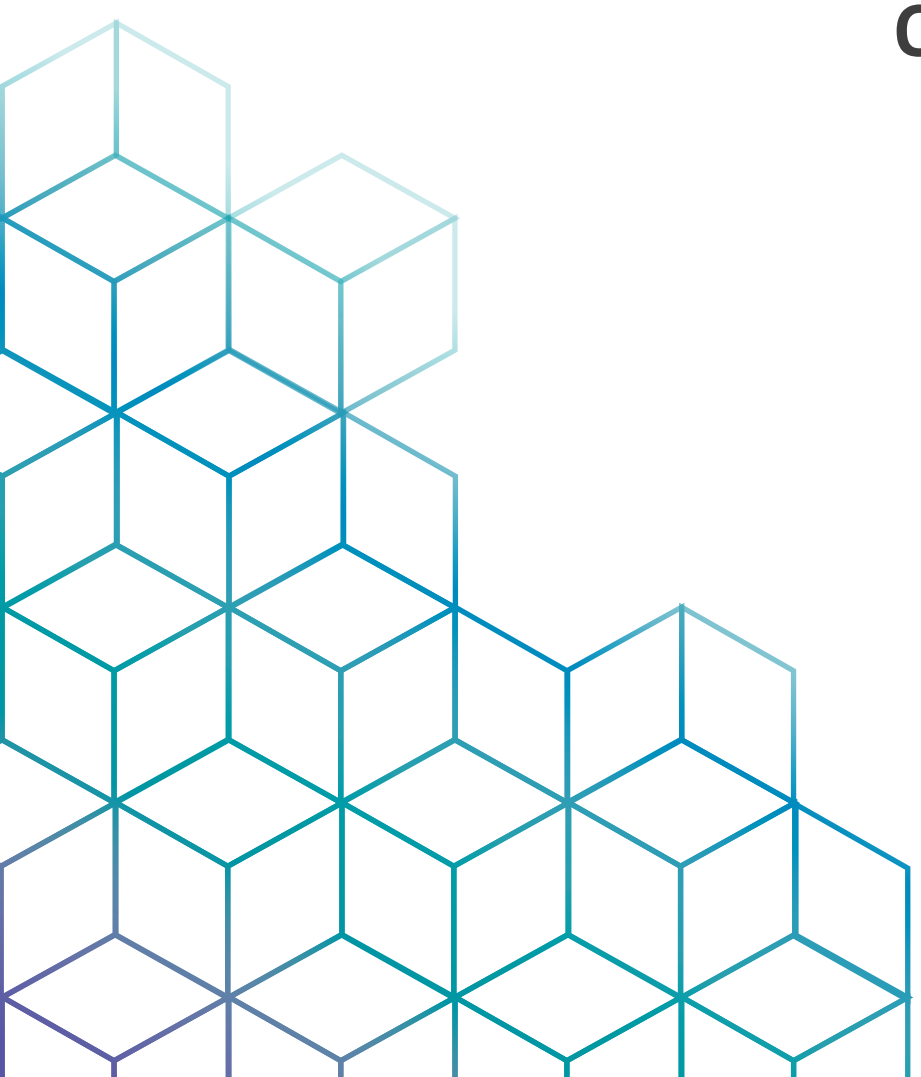
ALPINION
MEDICAL SYSTEMS

X-CUBE 70

DIAGNOSTIC ULTRASOUND SYSTEM

Quick Guide

Rev. 0 (ENG)
D/N: 70003656



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Original Documentation

Original Documentation

The original document was written in English and published in PDF File.

The English version of the user documentation is intended for the countries of the European Union, North or South America, Asia as well as other worldwide countries where the products are sales and used. In addition, the English version of the user documentation is designed so that the majority of people who are familiar with English can read and correctly understand the instructions.

The user documentation is translated into other languages so that most people who are familiar with languages other than English can read the instructions and understand them correctly. The translated user documentation is intended for users who speak the language of the country where they sell and use the product.

Please note that the authoritative source of information is the English version. If there is any conflict between the translated versions and the English, the latter takes precedence.

Precautions For Use

Precautions For Use

Be sure to read this manual and fully understand the operation of the product and the relevant safety information before using the product.

- Keep this manual near the product and refer to it when using the product.
- The contents and specifications described in this manual may be changed without notice.
- All important safety information in the **"4. Safety"** should be read and thoroughly understood before operating the unit.
- Be sure to read and fully understand the safety precautions identified by the following flag words and icons which precede the precautionary statement.

WARNING

WARNING indicates that a specific hazard is known to exist which through inappropriate conditions or actions may cause severe or fetal personal injury or substantial property damage.

CAUTION

CAUTION indicates that a potential hazard may exist which through inappropriate conditions or actions will or can cause minor poersonal injury or property damage such as loss of patient or system data.

NOTE

NOTE indicates precautions or recommendations that will help you operate the product more effectively.

- This product is intended for use by, or by the order of, and under the supervision of a licensed physician qualified to direct the use of the device.
- This product is intended for ultrasound diagnosis and cannot be used in your PC environment. We are not responsible for any problems that occur in such situations.

Regulatory Requirements

Classifications

- Type of protection against electrical shock: Class I
- Degree of protection against electrical shock (Patient connection): Type BF equipment
- Degree of protection against harmful ingress of water: Ordinary equipment and all of applied parts (IPX7, IPX8) except ECG meet ingress protection level according to IEC 60529.
- Degree of safety of application in the presence of a flammable anesthetic material with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation: Continuous operation

Electromechanical safety standards met

- MDD 93/42/EEC
- EN ISO 10993-1:2009 (ISO 10993-1:2009)
- EN ISO 10993-10:2013 (ISO 10993-10:2010)
- EN ISO 10993-5:2009 (ISO 10993-5:2009)
- EN ISO 13485:2016 (ISO 13485:2016)
- EN ISO 14155:2011+AC:2011 (ISO 14155:2011)
- EN ISO 14971:2012 (ISO 14971:2007)
- EN ISO 15223-1:2016 (ISO 15223-1:2016)
- EN 1041:2008+A1:2013
- EN 55011:2016+A1:2017 (CISPR 11:2015/AMD1:2016)
- EN 55032:2015 (CISPR 32:2015)
- EN 60601-1:2006+A1:2013 (IEC 60601-1:2005/AMD1:2012)
- EN 60601-1-2:2015 (IEC 60601-1-2:2014)
- EN 60601-1-6:2010+A1:2015 (IEC 60601-1-6:2010/AMD1:2013)
- EN 60601-2-37:2008+A11:2011+A1:2015 (IEC 60601-2-37:2007/AMD1:2015)
- EN 61000-3-2:2014 (IEC 61000-3-2:2018)
- EN 61000-3-3:2013 (IEC 61000-3-3:2013)
- EN 61000-4-11:2004 (IEC 61000-4-11:2004)
- EN 61000-4-2:2009 (IEC 61000-4-2:2008)
- EN 61000-4-3:2006+A1:2008+A2:2010 (IEC 61000-4-3:2006/AMD2:2010)
- EN 61000-4-4:2012 (IEC 61000-4-4:2012)

- EN 61000-4-5:2014 (IEC 61000-4-5:2014)
- EN 61000-4-6:2014 (IEC 61000-4-6:2013)
- EN 61000-4-8:2010 (IEC 61000-4-8:2009)
- EN 62304:2006+A1:2015 (IEC 62304:2006/AMD1:2015)
- EN 62366-1:2015 (IEC 62366-1:2015)
- MEDDEV 2.12/2 Rev.2
- MEDDEV 2.7.1 Rev.4
- NEMA UD2:2004 (R2009)
- Medical Devices Regulations (SOR/98-282)
- 의료기기법, 의료기기법 시행령, 의료기기법 시행규칙

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CE 2460

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

Revision History

Revision History

The revision history of this manual is as follows.

Rev	Date (YYYY/MM/DD)	Description
Rev. 0	2021/04/26	Initial Release

Please verify that you are using the latest revision of this document. If you need to know the latest revision, contact your local agent or local Alpinion sales representative.

Table of Contents

1

Getting Started

This chapter introduces the followings:

Introduction

Documentation

The X-CUBE 70 Quick Guide (TRANSLATED) provides basic information needed by the user to operate the system safely.

For more information, see the X-CUBE 70 User Manual.

System Feature

Table 1-1 System feature

Physical Dimensions	• Height: 1440/1605 mm • Width: 580 mm • Depth: 835 mm • Weight: 85 kg (not including options)
Clinical Applications	• Abdomen • OB • GYN • Cardiology • Small Parts • MSK • Vascular • Urology • EM • TCD • Breast • Appendix
Available Imaging Modes	• 2D mode • Harmonic mode (HAR) • M mode • Color M mode • Anatomical M mode (AMM) • Color Flow Doppler (CF) mode • Power Doppler (PD) mode • Directional PD mode • Pulsed Wave Doppler (PWD) mode • Continuous Wave Doppler (CWD) mode • High PRF Doppler mode • Tissue Doppler Imaging (TDI) mode • 3D/4D mode

Image Processing Technology	• Xpeed™ • Full SRI™ • Spatial Compounding Image (SCI) • Panoramic • Live HQ™ • Needle Vision™ Plus • Contrast Enhanced Ultrasound (CEUS) • ECG • Elastography • X^+ Point Shear Wave • X^+ MicroView • Filter Method Tissue Harmonic Image (FTHI) • Pulse Inversion Tissue Harmonic Image (PTHI) • Raw Data Processing • Post Processing
Operable Transducers	• Pencil Doppler • Linear Array • Sector Phased Array • Convex Array • Endocavity • Volume Convex • Volume Endocavity
Measurement Package	Including reports for: • Abdomen • OB • GYN • Cardiology • Vascular • Urology • Pediatrics • Small Parts • Breast • MSK • EM

Available Measurements	• Distance • Ellipse • Trace • Spline • Velocity • Time • Slope • Acceleration • Auto Calculation • Semi-Auto Calculation • Auto IMT • Auto NT • Auto EF • X⁺ Auto Biometry
Connectivity	• Verification • DICOM Storage • DICOM Print • DICOM Storage Commitment • DICOM Media • DICOM Worklist • DICOM MPPS • DICOM Q&R • DICOM Structured Report (OB-GYN) • DICOM Structured Report (Echocardiography) • DICOM Structured Report (Vascular) • CUBE View™ • Cube Note • Network Storage • Wireless LAN (Option)
User Interface	• English • German • French • Spanish • Italian • Russian • Portuguese • Chinese

NOTE

Not all features, transducers, optional supplies or peripherals described in this document may be available or cleared for sale in all markets. Please contact your local agent or local Alpinion sales representative to get the latest information.

Console Overview

System_Front View

There are the main components of your system:

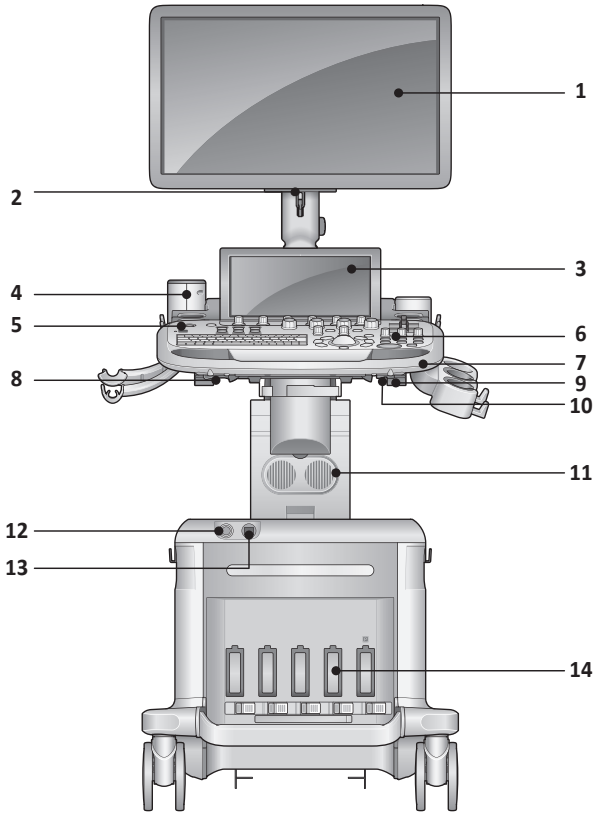


Figure 1-1 X-CUBE 70 System (Front view)

No.	Component	No.	Component
1	Monitor	**8**	Control panel swivel button
2	LED lamp	**9**	Transducer cable holder
3	Touch screen	**10**	Control panel up/down button
4	Gel warmer	**11**	Speaker
5	Transducer holder	**12**	CW port
6	Control panel	**13**	ECG port
7	Front handle	**14**	Transducer port

System_Rear View

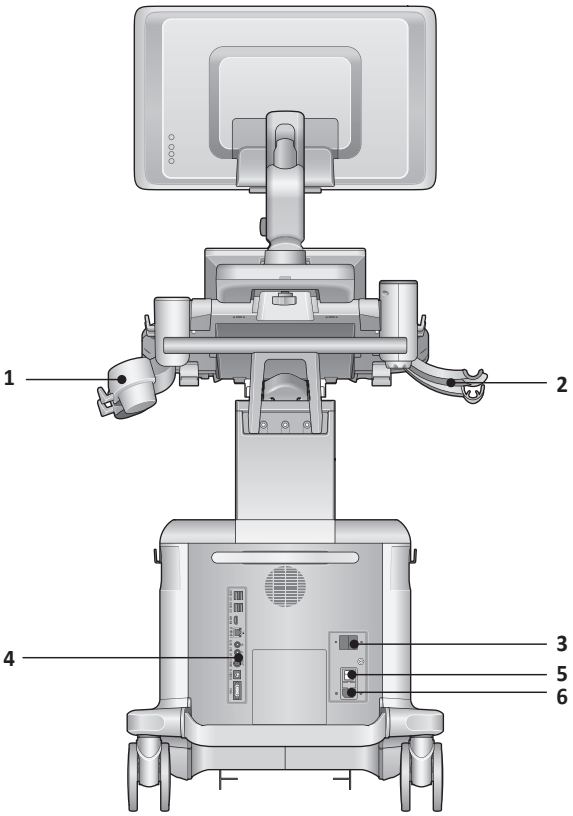


Figure 1-2 X-CUBE 70 System (Rear view)

No.	Component	No.	Component
1	Transducer holder	**4**	I/O panel
2	Endocavity transducer holder	**5**	System On/Off switch
3	AC outlet	**6**	AC inlet

NOTE

When connecting an external monitor to your system, use the monitor with 1366 x 768 or higher resolution.

System_Side View

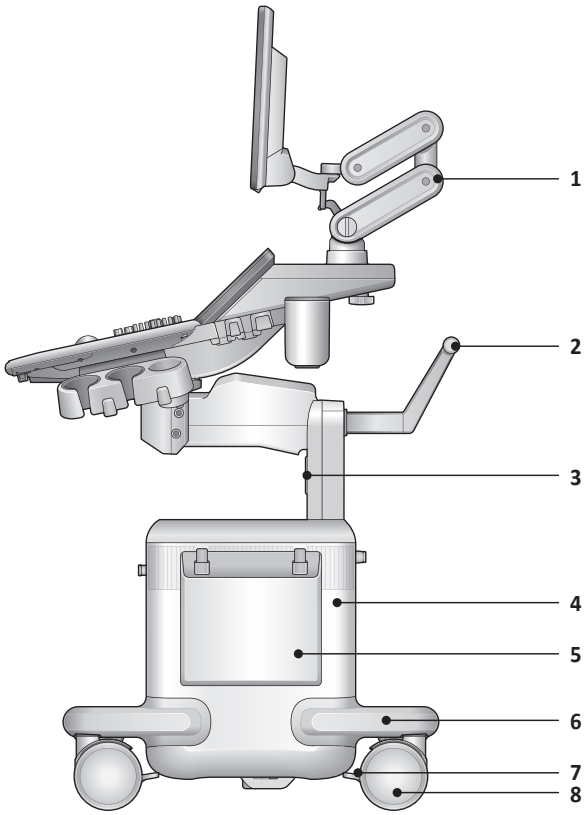


Figure 1-3 X-CUBE 70 System (Side view)

No.	Component	No.	Component
1	Monitor arm	**5**	Side tray (Option)
2	Rear handle	**6**	Body base
3	Speakers	**7**	Caster lock
4	Body cover	**8**	Caster

Monitor and Touch Screen

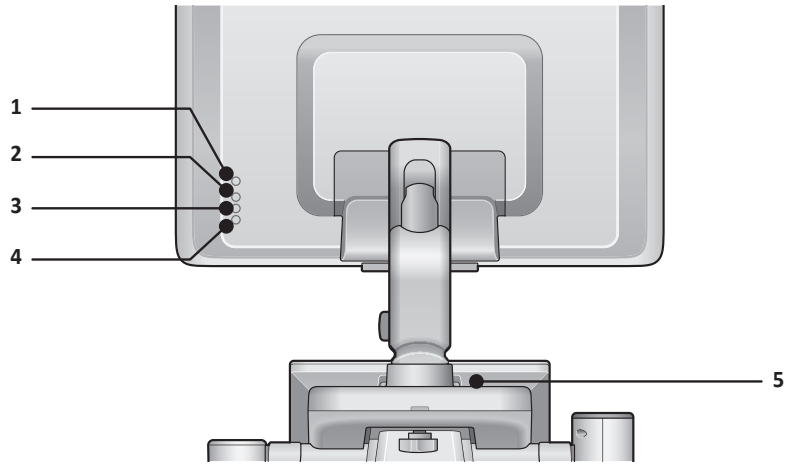


Figure 1-4 Monitor buttons

No.	Component	No.	Component
1	LED lamp button	**4**	Down (∨) button
2	Up (∧) button	**5**	Touch screen Brightness buttons
3	Mode/Select (◇) button		

CAUTION

The LED lamp may overheat. Be careful not to directly touch it to avoid injury.

Adjusting the monitor's contrast and brightness

To adjust the brightness of the monitor,

1. Press the **Mode/Select** (◇) button on the monitor once.
2. To increase the brightness, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the brightness. Repeat step 2 until desired value reached.

To adjust the contrast of the monitor,

1. Press the **Mode/Select** (◇) button on the monitor twice.
2. To increase the contrast, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the contrast. Repeat step 2 until the desired value is reached.

Adjusting the touch screen's contrast and brightness

To adjust the brightness of the touch screen,

1. Press the **Mode/Select** (◇) button on the touch screen once.
2. To increase the brightness, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the brightness. Repeat step 2 until desired value reached.

To adjust the contrast of the touch screen,

1. Press the **Mode/Select** (◇) button on the touch screen twice.
2. To increase the contrast, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the contrast. Repeat step 2 until the desired value is reached.

Control Panel

The control panel can be used for controlling the system.

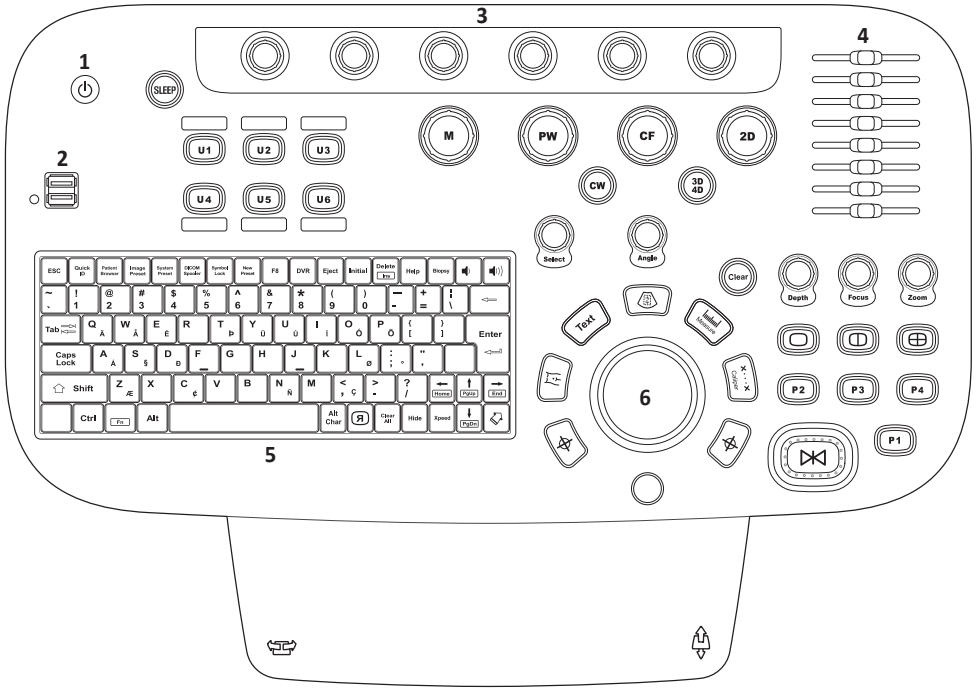
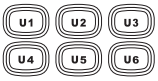
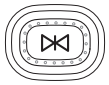


Figure 1-5 Control panel layout

1	Power on/off key	**4**	TGC slides
2	USB port	**5**	QWERTY keyboard
3	Soft keys	**6**	Trackball

Table 1-2 Key description

Control	Control Name	Description
	**SLEEP**	Activate Sleep mode.
	**User-Defined Keys (U1–U6)**	Access user-defined functions. The function for each key can be assigned in **Utility** > **Setup** > **SystemPreset** > **User Setting** > **User Defined Key**.
	**M**	Activate M mode.
	**PW**	Activate PW mode.
	**CF**	Activate CF mode.
	**2D**	Activate 2D mode.
	**CW**	Activate Continuous Wave (CW) Doppler mode. This control is optional.
	**3D4D**	Activate 3D or 4D mode.
	**Select**	Select the desired function from the context menu on the screen.
	**Angle**	Adjust the angle. • In 2D or Color mode, rotate to adjust the angle steer. • In CW or PW mode, rotate to adjust the Doppler angle correct. • In Body Pattern mode, rotate to adjust the transducer angle. • In Arrow mode, rotate to adjust the arrow angle. • In CW or PW mode, press to adjust the auto angle.
	**Clear**	Delete the arrow, annotation, body patterns and measurement results displayed on an image.
	**Depth**	Adjust the scanning depth of an image.
	**Focus**	Change location and number of focus on the area of interest.
	**Zoom**	Turn the Zoom mode on. • Rotate to activate Read zoom. • Press to activate Write zoom in Read zoom mode.

Control	Control Name	Description
	**Set/Cur**	**Set** or **Cursor** function may be assigned to these keys. The function for each key can be assigned in **Utility** > **Setup** > **SystemPreset** > **System** > **Control Panel** > **Key** > **Set the Cursor and Set Keys**. • **Set**: Select an item or value using the trackball. • **Cursor**: Display the cursor on the screen.
	**Body Pattern**	Activate the annotation function in order to add body patterns to an image.
	**Text**	Activate the annotation function in order to type text on an image.
	**Caliper**	Start basic measurements such as distance, circumference, area, and volume.
	**Measure**	Start measurements by application.
	**Priority**	Adjust the priority of Trackball. • In 2D mode, press to select the priority between the width and tilt functions. • In Duplex or Triplex mode, press to select the priority between ROIs of the activated imaging modes.
	**Single, Dual, Quad**	View an image in dual or quad screen.
	**P1, P2, P3, P4**	Control the designated recording device or perform alternative storage. To configure these keys, go to **Utility** > **Setup** > **SystemPreset** > **User Setting** > **Print/Foot Switch**.
	**Freeze**	Pause and resume scanning.
	**User-Defined Key (U7)**	You can use this control as an user-defined hard key. The function for the key can be assigned in **Utility** > **Setup** > **SystemPreset** > **User Setting** > **User Defined Key**. **TIPS** • **Exit**: Exit current screen (mode) and return to the previous screen (mode). • **End Exam**: End the current study and store patient and measurement data and clear all temporary data.

QWERTY Keyboard

The QWERTY keyboard is available which you can enter text or perform special functions.

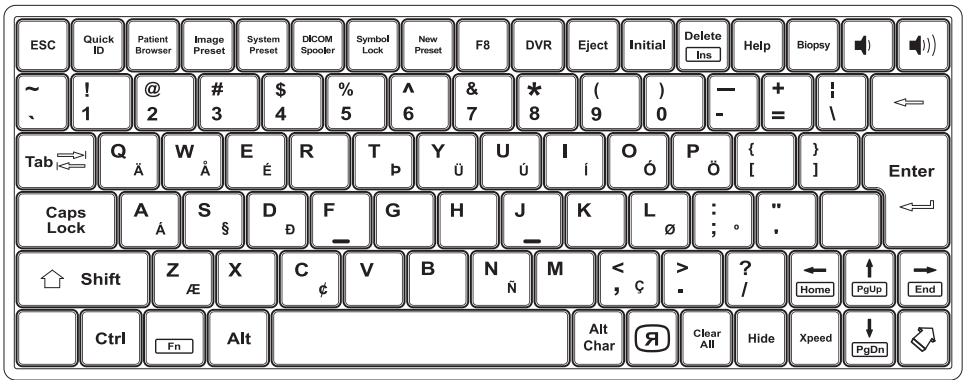


Figure 1-5 QWERTY keyboard

Using the special keys

Table 1-3 Special key description

Control	Control Name	Description
Quick ID	**Quick ID**	Access the ***Quick ID*** screen.
Patient Browser	**Patient Browser**	Access the ***E-View*** screen.
Image Preset	**Image Preset**	Access the ***Image Preset*** screen.
System Preset	**System Preset**	Access the ***System Preset*** screen.
DICOM Spooler	**DICOM Spooler**	Display the DICOM Spooler on the screen.
Symbol Lock	**Symbol Lock**	Lock all keyboard symbol keys.
New Preset	**New Preset**	Create your own user preset.
DVR	**DVR**	Access the **DVR** menu.
Eject	**Eject**	Eject a media.
Initial	**Initial**	Restore the default settings of the current function.

Control	Control Name	Description
	**Help**	Access the electronic manual.
	**Biopsy**	Show the biopsy guideline.
	**Speaker Volume**	Turn up/down the speaker volume.
	**Reverse**	Flip the image 180 degrees left/right.
	**Clear All**	Clear your input or cancel your selection.
	**Hide**	Hide the current menu screen.
	**Xpeed**	Activate Xpeed to automatically optimize image parameters on the live screen.
	**Arrow**	Show the arrow pointer on the screen.

Touch Screen

Your ultrasound system has the touch screen that enables you to easily access menus or adjust options on the current monitor display. With the touch screen, you can also enter text instead of using the QEWRTY keyboard. Simply touch the menu or option you want.

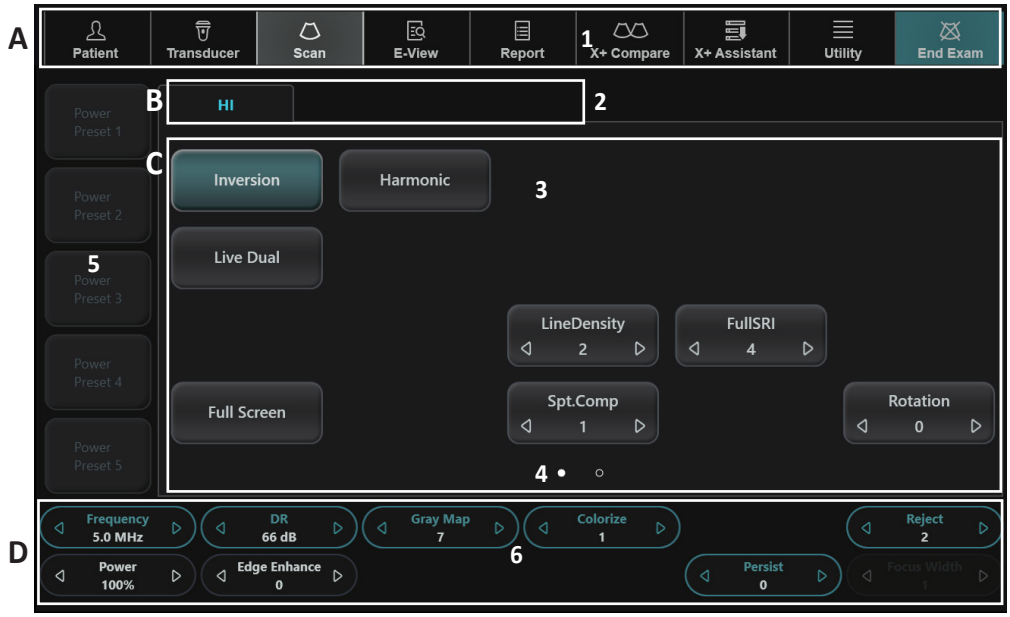


Figure 1-6 Touch screen

Table 1-4 Touch screen description

No.	Control	Description
A	**Workflow Area**	Contain tools that enable the major workflow activities for starting, performing, and completing an exam.
1	**Shortcut Bar**	Quick access to different functions on the system.
B	**Tabs**	Contain mode-specific or application-specific controls in different tabs.
2	**Scanning Modes Tab**	Select the tab to activate scanning mode.
C	**Controls**	The main area of the touch screen, which shows the controls for the currently selected tab in the current mode or application.
3	**Touch Menus**	Touch buttons with mode/function specific controls.
4	**Page Indicator**	Switch to the previous/next page of the touch menu screen.
5	**Power Preset 1-5**	Show up to five (5) Preset buttons.

No.	Control	Description
D	**Soft Key Labels**	Display the labels for the current functions of the soft keys. Some modes and applications have two rows of labels, while some have no soft keys. You can select the functions assigned to the soft keys by touching the labels or by pressing or rotating the knob below the label.
6	**Soft Menus**	Rotary/Push buttons with mode/function specific controls. • Press the button to switch between controls. • Rotate the dial to adjust the value.

Image Display

The image display consists of an ultrasound image, application information, patient information, and indicators.

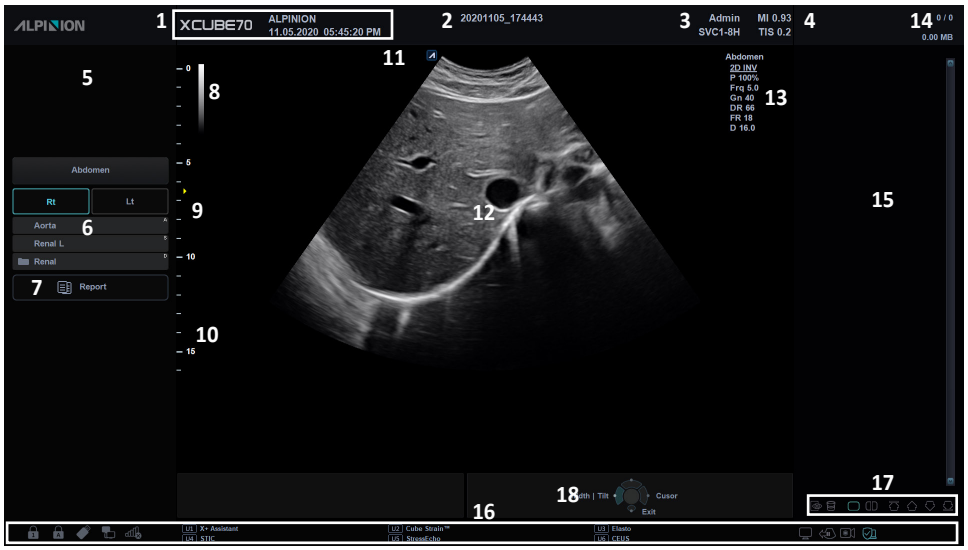


Figure 1-7 Image display

1	Hospital logo & name	**12**	Image area
	Current date & time	**13**	Image parameter
2	Patient ID, Patient name	**14**	Clipboard indicator
3	Operator ID, Transducer name	**15**	Image clipboard
4	Mechanical index, Thermal index	**16**	Status bar: Symbol lock, Caps lock, USB connection, Network connection, Wireless network connection, User defined key, Data backup status, Cube View connection, Windows Defender, Battery status
5	Zoom reference window		
6	Labeled measurement menu		
7	Report		
8	Gray/Color scale bar	**17**	Clipboard icons: Touch Clip, Thumbnail Preview, Trash can, Single & Dual layout format, Scroll Up/ Down/Home/End
9	Focal zone marker		
10	Depth scale marker		
11	Transducer orientation marker	**18**	Trackball controls and status

System Start-Up

Power On

1. Make sure that the power cord is plugged into the power outlet.

   CAUTION
   Make sure that the system power is supplied from a separate and properly rated power outlet.

2. Push the **System On/Off** switch to turn on the system power on the bottom rear of the system.
3. Press the **[Power On/Off]** key on the control panel.
4. The system boots up and the progress bar appears on the monitor.
5. After initialization is complete, the scan screen appears.
6. If the access control has been set by the system administrator, the ***System Log In*** window appears.

   NOTE
   To set the system to log on automatically, go to **Utility** > **Setup** > **SystemPreset** > **Administration** > **Users** and select the **System Auto Login** check box.

7. Enter the operator's ID and password, and then click **OK**.

Power Off

CAUTION
Do not unplug the power cord during the system operation. Do not push the **System On/Off** switch before pressing the **[Power On/Off]** key. This may lead to data loss or system software damage.

NOTE
Depending on the power-off setting, you can activate Sleep mode or turn the system off immediately. The power-off setting can be configured in **Utility** > **Setup** > **SystemPreset** > **System** > **General** > **Power Off**.

1. Enter the scan screen and press the **[Power On/Off]** key on the control panel.
   The ***Power off*** dialog box appears.
2. Click **Shutdown** by using **[Trackball]**.
   The shutdown process takes a few seconds and is completed when the control panel backlight shuts down.

   NOTE
   If the system has not fully shut down in 60 seconds, press and hold down the **[Power On/Off]** key until the system shuts down.

Transducer

Connecting the Transducer

You can connect the transducer to the transducer port when the system is powered off or on. Make sure that you press the **[Freeze]** key on the control panel before connecting the transducer.

CAUTION
Do not touch the patient when connecting or disconnecting a transducer.

1. Check if you press the **[Freeze]** key on the control panel.
2. Insert the transducer connector into the transducer port.

   CAUTION
   Do not forcibly insert the transducer connector to the system. Improper connection may cause damages to the system and transducer.

3. Push the connector locking lever to the right to secure the transducer connector.

   NOTE
   After connecting the transducer to the system, you need to activate the desired transducer by selecting it from the screen.

4. Place the transducer in its holder.

   CAUTION
   Do not allow the transducer head to hang free. Impact to the transducer head could result in irreparable damage.

Disconnecting the Transducer

You can disconnect the transducer from the transducer port when the system is powered off or on. Make sure that you press the **[Freeze]** key on the control panel before disconnecting the transducer.

CAUTION
Do not touch the exposed surface of the transducer connector when the transducer is removed.

1. Check if you press the **[Freeze]** key on the control panel.
2. Push the connector locking lever to the left to release the transducer connector.
3. Pull out the transducer connector from the transducer port.

Activating the Transducer

Use the following procedure to activate the transducer and application.

1. Touch **Transducer** on the touch screen.
   The dialog box for transducer and application selection appears.
2. Select the desired transducer, application and preset on the touch screen.

   NOTE

   Default transducer for the selected preset or default preset for the selected transducer is selected automatically.
3. Click **Exit** to complete the transducer selection.

   NOTE

   Selecting the **Automatic Preset selection when changes the Transducer** check box shows the default application and preset for the selected transducer.

Deactivating the Transducer

NOTE

Before deactivating the transducer, press the **[Freeze]** key on the control panel. An error may occur when you deactivate the transducer while the system is running.

Use the following procedure to deactivate the transducer.

1. Press the **[Freeze]** key on the control panel.
2. Gently wipe the excess gel on the transducer surface.
3. Place the transducer in its holder.

System Preset

In each preset menu, you can configure different default settings for its submenus.

System Preset Display

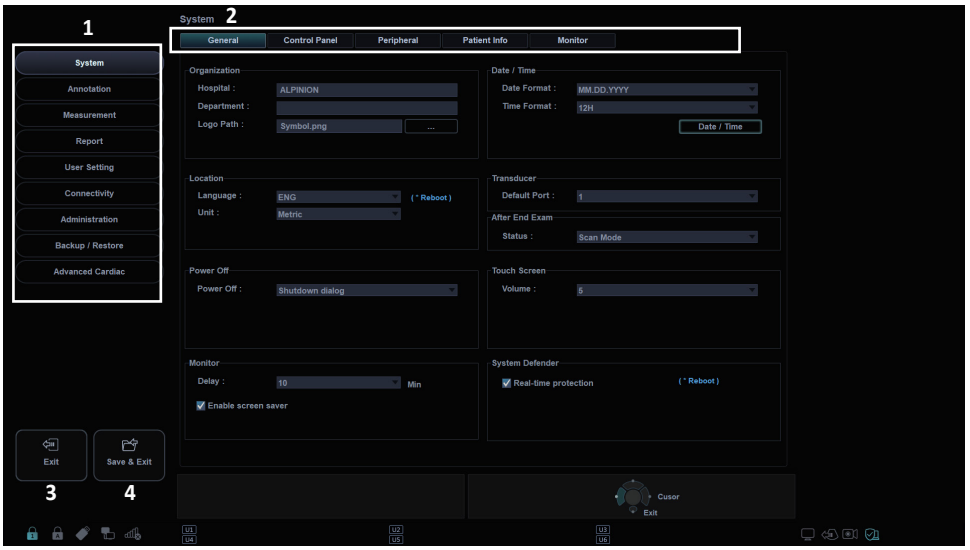


Figure 1-8 System preset display

1	System presets	**3**	Exit
2	Preset menus	**4**	Save & Exit

System Preset Menus

To access preset menus, select the desired menu on the touch screen.

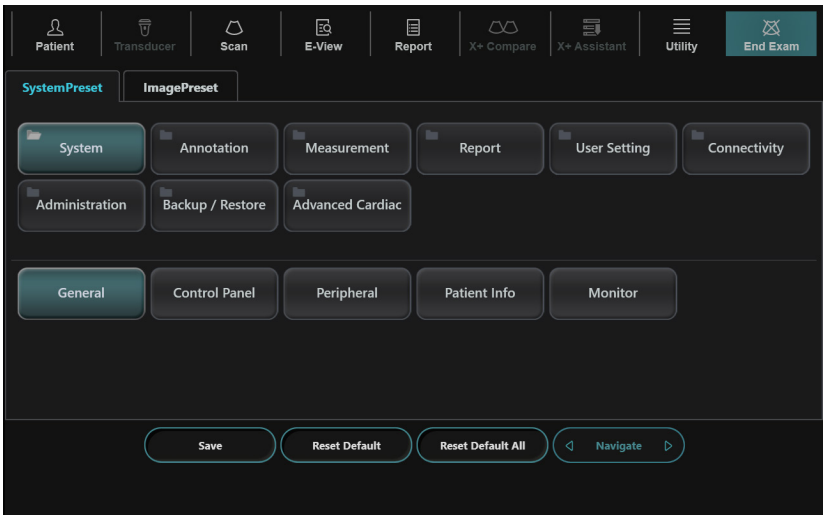


Figure 1-9 System preset touch screen

Preset menu	Description
System	Customize the system configurations such as general settings, control panel, peripheral, patient info, and monitor calibration.
Annotation	Customize the comment and body pattern settings.
Measurement	Customize the labeled measurement for each study and create a new measurement and OB table.
Report	Customize the report and report print settings.
User Setting	Customize the user-defined settings.
Connectivity	Customize the DICOM device and service.
Administration	Create a user ID, activate the service browser, and view the option information.
Backup / Restore	Back up and restore data, and perform full backup for image data.
Advanced Cardiac	Customize the settings for the Stress Echo and CUBE Strain™ functions.

General Workflow

To change system parameters,

1. Touch **Utility** on the touch screen.
2. Touch **Setup** on the touch screen.
3. Touch the **SystemPreset** tab on the touch screen.
   The ***System Preset*** screen appears.
4. Select the appropriate preset you want to specify.
5. Select the preset menu on the touch screen.
6. Change values for the parameters you want to change.
   To change a parameter, do one of the following:
   - Enter the desired value using the keyboard in the text box.
   - Select the value from a drop-down list.
   - Select or clear a check box.
   - Click one value from a choice of two or more radio buttons.
7. When you have finished, click **Save & Exit** to save the changes and return to scanning.
   In some cases, you may need to reboot the system for the change to take effect.

NOTE

- To restore the settings on the current menu screen, click **Reset Default**.
- To restore all settings of the system preset, click **Reset Default All**.

Configuring Connectivity

You use **Connectivity** preset to configure the network connection and DICOM protocols. DICOM is an abbreviation of Digital Imaging and Communications in Medicine. This is a standard protocol for handling, storing, printing, and transmitting information in medical imaging. Using the DICOM option, you can send or print images after connecting the system and PACS.

Connectivity

The **Connectivity** preset allows you to set up the connection and communication protocols for the ultrasound system.

To access the **Connectivity** preset,

1. Touch **Utility** on the touch screen.
2. Touch **Setup** on the touch screen.
3. Touch the **SystemPreset** tab on the touch screen.
   The ***System Preset*** screen appears.
4. Select **Connectivity** on the touch screen.

General

The **General** menu allows you to configure the general network connection settings such as computer name, AE title, and port number.

NOTE

To set up Internet Protocol, contact your hospital's network administrator.

To configure the general network connection settings,

1. Enter a computer name in the ***Computer Name*** field.
2. Enter an Application Entity (AE) title in the ***AE Title*** field.
3. Enter a port number of your system in the ***Port No*** field.
   - **Cleanup DICOM Spooler jobs in Queue when System Bootup**: Set to delete all DICOM jobs in queue when system reboots.
4. Press the **Save** soft key and then click **Yes** to save the changes.
5. Reboot your system.

Network

The **Network** menu allows you to set up Internet protocol. You need a separate IP address for your system.

NOTE

To set up Internet Protocol, contact your hospital's network administrator.

Local Area

Specify the following IP address settings:

- **DHCP**: Select the DHCP option for a dynamic IP address.
- **Use Following IP Address**: Select this option to use a static IP address.
  - **IP Address**: Enter an IP address.
  - **Subnet Mask**: Enter the subnet mask.
  - **Default Gateway**: Enter the default gateway address.
  - **Preferred DNS Server**: Enter the preferred DNS server.
  - **Alternate DNS Server**: Enter the alternate DNS server.
  - **Network Speed**: Select the network speed.

Wireless

To connect to the wireless network,

1. Specify the following IP address settings.
2. Select the desired SSID from the ***Wireless search*** list.
3. Click **Connect**.
4. Enter a password and click **OK**.
5. You can see the connection status of wireless network in the status bar.

Icon	Description
	Disconnected to the USB Wireless module.
	Connected to the USB Wireless module but disconnected to the wireless network.
	Successfully connected to the wireless network.

Network Storage

The **Network Storage** menu allows you to customize options for sending backup data to Shared directory. You can add and edit a network storage device.

To enter the **Network Storage** menu,

– Go to **General** menu and click **Network Storage** on the bottom right of the display.

To add a network storage device,

1. Click **New**.
2. Enter a name of the network storage device in the ***Destination Name*** field.
3. Enter a shared directory path for the device in the ***Shared Dir*** field.
4. Enter an ID of the device in the ***ID*** field.
5. Enter a password of the device in the ***Password*** field.
6. Select a device that is connected to the intra network driver.
7. Click **Verify** to verify the network connection.

To delete a network storage device,

1. Select the destination name that you want to delete.
2. Click **Remove**.
3. Press the **Save** soft key.

Properties

- **Type**: Select an image format to save images to network storage (JPEG, BMP).
- **2D Cine**: Save 2D Cine images as WMV format.
- **4D Volume Cine(*AVI)**: Save 4D volume images as AVI format.

CubeNote

The **CubeNote** menu allows you to set up the network options for accessing to the CubeNote Control Server. You can add and edit a CubeNote Control server device.

To enter the **CubeNote** menu,

– Go to **General** menu and click **CubeNote** on the bottom right of the display.

To add a Control Server device,

1. Enter a hospital code in the ***Hospital Code*** field.
2. Enter a name of the CubeNote Control Server device in the ***Destination Name*** field.
3. Enter an access ID of CubeNote Client in the ***ID*** filed.
4. Enter a password of CubeNote Client in the ***Password*** field.
5. Click **Verify** to verify the CubeNote Control Server connection.

Common DICOM service parameters

There are certain parameters that may need to be set up for each DICOM service. The parameters are described on the following DICOM services.

NOTE

- DICOM is an optional service. To use this service, you need DICOM installation.
- To enter the connectivity screen, you must log in as an administrator.

- DICOM Storage
- DICOM Storage Commitment
- DICOM Print
- DICOM Worklist
- DICOM MPPS
- DICOM Q&R

Setting

- **Name**: Enter a description for each service.
- **AE Title**: Enter the Application Entity (AE) title of this service.
- **Port No**: Enter a port number of the service.
- **Retry**: Enter a maximum number of times to try when the system fails to connect to a destination device.
- **Retry Interval(s)**: Set the time interval of retry.
- **Timeout(s)**: Set the period of timeout when the retry connection is over.
- **Move AE Title**: Enter the Application Entity (AE) title of this service.

  NOTE

  This parameter is only available for DICOM Q&R. If necessary, ask your PACS vendor for this information.

- **Move Port No**: Enter a port number of this service.

  NOTE

  This parameter is only available for DICOM Q&R. If necessary, ask your PACS vendor for this information.

Verify

1. Select a destination.
2. Click **Verify** to start verification. When the verification is completed, the one of the following icons is shown.

Icon	Description
	Successfully connected
	Failed in connection
	In progress

View

View allows you to view the connectivity architecture of your system such as configured DICOM service and network structured tree.

Storage

The **Storage** menu allows you to send images with DICOM standard format to view or interpret in PACS. In this menu, you can add, edit, and remove a DICOM storage service and configure the service properties.

To add a DICOM storage device,

1. Click **New**.
2. Enter a name of the DICOM storage device in the ***Destination Name*** field.
3. Enter a device's IP address in the ***IP Address*** field.
4. Enter the Application Entity (AE) title for a device in the ***AE Title*** field.
5. Enter a port number in the ***Port No*** field.
6. Click **Verify** to confirm the connection.
7. Click **OK**.

To remove a DICOM storage device,

1. Select the destination name that you want to remove.
2. Click **Remove**.
3. Click **Yes** to confirm.

- **Properties**
  - **Enable Structure Report:** Set to send a report with images.
  - **Enable Raw data of Compact 3D/4D (Image Arena™)**: Set to send a 3D/4D image with raw data for Image Arena™.
  - **Enable Multiframe**: Set to save multi-frame Cine images in the DICOM Storage.
  - **Compression**: Select a default compression type.
  - **Quality**: Select a default image quality.
  - **Monochrome**: Set to send images in monochrome. If you select **Monochrome or Color**, you will be asked every time to determine sending images in monochrome or color.
  - **Commitment**: Set to receive notification from PACS when a study has been transferred successfully. When this option is enabled, you can specify the following information:
    - **Properties**: Select an associated storage.
    - **Accepter**: Specify the accepter's settings such as AE title, port number, and timeout.

Worklist

The **Worklist** menu provides a list of patients sorted by query parameters. The **Search Criteria** menu allows you to define specific search parameters for the system to use when querying the patient archive.

To add a worklist,

1. Click **New**.
2. Enter a name of the DICOM storage device in the ***Destination Name*** field.
3. Enter a device's IP address in the ***IP Address*** field.
4. Enter the Application Entity (AE) title for a device in the ***AE Title*** field.
5. Enter a port number in the ***Port No*** field.
6. Click **Verify** to confirm the connection.
7. Click **OK**.

To remove a worklist,

1. Select the destination name that you want to remove.
2. Click **Remove**.
3. Click **Yes** to confirm.

Search Criteria

- **DICOM Tag**: Select information type that you want to define for search parameters such as Modality and Referring Physician's name.
- **Value**: Enter the value of the selected tag item.
- **Add to list**: Add tag and value to the list of search criteria.
- **Remove**: Remove tag and value to the list of search criteria.
- **Clear**: Clear all tags from the list.

MPPS

The **MPPS** menu provides a notifying function that the procedure information of the current study is transferred to PACS while performing a study.

DICOM Q&R (DICOM Query/Retrieve)

The **DICOM Q&R** menu provides a list of patients sorted by query parameters.

2

Performing an Exam

This chapter introduces the followings:

Beginning an Exam

Patient Screen

The following components are shown on the screen:

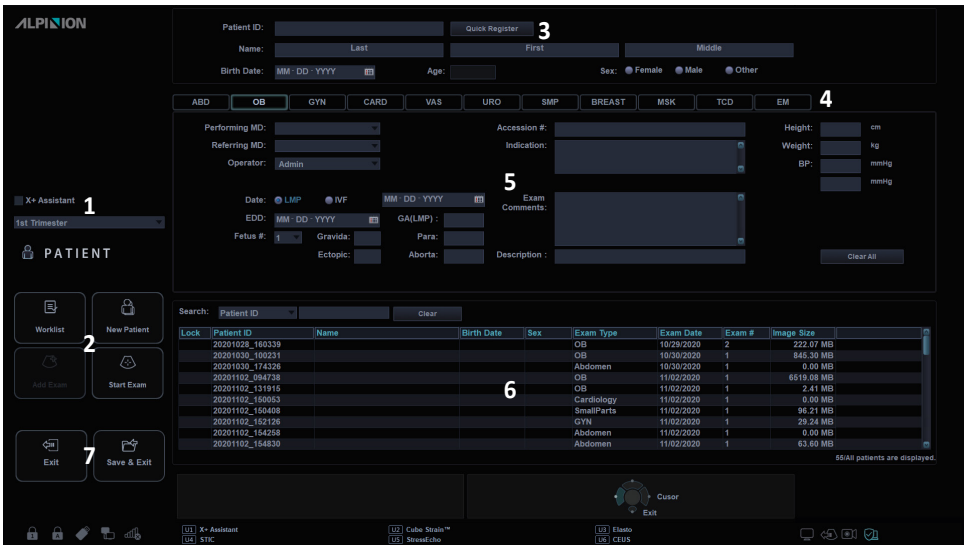


Figure 2-1 Patient screen

1	X⁺ Assistant	**5**	Exam information
2	Function selection	**6**	Patient list/Study list
3	Patient information	**7**	Save & Exit, Exit
4	Application selection		

Starting a New Patient

1. Touch **Patient** on the touch screen. The ***Patient*** screen appears.
2. The cursor positions on the ***Patient ID*** field. Enter the patient information using the alphanumeric keyboard.

   NOTE

   To automatically generate a patient ID with current date and time,
   - Press the **[System Preset]** key on the QWERTY keyboard and go to **Patient Info**. Select the **Auto ID Generation** check box.
   - Press the **[Quick ID]** key on the QWERTY keyboard and select the **Auto ID Generation** check box on the ***Quick ID*** screen.
   - Select **Quick Register** on the touch screen.
3. Select the desired application from exam application categories. When a category is selected, the measurement and category presets are displayed.
4. Enter the required application information for the selected application.

   NOTE

   Using the **[TAB]** or **[Enter]** key on the QWERTY keyboard allows you to navigate through each field on the ***Patient*** screen. You can use **[Trackball]** and the **[Set]** key on the control panel to move and fix the cursor.
5. Enter the general application information.
6. Click **Save & Exit** or select **Start Exam** on the touch screen to save the patient and application information. The scan screen appears.
   If you click **Exit**, return to the scan screen without saving the patient and application information.

Quick ID

1. Press the **[Quick ID]** key on the QWERTY keyboard. Or select **Quick Register** on the touch screen.
   The ***Quick ID*** screen appears.
2. Enter Patient ID, Name, Birth Date, and Sex. Only OB application shows the LMP and EDD fields.

   NOTE

   Using the **[TAB]** or **[Enter]** key on the QWERTY keyboard allows you to navigate through each field on the ***Quick ID*** screen. You can use **[Trackball]** and the **[Set]** key on the control panel to move and fix the cursor.

   To enter more information including the application information, go to the ***Patient*** screen by touching **Patient** on the touch screen.
3. Click **OK** to save the patient information.

Searching for an Existing Patient

1. Touch **Patient** on the touch screen. The ***Patient*** screen appears.
2. Select a search criteria (Patient ID, Patient Name, Birth Date, Sex, Exam Date, and Locked) from the ***Search*** drop-down list and enter a search keyword.
   If you select Exam Date, you can select a desired period (Today, Last Week, Last Month, and Last 3 Months) and a specific date from the drop-down list.

   NOTE

   To view all registered patients while entering a search keyword, click **Clear**.
3. The list of patients who match the criteria is displayed in the patient list.

Starting a New Exam on an Existing Patient

NOTE

When you register a patient, the study list appears on the display. If the patient is not registered, the patient list appears instead.

1. Touch **Patient** on the touch screen. The ***Patient*** screen appears.
2. Select a search criteria (Patient ID, Patient Name, Birth Date, Sex, Exam Date, and Locked) from the ***Search*** drop-down list and enter a search keyword.

   NOTE

   To view all registered patients while entering a search keyword, click **Clear**.
3. The list of patients who match the criteria is displayed in the patient list.
4. Select a desired patient from the patient list.
5. If necessary, enter or edit the patient information.
6. Select **Add Exam** on the touch screen to create a new study.
7. Select **Start Exam** on the touch screen to return to the scan screen.
8. Perform an exam.
9. Store the raw data to the clipboard.

Retrieving Patient Information via Worklist

1. Touch **Patient** on the touch screen. The ***Patient*** screen appears.
2. Select **Worklist** on the function selection to view patient data from the default worklist server.
3. To change the worklist server, select a source from the ***Source*** drop-down list.

   NOTE

   Before connecting to the worklist server, you need to configure the worklist settings. The worklist settings can be configured in **Utility** > **Setup** > **SystemPreset** > **Connectivity** > **Worklist**.
4. Select **Worklist** to retrieve patient data from the worklist server.
   The search results appear on the list.
5. Select the patient you want to start a study.
6. Select **Transfer** on the touch screen to transfer the selected study to the patient archive.

   NOTE

   Destination for transfer is always Local Archive HDD.
7. Enter the required information and start an exam.

Ending an Exam

When you end an examination, all images of the current study are saved in the local hard disk.

– Touch **End Exam** on the touch screen to save the current study.

– You can also end a study by selecting **New Patient** on the ***Patient*** screen.

NOTE

You can return to the ***Patient*** screen after ending the current study. To configure, go to **Utility** > **Setup** > **SystemPreset** > **System** > **General** > **After End Exam**.

Optimizing the Image

2D Mode Controls

Gain

Gain allows you to Increase or decrease in 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. To increase or decrease overall gain, rotate the **[2D]** key on the control panel.

Depth

Increasing the depth enables the deeper structures to be visualized. You can decrease the depth if you do not need the bottom portion of the display. To increase or decrease the depth, rotate the **[Depth]** key clockwise or counter- clockwise on the control panel. You can see the display and image parameters are automatically changed.

Xpeed™

Xpeed™ is an auto-optimizing technology that enables you to easily adjust an image's the contrast resolution and brightness uniformity. To activate or deactivate Xpeed, press the **[Xpeed]** key on the QWERTY keyboard.

Time Gain Compensation (TGC)

To compensate for weak signals or over-bright signals at various depths, you can adjust Time Gain Compensation (TGC) using the TGC slide controls. The 2D control adjusts the overall receiver gain and compensates for the brightness of the image.

TGC slide control selectively adjusts the sensitivity (brightness) in depth.

– Slide the slide control to the left to decrease the gain in the corresponding specific 2D depth.

– Slide the slide control to the right to increase the gain in the corresponding specific 2D depth.

Focus

Convex array, linear array, and phased array transducers support multiple transmit focus zones, which you can select in 2D-mode images. Focal zone markers display on the left side of the image screen.

- **Focus Num**

  To increase or decrease the number of focal zones, press the **[Focus]** key on the control panel and then rotate the key clockwise or counter-clockwise.

- **Focus Pos**

  To move the focal zone to the near/far field, rotate the **[Focus]** key on the control panel.

Dual/Quad Imaging

Using Dual (or Quad) imaging, you can view two (or four) images at the same time on the display.

To activate the image layout,

1. In 2D mode, Color Flow mode, or M mode imaging, press the **[Dual]** (or **[Quad]**) key on the control panel. The image is shown on the left of the display.
2. Press the **[Dual]** (or **[Quad]**) key again to activate the second image.
3. To switch between the two (or four) images, press the **[Dual]** (or **[Quad]**) key.
4. Press the **[2D]** key to exit the dual (or quad) imaging.

Priority

The priority function has the following two options: Width, Tilt

- **Width**

  Control the size or angle width of the 2D image sector. A smaller angle generally produces an image with a higher frame rate. To narrow or widen the ROI, press the **[Priority]** key on the control panel. **Width** is highlighted in the message line. Move **[Trackball]** left or right to decrease or increase the angle size. Then, press the **[Priority]** key to set the region of interest (ROI).

- **Tilt**

  After the size or angle width of the 2D image sector is set, you can steer the image sector by using the tilt option. Press the **[Priority]** key to select the tilt function. Then move **[Trackball]** to tilt the angle.

Angle Steer

In 2D mode, you can tilt an image left or right by using a linear transducer. To adjust the angle steer, rotate the **[Angle]** key clockwise or counter- clockwise on the control panel. The each level of the angle increment/decrement is 5 degrees.

Harmonic

Tissue Harmonic Imaging (THI) is a system feature that can enhance the contrast resolution with fine tissue differentiation, benefiting patients with poor images. THI creates images from received signals using the harmonics of the transmitted frequency. For certain applications, Filtered THI (FTHI) can be used to optimize temporal resolution.

To adjust FTHI,

1. Select **Harmonic** on the touch screen. **2D HAR** appears next to 2D image parameters.
2. To change the frequency of FTHI, rotate the **Frequency** soft key clockwise or counter-clockwise.
3. To exit FTHI, select **Harmonic** on the touch screen.

Live Dual

Live Dual is a feature that enables you to view the 2D image and activate other function at the same time. To activate Live Dual, select **Live Dual** on the touch screen.

Sepia

Sepia function is used to activate the sepia map. To activate or deactivate the sepia map, select **Sepia** on the touch screen.

S-FOV

On convex transducers, S-FOV provides a larger field of view in the far field. To activate or deactivate S-FOV, select the S-FOV icon (

) on the touch screen.

EX-FOV

On endocavity transducers, EX-FOV provides wide angle field of view. To activate or deactivate EX-FOV, select the EX-FOV icon () on the touch screen.

Virtual Convex

On linear transducers, virtual convex provides a larger field of view in the far field. To activate or deactivate the virtual convex, select **Virtual** on the touch screen.

Full Screen

Full Screen allows you to view magnified images in full screen. To activate or deactivate the Full Screen mode, select **Full Screen** on the touch screen.

Panoramic (Option)

The Panoramic feature extends your field of view by piecing together multiple 2D images into a single, extended 2D image. You can perform the Panoramic feature on 2D images with linear and convex transducers. For more information, please refer to "Panoramic Imaging" in User Manual.

To perform the panoramic imaging,

1. Select **Panoramic** on the touch screen.
   You can access the Panoramic setup mode, and the blue-colored ROI appears.
2. Press the **[Set]** key to start the image acquisition.
3. Move the transducer linearly along the scan path.

   NOTE

   To acquire an optimal image, move the transducer slowly and steadily.
4. When you have finished acquiring an image, press the **[Freeze]** key on the control panel.
5. Adjust the image parameters to optimize the image, if necessary.
6. Press the **[Caliper]** key to perform a measurement.
7. Press the **[P1]** key to save the image.
8. To exit the Panoramic imaging mode, press the **[2D]** key or select **Exit** on the touch screen.

Strain Elastography (Option)

Strain Elastography is a non-invasive method used to help detect or classify tumors. It shows the spatial distribution of tissue elasticity properties in a region of interest by estimating the strain before and after tissue distortion caused by external or internal forces. For more information, please refer to "Strain Elastography" in User Manual.

To perform Strain Elastography,

1. Select **Elasto** on the touch screen.
   The system displays two images on the screen in a live, dual format.
2. Perform the scan. Proper manual compression/decompression is displayed by the colored strain map.
3. Adjust the image parameters to obtain an optimized image.
4. When you have finished acquiring an image, press the **[Freeze]** key on the control panel.
5. If necessary, press the **[P1]** key to save the image.
6. To perform a measurement, press the **[Caliper]** key on the control panel.
7. Estimate the size and hardness of lesions.
8. To exit the Strain Elastography mode, select **Exit** on the touch screen.

Point Shear Wave Elastography (Option)

Point Shear Wave Elastography detects the velocity of the shear wave propagated through the targeted lesion and displays the numerical measurement of tissue stiffness in kPa or m/s. For more information, please refer to "Point Shear Wave Elastography (pSWE)" in User Manual.

To perform point Shear Wave Elastography,

1. Select **pSWE** on the touch screen to activate point Shear Wave Elastography.
2. If necessary, instruct the patient that during the exam they can mostly breathe normally. However, advise the patient that they will need to suspend their breathing mid breath so that you can obtain an optimum image while performing the scan.
3. Position and size the region of interest (ROI).
4. Adjust the ROI as needed.
5. Start the Point Shear Wave aquisition.
6. Press the **[Freeze]** key to obtain the desired frame.
7. Perform the measurement.
8. If necessary, repeat previous step to obtain the desired frame for the remaining samples.

Needle Vision™ Plus (Option)

Needle Vision™ Plus is a needle enhancement feature that can enhance viewing of the needle to assist you in guiding the needle to the target anatomy. For more information, please refer to "Needle Vision™ Plus" in User Manual.

To perform Needle Vision™ Plus,

1. Select **NeedleVision** on the touch screen.
2. Adjust the image parameters to obtain an optimized image.
3. To exit Needle Visions™ Plus, select **OFF** on the touch screen.

Contrast Enhanced Imaging (Option)

The contrast enhanced ultrasound imaging is used in conjunction with ultrasound contrast agents to enhance the imaging of blood flow and microcirculation. Blood containing the contrast agent stands out brightly against a dark background of normal tissue. For more information, please refer to "Contrast Enhanced Imaging" in User Manual.

To perform the contrast imaging,

1. Select **Contrast** on the touch screen.
   The contrast image and 2D image are displayed side-by-side.
2. Adjust the acoustic power experientially to obtain a good image.
3. Observe the tissue image to find the target view.
4. Inject the contrast agent, and select **Timer** on the touch screen to start the timing.
   When the timer begins to work, the time will be displayed on the screen.
5. Observe the image.
6. To save the images, press the **[P1]** key on the control panel.
7. Perform several live captures if there are more than one sections of interest.
8. At the end of the contrast imaging, press the **[2D]** key to exit the contrast imaging.
9. Perform step 2–8 if necessary.

Line Density

Line density optimizes 2D mode frame rate or spatial resolution for the best possible image. A lower line density is useful in fetal heart beat, adult cardiac applications and in clinical Radiology applications requiring significantly higher frame rates. A higher line density is useful in obtaining very high resolution (e.g. thyroid, testicles). To adjust the line density, select **<** or **>** of **LineDensity** on the touch screen.

Full SRI™

Full SRI™ is a more powerful SRI feature that allows you to adjust the SRI level according to your image condition or imaging mode. The full SRI feature is available in 2D, 3D, and 4D modes. To adjust the full SRI, select **<** or **>** of **FullSRI** on the touch screen.

Spatial Compound

Spatial compound allows you to combine different steering frames to form a single frame at real-time frame rates. To adjust the spatial compound, select **<** or **>** of **Spt.Comp** on the touch screen.

NOTE

The spatial compound function may not be available with phased array transducers.

Rotation

In 2D mode, you can rotate an image clockwise by 90 degrees. To adjust the rotation, select **<** or **>** of **Rotation** on the touch screen.

VelocityUs

VelocityUS allows you to change the transmitted speed of sound for various tissue types. To adjust the transmitted speed of sound, select **<** or **>** of **VelocityUS** on the touch screen.

Frequency

You can adjust the operating frequency of the transducer. The selected frequency is displayed in the Image Parameter. To adjust the frequency, rotate the **Frequency** soft key clockwise or counter-clockwise.

Dynamic Range

Dynamic range is useful for optimizing tissue texture in different anatomy. Dynamic range should be adjusted so that the highest amplitude edges appear as white while lowest levels (such as blood) are just visible. To adjust the dynamic range, rotate the **DR** soft key clockwise or counter-clockwise.

Gray Map

Gray Map provides you with the system maps for 2D, M, and Doppler modes. To adjust the gray map, rotate the **Gray Map** soft key to clockwise or counter-clockwise.

Colorize

Colorize is the colorization of a conventional 2D mode image or Doppler Spectrum to enhance the user's ability to discern 2D mode, M mode, and Doppler mode intensity valuations. Colorize is NOT a Doppler mode. To adjust the colorize, rotate the **Colorize** soft key clockwise or counter-clockwise.

Reject

Low echo information will not be displayed on the screen below the adjusted rejection level. The rejection function determines the amplitude level below which echoes are suppressed (rejected). Rejection set to high leads to bad tissue display. To adjust the rejection values, rotate the **Reject** soft key clockwise or counter-clockwise.

Power

Power controls the amount of acoustic power applied in all modes. To adjust the power, rotate the **Power** soft key clockwise or counter-clockwise.

Edge Enhance

Edge Enhance demonstrates subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. This function allows your system to display the outline of tissues or an organ more clearly. To adjust the edge enhance, rotate the **Edge Enhance** soft key clockwise or counter-clockwise.

Persist

Persistence provides a visible smoothing effect to the 2D-mode image by persisting lines of image data for each frame of imaging. To adjust the persist, rotate the **Persist** soft key clockwise or counter-clockwise.

Reverse

Reverse allows you to flip the image 180 degrees left/right. To flip the image horizontally, press the Я key on the QWERTY keyboard.

Up/Down (If Preset)

Up/Down allows you to flip the image 180 degrees up/down. To flip the image vertically, press the **U/D Flip** key on user-defined key.

M Mode Controls

Cine

In M mode, image trace information can be recalled. When freezing an image, a certain time frame (M information of the last examination sequence) is stored in the loop memory. The sequence can be reviewed second by second.

Full Timeline

Full timeline expands the display to full timeline display. To activate or deactivate the full timeline, select **Full M** on the touch screen.

Display Format

Display Format changes the horizontal/vertical layout between 2D mode and Doppler mode or timeline only. You can select how to have your Doppler time line and anatomy displayed. To adjust the display format, select **<** or **>** of **Display Format** on the touch screen.

Sweep Speed

During M mode imaging, you can adjust the sweep speed of the display. To increase or decrease the sweep speed, rotate the **Sweep** soft key clockwise or counter-clockwise.

Anatomical M mode (Option)

Anatomical M mode allows you to move or rotate an M line and review an image on the desired region. For using this feature, you need an additional request to your local agent.

To activate Anatomical M mode,

1. In M mode, select **Anatomical M** on the touch screen.
   The cursor line of the Anatomical M mode appears in the middle of a 2D image.
2. Use **[Trackball]** to move the cursor line (left/right/up/down).
3. Rotate the **[Angle]** key on the control panel to rotate the angle.

M mode zoom

When the system is in M mode, you can magnify a portion of the reference image using M mode zoom function.

To adjust the M mode zoom,

1. In M mode or 2D mode with the M-line displayed, press the **[Zoom]** key on the control panel to activate Write zoom. To activate Read zoom, rotate the **[Zoom]** key.
2. Use **[Trackball]** to position the zoom box and M line in the zoomed image, and press the **[Set]** key.
3. Use **[Trackball]** to adjust the size of the zoom box, and press the **[Set]** key.
4. To zoom out, press the **Exit** key on user-defined key.

M color mode

M color mode is a combination mode of M mode and Color Flow mode which color flow information overlays the M mode image by using the velocity and color map. The color flow wedge is shown on the M-mode timeline. The color map in this mode is the same as in Color Flow mode, but the size and position of the color flow window depends on the 2D mode image.

To activate M color mode,

1. Press the **[M]** key, and then press the **[CF]** key.
2. To switch to Color Flow mode, press the **[M]** key.
   To return to M color mode, press the **[M]** key again.

CF Mode Controls

Positioning, sizing, and steering the ROI

When you press the **[CF]** key in 2D mode, the color window or ROI appears on the image.

The initial location and the shape of the window depend on the active transducer and default imaging depth.

Changing the size and position of the color ROI

1. Press the **[CF]** key on the control panel. The system places the ROI, outlined in solid yellow, on the image.
2. Use **[Trackball]** to reposition the ROI.
3. To resize the ROI, press the **[Set]** key and move **[Trackball]**. The system outlines the ROI with a dotted yellow line with solid corners.
4. Press the **[Set]** key to set the size.
5. To exit Color Flow mode, press the **[CF]** or **[2D]** key.

Micro Vascular Imaging (Option)

MVI aims to visualize low velocity and small diameter blood vessel. To activate or deactivate MVI mode, select **X+ MicroView** on the touch screen.

Invert (Color Invert)

Invert allows you to 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. To reverse the color flow, select **Invert** on the touch screen.

Color Only

Color Only function hides the 2D image from the display so that you can see the color image only. To activate or deactivate the color only function, select **ColorOnly** on the touch screen.

Hide Color

Hide Color function hides the color image from the display so that you can see the 2D image only. To activate or deactivate the hide color, select **Hide Color** on the touch screen.

Adaptive Blend

Adaptive Blend superimposes a translucent color image over a 2D image in the color image area. You can adjust the transparency of the color image easily to demonstrate the tissues behind the color. To activate or deactivate this function, select **Adaptive Blend** on the touch screen.

Adaptive Blend Level

Adaptive Blend Level allows you to specify the blending ratio between the 2D image and the color image. To adjust this function, select **<** or **>** of **Adaptive Level** on the touch screen.

Blend

Blend superimposes a translucent color image over a 2D image in the color image area. You can adjust the transparency of the color image to demonstrate the tissues behind the color. To activate or deactivate this function, select **Blend** on the touch screen.

Blend Level

Blend Level allows you to specify the blending ratio between the 2D image and the color image. To adjust this function, select **<** or **>** of **Blend Level** on the touch screen.

Line Density

Line density optimizes the Color Flow mode frame rate or spatial resolution for the best possible color image. A lower line density is useful in fetal heart beat, adult cardiac applications and in clinical Radiology applications requiring significantly higher frame rates. A higher line density is useful in obtaining very high resolution (e.g. thyroid, testicles). To adjust the line density, select **<** or **>** of **LineDensity** on the touch screen.

Angle Steer

You can tilt the ROI of the color flow image to the left or right by using a linear transducer. To adjust the angle steer, select **<** or **>** of **Angle Steer** on the touch screen. The each level of the angle increment/decrement is 5 degrees.

PRF

PRF function is used to adjust the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines the pulse repetition frequency (PRF). To raise or lower the velocity scale, rotate the **PRF** soft key clockwise or counter-clockwise.

Ensemble

Ensemble allows you to select the density of the scan line. With increasing the number of ensemble, the frame rate decreases. To adjust the ensemble, rotate the **Ensemble** soft key clockwise or counter-clockwise.

Wall Filter

Wall filter filters out clutter signals caused from vessel movement. To raise or lower the wall filter, rotate the **WF** soft key clockwise or counter-clockwise.

Smooth

Smooth allows you to make a color image smoother by enhancing connection in the axial direction. To adjust the smooth, rotate the **Smooth** soft key to clockwise or counter-clockwise.

Color Map

Color Map allows you to change the color map used for Color Flow mode, Power Doppler mode and Tissue Doppler Imaging mode. To adjust the color map, rotate the **Color Map** soft key clockwise or counter-clockwise.

Baseline

Baseline adjusts the Color Flow or Doppler spectrum baseline to accommodate higher velocity blood flow to eliminate aliasing. To adjust the baseline, rotate the **Baseline** soft key.

Threshold

Threshold assigns the grayscale level at which color information stops. To increase or decrease the grayscale threshold, rotate the **Threshold** soft key clockwise or counter-clockwise.

PD Mode Controls

Micro Vascular Imaging (Option)

MVI aims to visualize low velocity and small diameter blood vessel. To activate or deactivate MVI mode, select **X+ MicroView** on the touch screen.

Directional power Doppler Imaging (DPDI)

DPDI (Directional power Doppler Imaging) function shows information on the intensity and direction of blood flow. To activate or deactivate this function, select **DPDI** on the touch screen.

Color Only

Color Only function hides the 2D image from the display so that you can see the color image only. To activate or deactivate the color only function, select **ColorOnly** on the touch screen.

Hide Color

Hide Color hides the color bar and the ROI box from the screen. To activate or deactivate the hide color, select **Hide Color** on the touch screen.

Adaptive Blend

Adaptive Blend superimposes a translucent color image over a 2D image in the color image area. You can adjust the transparency of the color image easily to demonstrate the tissues behind the color. To activate or deactivate this function, select **Adaptive Blend** on the touch screen.

Adaptive Blend Level

Adaptive Blend Level allows you to specify the blending ratio between the 2D image and the color image. To adjust this function, select **<** or **>** of **Adaptive Level** on the touch screen.

Blend

Blend superimposes a color image over a 2D image in the color image area. To activate or deactivate this function, select **Blend** on the touch screen.

Blend Level

Blend Level allows you to specify the blending ratio between the 2D image and the color image. To adjust this function, select **<** or **>** of **Blend Level** on the touch screen.

Flow State

Flow State adjusts the PRF of the color image. To adjust this function, select **<** or **>** of **Flow State** on the touch screen.

Angle Steer

In Power Doppler mode, you can tilt an image left or right by using a linear transducer. To adjust the angle steer, select **<** or **>** of **Angle Steer** on the touch screen. The each level of the angle increment/decrement is 3 or 5 degrees depending on the linear transducer type.

PWD Mode Controls

PW Doppler angle

Angle between the direction of reflector motion and the direction of propagation of the ultrasound beam.

PW Doppler effect

Phenomenon whereby there is a change in the perceived frequency of a sound source relative to the transmitted frequency when there is a relative motion between a sound source and the listener.

Angle Correct

Estimate 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.
Flow toward the transducer is mapped above the baseline and vice versa. To adjust the angle relative to the transducer face, rotate the **[Angle]** key on the control panel. The velocity scale changes when you adjust angle correct.

Invert

Invert vertically inverts the spectral trace without affecting the baseline position. To invert the spectral trace, select **Invert** on the touch screen. The plus (+) and minus (-) signs on the velocity scale are reversed when the spectrum is inverted. Positive velocities display below the baseline.

Auto Angle

Auto angle allows you to adjust the angle by 60 degrees. To adjust the PW Doppler angle, select **Auto Angle** on the touch screen.

Simultaneous

In simultaneous mode of 2D and Doppler modes, you can pause a Doppler image and move the image to the 2D live screen by adjusting the Doppler gate. To activate the simultaneous mode, select **Simultaneous** on the touch screen.

Full Timeline

Full timeline allows you to expand the display in full timeline. To expand the display in full timeline, select **Full D** on the touch screen.

Doppler sample volume length

Size the sample volume gate. To increase or decrease the gate size, select **<** or **>** of **SV** on the touch screen. You can adjust the sample volume gate length whenever the sample volume gate appears on the display.

AutoCalc

Activate the calculation automatically when the system is in a state of freeze or live. To adjust the AutoCalc, select **<** or **>** of **AutoCalc** on the touch screen.

AutoCalc Cycle

AutoCalc Cycle is used to adjust the number of cycles. To adjust the AutoCalc Cycle, select **<** or **>** of **AutoCalc Cycle** on the touch screen.

Wall Filter

Wall filter filters out clutter signals caused from vessel movement. To raise or lower the wall filter, select **<** or **>** of **WF** on the touch screen.

Angle Steer

Angle steer tilts the sample volume for the Doppler spectrum. This function is only for linear transducers. To adjust the angle steer, select **<** or **>** of **Angle Steer** on the touch screen. The each level of the angle increment/decrement is 5 degrees.

Direction

Direction is used to specify the part of the spectrum to calculate when using AutoCalc. To adjust the direction, select **<** or **>** of **Direction** on the touch screen.

Display Format

Display Format changes the horizontal/vertical layout between 2D mode and Doppler mode or timeline only. You can select how to have your Doppler time line and anatomy displayed. To adjust the display format, select **<** or **>** of **Display Format** on the touch screen.

Method

Method is used to trace the average mean and peak velocities in realtime or frozen images. To adjust the method, select **<** or **>** of **Method** on the touch screen.

Sensitivity

Sensitivity is used to adjust the trace to follow the waveform for signal strength. To adjust the sensitivity, select **<** or **>** of **Sensitivity** on the touch screen.

Sound

CAUTION
Doppler audio sounds may change abruptly. Adjust the volume of sound in smaller increments to avoid startling the patient.

Sound adjusts the Doppler sound volume. Audio sounds of the blood flow in a vessel can be used to check the proper position of the transducer. To adjust the sound, rotate the **Sound** soft key clockwise or counter-clockwise.

Sweep Speed

Sweep speed allows you to adjust the sweep speed of the Doppler spectrum. To increase or decrease the sweep speed, rotate the **Sweep** soft key clockwise or counter-clockwise.

CWD Mode Controls

Update (D pause)

In simultaneous mode of 2D and Doppler modes, you can pause a Doppler image and move the image to the 2D live screen by adjusting the Doppler gate. To activate the update, press the **[Uptate]** key on the control panel.

Angle Correct

Angle correct 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.
Flow toward the transducer is mapped above the baseline and vice versa. To adjust the angle relative to the transducer face, rotate the **[Angle]** key on the control panel. The velocity scale changes when you adjust angle correct.

Full Timeline

Full timeline allows you to expand the display in full timeline. To expand the display in full timeline, select **Full CW** on the touch screen.

3D and 4D Modes Operation Controls

Key	Description
Freeze	In 3D/4D setup mode, press to obtain a 3D or 4D image. In 3D mode, press to switch to 3D/4D setup mode. In 4D mode, press to switch to 3D mode. Press again to return to 4D mode.
M	In 3D or 4D mode, rotate the X axis; up and down rotation.
PW	In 3D or 4D mode, rotate the Y axis; left and right rotation.
CF	In 3D or 4D mode, rotate the Z axis; clockwise and counter-clockwise rotation.
Select/Depth	In 3D or 4D mode, move parallel. • **PlaneA**: Left/Right • **PlaneB**: Up/Down • **PlaneC** or **3D**: Forward/Backward
Single	Show a 3D image.
Dual	Show one reference image and one 3D image.
Quad	Show three reference images and one 3D image.
Priority	While or after acquiring the volume data, press to change the function. The activated function is shown on the bottom right of the display: • **Priority**: Cine, Cine Calc., Move, ROI, Curved ROI, Line1,2,3, Light Direction • **Set**: Run and Stop (Cine or Cine Calc.), Image and Axis (Move), Pos and Size (ROI), Pos and Rot (Line1,2,3) • **Cursor**: Cursor (Display remains blank.)
Trackball	Adjust the position, light direction, and the size of the ROI box. When the **[Priority]** key is pressed, use to perform the activated function: • **Cine** or **Cine Calc.**: Use to move the cine frame. • **Move**: Use to move the image. • **ROI**: Use to adjust the clipping box size of ROI. • **Curved ROI**: Use to change the contour of the clipping line. • **Cursor**: Use to move the cursor to a desired location. • **Light Direction**: Use to change Light Direction in LiveHQ.

Performing 3D image scanning

In 3D mode, you can acquire 3D images through an acquisition interface.

1. Obtain a 2D image and optimize the image for the best quality.
2. On the control panel, press the **[3D/4D]** key.
3. Touch the **3D** tab on the touch screen.
   The yellow-colored ROI and soft menus for 3D mode appear.
4. Rotate the **Volume Angle** soft key.
5. Rotate the **Quality** soft key to adjust the image quality.
6. To change the direction of the image view, rotate the **Render Direction** soft key.
7. When you have finished, press the **[Freeze]** key on the control panel to acquire the image data.

Performing 4D image scanning

In 4D mode, you can acquire real-time 4D images through an acquisition interface.

1. Obtain a 2D image and optimize the image for the best quality.
2. On the control panel, press the **[3D/4D]** key.
3. Touch the **4D** tab on the touch screen.
   The yellow-colored ROI and soft menus for 4D mode appear.
4. Rotate the **Volume Angle** soft key.
5. Rotate the **Quality** soft key to adjust the image quality.
6. To change the direction of the image view, rotate the **Render Direction** soft key.
7. When you have finished, press the **[Freeze]** key on the control panel to acquire the image data.

Other Controls

Zooming an image

You can magnify a region of interest (ROI) in a live image or in Cine mode. The zoom option magnifies the ROI on the display. There are two zoom functions that you can use: Read zoom and Write zoom

– To activate Read zoom, rotate the **[Zoom]** key on the control panel.

– To activate Write zoom, press the **[Zoom]** key on the control panel while scanning a live image.

Viewing an image in full screen

Full Screen allows you to view magnified images in full screen.

To activate the Full Screen mode,

1. On the touch screen, select **Full Screen** in the **2D** tab.
   The magnified image is displayed in full screen.
2. To exit the Full Screen mode, select **Full Screen** again.

Freezing an image

1. While scanning an image, press the **[Freeze]** key on the control panel to freeze the image.
   You can also freeze an image with the right pedal of the footswitch, if supported.
2. To reactivate the image, press the **[Freeze]** again.

Activating Cine mode

1. Press the **[Freeze]** key on the control panel.
2. Use **[Trackball]** to scroll through the Cine sequences.
   To move the Cine sequence by frame, rotate the **Frame by Frame** soft key.
3. On the touch screen, select **Move First Frame** to take the first frame.
4. Select **Move Last Frame** to take the last frame.
5. To exit Cine mode, press the **[Freeze]** or **[2D]** key on the control panel.

Annotating an image

1. Press the **[Text]** key on the control panel to activate Annotation mode.
2. To configure the default position of the comment cursor, use **[Trackball]** to place the comment cursor to the desired location of the image screen and select **Set Home** on the touch screen.
3. The system automatically searches for the word you want in the text bar.
4. After activating the text mode, a vertical bar type cursor appears on the screen. Use **[Trackball]** to move the cursor.

   NOTE

   The default text color is yellow. The color selection can be changed to any of the colors available on the system.

5. When a specific comment or comment group is selected, the color turns to green. Once the comment is set or fixed, the color returns to yellow or to the user-selected color.
6. Delete characters or all comments, if necessary.
   - To delete comments by character, select **Backspace** on the touch screen.
   - To delete comments by word, rotate and press the **Grab/Delete** soft key.
   - To delete the comments only, press the **[Clear]** key right after selecting **Text** on the touch screen.
   - To delete the arrow marks only, press the **[Clear]** key right after selecting **Arrow** on the touch screen.
   - To delete all comments as well as arrow marks, press the **[Clear]** key after entering the scan mode.
7. Rotate the **Grab/Delete** soft key to move a group of words on the screen.
8. To deactivate Annotation mode, press the **[2D]** key.

Body Pattern

To insert a body pattern,

1. To activate Body Pattern, press the **[Body Pattern]** key on the control panel.
   A list of body patterns appears on the touch screen.
   A default body pattern is displayed automatically when Body Pattern is activated.

   NOTE

   The body pattern list can be configured in **Utility** > **Setup** > **SystemPreset** > **Annotation** > **BodyPattern**.

2. Rotate the **Library** soft key to select the desired application.

   NOTE

   The body pattern list that appears on the touch screen will vary depending on the selected application.

3. Select the desired body pattern on the touch screen.
   The body pattern with a transducer marker is shown on the screen.
4. To reposition the body pattern, press the **Move Pattern** soft key.
5. Use **[Trackball]** to adjust the position of the body pattern and press the **[Set]** key.
6. Rotate the **Probe Size** soft key to select the desired size of transducer marker.
   The selected transducer marker appears on the screen.
7. Rotate the **Probe Angle** soft key to adjust the angle of the transducer marker.
8. Use **[Trackball]** to adjust the position of the transducer marker and press the **[Set]** key.

To delete a body pattern,

– Press the **[Clear All]** key on the QWERTY keyboard.

Managing Image and Patient Data

Clipboard

Capturing onto the clipboard

Press the **[P1]** key to capture images onto the clipboard. You can see thumbnail images on the clipboard.

NOTE

The print key is programmable. You can assign the P1, P2, P3 and P4 key functions in **Utility** > **Setup** > **SystemPreset** > **User Setting > Print/Foot Switch**.

Reloading images from the clipboard

1. Press the **[Cursor]** key to obtain the cursor.
2. Move the cursor over the image you want to reload by using **[Trackball]** and press the **[Set]** key.
3. Press the **[Set]** key twice to reload the selected image on the full screen image.
   You can also double-click a thumbnail image to reload an image. To scroll the page, click the arrow mark of the scroll bar to move up and down.

Deleting images from the clipboard

1. Press the **[Cursor]** key to obtain the cursor.
2. Move the cursor over the image you want to delete by using **[Trackball]** and press the **[Set]** key.
3. Click the trash can icon () on the bottom right.
4. When the confirmation dialog appears, click **Yes** to delete the image.

Saving images permanently

1. Touch **E-View** on the touch screen. The images on the clipboard appear expanded.
2. Use **[Trackball]** to select an image or multiple images and press the **[Set]** key.
   To select all images, select **Select All**.
3. Select **Archive** on the touch screen to save the image(s).

E-View

The system provides the E-View feature that allows fast and easy image management. The E-View feature allows you to view the whole patient from local database or removable media, export/import, save as with PC friendly format and send DICOM images to remote server over the network. And it allows you to review the current patient exam or the already existing patient exam.

To access the E-View mode,

– Touch **E-View** on the touch screen.

Patient Browser/Backup

To export from the local HDD to a removable media,

1. Insert your removable media to the media tray properly.
2. Select **Local HDD** from the ***Source*** drop-down list.
3. Select the patient(s) from the patient list.
4. Select **Backup** on the touch screen, or select **Backup** on the function selection. The dialog box appears.
5. Select a media from the ***Device*** drop-down list.
6. If you select **USB** or **USB HDD** from the ***Device*** drop-down list, you can enter the description such as information or comment.
7. If you select **CD/DVD** from the ***Device*** drop-down list, you can use the following options:
   - **Finalization of CD/DVD**: Finalize the CD or DVD to prevent from further writing.
   - **Verification after CD burning**: Verify your patient data in a CD or DVD after burning the CD or DVD.
8. Click **Yes**. The status information is displayed in the Backup Spooler during exporting files.

To restore from a removable media to the local HDD,

1. Insert a media that contains patient data.
2. Select a removable media from the ***Source*** drop-down list.
3. Select the patient(s) from the patient list.
4. Click **Restore**. The progress bar appears while importing files.
5. To eject the removable media (for CD or DVD), press the **[Eject]** key on the QWERTY keyboard.

Patient Browser/Send To

CD/DVD, USB/USB HDD, Network

1. Select **Local HDD** from the ***Source*** drop-down list.
2. Select the patient(s) from the patient list.
3. Insert your removable media to the media tray properly.
4. Select **Send To** on the touch screen, or select **Send To** on the function selection. The dialog box appears.
5. Select a storage media type on the left of the dialog box.
6. Select a media from the ***Device*** drop-down list.

   NOTE

   If you select **USB**, **USB HDD**, or **Network Drive** from the ***Device*** drop-down list, you can add or delete folders by using the add folder icon () or delete folder icon ().

7. If you select **CD/DVD**, **USB/USB HDD** or **Network**, you can use the following options:
   - **Generate DICOMDIR file**: Save the patient data as DICOMDIR file.
   - **Finalization of CD/DVD**: Finalize the CD or DVD to prevent from further writing.
   - **Verification after CD burning**: Verify your patient data in a CD or DVD after burning the CD or DVD.
8. The system automatically creates a file name.
   To change the file name, select the **Edit File Name** check box and enter a file name in the ***File Name*** field.
9. Select an image format in the ***Type*** field.
   To save Cine images as a video file, skip to step 12.
10. If you selected **DCM** in step 9, select a compression type in the ***Compression*** field.
11. If you selected **JPEG** in step 9, select an image quality in the ***Quality*** field.
12. Select a video file format.
    - **2D Cine**: Save 2D Cine Images as MPEG or AVI format.
    - **4D Volume Cine(*AVI)**: Save 4D volume Cine images as AVI format.
13. When you have finished, click **Save**.

PACS

PACS allows you to transfer patient(s) data to the DICOM device such as DICOM storage or DICOM Print.

To send from the local HDD to a DICOM device,

1. Select **Local HDD** from the ***Source*** drop-down list.
2. Select the patient(s) from the patient list.
3. Select **Send To** on the touch screen, or select **Send To** on the function selection. The dialog box appears.
4. Select **PACS** on the left of the dialog box.
5. Select a destination device.
6. Click **Send**. The progress bar appears during transferring files.

Printer

1. Select **Local HDD** from the ***Source*** drop-down list.
2. Select the patient(s) from the patient list.
3. Select **Send To** on the touch screen, or select **Send To** on the function selection. The dialog box appears.
4. Select **Printer** on the left of the dialog box.
5. Select a standard (default) printer and set up the printing options.
6. When you have finished, click **Print**.
   The selected printer prints out the selected image(s).

Patient Browser/Report

Report allows you to access Worksheet page. Touch **Report** on the touch screen.

Patient Browser/Reopen Exam

To open the selected exam,

1. Select a desired patient from the patient list.
2. Select **Reopen Exam** on the touch screen, or select **Reopen Exam** on the function selection.
   The scan screen appears.
3. Edit an image and save it.
4. To end the current exam, touch **End Exam** on the touch screen.

Reviewing an image

Select an image and select **Review** on the touch screen. The image is shown on the scan screen.

Ending a study

To end a study immediately,

– Touch **End Exam** on the touch screen.

Measurement and Report

Basic Measurement Operations

To begin the measurement,

1. On the control panel, press the **[Caliper]** key.
2. Use **[Trackball]** to move the point.
3. Press the **[Set]** key to fix the point.

To modify a measurement,

1. Click the result value you want to change from the ***Result*** window. The caliper is activated.
2. Use **[Trackball]** to change the measurement value and press the **[Set]** key.
   - To switch the caliper mark of the current value, press the **[Caliper]** key when the caliper is active.
   - To activate the caliper of another value, press the **[Priority]** key repeatedly until the desired value is highlighted.

To delete a measurement,

1. Click the result value you want to delete from the ***Result*** window. The caliper is activated.
2. Press the **[Clear]** key on the control panel.

To exit, press the **Exit** key on user-defined key or **[2D]** key on the control panel.

Measurement Result Window

The ***Result*** window displays the measurement result.

Icon	Description
	Change the background type (e.g. transparent or opaque) of the ***Result*** window.
	Change the position of the ***Result*** window.
	View the mini report.

Basic Measurements

The basic measurements are available in the following imaging modes:

- 2D mode
- M mode
- Doppler mode

2D mode measurements

Distance

1 Distance

1. Select **Distance** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point.
3. Press the **[Set]** key to fix the point. The end point, overlapping the start point, appears.
4. Use **[Trackball]** to move the marker to the end point, and press the **[Set]** key.
5. The measured value is fixed, and the distance (**D**) is shown on the ***Result*** window.

3 Lengths

1. Select **Distance** on the touch screen. The start point appears.
2. Draw three straight lines using **[Trackball]**, and press the **[Set]** key.
3. Move the fourth point, and then press the **[Set]** key.
4. The measured value is fixed, and three distances (**D1**, **D2**, **D3**) are shown on the ***Result*** window.

Trace Length

1. Select **Distance** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The end point appears.
3. Move the end point gradually along the circumference of the target object using **[Trackball]**.
4. When the start point and the end point are connected with a line, press the **[Set]** key to complete the measurement.
5. The measured value is fixed, and the distance (**D**) is shown on the ***Result*** window.

Circumference and Area

Ellipse

1. Select **Ellipse** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The first point is fixed, and the second point appears.
3. Use **[Trackball]** to move the marker to the second point, and press the **[Set]** key. The ellipse appears.
4. Use **[Trackball]** to adjust the height of the ellipse, and press the **[Set]** key again.
   - To increase the height, move **[Trackball]** up and right.
   - To decrease the height, move **[Trackball]** down and left.
5. The measured value is fixed. The two diameters (**D1**, **D2**), the circumference (**C**), and the area (**A**) are shown on the ***Result*** window.

Trace

1. Select **Trace** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The end point appears.
3. Use **[Trackball]** to move the end point gradually along the circumference of the target object.
4. When the start point and the end point are connected with a line, press the **[Set]** key to complete the measurement.
5. The measured value is fixed. The circumference (**C**) and the area (**A**) are shown on the ***Result*** window.

Spline

1. Select **Spline** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The second point appears.
3. Set the third and subsequent points in the same way.
4. Press the **[Set]** key twice at the same point to fix the end point.
5. The measured value is fixed. The circumference (**C**) and area (**A**) are shown on the ***Result*** window.

Angle

Angle 3 Points

1. Select **Angle** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The first point is fixed, and the second point appears.
3. Use **[Trackball]** to move the marker to the second point.
4. Press the **[Set]** key. The third point appears.
5. Use **[Trackball]** to move the third point to the end point of the angle measurement.
6. Press the **[Set]** key. The angle between the two lines appears.
7. The angle (**Angle**) is shown on the ***Result*** window.

Angle 3 Lines

1. Select **Angle** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The first point is fixed, and the second arrow-shaped point appears.
3. Use **[Trackball]** to move the marker to the second point.
4. Draw the baseline, and press the **[Set]** key to fix the baseline. The third point appears.
5. Draw the remaining two straight lines to cross the baseline as the same way. The α angle and β angle appear.
6. Press the **[Set]** key at the end point of the third straight line to fix the measured value. The two angles (**Alpha**, **Beta**) are shown on the ***Result*** window.

%Stenosis

Two diameters percent stenosis calculation

1. Select **%Stenosis** on the touch screen. The start point appears.
2. Measure the larger diameter (**D1**) of the stenosis using **[Trackball]**, and press the **[Set]** key.
3. Measure the smaller diameter (**D2**) of the stenosis using **[Trackball]**, and press the **[Set]** key.
4. The two diameters (**D1**, **D2**) and the diameter percent stenosis (**%Steno(Diam)**) are shown on the ***Result*** window.

Two ellipses percent stenosis calculation

1. Select **%Stenosis** on the touch screen. The start point appears.
2. Measure the outer area (**A1**) of the stenosis using **[Trackball]**, and press the **[Set]** key.
3. Measure the inner area (**A2**) of the stenosis using **[Trackball]**, and press the **[Set]** key.
4. The two ellipses (**A1**, **A2**) and the diameter percent stenosis (**%Steno(Area)**) are shown on the ***Result*** window.

Volume

3 Distance volume

1. Select **Volume** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key.
   The first point is fixed, and the second point appears.
3. Use **[Trackball]** to move the marker to the second point, and press the **[Set]** key again.
   The first distance is measured.
4. Measure the second and third distances in the same manner.
   When the three distances are measured, the volume is calculated.
5. The measured value is fixed. The three distances (**D1**, **D2**, **D3**) and the volume (**Vol**) are shown on the ***Result*** window.

Ellipse

1. Select **Volume** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key.
   The first point is fixed, and the second point appears.
3. Use **[Trackball]** to move the marker to the second point and press the **[Set]** key. The ellipse appears.
4. Use **[Trackball]** to adjust the height of the ellipse, and press the **[Set]** key again.
   - To increase the height, move **[Trackball]** up and right.
   - To decrease the height, move **[Trackball]** down and left.
5. The measured value is fixed. The two distances (**D1**, **D2**) and the volume (**Vol**) are shown on the ***Result*** window.

Disk Volume

Trace

1. Select **DiskVolume** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key.
   The first point is fixed, and the second point appears.
3. Use **[Trackball]** to create a trace of the structure with the second point.
4. Press the **[Set]** key to complete the trace.
   The start and end points of the trace are connected, and a line representing the long axis appears.
5. Press the **[Set]** key again.
6. The volume is calculated. The area (**A**), the circumference (**C**), the diameter (**D**), and the volume (**V**) are shown on the ***Result*** window.

Spline

1. Select **DiskVolume** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key. The second point appears.
3. Set the third and subsequent points in the same manner.
4. Press the **[Set]** key twice to complete the trace.
   The start and end points of the trace are connected, and a line representing the long axis appears.
5. Press the **[Set]** key again.
6. The volume is calculated. The area (**A**), the circumference (**C**), the diameter (**D**), and the volume (**V)** are shown on the ***Result*** window.

A/B Ratio

Two diameters ratio

1. Select **A/B Ratio** on the touch screen. The start point appears.
2. Measure the first diameter (**D1**) of the ratio using **[Trackball]**, and press the **[Set]** key.
3. Measure the second diameter (**D2**) of the ratio using **[Trackball]**, and press the **[Set]** key.
4. The ratio is calculated. The two distances (**D1**, **D2**) and A/B ratio (**A/B Ratio**) are shown on the ***Result*** window.

Two ellipses ratio

1. Select **A/B Ratio** on the touch screen. The start point appears.
2. Measure the first area (**A1**) of the ratio using **[Trackball]**, and press the **[Set]** key.
3. Measure the second area (**A2**) of the ratio using **[Trackball]**, and press the **[Set]** key.
4. The ratio is calculated. The two ellipses (**A1**, **A2**) and A/B ratio (**A/B Ratio**) are shown on the ***Result*** window.

Histogram

1. Select **Histogram** on the touch screen.
2. Use **[Trackball]** to move the caliper to the corner of the area where you want to measure the histogram.
3. Press the **[Set]** key.
4. Use **[Trackball]** to move the caliper diagonally to the opposite side of the area.
5. Press the **[Set]** key. The measured value is shown on the ***Histogram*** window. To view the histogram, go to the ***Histogram*** window.

Elasto Size Compare

NOTE

Elasto Size Compare is only available to use on freezing in Elastography mode.

1. Select **Elasto** on the touch screen to enter Elastography mode.
   Live Dual mode is displayed.
2. Perform the scan. Proper manual compression/decompression is displayed by the colored strain map.
3. Press the **[Freeze]** key to freeze the image.
4. Press the **[Caliper]** key.
5. Select **Elasto Size Compare** on the touch screen.
6. Use **[Trackball]** to move the marker to the start point on the 2D image, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
7. Use **[Trackball]** to move the marker to the end point, and press the **[Set]** key.
8. The copied caliper appears on the Elastography image area.
9. Use **[Trackball]** to move the marker of the copied start point to the desired position on the Elastography image, and press the **[Set]** key.
   The copied start point is fixed, and the copied end point appears.
10. Use **[Trackball]** to move the marker of the copied end point to the desired position on the Elastography image, and press the **[Set]** key.
11. The measured value is fixed. The two values and one ratio are shown on the ***Result*** window.

Elasto Strain Ratio

NOTE

Elasto Strain Ratio is only available to use on freezing in Elastography mode.

1. Select **Elasto** on the touch screen to enter Elastography mode.
   Live Dual mode is displayed.
2. Perform the scan. Proper manual compression/decompression is displayed by the colored strain map.
3. Press the **[Freeze]** key to freeze the image.
4. Press the **[Caliper]** key.
5. Select **Elasto Strain Ratio** on the touch screen.
6. Use **[Trackball]** to move the marker to the start point on the Elastography image, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
7. Use **[Trackball]** to move the marker to the end point, and press the **[Set]** key.
   The target strain is shown on the ***Result*** window.
8. The copied caliper appears on the Elastography image area.
9. Use **[Trackball]** to move the marker of the copied caliper to the reference strain point on the Elastography image, and press the **[Set]** key.
   The reference strain is shown on the ***Result*** window.
10. The measured value is fixed. The strain ratio is shown on the ***Result*** window.

Volume Flow Area

1. Select **Volume Flow Area** on the touch screen.
2. Use **[Trackball]** to move the marker to the start point.
3. Press the **[Set]** key to fix the point. The end point, overlapping the start point, appears.
4. Use **[Trackball]** to move the marker to the end point, and press the **[Set]** key.
5. The measured value is fixed, and the volume flow area is shown on the ***Result*** window.

M mode measurements

Distance

1 Distance

1. Select **Distance** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The measured value is fixed, and the distance (**D**) is shown on the ***Result*** window.

3 Lengths

1. Select **Distance** and then select **3 Lengths** on the touch screen.
   The start point appears.
2. Use **[Trackball]** to move the marker to the start point, and press the **[Set]** key.
3. Draw the first straight line using **[Trackball]**, and press the **[Set]** key.
4. Draw the second straight line using **[Trackball]**, and press the **[Set]** key.
5. Draw the third straight line using **[Trackball]**, and press the **[Set]** key to complete the measurement.
6. The measured value is fixed, and three distances (**D1**, **D2**, **D3**) are shown on the ***Result*** window.

Time

1. Select **Time** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The time interval between the two points appears. The time (**T**) is shown on the ***Result*** window.

Slope

1. Select **Slope** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The oblique line is displayed, and the slope is calculated. The distance (**D**), time (**T**) and slope (**Slope**) are shown on the ***Result*** window.

%Stenosis

Two diameters percent stenosis calculation

1. Select **%Stenosis** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Measure the larger vertical diameter (**D1**) of the stenosis using **[Trackball]**, and press the **[Set]** key.
3. Measure the smaller vertical diameter (**D2**) of the stenosis using **[Trackball]**, and press the **[Set]** key.
4. The diameters (**D1**, **D2**) and the diameter percent stenosis (**%Steno(Diam)**) are shown on the ***Result*** window.

A/B Ratio

Distance ratio

1. Select **A/B Ratio** and then select **Distance** on the touch screen.
   The start point appears.
2. The vertical line and the horizontal line are perpendicular to each other.
3. Measure the first vertical diameter (**D1**) of the ratio using **[Trackball]**, and press the **[Set]** key.
4. Measure the second vertical diameter (**D2**) of the ratio using **[Trackball]**, and press the **[Set]** key.
5. The ratio is calculated. The two distances (**D1**, **D2**) and A/B ratio (**Distance Ratio**) are shown on the ***Result*** window.

Time ratio

1. Select **A/B Ratio** on the touch screen. And select **A/B Ratio** and then select **Time** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Measure the first vertical diameter (**T1**) of the ratio using **[Trackball]**, and press the **[Set]** key.
3. Measure the second vertical diameter (**T2**) of the ratio using **[Trackball]**, and press the **[Set]** key.
4. The ratio is calculated. The two distances (**T1**, **T2**) and A/B ratio (**Time Ratio**) are shown on the ***Result*** window.

Heart Rate (HR)

1. Select **HR** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

D mode measurements

Velocity

1. Select **Velocity** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
3. The measured value is fixed. The velocity (**Vel**) and pressure gradient (**PG**) are shown on the ***Result*** window.

Time

1. Select **Time** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The time interval between the two points appears. The velocity (**Vel**) and time (**T**) are shown on the ***Result*** window.

Acceleration

1. Select **Acceleration** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The oblique line is displayed, and the acceleration is calculated. The acceleration (**Accel**), the acceleration time (**AT**), and maximum velocity (**Vmax**) are shown on the ***Result*** window.

Resistivity Index (RI)

1. Select **RI** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point and press the **[Set]** key again.
4. The end point is fixed, and the resistive index is calculated. The peak systolic velocity (**PS**), end diastolic velocity (**ED**), and resistivity index (**RI**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Select **PI** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Move the marker to the start point of the waveform using **[Trackball]**, and press the **[Set]** key.
   The end point appears.
3. Use **[Trackball]** to manually trace the waveform, and press the **[Set]** key.
4. The pulsatility index is calculated. The peak systolic velocity (**PS**), end diastolic velocity (**ED**), minimum diastolic velocity (**MD**), the maximum time-average velocity (**TAmax**), the resistivity index (**RI**), the pulsatility index (**PI**), and systole/diastole ratio (**S/D Ratio**) are shown on the ***Result*** window.

Velocity-Time Integral (VTI)

1. Select **VTI** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Move the marker to the start point of the waveform using **[Trackball]**, and press the **[Set]** key.
   The end point appears.
3. Use **[Trackball]** to trace one cycle of the waveform, and press the **[Set]** key.
4. The velocity-time integral is calculated. The minimum, maximum, mean velocities (**Vmin**, **Vmax**, **Vmean**) and maximum and mean pressure gradients (**PGmax**, **PGmean**) are shown on the ***Result*** window.

A/B Ratio

Velocity ratio

1. Select **A/B Ratio** on the touch screen. And select **A/B Ratio** and then select **Velocity** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Measure the first point (**V1**) of the ratio using **[Trackball]**, and press the **[Set]** key.
3. Measure the second point (**V2**) of the ratio using **[Trackball]**, and press the **[Set]** key.
4. The ratio is calculated. The two velocities (**V1**, **V2**) and A/B ratio (**Velocity Ratio**) are shown on the ***Result*** window.

Time ratio

1. Select **A/B Ratio** on the touch screen. And select **A/B Ratio** and then select **Time** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Measure the first time interval (**T1**) of the ratio using **[Trackball]**, and press the **[Set]** key.
3. Measure the second time interval (**T2**) of the ratio using **[Trackball]**, and press the **[Set]** key.
4. The ratio is calculated. The two time values (**T1**, **T2**) and A/B ratio (**Time Ratio**) are shown on the ***Result*** window.

AC/DC

1. Select **AC/DC** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Measure the first oblique line (**Accel**) of the slope using **[Trackball]**, and press the **[Set]** key.
3. Measure the second oblique line (**Decel.**) of the slope using **[Trackball]**, and press the **[Set]** key.
4. The ratio is calculated. The acceleration index (**Accel**), the acceleration time (**AT**), the deceleration index (**Decel.**), and deceleration time (**DT**) are shown on the ***Result*** window.

Heart Rate (HR)

1. Select **HR** on the touch screen.
   The vertical line and the horizontal line are perpendicular to each other.
2. Use **[Trackball]** to move to the point of intersection, and press the **[Set]** key.
   The start point is fixed, and the end point appears.
3. Use **[Trackball]** to move the point, and press the **[Set]** key again.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

Auto Calc

1. In PW mode, select **AutoCalc** on the touch screen.
2. Select **Frozen** or **Live**.
3. If you select **Live**, the caliper and waveform trace automatically appear.
4. If you select **Frozen**, press the **[Freeze]** key on the control panel to freeze the image. The caliper and waveform trace automatically appear.
5. The calculated value is shown on the ***Result*** window.

Auto Trace

1. In PW mode, select the desired measurement item and then select **Auto Trace** on the touch screen.
   The Doppler spectrum is traced automatically and the results are displayed.
2. If necessary, adjust the calculation cycle using **[Trackball]** and the **[Caliper]** key on the control panel.
   a. A green line appears at the right of the spectrum.
   b. Using **[Trackball]**, move the line and readjust the end cycle.
   c. Press the **[Caliper]** key on the control panel.
      The line changes to yellow.
   d. A green line appears at the left of the spectrum.
   e. Using **[Trackball]**, move the line and readjust the start cycle.
   f. Press the **[Set]** key on the control panel. The line changes to yellow.
3. The calculated value is shown on the ***Result*** window.

Semi Auto Trace

1. In PW mode, select the desired measurement item and then select **Semi Auto Trace** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point of the waveform and press the **[Set]** key. The end point appears.
3. Use **[Trackball]** to trace one cycle of the waveform, and press the **[Set]** key.
4. The calculated value is shown on the ***Result*** window.

Manual Trace

1. In PW mode, select the desired measurement item and then select **Trace** on the touch screen. The start point appears.
2. Use **[Trackball]** to move the marker to the start point of the waveform and press the **[Set]** key.
   The end point appears.
3. Use **[Trackball]** to trace one cycle of the waveform, and press the **[Set]** key.
4. The calculated value is shown on the ***Result*** window.

Viewing and Editing a Worksheet

Viewing a worksheet

To view a worksheet, do one of the following:

– Touch **Report** on the touch screen.

– Select **Report** on the context menu.

The system displays the worksheet for the current exam.

To view a worksheet of basic measurement,

– Select **Basic MEAS.** on the touch screen.

To view a worksheet by application or measurement mode,

– Select an application or a mode from the corresponding list or field on the top left of the display.

- To view a worksheet with data for a particular mode, select a mode (**2D, M**, or **Doppler**) on the touch screen.
- To view a worksheet with data for more than one mode, select **All** on the touch screen.

If a worksheet has more data on a second page, to view the next page,

– Rotate the **Select Page** soft key.

To exit the worksheet page and return to the scan mode, do one of the following:

– Press the **Exit** key on user-defined key.

– Select **Exit** on the touch screen.

Editing a worksheet

To change the measurement value,

1. Use **[Trackball]** to move the cursor to the field that you want to change.
   The field is highlighted.
2. Press the **[Set]** key. The field backlights.
3. Type the new data in the field.
   The new data is displayed in green with an asterisk mark.

NOTE

The new data, displayed in green with an asterisk mark, is appended to the updated value and resultant value to indicate that it was manually entered.

To delete measurement values,

1. Use **[Trackball]** to move the cursor to the field that you want to erase. The field is highlighted.
2. Do one of the following:
   – Select **Delete Value** to delete the current value.
   – Press the **Delete All** soft key to delete all values for all measurement modes from the report.
   – Press the **[Clear]** key on the control panel to delete all measurement values from the report.

To exclude or include measurement values,

1. Use **[Trackball]** to move the cursor to the field that you want to exclude.
   The field is highlighted.
2. Do one of the following:
   – Select **Exclude Value** to exclude the data. The excluded data is displayed in white.
   – Select **Exclude Value** again to include the data that you previously excluded.

To select a method,

1. Use **[Trackball]** to move the cursor over the value in the Method column and press the **[Set]** key.
2. Select a method from the drop-down list.
   - **Last**: Last measurement that was taken
   - **Aver**: Average of the measurements taken
   - **Max**: Maximum measurement
   - **Min**: Minimum measurement
3. The selected method is displayed in the column, and the value is updated accordingly.

To type a comment,

1. Select **Comment** on the touch screen. The ***Comment*** screen appears.
2. In the ***Comments*** field, type comments about the exam by using the QWERTY keyboard.
3. To close the ***Comment*** screen, click **OK** or select **Comment** on the touch screen.

NOTE

On the ***Patient*** screen, you can edit text in the ***Exam Comments*** field.

Previewing the report

To preview the report in print layout,

– Select **Preview** on the touch screen, or select **Preview** on the context menu.
You can preview a report to be printed.

To add an image to the report,

1. Move the cursor to the desired image on the clipboard and press the **[Set]** key.
2. Move the cursor where the selected image is to be inserted and press the **[Set]** key.

To remove an image from the report,

– Move the cursor to the desired image on the report and select **Delete Image** on the touch screen.

Exporting the report to media

To export the report to storage media as PDF format,

1. Select **PDF Export** on the touch screen. The ***Save*** dialog box appears.
2. Select a media from the ***Device*** field.
3. Type a file name in the ***File Name*** field.
4. Click **Save**. The progress bar appears during exporting files.

Printing a report

To print a report via a standard printer,

– Select **Print** on the touch screen.

To capture the report screen,

– Press the **[P1]**, **[P2]**, **[P3]** or **[P4]** key on the control panel.

NOTE

- A default standard printer can be configured in **Utility** > **Setup** > **SystemPreset** > **System** > **Peripheral** > **Standard Printer**.
- The supported paper size for report is A4, Letter only.

3

After the Exam is Over

This chapter introduces the followings:

Data Backup

You may lose user settings or patient information files such as patient's basic information and scanned images because of physical shocks to the product or internal errors. Therefore, you should back up user settings and patient information data on a regular basis.

Backup/Restore

The **Backup/Restore** preset allows you to backup and restore patient data, system and user-defined configurations. You can select a storage media (CD, DVD, USB flash drive, USB hard disk, and network storage) to perform the backup.

NOTE

To save images permanently, avoid using the local hard disk. Regularly back up the image archive to a storage media.

CAUTION

Follow the suggested backup procedure in the manual. ALPINION MEDICAL SYSTEMS does not have the responsibility for data loss caused by the user's carelessness.

To access the **Backup/Restore** preset,

1. Touch **Utility** on the touch screen.
2. Touch **Setup** on the touch screen.
3. Touch the **SystemPreset** tab on the touch screen.
   The ***System Preset*** screen appears.
4. Select **Backup/Restore** on the touch screen.

User Backup

The **User Backup** menu allows you to back up the each preset data. To select all user-defined presets, select the **User Defined Configuration** check box.

To back up the user preset data,

1. Insert a blank media properly on your system.
2. Select a media from the ***Media*** drop-down list.
3. If you select **USB** from the ***Media*** drop-down list, enter the description in the ***Description*** field.
4. Select the user preset you want to back up.
5. Click **Backup** to start backup. The backup procedure begins.
6. After the backup is completed, the last backup time and date appear next to the preset category.

To restore the user preset data,

NOTE

Make sure that the software version of the data is the same as the system's software version. If NOT, you may not perform the restoration.

1. Insert a media on your system.
2. Select the user preset(s) you want to restore.
   If your media is USB flash drive, select the user preset(s) you want to restore from the backup list.
3. Click **Restore** to start restoring. The restore procedure begins.

Image Backup

The **Image Backup** menu allows you to perform image backup using a storage media. Select your memory storage such as CD, DVD, USB flash drive, USB hard disk, and network storage.

To back up Image Archive,

1. Configure Media.
2. Configure Image Archive Option.
3. Prepare unformatted CD(s).
4. Click **Backup** to start backup Image archive.
   The media formatting starts and the instructional message appears.

You can view and import backup media via **E-View** menu.

To view the backup images,

1. Insert your media.
2. Go to **E-View**.
3. Change the source to your media from the local hard disk.
4. View the backup images of the study you want.

System Care and Maintenance

It is the responsibility of the user to verify that the ultrasound system is safe for diagnostic operation on a daily basis. Each day, prior to using the system, perform each of the steps in the daily checklist.

CAUTION

- The system does not contain any operator serviceable internal components. Ensure that unauthorized personnel do not tamper with the unit.
- When defects or malfunctions occur, do not operate the system until the problems are resolved. Contact your local service representative.

Daily Maintenance

Perform the following each day before using the ultrasound system:

- Visually inspect all transducers. Do not use a transducer which has a cracked, punctured, or discolored casing or frayed cable.
- Visually inspect all power cords. Do not turn on the power if a cord is frayed or split, or shows signs of wear. If your system's power cord is frayed or split, or shows signs of wear, contact your ALPINION service representative for power cord replacement.
- Visually inspect that the trackball and other controls on the control panel to make sure that they are clean and free from gel or other contaminants.
- Visually inspect the ECG connector and cables. Do not use the ECG connector and cables if they are damaged.

WARNING

To avoid electrical shock, you must visually inspect the transducer prior to use. Do not use the transducer that has a cracked, punctured, or discolored casing or a frayed cable.

Weekly Maintenance

The system requires weekly care and maintenance to function safely and properly. Clean the following:

- Monitor
- Control panel
- Footswitch

Failure to perform required maintenance may result in unnecessary service calls.

Monthly Maintenance

WARNING

When the LED lamp needs to be replaced, contact the ALPINION service representative.

CAUTION

To avoid electrical shock hazard, do not remove panels or covers from the console. This service must be performed by qualified service personnel. Failure to do so could cause a serious injury.

NOTE

To maintain the safety and functionality of the ultrasound system, maintenance must be performed every 12 months. Electrical safety tests must also be performed at regular intervals as specified by local safety regulations. Refer to the service manual for the electrical leakage test.

To inspect the system, examine the following on a monthly basis.

- Connectors on cables for any mechanical defects
- Entire length of electrical and power cables for cuts or abrasions
- Control panel and keyboard for defects
- Casters for proper locking operation

Transducer Care and Maintenance

Cleaning and Disinfecting Transducers

WARNING

- To avoid electrical shock and damage to the system, disconnect the transducer before cleaning and disinfecting.
- Always use protective eyewear and gloves when cleaning and disinfecting transducers.
- Check the housing, strain relief, lens and seal for damage, and check for any functional problem after cleaning and disinfecting the transducer.

CAUTION

- Do not use a surgical brush when cleaning transducers. Even the use of soft brushes can damage the transducer.
- Do not use paper products or products that are abrasive when cleaning the transducer. They damage the lens of the transducer.
- Be sure to use the proper concentration of enzymatic cleaner and rinse thoroughly.
- Before storing transducers, ensure that they are thoroughly dry.
- The use of 70% isopropyl alcohol (rubbing alcohol) and alcohol-based products on all transducers is restricted. On non-TEE transducers, the only parts that may be cleaned with isopropyl alcohol are the connector housing and the transducer housing and lens.
- Do not wipe any other part of a transducer with isopropyl alcohol (including cables or strain reliefs), as it can damage those parts of the transducer. This damage is not covered by the transducer warranty.

Cleaning the transducer

1. Disconnect the transducer from the system.
2. Moisten a clean gauze pad with purified water and wipe the transducer to remove any gel or particles remaining on the transducer. If purified water is not effective, then you can use an approved pre-cleaner or low-level disinfectant.
3. Carefully wipe the entire transducer, including the cable and connector.
   When cleaning the connector, do not allow any type of fluid to enter through the connector strain relief, electrical contacts or areas surrounding the locking-lever shaft and the strain relief.
4. To remove remaining particulate and cleaning residue, use cleaning wipes according to the manufacturers' instructions, or rinse thoroughly with water up to the immersion point.
   Do not immerse the connector, connector strain relief, or cable that is within 5 cm of the connector strain relief.
5. After cleaning the transducer, use a clean cloth to dry the transducer.
   To dry the lens, use a soft cloth and a blotting motion instead of a wiping motion.
6. Examine the housing, strain relief, lens and seal for damage, and check for any functional problem.
   If any damage is found, do not use a transducer and contact your ALPINION MEDICAL service engineer or an authorized agent.

Disinfecting the transducer

WARNING

- If a pre-mixed solution is used, be sure to observe the solution expiration date.
- The type of tissue it will contact during use dictates the level of disinfection required for a device. Ensure that the solution strength and duration of contact are appropriate for disinfection.

CAUTION

- Do not wipe the cable, strain relief, and connector of the transducer with the disinfectant, as it can damage and/or discolor those parts of the transducer.
- Do not immerse transducers for longer than one hour, unless they are sterilizable.
- Using a non-recommended disinfectant or not following the recommended disinfection method can damage and/or discolor the transducer and will void the transducer warranty.

To low-level disinfect a transducer,

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. After cleaning, choose a low-level disinfection solution compatible with your transducer.
4. Low-level disinfect the transducer by following the disinfection method recommended by the disinfection solution manufacturer.
5. After disinfecting, examine the housing, strain relief, lens and seal for damage, and check for any functional problem. If any damage is found, do not use a transducer and contact your ALPINION MEDICAL service engineer or an authorized agent.

To high-level disinfect a transducer,

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. After cleaning, choose a high-level disinfection solution compatible with your transducer. If a pre-mixed solution is used, be sure to observe the solution expiration date.
4. Disinfect or high-level disinfect the transducer by following the disinfection method recommended by the disinfection solution manufacturer.
5. Rinse the transducer with plenty of sterile water to remove all chemical residues on it. Or follow the rinsing method recommended by the disinfectant manufacturer to rinse the transducer.
6. Wipe off the water on the transducer with sterile cloth or gauze after rinsing it. Do not dry the transducer by heating.
7. Examine the housing, strain relief, lens and seal for damage, and check for any functional problem. If any damage is found, do not use a transducer and contact your ALPINION MEDICAL service engineer or an authorized agent.

Approved List of Disinfectant, Pre-Cleaner, and Ultrasound Gel

An appropriate substance should be selected based on the list of compatible disinfectants, pre-cleaners, and gels. For further information about approved ultrasound gel, cleaning, and disinfectant products, please refer to the relevant chapters in the User Manual.

Cable Handling

Take the following precautions with transducer cables:

- Keep free from wheels
- Do not bend the cable acutely
- Avoid crossing cables between transducers

Planned Maintenance

The following maintenance schedule is suggested for the transducer to ensure the optimum operation and safety.

- Daily: inspect transducers
- After each use: clean transducers
- After each use: disinfect transducers

4

Safety

This chapter introduces the followings:

Safety Precautions

You should make sure the safety precautions during all phases of operation, service, and repair of the X-CUBE 70 ultrasound system. If you fail to comply with these safety precautions or specific warnings in this manual, you violate safety standards in terms of design, manufacture, and intended use of this system. ALPINION MEDICAL SYSTEMS Co., LTD. does not have liability for your failure to comply with these requirements.

Precaution Levels

You can view various levels of safety precautions on your equipment, and each level of caution can be identified by one of the following flag words and icons which precede the precautionary statement.

WARNING

WARNING indicates that a specific hazard is known to exist which through inappropriate conditions or actions may cause severe or fetal personal injury or substantial property damage.

CAUTION

CAUTION indicates that a potential hazard may exist which through inappropriate conditions or actions will or can cause minor personal injury or property damage such as loss of patient or system data.

NOTE

NOTE indicates precautions or recommendations that will help you operate the product more effectively.

Equipment and Personnel Safety

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

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

Equipment and Personnel Safety

WARNING

The system voltage may cause serious injury or damage to the system.

- Installing the system yourself may cause damage to the system or electrical shock. To avoid damage to the system and avoid electrical shock, only qualified ALPINION service engineer must install the system.
- When you observe that the system causes any malfunction, you must stop operating the system and take proper action for patients. After that, contact ALPINION service engineer.
- Do not modify this system such as system components, or software. When you modify the system, it may cause safety hazards. Only qualified ALPINION service engineer must modify the system.
- Always make sure you turn off the system power and unplug the power cord from the power outlet before cleaning up and disinfecting the system.

WARNING

To avoid injury:

- Do not remove the covers of a system yourself to avoid damage to the system and unexpected electrical shock. Only qualified ALPINION service engineer must repair or replace components.
- You must make sure grounded integrity of the power outlet and system regularly.
- To avoid risk of electric shock, you must connect the system to the supply mains with the protective earth.
- Do not allow water or liquids on or above the system. Dripping water or liquids into the system may cause electrical shock and damage to the system.

WARNING

Always make sure that you do not operate the system in the presence of flammable or explosive liquids, vapors or gases. Malfunctions in the system, 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 system, or to unplug it.
- If flammable substances are detected, evacuate and ventilate the area before turning off the system.

WARNING

For patient safety, you must locate the system to easily unplug the power cord from the power outlet when a malfunction or an error occurs.

WARNING

Always use peripherals and accessories approved by ALPINION. You must securely connect peripherals and accessories to the system.

WARNING

The ultrasound diagnostic system is not intended to be used as a data storage device. The user is responsible for the data on the system and is strongly recommended to perform a regular backup.

CAUTION

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

CAUTION

- Your ultrasound system is not intended for diagnosing and monitoring ECG.
- Do not use the system for cardiac operation.

CAUTION

Always use approved ECG cables and recommended electrodes by ALPINION.

CAUTION

Always use transducers approved or recommended by ALPINION.

CAUTION

Do not touch the patient and any of the connectors on the system simultaneously, including transducer connectors.

CAUTION

Do not load non-system software on the system computer.

Caution for Moving the System

Be careful when moving the system. Failure to follow these precautions can result in serious injury and/or system damage.

CAUTION

To avoid serious injury and/or system damage when transporting from one area of use to another:

- Two or more people are required when moving the system on inclines or long distance.
- Secure the monitor and accessories for transport.
- Be sure the pathway is clear.
- Move the system slowly and carefully.
- Avoid collisions with walls or door frames.
- Always place the system on horizontal ground and engage the caster brakes.
- Do not move the system when the brakes are engaged.

Caution for Using Monitor

When adjusting the height or position of the monitor, do not place a finger, hand or object on the joint of the monitor or monitor arm to avoid injury or system damage.

Caution for Using Control Panel

When adjusting the height, make sure nothing is within the range of motion to avoid injury or system damage.

Patient Safety

The precautions listed can seriously affect the safety of patients undergoing diagnostic ultrasound examinations.

Patient Identification

When entering patient data, always ensure that the patient's name and ID number are correct. Make sure that all saved data and hard copy prints contain the patient ID correctly. Identity errors could lead to incorrect diagnosis.

Patient Data

Make sure that the ultrasound diagnostic system is not used to store the patient data and images for the long term. The user is responsible for the data on the system and is strongly recommended to perform a regular backup.

It is advisable to back up the system data to the hard drive prior to any service repairs. It is always possible to lose the patient data during the system failure and repair. Alpinion Medical Systems is not responsible for any lost patient data.

Diagnostic Information

The images and calculations provided by the diagnostic ultrasound system are intended for experienced users and should not be considered as the sole and incontrovertible basis for clinical diagnosis.

Users are encouraged to study the literatures and make their own professional conclusions regarding the clinical utility of the system.

The user should be familiar with product specifications, system accuracy and stability limitations, and consider these limitations before making decisions based on quantitive values.

Equipment malfunction or incorrect settings can result in measurement errors or failure to detect details within the image. The user must become thoroughly familiar with the equipment operation in order to optimize its performance and recognize possible malfunctions.

CAUTION

The system provides calculations (eg, estimated fetal weight) and charts based on published scientific literature. It is the user's responsibility to select the appropriate chart and clinical interpretation of the chart and calculations. The user should consider contraindications when using calculations and charts in scientific literature. In addition, the diagnosis, decision for further examination, and medical treatment must be performed by a qualified physician in accordance with Good Clinical Practice guidelines.

CAUTION

Be certain to ensure the patients' privacy data and confidentiality.

Mechanical Hazards

The use of damaged transducers or improper use and manipulation of the endocavity transducers may result in injury or increase the risk of infection. Inspect transducer often for sharp, pointed, or rough surface damage that could cause injury or tear protective barriers.

Never use excessive force when manipulating endocavity transducers.

CAUTION

Look for any damage that would allow liquid to enter the transducer. If any damage is found, do not use the transducer until it has been inspected and repaired/replaced by ALPINION Service Representative.

CAUTION

Ultrasound transducers are sensitive instruments which can easily be damaged by rough handling. Take extreme care when handling or storing transducers. A damaged housing, lens or cable can result in patient injury or transducer malfunctions.

CAUTION

Do not use the system with defibrillator. The system does not include a defibrillation-proof applied part for ECG.

ALARA (As Low As Reasonably Achievable)

Ultrasound can have harmful effects on tissues, potentially causing patient injuries. Always minimize exposure time and keep ultrasound levels low when there is no medical benefit. Follow the principle of ALARA (As Low As Reasonably Achievable), increasing acoustic output only when needed to achieve a diagnostic quality image. Observe the acoustic output display and make sure you are familiar with all controls affecting the output level.

Training

It is recommended that all users receive proper training in applications before performing them in a clinical setting. ALPINION provides training assistance, if needed. Please contact the local Alpinion representative for training assistance.

Anti-Virus Program

Anti-Virus Program

Since the X-CUBE ultrasound systems are integrated into your IT-network, ALPINION MEDICAL SYSTEMS Co., LTD wants to make sure that you are aware of the proactive measures we are taking to secure the system. Below are measures we have implemented to secure the X-CUBE ultrasound systems.

- Use of Windows* Embedded Standard 10, a componentized version of Windows 10 specifically made for embedded systems. Only the components required are used for the X-CUBE scanners, thereby reducing the OS attack surface. Please note that Windows Embedded Standard 7 is not the same operating system as Windows 10.
- Disable the user's ability to access the internet and Windows desktop.
- Disable, or make inaccessible, functionality that is typically used as malware vectors for spreading viruses (e.g. email services, web browsers).
- Disable the AutoRun functionality on removable media.

ALPINION MEDICAL SYSTEMS Co., LTD believes that this Defense in Depth strategy using the combination of the security measures above and the security standards of Microsoft's Windows Embedded Standard 10 will provide security against malware, especially for a system used in a professional, hospital grade networking environment that itself should provide a high level of security measures.

Finally, a few points as to why ALPINION MEDICAL SYSTEMS Co., LTD do not use the anti-virus software. Commercial anti-virus software is commonly used on general-purpose computers to detect the presence of malicious software (e.g. virus, Trojan horse, worm). Anti-virus software is useful on general-purpose computers as they typically cannot be sufficiently hardened against the attack vectors used by malicious software.

The X-CUBE ultrasound systems however are single purpose devices that have controlled intended use, and thus are well hardened. For the X-CUBE ultrasound systems, the potential patient safety and security risks introduced by using commercial anti-virus software would outweigh the security benefits. Such risks include:

- Real-time anti-virus scanning can affect ultrasound system performance.
- The effectiveness of anti-virus software depends on regular updates of the virus definitions files. This would typically require internet connectivity for the ultrasound system.
- The anti-virus software itself is a popular attack vector.
- Disruptive nature of the support of the anti-virus software throughout the life cycle of the medical device. The operating system of a medical ultrasound system is part of a medical device that requires a special and controlled release process. Any update of the anti-virus software would require a change of the system software.

Due to the cited risks, the use of commercial anti-virus software is not part of the X-CUBE ultrasound systems product security strategy.

Transducer Safety

The following recommendations help to prevent preventable transducer damage and serious injuries.

Handling and Care Precautions

Care precautions

CAUTION

Failure to follow the precautions listed below can result in transducer damage and/or electric shock due to damaged electrical insulation.

- Do not apply excessive bending or pulling force to the transducer cable.
- Do not kink, tightly coil, or apply excessive force on the transducer cable.

Handling precautions

WARNING

Do not use damaged or defective transducers. Injury to the operator or patient may occur if cracks, cuts, sharp edges or exposed wiring exist. Cleaning and/ or gel solutions may leak into the transducer resulting in electrical shock. Discontinue use, immediately disconnect the ultrasound transducer and notify the ALPINION Service Representative.
Failure to follow these precautions can result in serious injury.

CAUTION

After each use, inspect the transducer's lens, cable, and casing. Look for any damage that would allow liquid to enter the transducer. If any damage is found, do not use the transducer until it has been inspected and repaired/replaced by ALPINION Service Representative.

Electrical shock hazard

WARNING

Do not drop the transducers. If a transducer has dropped on the floor or on any other hard surface, immediately disconnect the transducer from the ultrasound system. Do not use the transducer any more. There is a risk of electric shock due to damaged electrical insulation.

WARNING

Prior to each use, visually inspect the transducer lens and case area for cracks, cuts, tears, and other signs of physical damage. Do not use a transducer which appears to be damaged until you verify functional and safe performance.

WARNING

Do not immerse the transducer into any liquid beyond the immersion level. Never immerse the transducer connector into any liquid.

WARNING

Do not kink, tightly coil, or apply excessive force on the transducer cable. There is a risk of electric shock due to damaged electrical insulation.

WARNING

Before inserting the connector into the transducer port, inspect the transducer connector pins. If a pin is bent, do not use the transducer until it has been inspected and repaired/ replaced by a ALPINION Service Representative.

Special Handling Instructions

WARNING

Protective barriers may be required to minimize disease transmission. Transducer sheaths are available for use with all clinical situations where infection is a concern.

WARNING

Do not use an expired transducer sheath. Before using transducer sheaths, verify whether the term of validity has expired. Failure to follow these instructions could lead to exposure to infectious agents.

WARNING

Devices containing latex may cause severe allergic reactions in latex sensitive individuals.

CAUTION

Do not use pre-lubricated condoms as a sheath. In some cases, they may damage the transducer.

CAUTION

Only use approved coupling gels and cleaning/disinfection agents. Failure to follow the precaution can result in transducer damage.

CAUTION

Adequate cleaning and disinfection is necessary to prevent disease transmission.

- The user is responsible to ensure adequate cleaning and disinfection of ultrasound transducers. Transducers are not sterile when delivered.
- High-level disinfection is recommended for surface transducers and is required for endocavity transducers.
- Transducers must be cleaned and disinfected before they are replaced or disposed.

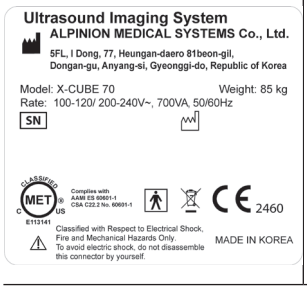
System Symbols and Labels

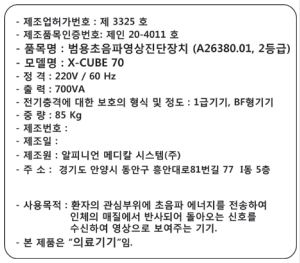
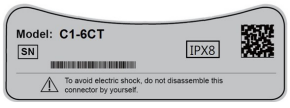
System Symbols and Labels

The following is a list of system symbols and labels for safety. They indicate that you must refer to the manual for specific information to avoid personal injury or damage to the product.

Safety Symbols/ Labels	Location	Explanation
	On the power button of the control panel	System on/off/stand-by
	On the system rating label for overseas, transducer label, and ECG port	Patient applied part meets the isolation requirements for type BF equipment
	On the ECG port	ECG triggered display
	On the transducer label	This symbol indicates that the transducer meets immersion requirements. Depending on the transducer model, the immersion label may differ.
	On the multi-caution label, rating label for overseas, transducer label, and gel warmer label	This symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.
	On the multi-caution label, rating label for overseas, and system packing box	This system complies with regulatory requirements of European Directive 93/42/EEC regarding medical device.
	On the multi-caution label, gel warmer label, and I/O panel	Consult instructions for use (or consult operating instructions)
	Various locations on labels	Attention (Caution) – consult accompanying documents if complete information cannot be provided on the label

Safety Symbols/ Labels	Location	Explanation
	On the rating label for overseas: Adjacent to the AC power and the AC power outlet	Alternating current in accordance with IEC 60878-01-14
	Adjacent to the AC power outlet	Push-push button
	Adjacent to the AC power	Equipotentiality
	On the right side of the touch screen	Universal Serial Bus
	On the multi-caution label	This symbol indicates that the transducer should not be used in the MRI scanner room.
	On the system rating label for overseas and transducer label	Date of manufacture See ISO 8601 for date format
	On the system rating label for overseas and transducer label	Symbol for manufacturer This symbol shall be accompanied by the name and the address of the manufacturer.
	On the system rating label for overseas and transducer label	Serial Number
	On the multi-caution label	To ensure safety of user, moving and delivering system shall be performed by at least 2 persons.
	On the LCD caution label and multi-caution label	Do not forcibly push the monitor or the system when the casters are locked.
	On the LCD caution label	Do not press or place loads on the monitor when folded. Otherwise, monitor and (or) professional arm could be damaged.
	On the multi-caution label	Do not use mobile transmitter such as mobile phone, radio receiver, broadband power line, etc.

Safety Symbols/ Labels	Location	Explanation
	On the LCD caution label	Be very careful not to injure yourself or damage the system when rotating the monitor arm.
	Rear of the LCD monitor	Caution label
	Top of the monitor arm	Care against pinch shall be taken. (In accordance with IEC 60878)
	Rear of the system body	Multi-caution label
	Right cover of the system body	No gender detection label
	Top (or side panel) of the system body	Safety working load label
	Bottom of the control panel	System rating label for overseas

Safety Symbols/ Labels	Location	Explanation
	Bottom of the control panel	System rating label for domestics
	On the cable port of the gel warmer	Gel warmer voltage label
	Rear of the gel warmer	Gel warmer label
	Transducer	Name of transducer manufacturer, WEEE symbol, indicating separate collection, Certification mark
	Transducer	Transducer name, Serial, IPX Rating, Caution mark

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