QUICK GUIDE

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Revision Log

The following is a list of major changes and additions that have been made to this quick guide since it was first released.

Rev	Date	Description
Rev. 0	Mar. 10, 2016	Quick guide first released

Table of Contents

System Basics

Feature

Table 1. Feature

Physical Dimensions	Height: 1455/1695 mm Width: 590 mm Depth: 895 mm Weight: 94 kg (not including options)
Clinical Applications	Abdomen Obstetrics (OB) Gynecology (GYN) Urology Vascular Small Parts (incl. Breast) Pediatrics Cardiology Musculoskeletal (MSK) Transcranial (TCD)
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 ECG mode 3D/4D mode Live HQ™ mode Panoramic mode Elastography Stress Echo Cube Strain™

Image Processing Technology	Xpeed™ Full SRI™ Spatial Compounding Image (SCI) Frequency Compounding Image (FCI) Filter method Tissue Harmonic Image (FTHI) Pulse Inversion Tissue Harmonic Image (PTHI) Dynamic Range Colorize Line Density Persist (frame average) Write/Read Zoom Beam Steering Virtual Convex Sweep Speed Needle Vision™/Needle Vision™ Plus
Operable Transducers	Linear Array Transducer Convex Array Transducer Sector Phased Array Transducer Endocavity Transducer Volume Convex Transducer Volume Endocavity Transducer Pencil Doppler Transducer
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
Connectivity	Verification DICOM storage DICOM print DICOM storage commitment DICOM media DICOM worklist DICOM MPPS Network Storage DICOM Structured Report (OB-GYN) DICOM Structured Report (Echocardiography) DICOM Structured Report (Vascular) Cube View™ Wireless LAN (Option)
User Interface	English German French Spanish Italian Russian Portuguese Chinese

System Components

Front view

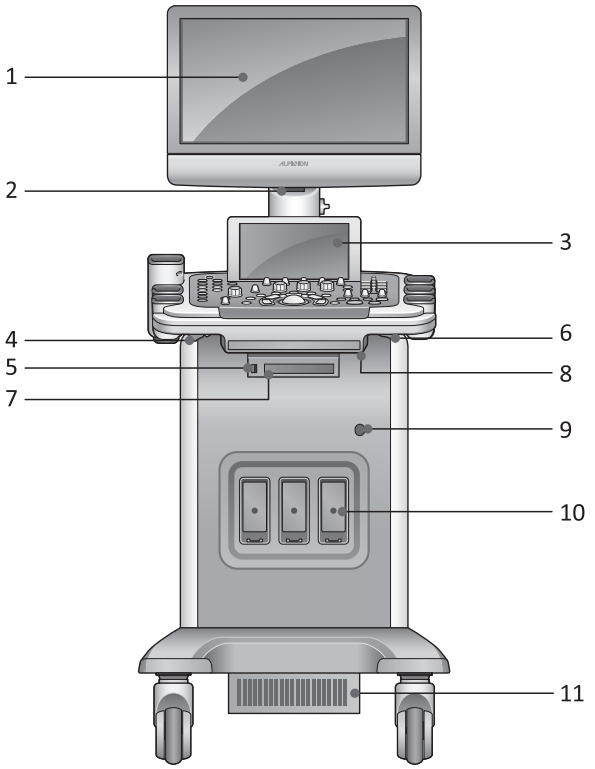

Figure 1. Front view

1 Monitor
2 LED lamp
3 Touch screen
4 Rotate lever
5 USB port
6 Up/Down lever
7 DVD-RW
8 Transducer cable holder
9 CW port
10 Transducer port
11 Air filter

Rear view

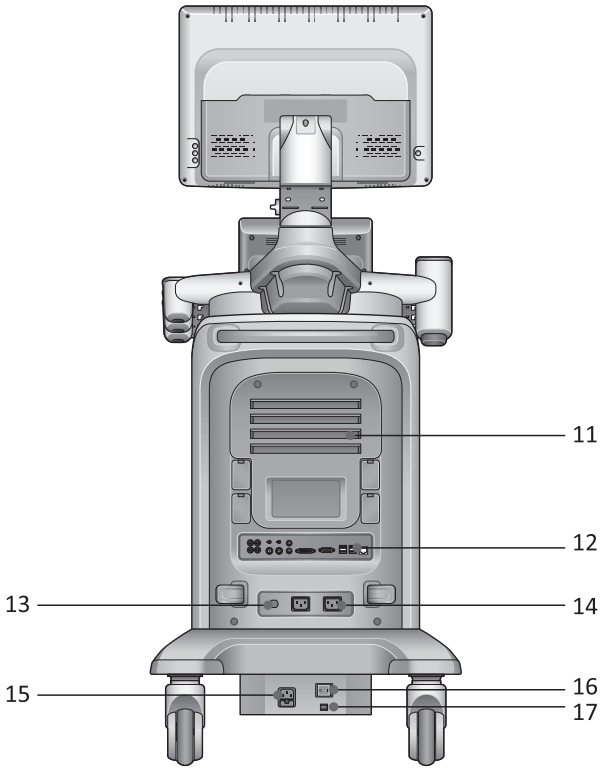

Figure 2. Rear view

11 Air filter
12 I/O panel
13 Circuit breaker
14 AC outlet
15 AC inlet
16 System on/off switch
17 Voltage selector-output

NOTE

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

Side view

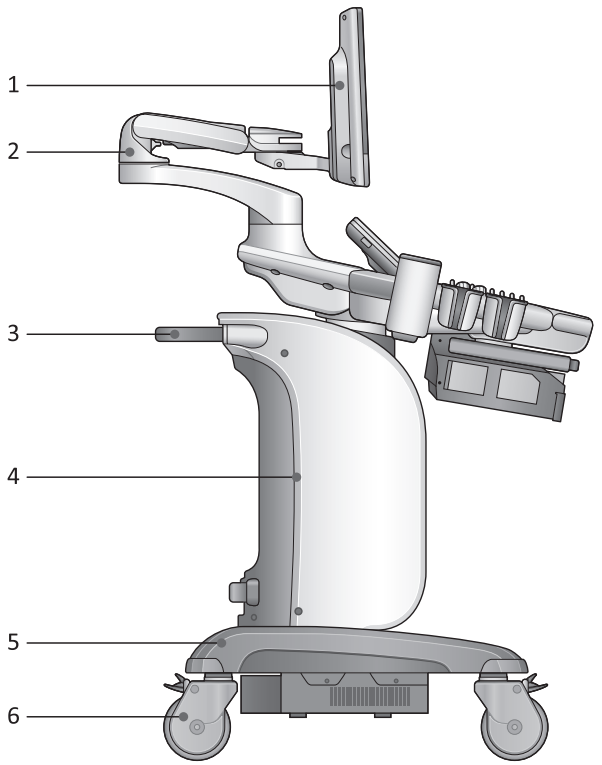

Figure 3. Side view

1 Monitor
2 Professional arm
3 Rear handle
4 Body cover
5 Body base
6 Wheel and control pedal

Footswitch (Option)

The optional tri-pedal footswitch that is connected with the rear panel of your system performs specific functions easily instead of pressing function keys on the control panel.

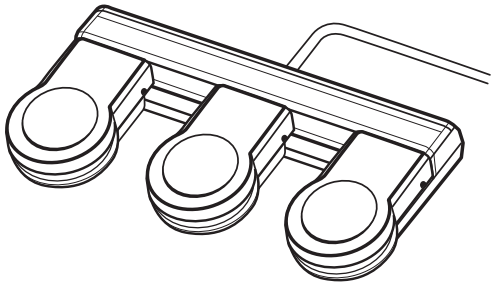

Figure 4. Footswitch

NOTE

The footswitch is programmable. To configure the footswitch, go to **System Preset** > **User Setting**.

Control panel

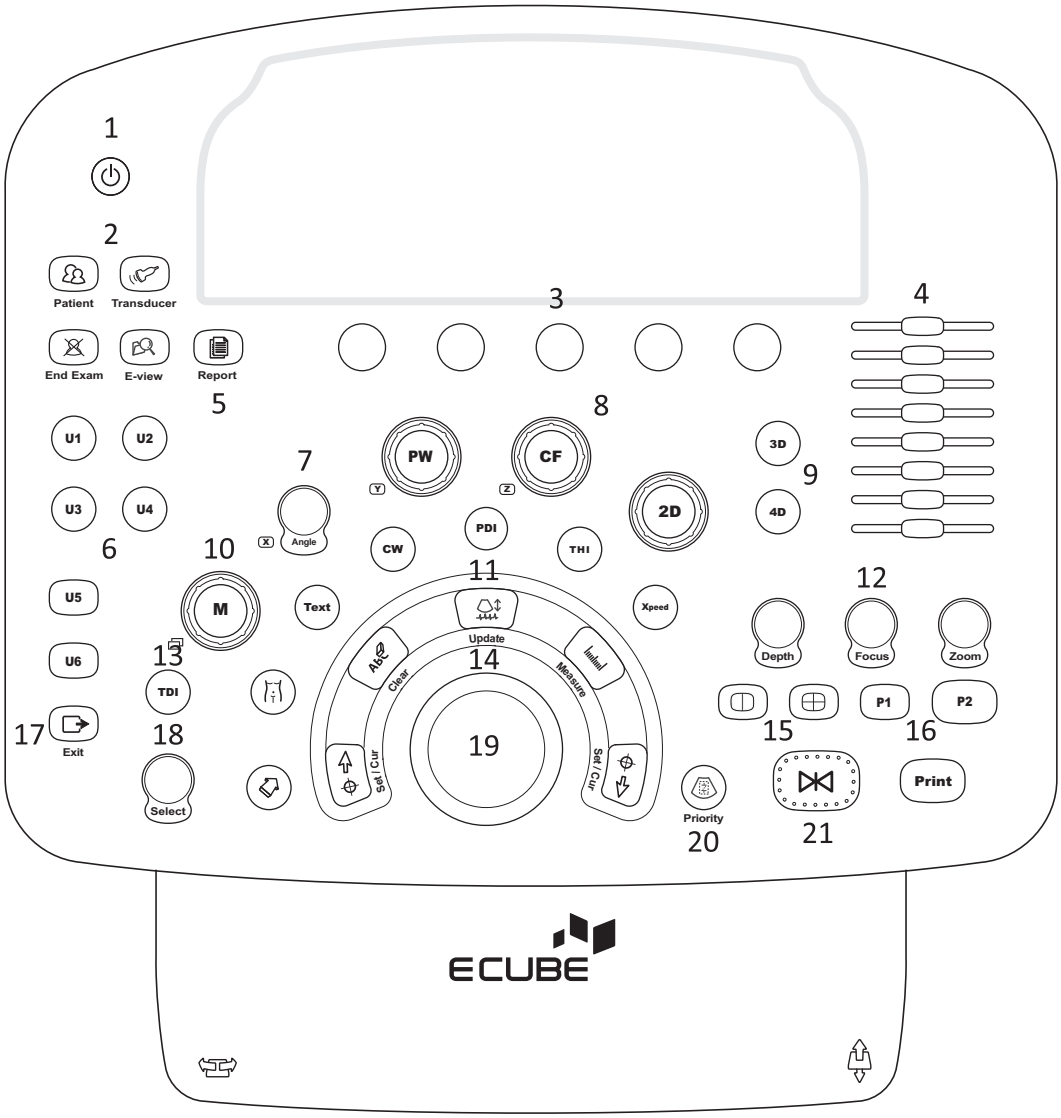

Figure 5. Control panel

Table 2. Key description

No	Controls	Description
1	**Power on/off**	Use this control to turn on and off the system.
2	**Patient**	Use this control to display the *Patient Registration* screen. You can enter patient data.
	Transducer	Use this control to select the desired transducer, application, and preset.
	End Exam	Use this control to end the current exam.
	E-view	Use this control to activate image management with end of study options.
3	**Soft keys**	Use these controls to select or adjust the functions in the soft menu at the bottom of the touch screen. • Press to select the corresponding soft menu. • Rotate to adjust the function of the corresponding soft menu.
4	**TGC slides**	Use these controls to adjust TGC values on images.
5	**Report**	Use this control to create a report based on the exam result and edit it.
6	**User (1~6)**	Use these controls to access user-defined functions.
7	**Angle**	Use this control to change an 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 probe angle. • In Arrow mode, rotate to adjust the arrow angle. • In CW or PW mode, press to adjust the quick angle.
8	**Imaging mode**	Use these controls to activate PW, CF, or 2D modes.
9	**3D**	Use this control to activate 3D mode.
	4D	Use this control to activate 4D mode.
10	**M**	Use this control to activate M mode.

No	Controls	Description
11	Arrow	Use this control to display an arrow pointer on the screen.
	Body Pattern	Use this control to display the body pattern images.
	Text	Use this control to annotate images.
	CW	Use this control to activate Continuous Wave (CW) Doppler mode. This control is optional.
	PDI	Use this control to activate Power Doppler mode.
	THI	Use this control to turn harmonic imaging on and off.
	Xpeed	Use this control to automatically optimize image parameters on the live screen.
12	Depth	Use this control to adjust the scanning depth of an image.
	Focus	Use this control to focus on the area of interest.
	Zoom	Use this control to turn Zoom mode on. • Rotate to activate Read zoom. • Press to activate Write zoom in Read zoom mode.
13	TDI	Use this control to activate Tissue Doppler Imaging mode.
14	Set/Cur	Use this control to show the cursor on the screen and set the current function. You can select a menu on the screen using this cursor.
	Clear	Use this control to delete the arrow, comment, and measurement.
	Update	Use this control to update a 2D image in real time based on the specified time or freeze a 2D image.
	Measure	Use this control to perform measurement.
15	Image layout keys	Use these controls to view an image in dual or quad screen.
16	P1, P2	Use this control to print out images.
	Print	Use this control to print out images.
17	Exit	Use this control to exit current screen (mode) and return to the previous screen (mode).

No	Controls	Description
18	Select	Use this control to select the desired function from the context menu on the screen.
19	Trackball	Use this control to scroll through menus or options on the screen by moving the cursor.
20	Priority	Use this control to 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.
21	Freeze	Use this control to start and stop scanning.

QWERTY keyboard

To open the QWERTY keyboard,

- Push the edge of the keyboard. The keyboard smoothly slides out.

To close the QWERTY keyboard,

- Slide the edge of the keyboard into the console, and then push it.

Figure 6. QWERTY keyboard

NOTE

For using the special keys on the keyboard, refer to the *User Manual*.

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 7. Touch screen

Image screen display

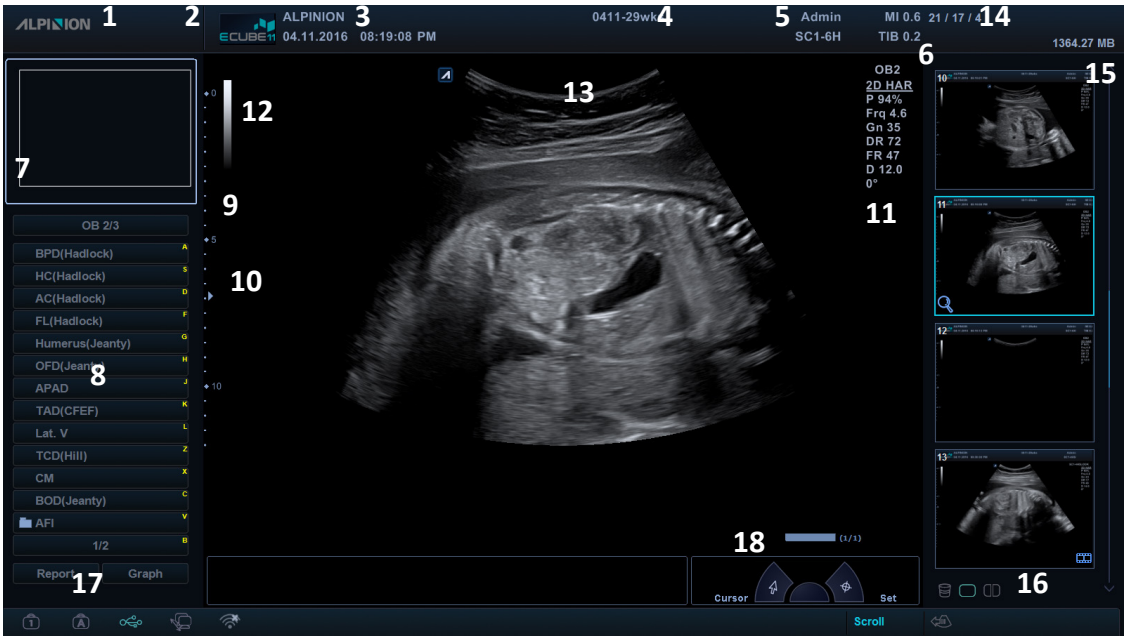

Figure 8. Image display

1 Company logo
2 Hospital logo
3 Hospital name, Current date & time
4 Patient ID, Patient name
5 Operator ID, Transducer name
6 Mechanical index, Thermal index
7 Zoom reference window (Zoom mode)
8 Labeled measurement menu
9 Depth scale bar
10 Focus mark
11 Image parameter
12 Gray scale bar
13 The location of transducer
14 Clipboard indicator
15 Clipboard area
16 Clipboard icons
(Recycle bin, Single layout format, Dual layout format)
17 Symbol lock, caps lock, USB connection, network connection, wireless network connection
18 CINE bar

Getting Started

Powering on

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

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.

Do not unplug the power cord when using the system. Otherwise, the system gets damaged and patient data might be lost.

Powering off

1 Press the **[Power On/Off]** key on the control panel.

2 When the shutdown dialog box appears, select **Shutdown** by using **[Trackball]**.

To configure how to power off the system, go to **System Preset** > **General**.

Adjusting the monitor

Contrast

1. Press the **Mode/Select** (☐) button at the right side of the monitor once.
2. Adjust the contrast value using the **Up** (∧) or **Down** (∨) button. To increase the contrast, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the contrast. The contrast value appears on the screen.

Brightness

1. Press the **Mode/Select** (☐) button at the right side of the monitor twice.
2. Adjust the brightness value using the **Up** (∧) or **Down** (∨) button. To increase the brightness, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the brightness. The brightness value appears on the screen.

Dim brightness

1. Press the **Mode/Select** (☐) button at the right side of the monitor three times.
2. Adjust the dim brightness value using the **Up** (∧) or **Down** (∨) button. To increase the dim brightness, press the **Up** (∧) button. Press the **Down** (∨) button to decrease the dim brightness. The dim brightness value appears on the screen.

You can use the dim brightness function in a dim room.

Connecting/Disconnecting the transducer

You can connect or disconnect the transducer to/from the transducer port regardless of when the system is turned off or on. Make sure that you press the **[Freeze]** key on the control panel before connecting or disconnecting the transducer.

CAUTION

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

Connecting the transducer

1. Make sure that you press the **[Freeze]** key on the control panel.
2. Open the transducer connect door.
3. Insert the transducer connector into the transducer port with the connector cable facing up.

CAUTION

Do not forcibly insert the transducer connecter to the system. Improper connection may cause damage to the system and transducer.

4. Turn the connector locking handle clockwise.

NOTE

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

Disconnecting the transducer

CAUTION

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

1. Make sure that you press the **[Freeze]** key on the control panel.
2. Turn the connector locking handle counter-clockwise.
3. Pull out the transducer connector from the transducer port.
4. Close the transducer connect door.

Activating/Deactivating the transducer

Activating the transducer

To activate the transducer, follow these steps:

1. On the control panel, press the **[Transducer]** key. The Transducer and Application Selection dialog box appears.
2. Select the desired transducer, application, and preset on the touch screen.

NOTE

Selecting the **Automatic Preset selection when changes the Transducer** check box displays 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 it is running.

To deactivate the transducer, follow these steps:

1. Press the **[Freeze]** key on the control panel.
2. Clean the gel from the transducer.
3. Carefully place the transducer in its holder.

Starting a Study

Patient registration screen

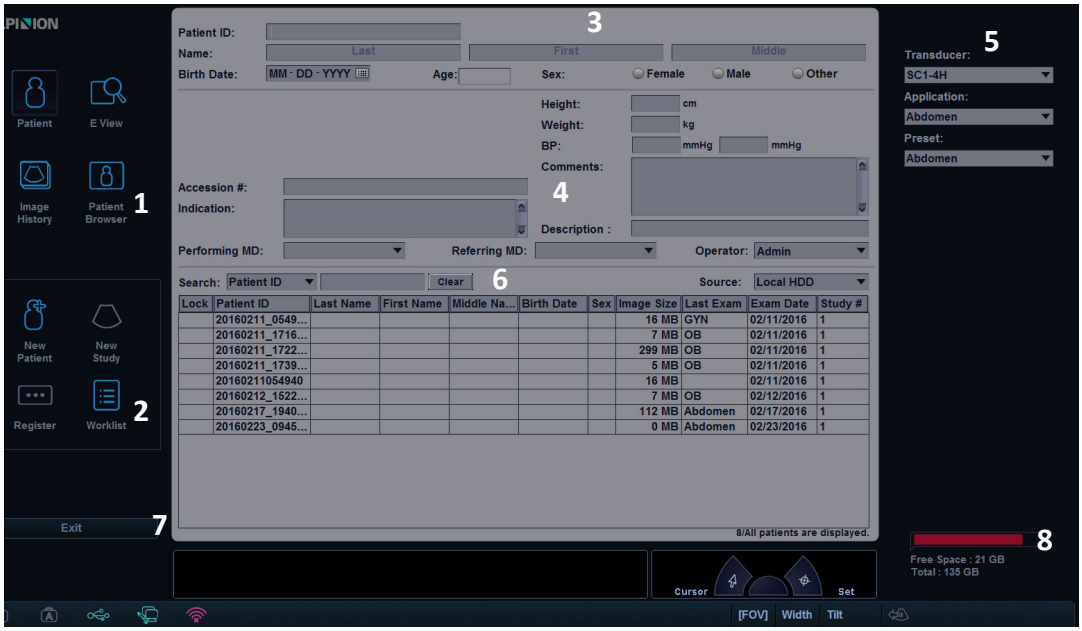

Figure 9. Patient registration screen

1 Menu selection
2 Function selection
3 Patient information
4 Application information
5 Transducer and application selection
6 Patient search (Switch to the Study list)
7 Exit
8 HDD capacity indicator

Entering a new patient data

1. Press the **[Patient]** key on the control panel, or select **Patient** on the touch screen to display the *Patient Registration* screen.
   The cursor positions the **Patient ID** field.

2. Enter the patient information using the QWERTY keyboard. You can also select  and use the virtual keyboard on the touch screen.

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

3. Select the desire transducer, application, and preset from the **Transducer**, **Application**, and **Preset** drop-down lists. When you select the application and preset, measurement and application information fields appear. You need to enter all possible information.

Different application and preset appear depending on which transducer is selected.

4. Enter commonly used application information.

5. Click **Register** to enter patient and application information into the database prior to examination.

6. Click **Exit**, or select **Register** on the touch screen to register patient and application information, and then exit from the *Patient Registration* screen. You can see the scan screen.

Quick ID

You can simply register patient data using the *Quick ID* screen. Only patient data is required for registration.

1 Press the **[Quick ID]** key on the QWERTY keyboard to display the *Quick ID* screen.

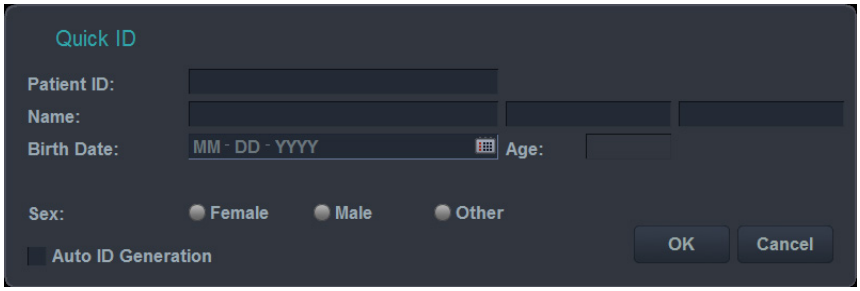

Figure 10. Quick ID

NOTE

You can use user-defined key to activate Quick ID. To assign the Quick ID function to user-defined key, press the **[System Preset]** key and go to **User Setting** > **User Defined key** > **Assign User Key** and select the **Quick ID**.

2 Enter the patient information. Only OB application shows the **LMP** and **EDD** field.

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.

NOTE

When you want to enter more detailed information, press the **[Patient]** key on the control panel.

3 Click **OK** to register patient data.

CAUTION

Do not register a patient ID using Quick ID while scanning an image or performing measurement and calculation with no patient ID. The current image or measurement data may be lost.

Imaging Modes

2D mode/M mode

Image optimization controls

Gain
You can 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 adjust this function, 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 adjust this function, rotate the **[Depth]** key on the control panel.

Focus
You can tighten up the beam for a specific area by either increasing the number of focal zones or moving the focal zone(s). A graphic caret corresponding to the focal zone position(s) appears on the depth scale bar. To adjust the number of focal zones, select **<** or **>** of **Focus Num** on the touch screen.

Zoom
- Read Zoom: Rotate the **[Zoom]** key to activate Read Zoom.
- Write Zoom: Press the **[Zoom]** key to activate Write Zoom.

NOTE

To use Write Zoom, press the **[Zoom]** key to adjust the Zoom ROI first, and then press the **[Zoom]** key again to view the ROI.

Xpeed™ (Option)
Xpeed™ is an auto-optimizing technology that enables you to easily adjust an image's the contrast resolution and brightness uniformity. For using this feature, you need an additional request to your local agent. To activate Xpeed, press the **[Xpeed]** key on the control panel.

Time Gain Compensation (TGC)
Move slide pot to the left/right to decrease/increase TGC. Use **[TGC slides]** to adjust this function.

Harmonic

Harmonics enhances near field resolution for improved small parts imaging as well as far field penetration by Digitally Encoded Ultrasound (DEU). Harmonics reduces low frequency high amplitude noise. Turning on this feature may be beneficial when imaging isoechoic lesions in shallow-depth anatomy in the breast, liver, and hard-to-visualize fetal anatomy. Harmonics may improve 2D mode image quality without introducing a contrast agent. To activate Harmonic imaging, press the **[THI]** key on the control panel.

FTHI is an optional feature. For using this feature, you need an additional request to your local agent.

Dual and Quad Imaging

Using dual (or quad) imaging, you can view two (or four) images at the same time on the display. Dual or quad imaging is available in all 2D live imaging modes, M mode, Color Flow mode, and TDI mode. To activate this function, press the **[Dual]** (or **[Quad]**) key on the control panel.

Panoramic (Option)

Panoramic imaging allows you to view an entire abnormality and its relationship to adjacent structures on a single, static image. To activate panoramic imaging, select **Panoramic** on the touch screen.

Priority

You can widen or narrow the size of the sector angle to maximize the image's region of interest (ROI). Increase the sector angle to see a wide field of view; decrease the sector angle when you need to have a faster frame rate, as in fetal heart. To activate this function, press the **[Priority]** key on the control panel.

The priority function may not be available with the linear array transducers.

Angle steer

Angle Steer allows you to tilt an image left or right. To adjust this function, rotate the **[Angle]** key on the control panel.

Frequency

In multi frequency mode, you can change the frequency to the transducer's next lower frequency or higher frequency. To adjust this function, rotate the **Frequency** soft key.

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

Rejection
The rejection function determines the amplitude level below which echoes are suppressed (rejected). To adjust the rejection, select **<** or **>** of **Rejection** on the touch screen.

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

Rotation
In 2D mode, you can rotate an image clockwise by 90 degrees. To adjust this function, rotate the **Rotation** soft key on the control panel.

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 the Live Dual, select **Live Dual** on the touch screen and press the **[CF]** key or **[PD]** key to change the imaging mode.

Gray Map
The 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 on the control panel. Gray maps gradually change from the least contrasty or softest to most contrasty.

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. To activate this function, rotate the **Colorize** soft key on the control panel.

Needle Vision (Option)
Needle Vision is a needle enhancement feature that can enhance viewing of the needle to assist you in guiding the needle to the target anatomy. To adjust this function, select **NeedleVision** on the touch screen.

Elastography (Option)
Elastography is a technique that adds value to the sonographic examination by enabling you to evaluate the stiffness of tissue. To activate this function, select **Elasto** on the touch screen.

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 this function, select **<** or **>** of **Persist** on the touch screen.

SRI
SRI is useful when unnecessary elements interfere with the desired image detail. After applying SRI, you can view your image more smoothly. To activate or deactivate SRI, select **SRI** on the touch screen.

Full SRI (Option)
Full SRI™ is a more powerful SRI feature that allows you to adjust the SRI level according to the image condition or imaging mode. To adjust the full SRI, select **<** or **>** of **FullSRI** on the touch screen.

Spatial Compound (Option)
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.

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

Line Density
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.

Frequency Compound (Option)
Frequency compound allows your system to compound images on between high and low frequencies. To activate or deactivate the frequency compound, select **Frq.Comp** on the touch screen.

Edge Enhance
Edge Enhance allows your system to provides a clearer view of tissue and organ outlines. To adjust the edge enhance, select **<** or **>** of **Edge Enhance** on the touch screen.

Sweep speed (M mode only)
You can change the sweep speed of the display by selecting **<** or **>** of **Sweep** on the touch screen.

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

M mode zoom (M mode only)
When the system is in M mode, you can magnify a portion of the reference image using M mode zoom function. Press the **[Zoom]** key on the control panel to activate Write zoom in M mode.

Anatomical M mode (Option)
This M mode allows you to move or rotate an M-line and review an image on the desired region.

M color mode (M mode only)
This mode allows you to view color flow information on the M-mode timeline. Press the **[M]** key and then the **[CF]** key to activate M color mode.

Color Flow (CF) mode/Power Doppler (PD) mode

Image optimization controls

Gain
Gain amplifies the overall strength of echoes processed in the Color Flow window or the PW Doppler timeline. To adjust this function, rotate the **[CF]** key.

Pulse Repetition Frequency (PRF)
Increases or decreases the PRF on the color bar. To adjust the PRF, rotate the **Scale** soft key.

Threshold
Threshold assigns the gray scale level at which color information stops. To adjust threshold, rotate the **Threshold** soft key.

Baseline
Changes the Color Flow baseline to accommodate higher velocity blood flow. To adjust the baseline, rotate the **Baseline** soft key.

Wall Filter
It helps get rid of motion artifacts caused from breathing and other patient motion by filtering out the low velocity signals. To adjust the wall filter, select **<** or **>** of **WF** 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). To reverse the color flow, select **Invert** on the touch screen.

Angle Steer
Tilts the ROI of the color flow image to the left or right. This function is only for linear transducers. To adjust the angle, rotate the **[Angle]** key on the control panel.

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, select **<** or **>** of **Ensemble** on the touch screen. The ensemble values are 6 to 12.

Flow State
Flow State allows you to adjust the PRF of the color image. To adjust this function, select **Low**, **Mid**, or **High** of **Flow State** on the touch screen. The flow state values may vary depending on the transducer and application.

Blending
Blending function 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. If you activate this function, **Blending Level** soft menu is enabled on the touch screen.

Blending Level
Blending Level allows you to specify the blending ratio between the 2D image and the color image. To adjust this function, select **<** or **>** of **Blending Level** on the touch screen. A lower value gives the 2D image greater prominence.

DPDI (PD mode only)
DPDI function shows information on the intensity and direction of blood flow. To activate or deactivate this finction, select **DPDI** on the touch screen.

Pulsed wave Doppler (PWD) mode

Image optimization controls

Doppler Sample Volume Length
Adjusts the sample volume gate size by rotating **SV** soft key.

PRF
Adjusts the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines pulse repetition frequency. To adjust the PRF, rotate the **Scale** soft key.

Baseline
Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing. To adjust the baseline, rotate the **Baseline** soft key.

Update (B 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 this fuction, press the **[Update]** key on the control panel.

Wall Filter
Insulates the Doppler signal from excessive noise caused from vessel movement. To adjust the wall filter, select **<** or **>** of **WF** on the touch screen.

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.

Angle Steer
Tilts the sample volume for the Doppler spectrum. This function is only for linear transducers. To adjust the angle, select **<** or **>** of **Angle Steer** on the touch screen.

Invert
Vertically inverts the spectral trace without affecting the baseline position. To invert the spectral trace, select **Invert** on the touch screen.

Full timeline
Expands display to full timeline display. To adjust this function, select **Full D** on the touch screen.

Continuous wave Doppler (CWD) mode

Image optimization controls

PRF
Adjusts the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines pulse repetition frequency. To adjust the PRF, rotate the **Scale** soft key.

Baseline
Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing. To adjust the baseline, rotate the **Baseline** soft key.

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Insulates the Doppler signal from excessive noise caused from vessel movement. To adjust the wall filter, select **<** or **>** of **WF** on the touch screen.

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.

Invert
Vertically inverts the spectral trace without affecting the baseline position. To invert the spectral trace, select **Invert** on the touch screen.

Full timeline
Expands display to full timeline display. To adjust this function, select **Full CW** on the touch screen.

Tissue Doppler imaging (TDI) mode

Tissue Doppler imaging (TDI) mode allows you to view the status of the myocardium by measuring the velocity of the tissue movement on the Doppler image. This mode only is available for adult cardiac application. For using this feature, you need an additional request to your local agent.

The combination imaging modes of TDI mode

- PW Tissue Doppler
- Color 2D Tissue Doppler

Activating TDI mode

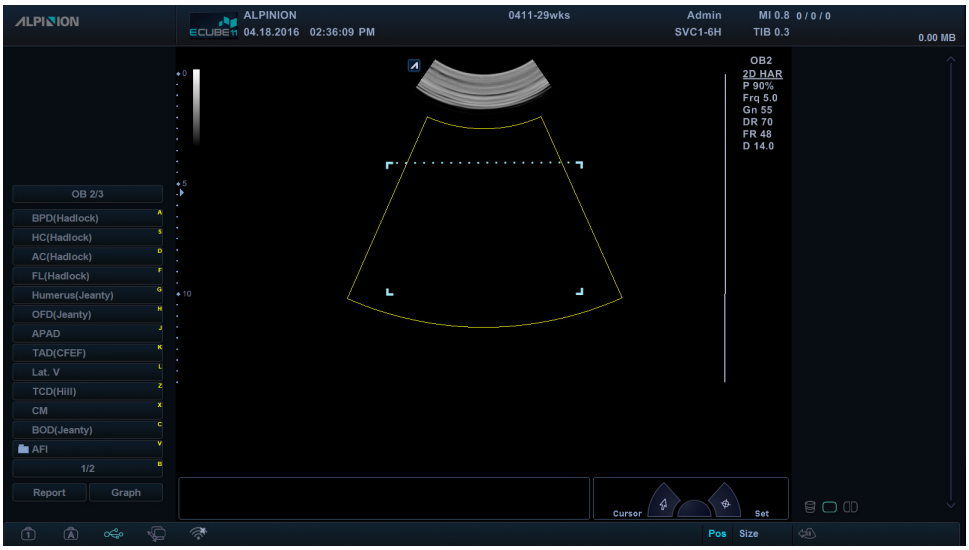
1. In 2D mode, press the **[TDI]** key on the control panel, or select **TDI** on the touch screen.
   Color 2D Tissue Doppler mode is activated.
2. To activate PW Tissue Doppler mode, press the **[PW]** key.
3. To exit TDI mode, press the **[TDI]** key or select **TDI**.

3D and 4D modes

Acquiring volume data

The 4D application allows you to acquire volume data through an acquisition interface.
To acquire volume data, follow these steps:

1. Obtain a 2D image and optimize the 2D image for best quality.
2. On the touch screen, select **4D**. The yellow-colored ROI and soft menus for 4D mode appear.



3. If necessary, select **3D** or **4D** on the touch screen.

NOTE

Depending on which mode you select, different context menu appears on the screen. When you select the 3D volume mode, **Volume movie** does NOT appear on the context menu.

4. Make sure that you configure proper settings.
5. Press the **[Freeze]** key to acquire the volume data.
6. After you acquire the volume data, the 4D mode screen appears.

7 Change the **Tile** parameter selecting **Single**, **Dual,** or **Quad** on the touch screen.

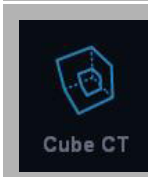
Key	Description
Single	Single : Display 3D image only
Dual	Dual : Display one reference image and 3D image
Quad	Quad : Display three reference images and 3D image

8 Rotate X, Y, and Z axes using the **[Angle](X)**, **[PW](Y)**, and **[CF](Z)** keys respectively.

Key	Description
Angle	Up and Down rotation
PW	Left and Right rotation
CF	Clockwise and Counter-clockwise rotation
M	Parallel movement (left/right, up/down, forward/backward)

Render view type

There are three render view types as follows. You can choose a view type after acquiring volume data by clicking one of icons on the view type menu area.

View	Icons	Description
MPR		When an 3D image is acquired, the 3D view screen appears.
Cube CT		Display the image of coronal, sagittal and axial plane in the volume.
Multi Slice		Display parallel cut plane which is aligned along the x, y, or z axis of volume's bounding box. Each texture is shown in an individual view.

Render Setting

Render Setting allows you to optimize the volume tissue component. To configure the render setting, follow these steps:

1. Select **Render Setting** on the context menu.
2. Select the proper value using the **[Select]** key.
3. To adjust the image, select the option you want on the context menu.

Easy Cut

Easy Cut allows you to edit a 3D image.

1. Select **Render Setting** on the context menu.
2. Select a proper value using the **[Select]** key.
3. Use **[Trackball]** and the **[Set]** key to define the portion you edit.

For more detailed parameters, see the *User Manual*.

Managing Image and Patient Data

Clipboard

The clipboard displays the captured ultrasound images for quick review. Pressing the **[Print]** key captures the active image and displays a preview image on the clipboard. When reloading the previous study, the images belongs to that study appear on the clipboard.

Capturing onto the clipboard

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

The print keys are programmable. To configure the print keys, go to **System Preset** > **User Setting**.

You can save many numbers of images onto the clipboard that is only limited by hard disk capacity. Depending on which layout you select, the number of images that can appear in one page of the clipboard is limited.

When the maximum number of images that can be displayed in the dual or the single layout is exceeded, a scroll bar automatically appears.

Reloading images from the clipboard

1. Move to the clipboard using **[Trackball]**. The cursor appears.
2. Move the cursor over the image you want to reload.
3. Press the **[Set]** key on the control panel to reload the selected image on the full screen.

To scroll the page, use the arrow on the scroll bar to move up and down.

Deleting images from the clipboard

1. Move to the clipboard using **[Trackball]**. The cursor appears.
2. Move the cursor over the image you want to delete and press the **[Set]** key.
3. Press the **[Cursor]** key to show the cursor again.
4. Click the Trash Can icon, indicating delete on the left corner.
5. Click **Yes** on the Confirmation dialog box to delete image.

You can delete images on the *E-view* screen as well.

Saving images permanently

To save a study and all unsaved images on the local archive, press the **[End Exam]** key on the control panel.

Patient Browser

The E-CUBE 11 ultrasound system provides Patient Browser that allows you to manage an image fast and easily. With Patient Browser, you can view the all patients from the local database or removable media as well as export/ import.

You can save images with PC friendly format and send DICOM images to remote server over the network.

Figure 11. Patient browser

1 Menu selection
2 Function selection
3 Search area
4 Source drop-down list
5 Patient view
6 Image area
7 Memory capacity indicator (Local HDD/removable media)

List view

List view allows you to search patients and studies for a quick view from the local HDD or a removable media.

To search patients and studies from the local HDD or a removable media, follow these steps:

1. Select the source from the **Source** drop-down list.
2. In the search area, you can specify searching filter according to the search key such as patient ID, patient name, birthdate, exam date, and lock.
3. Select the appropriate patient(s), and then use the menus (e.g. **Image View, Export**, **Save As**, **Send**) for the selected patient(s).

Image view

Image view allows you to view images for the selected patient(s) from the List view. You can change the layout of an image by selecting a layout from the Layout selection.

Figure 12. Image view

1. Layout selection
2. Select All / Select Inverse

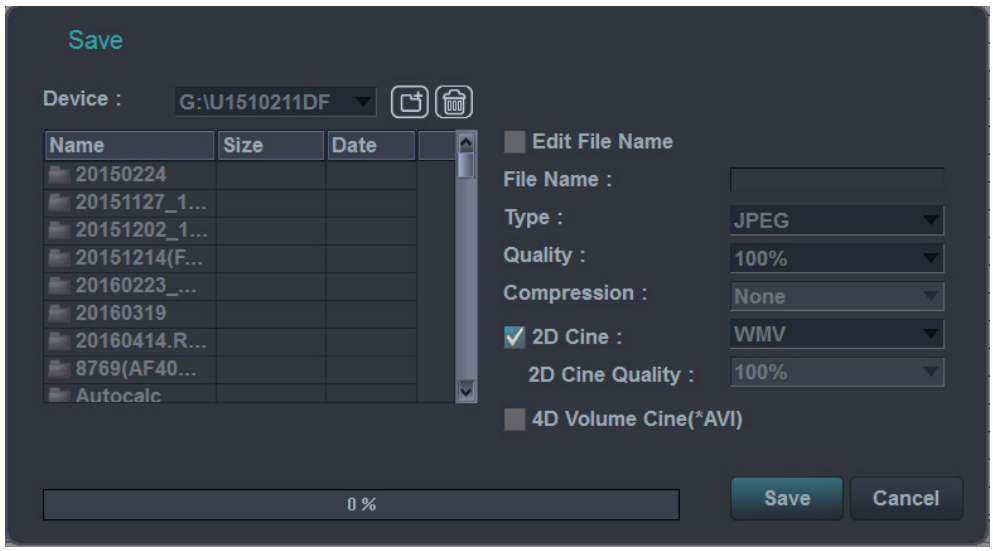
Save as

Save as allows you to save images or studies from your PC to a removable media, extension drive, and network storage.

NOTE

Before you click **Save As**, insert your media into the tray properly.

1. Press the **[Cursor]** key on the control panel to select images. You can select several images at the same time.
2. Select **Save As** on the menu selection. The Save dialog box appears.



3. Select a media from the **Device** drop-down list.
4. If you selected a media such as USB flash drive, USB hard disk, or Network storage, you can create or delete a folder by using the icons.
5. The system automatically creates a file name. You can also enter the name directly if you want to change the name.
6. Select an image format in the **Type** field. To save CINE images as a video file, skip to step 9.

NOTE

To see a DICOM format image on your PC, you need a dedicated DICOM view program.

7 If you selected **DCM** in step 6, you can select a compression type. Select a compression type in the **Compression** field.

8 If you selected **JEPG** in step 6, you can select an image quality. Select an image quality in the **Quality** field.

9 Select a video file format.

10 Click **Save**.

NOTE

To hide patient information on the screen, select the **Hide Patient Information** check box.

Import/Export

Import/Export alliws you to move patient(s) data between compatible systems or to backup and retrieve.

To export from local HDD to removable media, follow these steps:

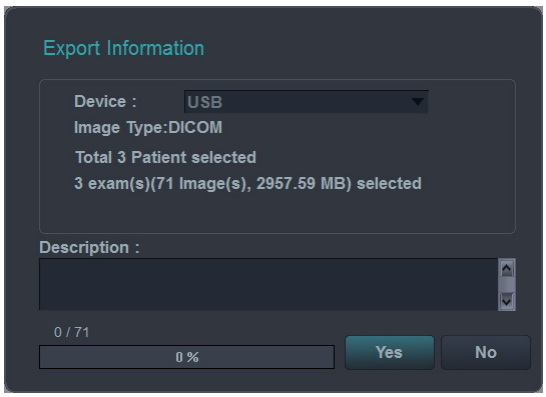
1 Select **Local HDD** from the **Source** drop-down list.

2 Select the patient(s) from the patient list.

3 Insert a blank media into the tray.

4 Click **Export** on the screen.

5 When the Export Information dialog box appears, select an exporting option. The progress bar appears during exporting files.



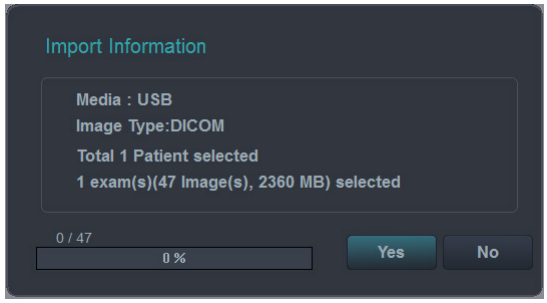
To import from removable media to local HDD, follow these steps:

1 Insert the CD or DVD, which includes exported patient data, into the tray.

2 Select the removable media from the **Source** drop-down list.

3 Select patient(s) from the **List** view.

4 Click **Import**. The progress bar appears during importing files.



5 To eject the removable media, press the **[Eject]** key on the QWERTY keyboard.

Send

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

NOTE

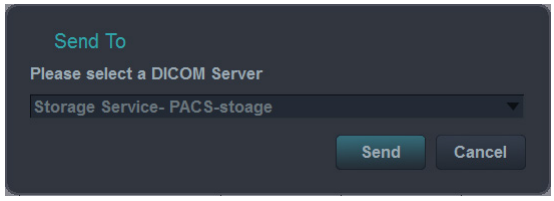
You can configure the destination device in the **System Preset** > **Connectivity**.

To send from local HDD to a DICOM device, follow these steps:

1 Select **Local HDD** from the **Source** drop-down list.

2 Select the patient(s) from the **List** view.

3 Click **Send** on the menu selection. The Send To dialog box appears.



4 Select a destination from the **Device** drop-down list.

5 Click **Send**. The progress bar appears during transferring files.

Measurements and Reports

Measurement operations

To begin the measurement, follow these steps:

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

To modify measurements, press the **[Measure]** or **[Priority]** key on the control panel.

To erase measurements, follow these steps:

1. Click the result value that you want to delete from the *Result* window.
2. Press the **[Clear]** key on the control panel to erase measurements.

To exit measurement, use following ways:

- Press the **[Exit]** or **[2D]** key on the control panel.

The *Result* window displays the measurement result.

	You can change the background type (e.g. transparent or opaque) of the *Result* window by clicking this icon.
	You can change the position of the *Result* window by clicking this icon.
	You can show the mini report by clicking this icon.

Basic measurements

Distance

1. Press the **Distance** soft key. The start point is displayed.
2. Move the marker to the start point using **[Trackball]**.
3. To fix the point, press the **[Set]** key. The end point, overlapping the start point, appears.
4. Move the marker to the end point using **[Trackball]**, and then press the **[Set]** key.
5. The measured value is fixed.

Ellipse

1. Press the **Ellipse** soft key. The start point is displayed.
2. Move the marker to the start point using **[Trackball]**, and then press the **[Set]** key.
   The first point is fixed and the second point appears.
3. Move the marker to the second point using **[Trackball]**, and then press the **[Set]** key. The ellipse appears.
4. Use **[Trackball]** to adjust the height of the ellipse, and then press the **[Set]** key again.
5. The measured value is fixed.

Trace

1. Press the **Trace** soft key. The start point is displayed.
2. Move the marker to the start point using **[Trackball]**, and then 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.

Slope

1. Press the **Slope** soft key. The vertical line and the horizontal line are displayed perpendicular to each other.
2. Use **[Trackball]** to move the point where they intersection point, and then press the **[Set]** key.
   The start point is fixed and the end point appears.
3. Use **[Trackball]** to move the point, and then press the **[Set]** key again.
4. The oblique line is displayed and the slope is calculated.

Time

1. Press the **Time** soft key. The vertical line and the horizontal line are displayed 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 then press the **[Set]** key again.
4. The time interval between the two points is displayed.

Velocity

1. Press the **Velocity** soft key. The vertical line and the horizontal line are displayed 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.

Report operation

To view a report, use following ways:

- Press the **[Report]** key on the control panel.
- Select **Report** on the context menu.

To edit a report, follow these steps:

1. Move the cursor to the field that you want to change.
2. Press the **[Set]** key. The field is highlighted.
3. Enter the new data into the field. The entered data is displayed in green.

To erase measurement results, follow these steps:

1. Move the cursor to the field that you want to erase. The field is highlighted.
2. Press the **Delete Value** soft key to delete the data.
3. Press the **Delete All** soft key to delete all report values from the worksheet.
4. Press the **[Clear]** key to delete all report values from the study.

To exclude or include measurement results, follow these steps:

1. Move the cursor to the field that you want to exclude. The field is highlighted.
2. Press the **Exclude Value** soft key to exclude the data. The excluded data is displayed in white.
3. Press thet **Exclude Value** soft key again to include a value that you previously excluded.

To exit a report, use following ways:

- Press the **[Report]**, **[2D]**, or **[Exit]** key on the control panel.
- Select **Exit** on the context menu.

System Preset

Pressing the **[System Preset]** key on the control panel allows you to enter the System Preset menu. To exit the System Preset menu, press the **[Exit]** or **[2D]** key on the control panel.

The System Preset provides the following categories:

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. The user defined keys (e.g. print keys and footswitch) can be programmable.

Connectivity
Customize the DICOM device and service.

Administration
Create a user ID, activate the service browser, and view the option information.

Back up/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.

Safety and Regulatory Information

Safety summary

You should make sure the following safety precautions during all phases of operation, service, and repair of the E-CUBE 11 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.

Safety notice

WARNING

A WARNING notice indicates a hazard. You need to observe an operating procedure, practice, or the like that. If you do not correctly perform this notice, it could result in personal injury or death.

CAUTION

A CAUTION notice indicates a hazard. You need to observe an operating procedure, practice, or the like that. If you do not correctly perform this notice, it could result in damage to the system or loss of important data.

Equipment Safety Information

WARNING

- 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.
- 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.
- Before cleaning up and disinfecting the system, always make sure you turn off the system power and unplug the power cord from the power outlet.
- 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.
- Always use peripherals and accessories approved by ALPINION. You must securely connect peripherals and accessories to the system.
- 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 use the system properly to avoid serious injury. Before using the system, you must make sure the instructions and hazards involving ultrasound system. ALPINION provides training assistance if needed.
- Always use transducers approved or recommended by ALPINION.
- Always use approved ECG cables and recommended electrodes by ALPINION.
- You must follow safety precautions and avoid any situation that causes injury or damage.
- The system voltage may cause serious injury or damage to 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.

WARNING

- You must make sure grounded integrity of the power outlet and system regularly.
- Always make sure that you do not use the system in an explosive atmosphere.
- For patient safety, you must locate the system to easily unplug the power cord from the power outlet when a malfunction or error occurs.
- Do not operate the system for ophthalmic purpose or any use affecting the patient's eye by the acoustic beam.
- Your ultrasound system is not intended for diagnosing and monitoring ECG. Do not use the system for cardiac operation.
- Never use your system with a high-frequency (HF) surgical equipment. Any malfunction of the HF surgical equipment may cause burns to your patient.

Patient safety information

WARNING

- When you enter patient data, always make sure you enter correct identification with patient data.
- Do not use the system until you become familiar with the system operation.
- To avoid the transducer from overheating, you must freeze the system when not imaging.

CAUTION

- Do not allow the system to transmit acoustic output when not using the transducer. Otherwise, it could result in transducer overheating.
- When not using the system, you should freeze the image or turn off acoustic output.
- Do not use the system with defibrillator. The system does not include a defibrillation-proof applied part for ECG.
- Do not allow the germicide to contact your patient. Contact to the patient's skin or mucous membrane may cause an inflammation.

Electrical safety information

WARNING

- Do not clean or disinfect a system before turning off and unplug the system from the power outlet. Otherwise, it could result in electrical shock and damage to the system.
- Do not place water or liquids on the system. Dripping water or liquids into the system may cause electrical shock and damage to the system.
- Do not remove the panels or covers of a system to prevent system damage and electrical shock.
- Do not use extension cords, adaptors or converters, which are a three-prong-to-two-prong type, to connect with a power plug.
- The system voltage may cause serious injury or damage to 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 the AC power connector plug of the system to prevent electrical shock.
- You should use the ultrasound system after few hours when leaving it in humidity place.
- Do not connect, disconnect, or replace any part of a system during scanning a patient at the same time.
- Do not replace the fuse or power cord by yourself. An ALPINION MEDICAL service engineer or an authorized agent must perform the replacement. Replacing the fuse or power cord by yourself will avoid your warranty.
- Using spray cleaners on the system drips cleaning fluid into the system. It damages components in the system.
- Do not use aerosol spray cleaners on the monitor to prevent electrical shock and damage to the system.
- While using the ECG function, keep ECG cables or patients away from any other electrical conductor to prevent electrical shock.
- Different voltage power between your system and other devices may cause electrical shock. According to the IEC requirements (Refer to IEC 60601-1-1 and clause 16 of the 3 Ed. of IEC 60601-1, respectively), you must use the equipotential cable (equipotential bonding) to connect additional devices to your system. Contact your ALPINION MEDICAL service engineer.

Transducer safety information

WARNING

- Do not use damaged or defective transducer to prevent system damage and serious patient injury.
- Make sure you do not bend or pull the transducer cable to prevent the damage to the transducer.
- Use only approved ultrasound gels. Using unapproved gels may damage the transducer and void the warranty.
- To reduce the risk of leakage currents and electrosurgical interference, use only isolated output electrosurgical units with an endocavity transducer and disconnect the transducer when it is not in use.
- When an endocavity transducer causes malfunctions, contact ALPINION Service Representative to prevent any safety hazard from the transducer.

CAUTION

- Do not drop the transducer. Always keep the transducer secure when you do not use it.
- Using damaged or defective transducer causes unexpected electric shock. Make sure the use and care of the transducer.
- Do not allow the system to transmit acoustic output when not using the transducer. Otherwise, it could result in transducer overheating.
- When not using the system, you should freeze the image or turn off acoustic output.
- To avoid serious patient injury, always inspect the transducer that you use has sharp edges and rough surfaces.
- Proper cleaning and disinfecting the transducer prevent disease transmission. You must follow infection control procedures.
- Always use sterile, legally marketed transducer sheaths for endocavity exams.
- Make sure that you do not use an expired transducer sheath.
- Using pre-lubricated condoms as a sheath might damage the transducer.
- Do not allow your eyes (or patient's eyes) to contact the ultrasound gel. If there is gel contact to the eyes, flush thoroughly with clean water.

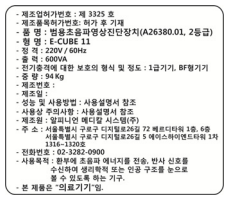
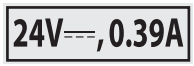
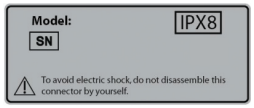
Safety symbols and labels

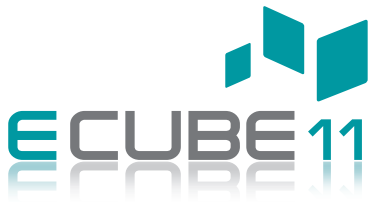
The following tables show a list of system symbols and labels for safety. Refer to the manual for specific information to prevent personal injury or damage to the system.

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 for recovery and recycling. By separating this product from other household-type waste, the volume of waste sent to incinerators or land-fills will be reduced and natural resources will thus be conserved. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.

Safety symbols/ Labels	Location	Explanation
CE 0470	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
~	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 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.
SN	On the system rating label for overseas and transducer label	Serial Number

Safety symbols/ Labels	Location	Explanation
	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.
	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	LCD 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
	Rear of the professional arm hinge	Up/Down Caution Label

Safety symbols/ Labels	Location	Explanation
	Top (or side panel) of the system body	No gender detection label
	Top (or side panel) of the system body	Safety working load label
	Rear of the system base	System rating label for overseas
	Rear of the system base	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, Authorized EU Representative, Safety, WEEE symbol, indicating separate collection, Certification mark
	Transducer	Transducer name, Serial, IPX Rating, Caution mark



QUICK GUIDE

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