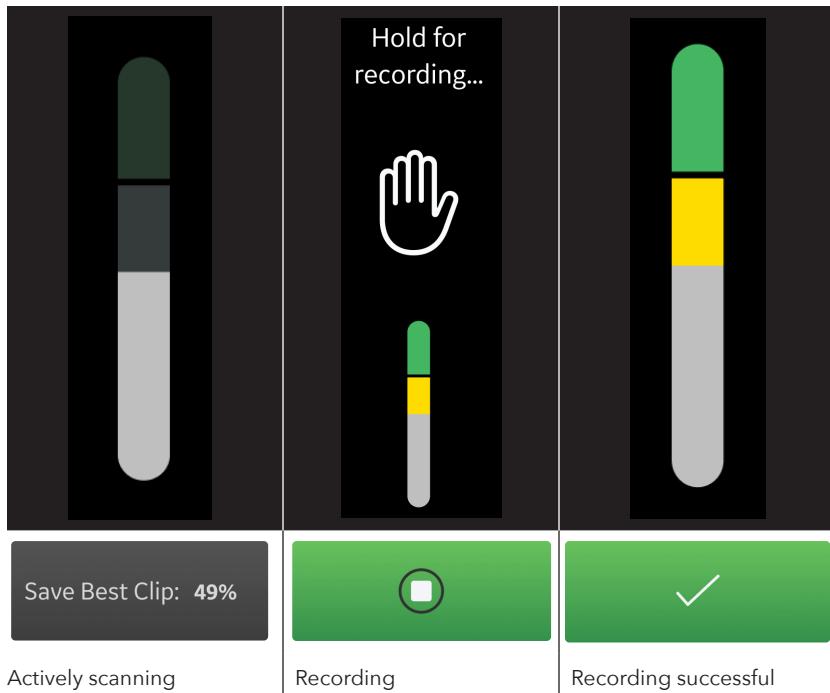


Figure 14. Quality Meter: AutoCapture states

Save Best Clip

Another way to record a clip is with the **Save Best Clip** feature, described below.

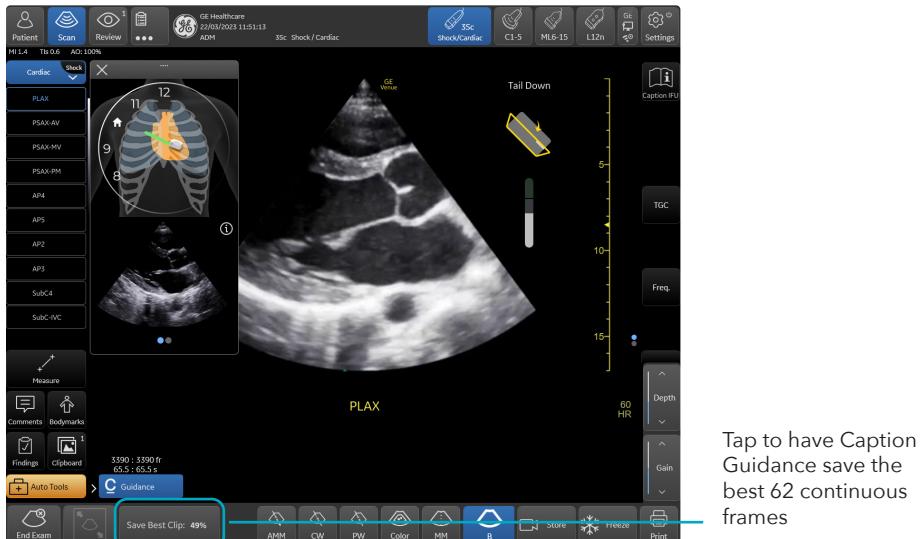


Figure 15. Save Best Clip feature

The **Save Best Clip** button appears after you have been scanning for some time without getting what Caption Guidance determines is a diagnostic-quality image. The button displays a quality “score,” which indicates how close your best clip is to the diagnostic-quality threshold. The score is updated at regular intervals as you continue to scan and helps you decide when to save the best clip that the system has seen and move on. If the quality score and image are satisfactory, tap **Save Best Clip**. Otherwise, continue scanning, following the Prescriptive Guidance and general suggestions, to try to get a better-quality image.

NOTE

Certain actions, such as freezing the image, entering Color Doppler mode, or exiting Caption Guidance will clear the Save Best Clip image buffer. If you have a clip in the Save Best Clip image buffer that you would like to store to the study, tap **Save Best Clip** to save your image loop before making the change.

Manual recording

If you are an experienced user and are able to determine whether a clip is of sufficient diagnostic-quality without the assistance of Caption Guidance, such as a trained sonographer, you might choose to manually record clips. Manual recording is the only way to capture clips for Color Doppler scans.

To manually record a clip, tap the **Store** button. When you have captured the requisite number of frames, select the **Store** button again to complete the manual recording.

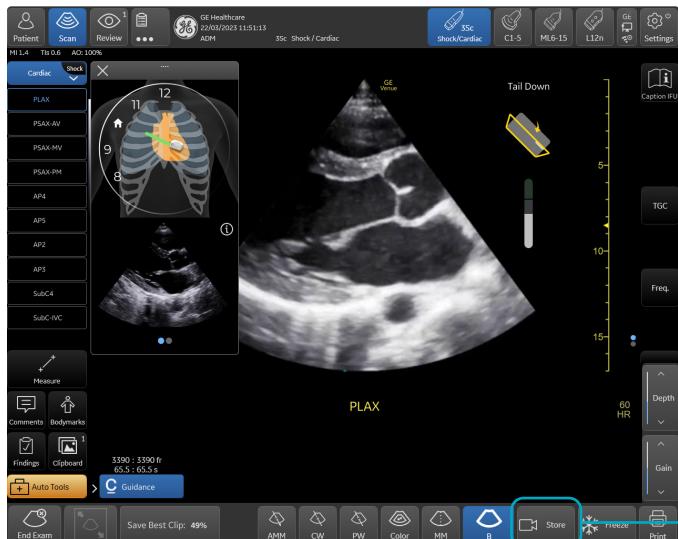


Figure 16. Record button: manual recording



When you manually record a clip, Caption Guidance assigns the active view label to the saved clip. To avoid a mismatch between the label and the actual view captured, confirm that the view you are saving manually is listed at the top of the screen.



Caption Guidance always presents the Quality Meter and Prescriptive Guidance during scanning of guided echo views, but because manual recording is always available during scanning, and manual recording is the only option for Color Doppler views, Caption Guidance cannot guarantee the quality of manually captured clips.

Freeze

The Venue "Freeze" functionality is available while Caption Guidance is on. If a user clicks **Freeze** the user will temporarily exit Caption Guidance. When the user exits **Freeze** they will be returned to their last step in the Caption Guidance protocol.

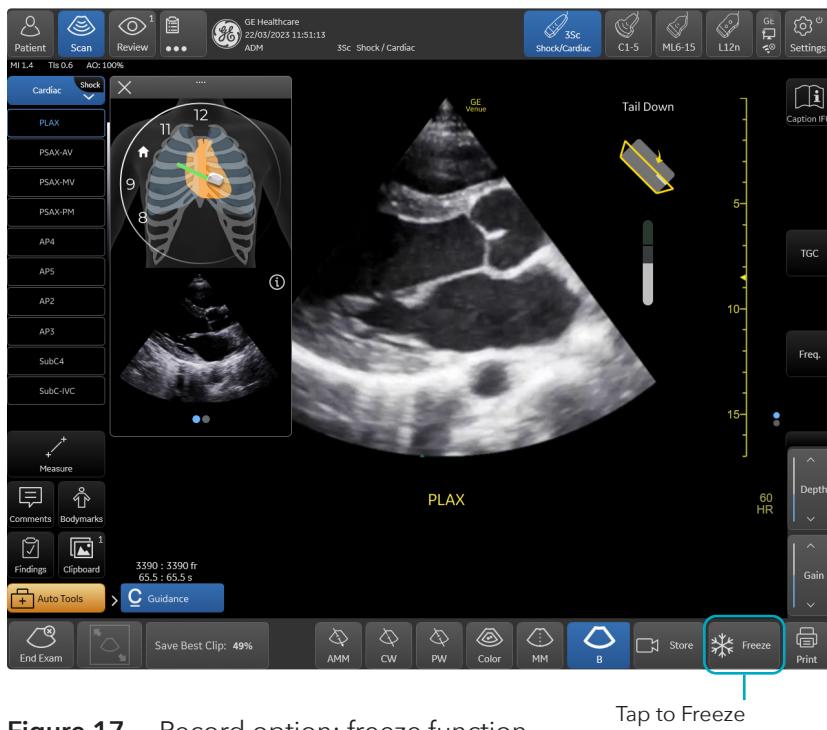


Figure 17. Record option: freeze function

Tap to Freeze

Non-sequential scanning

By default, when you record a study, you step through the views according to the protocol you are using for the exam. However, you may decide that you do not want to record a particular view or that you want to record a clip again before moving on to another view. Caption Guidance allows you to diverge from the protocol to meet the needs of the specific exam and patient. You can move between views, whether or not you have recorded clips for those views, and you can skip views you do not want to scan.

► To move between views

- On the left side panel all views in the scanning protocol are visible.

From here, you can select and progress your study to any view in the protocol that you would like to acquire.

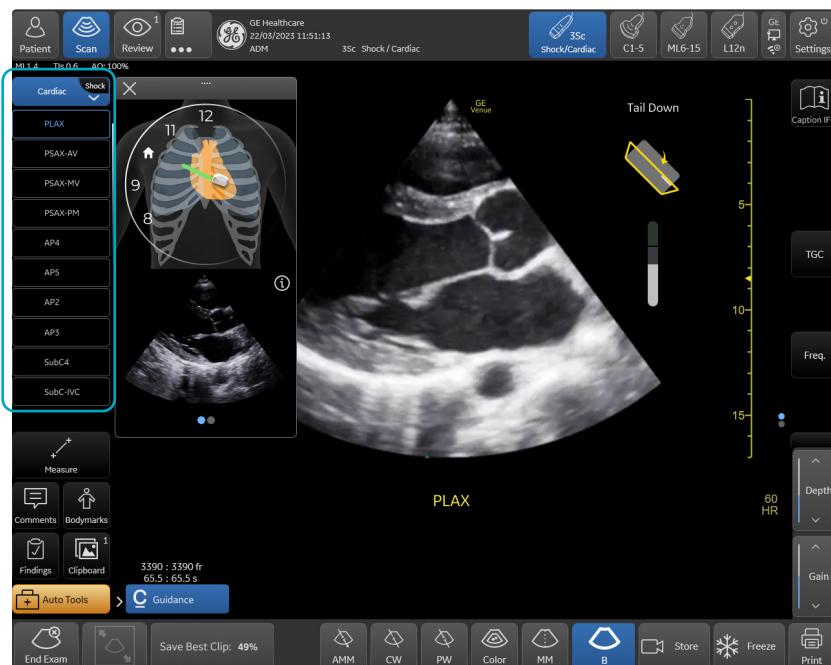


Figure 18. Scanning protocol list

Recording a clip with Color Doppler

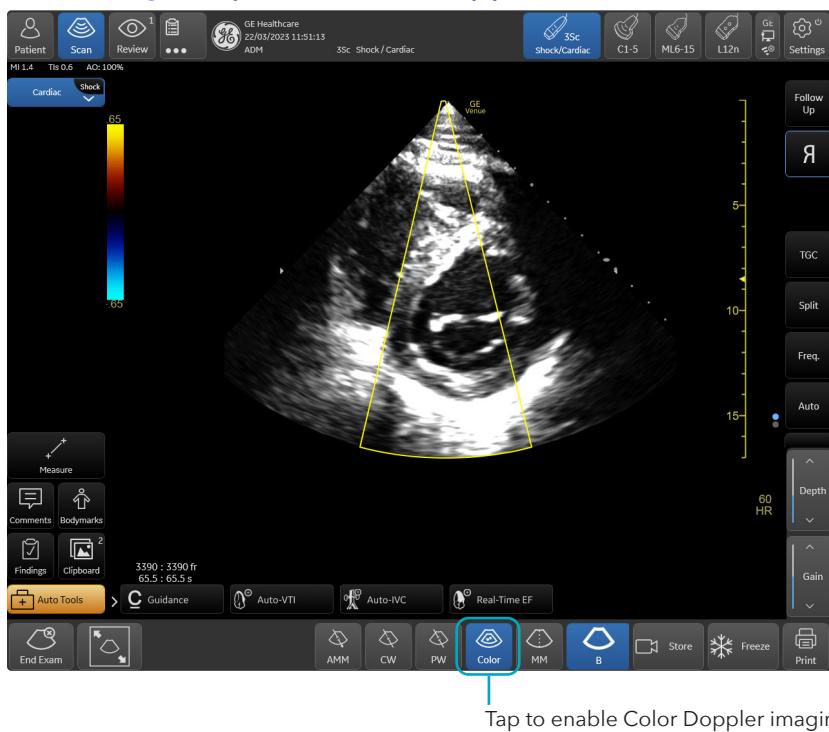


Figure 19. Scanning screen: Color Doppler mode

NOTE

Guidance during Color Doppler imaging is not supported by Caption Guidance software. By choosing to capture a view using Color Doppler clip, a manual recording is necessary. Refer to your ultrasound system's labelling for how to use Color Doppler.

Reviewing acquired clips during an exam

After you have acquired all views in your study, you can review the images and end the exam.

Select the **Review** tab to view all collected clips. Thumbnails for all acquired views will be shown. A border around a thumbnail indicates the clip that appears in the image window.

Select the **Play** button to watch the clip back. You can also double tap the thumbnail to enlarge the clip for review. If you are not satisfied with a recording, you can re-record a view by going back into the **Scan** tab, selecting **Guidance** and the view you would like to re-record.

For information relating to saving a study, refer to your ultrasound system's User Manual.

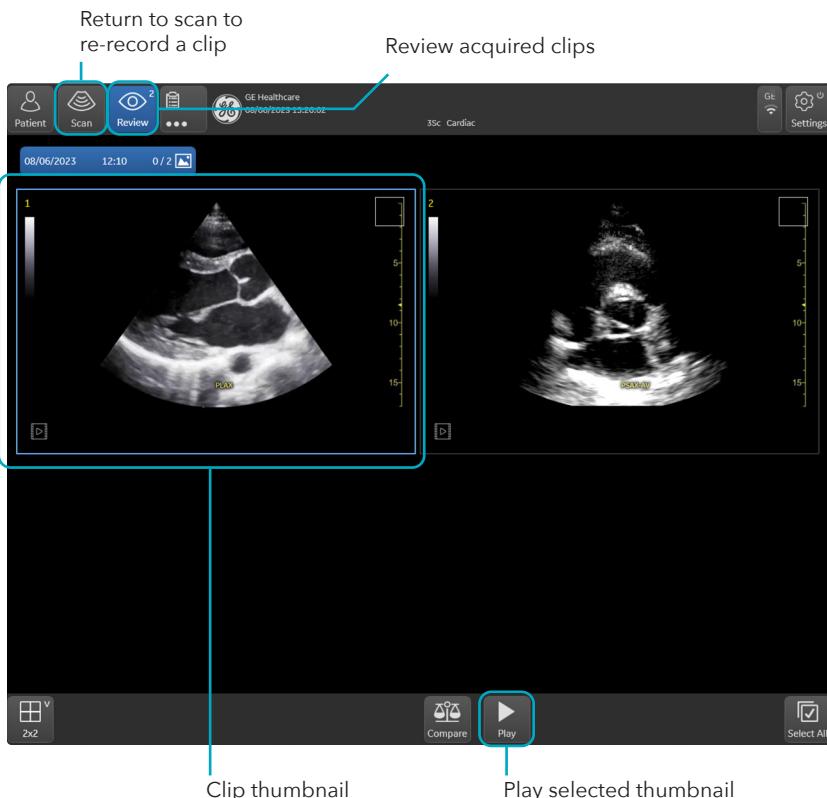


Figure 20. Reviewing recording clips

Ending an exam

After reviewing clips by playing back the thumbnails, select **End Exam**. This takes you to the "End Exam" page where you can confirm that you have acquired and are satisfied with your clips and would like to end the exam.

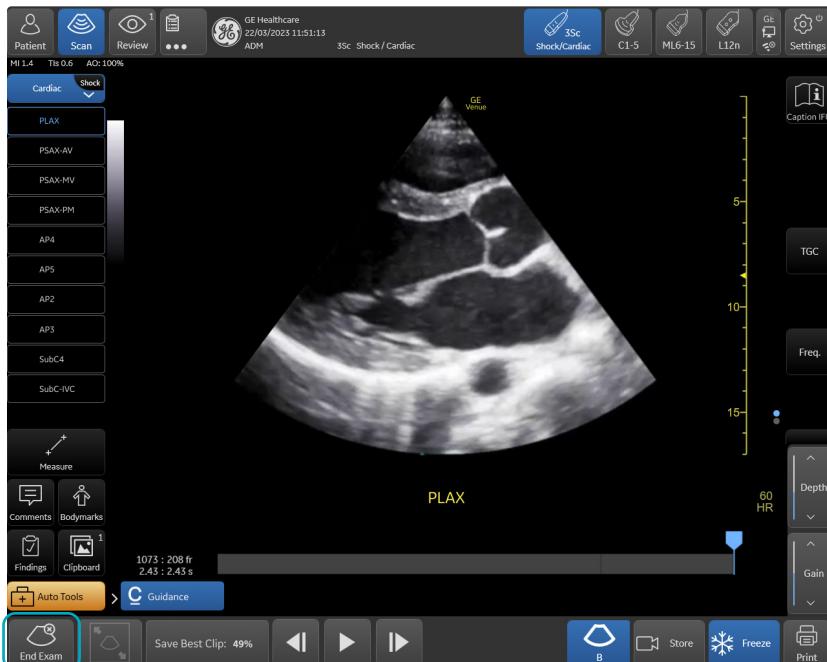
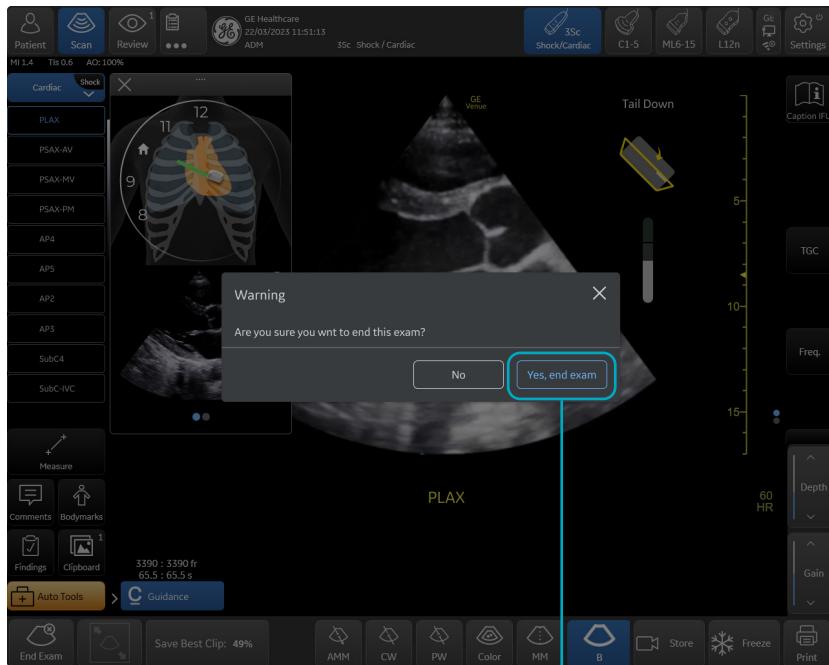


Figure 21. Ending an exam



End exam confirmation

Figure 22. End exam confirmation

Chapter 7

Working with Saved Studies

For information on working with saved studies, refer to your ultrasound system's User Manual.