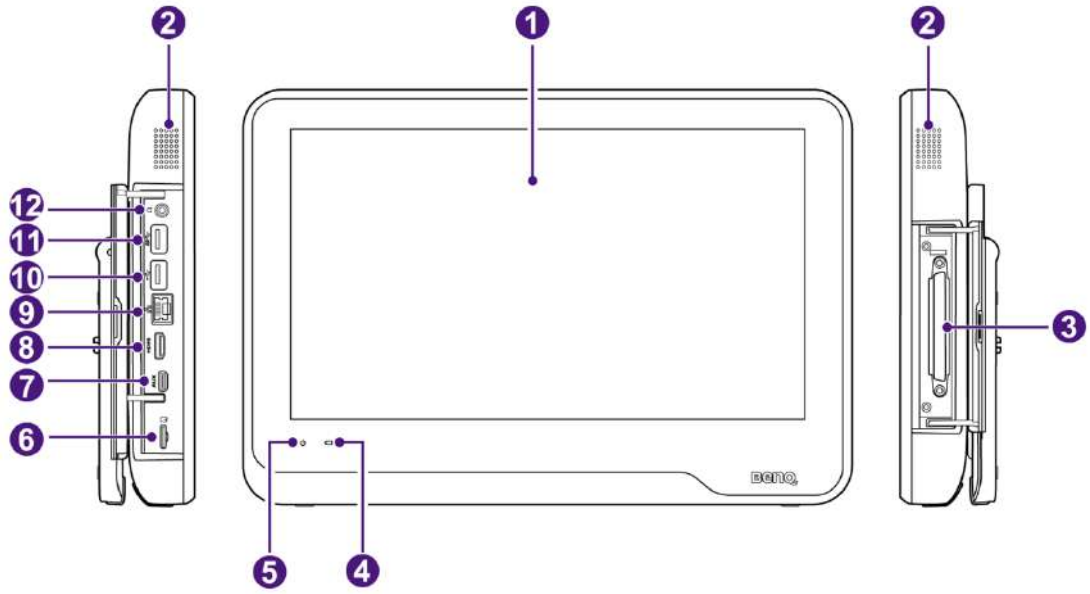
Vet Ultrasound System

Quick Guide

Table of Contents

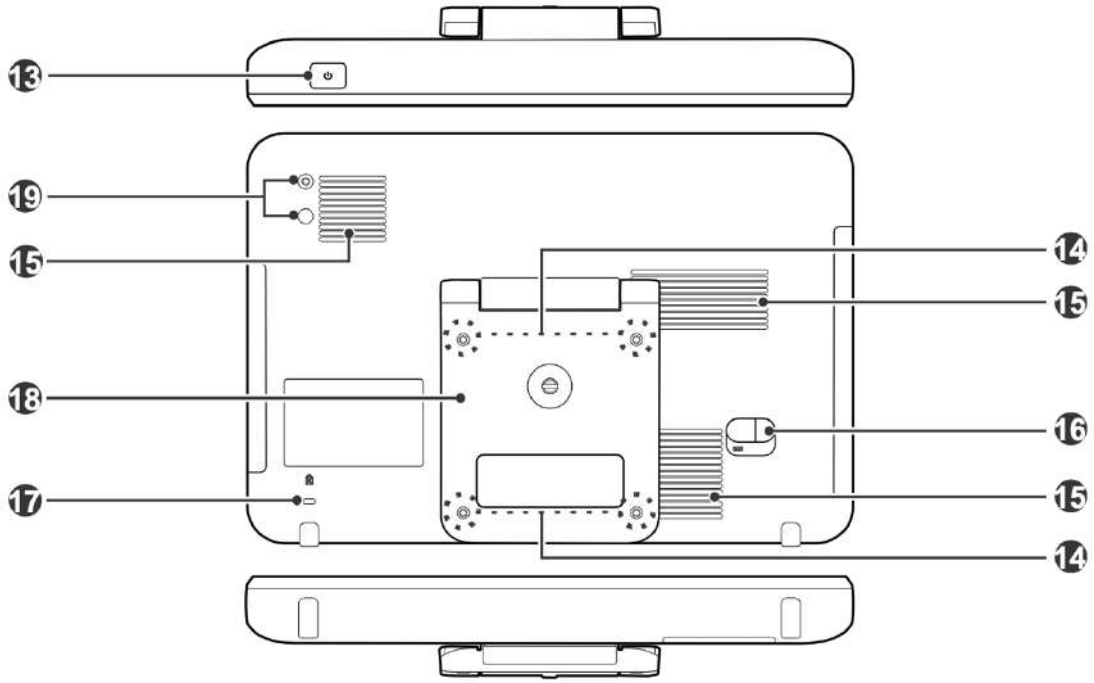
I. Ultrasound System

Front and Side Views



No.	Component	Function
1	Touch screen	Display system information and allow you to perform operations using different gestures.
2	Speakers	Built-in speakers for playing sounds, which are software-controlled
3	Transducer connection socket	Connect a transducer to the system.
4	Battery indicator	When the system is connected to power: ● If the system is turned off or enters sleep mode, the battery indicator behaves in the following lighting patterns: - Steadily on orange when the battery is charging. - Steadily on green after the battery is charged. ● If the system is turned on, the battery indicator lights off.
5	Power Indicator	Steadily on blue after the system enters Sleep mode.
6	MicroSD card slot	Insert a microSD card into the microSD card slot to exchange data from/to the system.
7	AUX port	For use by authorized service personnel only
8	HDMI port	Connect the system to an HDMI (High-Definition Multimedia Interface) device.
9	Ethernet socket	Connect the system to an Ethernet-based network.
10	USB 2.0 port	Connect the system to USB 2.0/USB 3.0 devices, such as keyboards, pointing devices, or portable storage devices.
11	USB 3.0 port	
12	Headphone jack	Connect the system to an audio device, such as headphones or speakers.

Rear and Top/Bottom Views



No.	Component	Function
13	Power button	● Press and hold the Power button to turn on/off the system. ● Press the Power button to enter/exit sleep mode.
14	VESA mounting holes	Used to install the system on any VESA wall mounts, including the system cart.
15	Ventilation slots	Release excessive heat during operation to keep the system in a safe operating temperature.
16	Power input socket	Used to connect the system to power.
17	Anti-theft lock slot	Used to lock the system securely to a solid surface to protect it from theft.
18	System stand	● Lift the stand to sustain the system on a flat surface. ● Can be used as a handle to carry the system around.
19	Transducer holder holes	Used to install the transducer holder.

II. Transducer

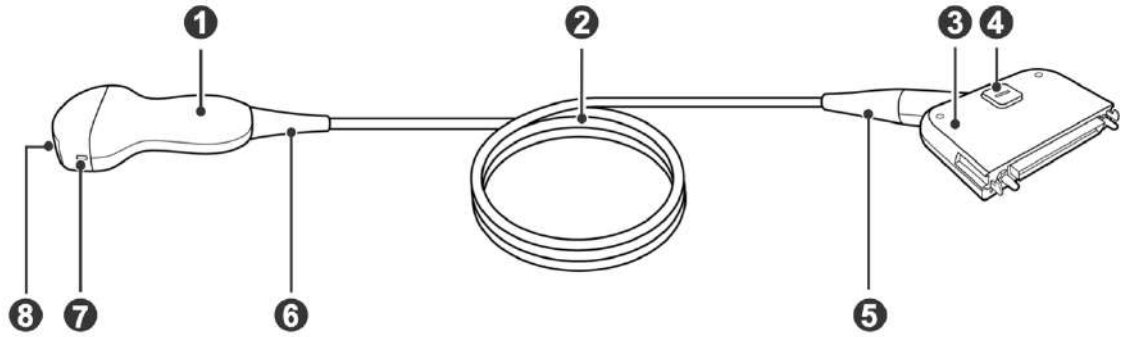


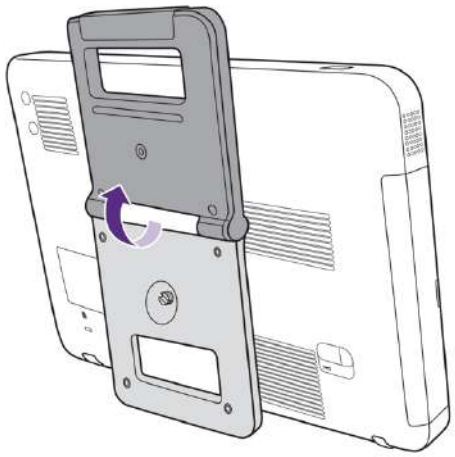
Table 17 Transducer Overview (Example transducer: C62B_T3300)

No.	Component	No.	Component
1	Transducer handle	2	Transducer cable
3	Transducer connector	4	Release latch
5	Connector strain relief	6	Transducer strain relief
7	Orientation marker	8	Transducer lens

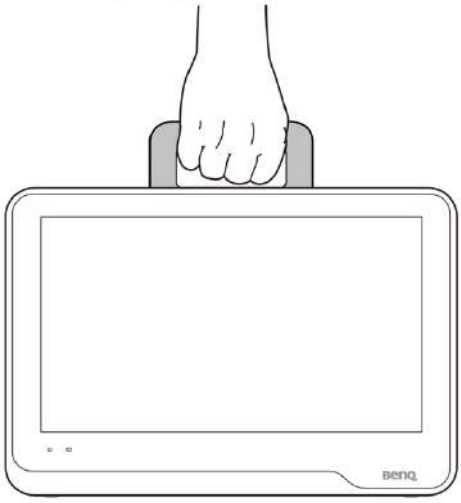
III. Accessories

Carrying the System

1. Lift the system stand by 180 degrees.

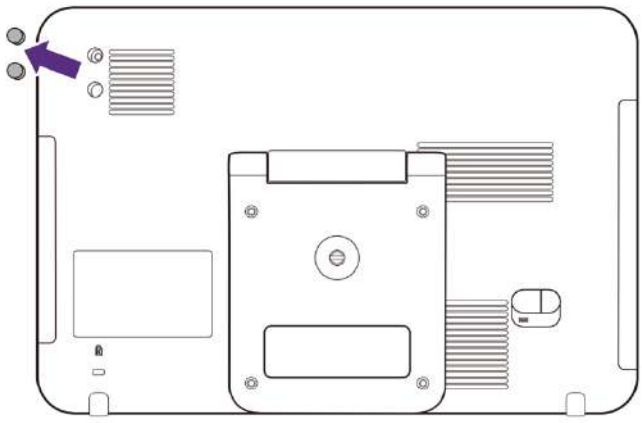


2. Use the stand as a handle to carry the system around.

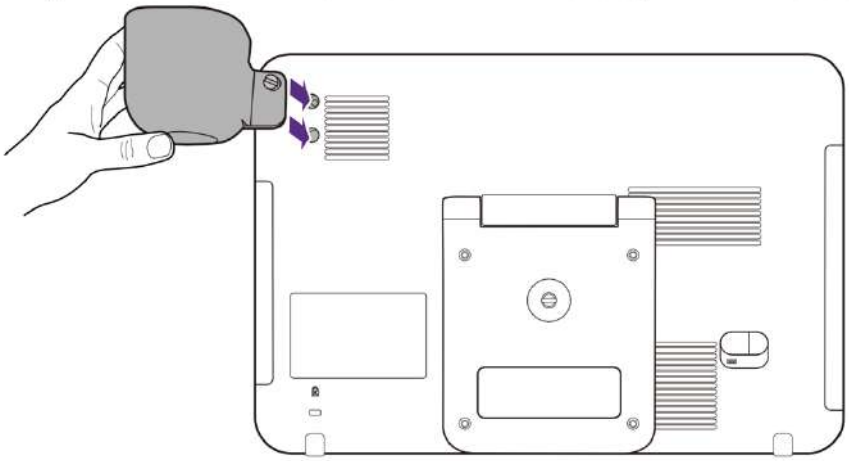


Installing the Transducer Holder

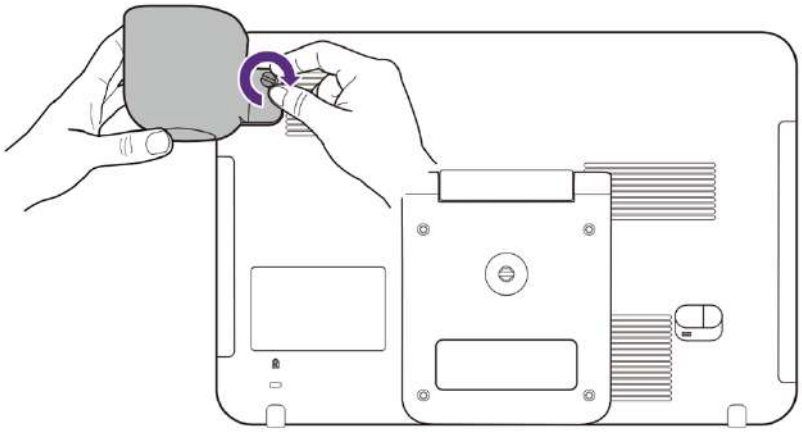
1. Use your fingertip to remove the protective rubber covers from the rear side of the system.



2. Align the holes on the transducer holder with the hole patterns on the rear side of the system.

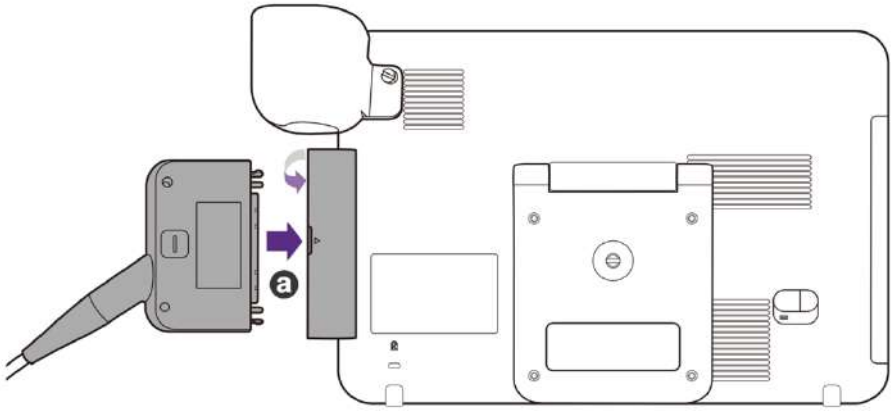


3. Rotate the screw clockwise through the upper hole of the transducer holder to tighten the transducer holder to the system.

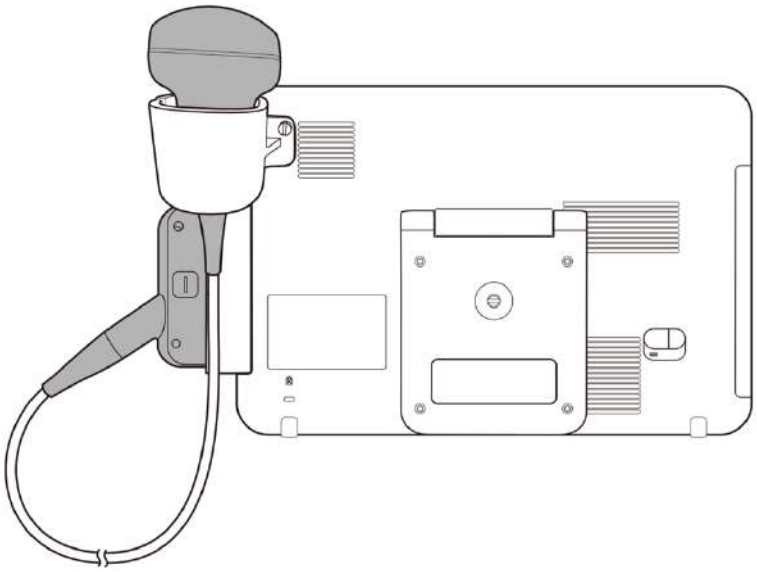


Connecting the Transducer

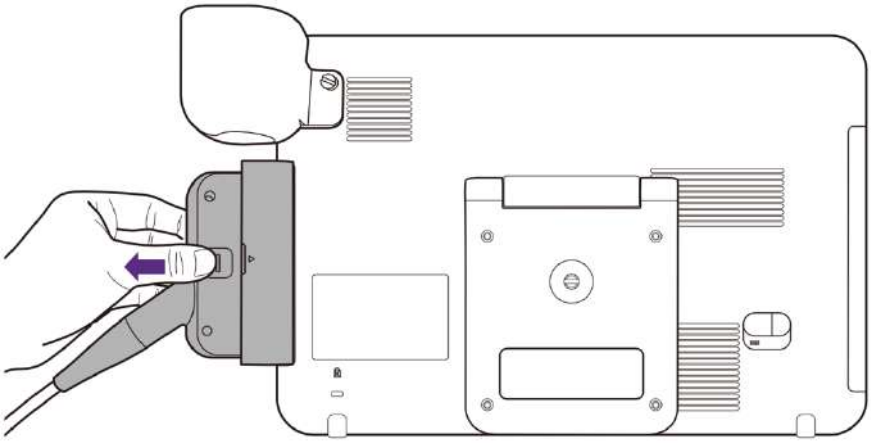
1. Flip the transducer cover open ⓐ. Insert the transducer connector carefully into the transducer connection socket until it is locked in place.



2. Place the transducer handle in the transducer holder and ensure that the cable hangs down smoothly from the opening of the transducer holder.



Press and hold the release latch, and carefully pull out the transducer connector.

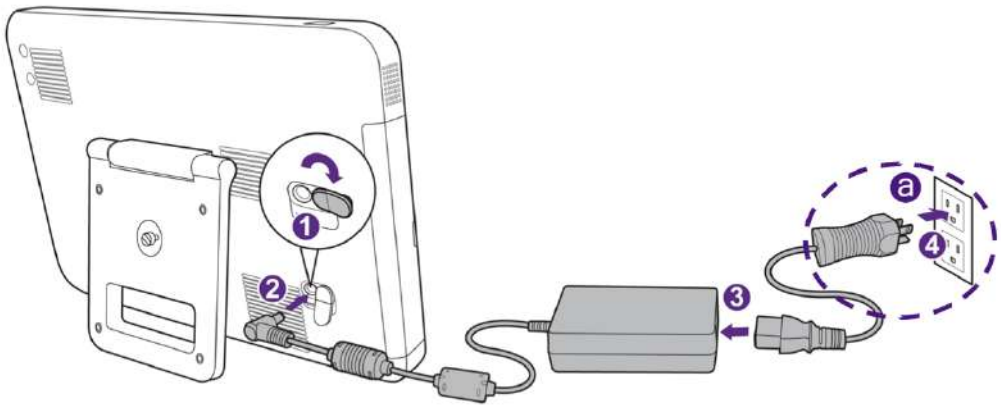


Charging the System

The system is only partially charged when first unpacked. Charge the battery fully for 5 hours before using the system for the first time.

WARNINGS

- **Use only the supplied power adapter and AC plugs for charging.**
- **AC plug and electric outlet types vary by country/region ⓐ.**
- **Do not try to repair or replace the battery or the power adapter. Any attempt to disassemble the system and the supplied accessories may cause damage to the system or result in personal injury.**



1. Lift the protective rubber cover open.
2. Connect the power adapter's connector into the system's power input socket.
3. Insert the matching AC plug fully into the power adapter.
4. Plug the AC plug of your power adapter into an electric outlet to start charging. The battery indicator lights up in solid orange.

WARNINGS

- **Keep good ventilation during charging. Do not cover the power adapter with paper or objects that will reduce cooling.**
- **Do not interrupt the connection during charging to avoid possible damage.**

IV. Using the System

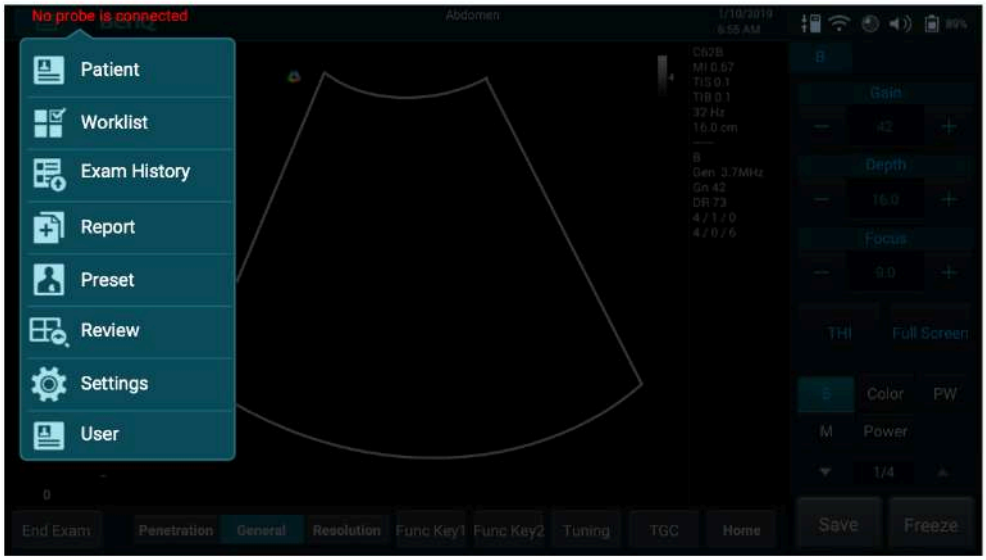
1. Turning On/Off the System

Press and hold the Power button to turn on the system. The system enters the main screen or the user login screen after system startup.

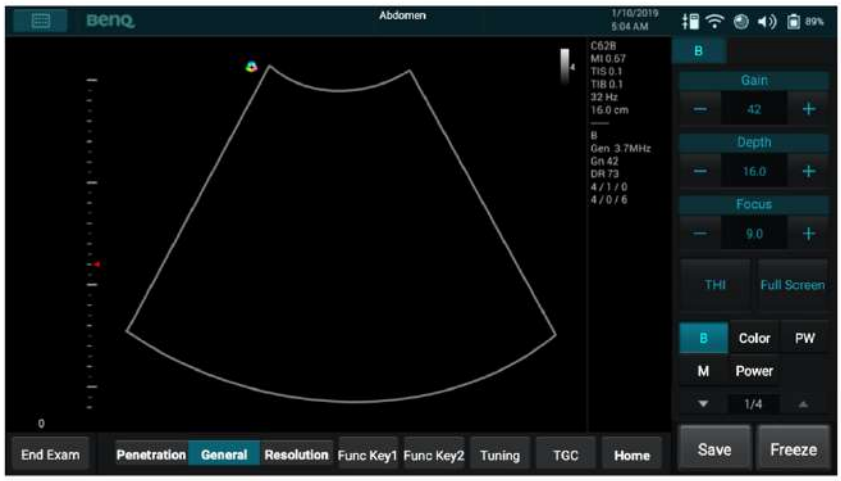
Press and hold the Power button until the **Power off** menu appears on the screen, then touch **OK** to turn off the system.

After turning on the system and successfully logging in as a registered user, if data security is enabled, one of the following main screens appears.

- If no transducer is connected, the system enters the system menu screen.



- If a transducer is connected, the system enters the real-time B mode imaging screen (default).



NOTES

- If a transducer is connected and the system displays the message "**No probe is connected**", remove then re-connect the transducer. If the system still cannot detect the transducer, turn off the system. Wait for a few seconds and restart the system.
- You can choose the screen to enter after starting and logging in the system (with the transducer connected). Go to > **Settings** > **Workflow** > **Screen after Enter Ultrasound**.

Identifying the Main Screen Layout

System Menu Screen

Touch to display the following system menu screen. Touch an icon to perform its function.

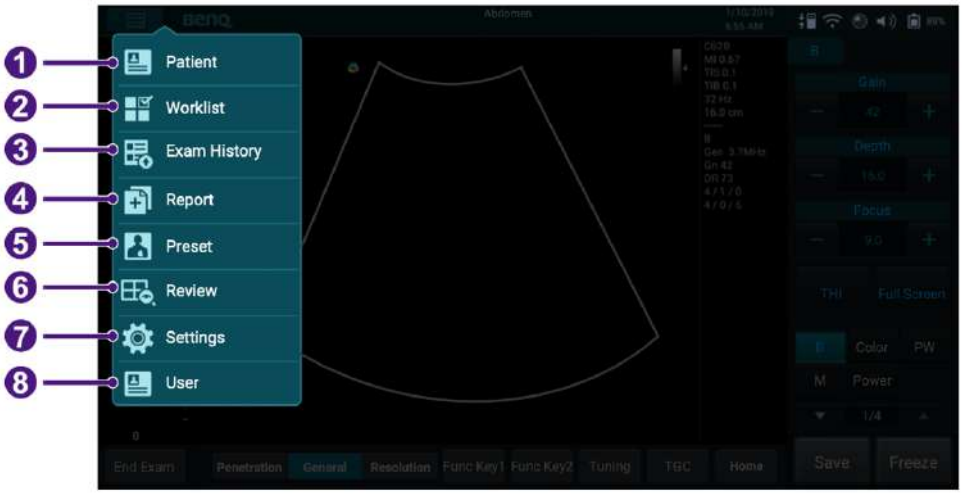
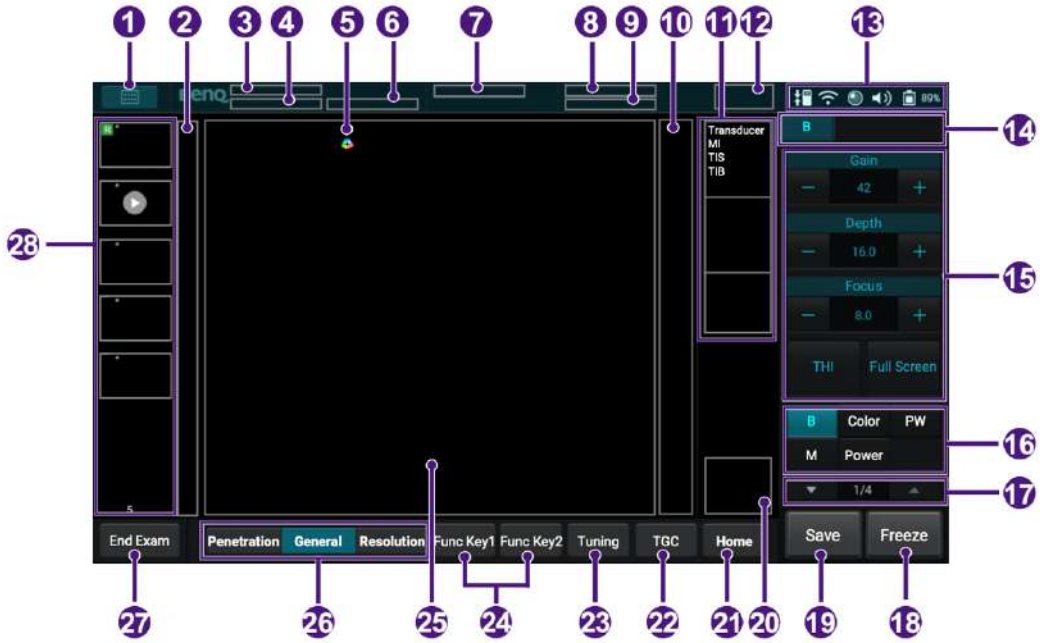


Table 23 Function and Description of System Menu

NO.	Function	Description
❶	Patient	Edit current or add new patient information.
❷	Worklist	Load the DICOM Modality Worklist (MWL) that contains patient information as well as the requested procedure electronically via the MWL query.
❸	Exam History	View a list of patients with their exam results. You can proceed with unfinished exams/reviews, or export exams according to the selection criteria all at once.
❹	Report	Display exam information including patient data, exam type, study-specific data, comments and saved ultrasound images.
❺	Preset	Select the predefined preset compatible with the connected transducer for optimized image control settings.
❻	Review	View, add annotations and measurements to, and export a saved exam.
❼	Settings	• Customize the system based on the operator's habitual needs. • Use the service tools to update software, backup/restore data or examine the system functionality. (See "Servicing your system" on page 89)
❽	User	Manage users and permissions to control access to ePHI (Electronic Protected Health Information) data on the system and the system features.

Imaging Screen (Real-time)

With the transducer connected correctly, the system enters the real-time imaging screen each time after pressing the **Home** button.



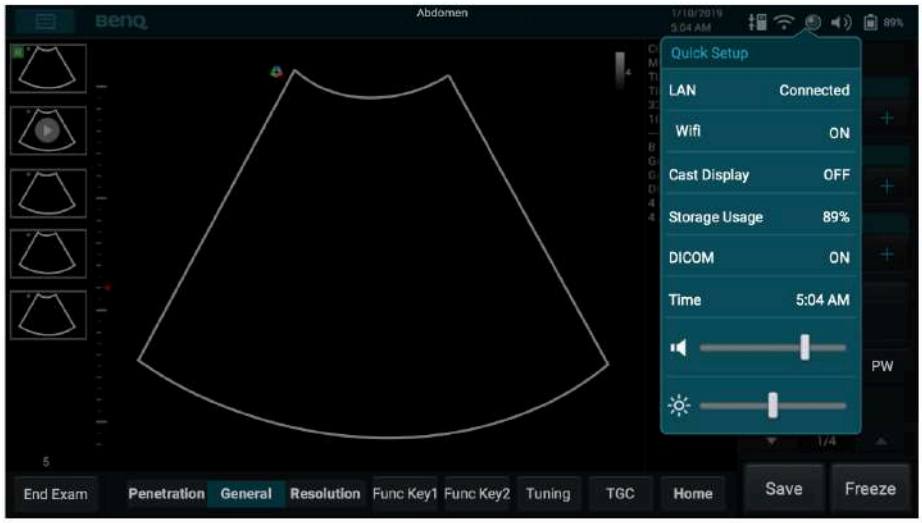
No.	Function
❶	 System menu button Enter the system menu screen.
❷	Depth scale
❸	Patient name*
❹	Patient ID*
❺	Transducer orientation icon
❻	Patient age/gender/DOB (date of birth)
❼	Application name Press and hold application name to go to the Preset screen.
❽	Institution name
❾	User name
❿	Grayscale/Color/Power wedge
⓫	Scan Properties Display Display information about the current scan, including the transducer type, thermal index (TI)/ mechanical index (MI) and scan parameters.
⓬	Current date and time

⓭	System toolbar Display information about current battery level, volume, system storage, and network connection status. Touch anywhere on the system toolbar to open the Quick Setup menu for system configuration.
⓮	Scan mode (image control) buttons When using duplex or triplex modes, touch the scan mode (image control) buttons here to display and adjust its corresponding image control settings -⓯.
⓯	Image control settings
⓰	Scan mode buttons
⓱	Open the next/previous page of the image control settings
⓲	**Freeze** button Freeze the current scan.
⓳	**Save** button** Save a default set of image frames as a loop to the system hard drive.
⓴	ROI (region of interest) area Use the **Zoom** function to zoom in and pan across the current image.
㉑	**Home** button Return to the real-time imaging screen in B mode.
㉒	**TGC** (Time Gain Compensation) Slide any of the 8 TGC sliders to adjust the gain for the desired section of the 2D image.
㉓	**Tuning** button Enable optimizing the image quality during a real-time scan. To turn it off, touch and hold the button.

㉔	**Func Key1**/**Func Key2** buttons Assign each of these buttons as a shortcut to perform a function. The **Func Key2** button is available only in real-time imaging modes.
㉕	Ultrasound imaging area Display the 2D imaging window in all scan modes. By default, the top area is close to the region located near the transducer surface (near field). When scanning in M-mode/PW Doppler/Triplex modes, the Time Series window displays under the 2D imaging window. The time increases from left to right and re-starts from the left again. The imaging area displays as common usage.
㉖	Adjust the overall resolution. • **Resolution** (High Resolution): view a clearer yet superficial image. • **General** (General Resolution): view a general resolution image. • **Penetration** (Deep Penetration): view a deeper yet less clear image.
㉗	**End Exam** button Close the current exam for the current patient, and start a new exam for the next patient. All the value settings adjusted during this exam will be stored automatically.
㉘	Thumbnail area Thumbnails of the scanned images/loops that are saved. Flick vertically to scroll through the list.

Quick Setup

Touch anywhere on the system toolbar to open the Quick Setup menu. Touch an item to adjust its setting.

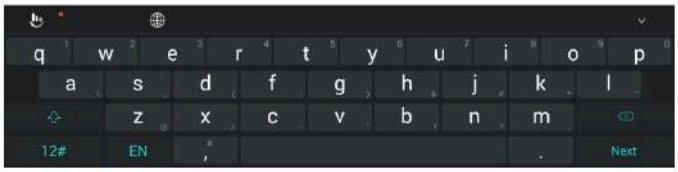


No.	Function
❶	Manage the LAN connection. • : LAN Connected
❷	Enable/disable the Wi-Fi function.
❸	Enable/disable the Bluetooth function.
❹	Cast the system screen to an external display.

❺	Display the percentage of the system storage used. • : Storage usage empty • : Storage usage full
❻	Check and manage outgoing queues to the DICOM server. • : DICOM Disconnected • : DICOM Connected
❼	Set current date and time.
❽	Adjust the volume.
❾	Adjust the brightness.

Virtual Keyboard

Whenever you need to enter text in a text field, simply touch the field, and a virtual keyboard appears on the lower part of the screen. Touch a letter to enter text; when finishing inputs, touch anywhere on the imaging area.



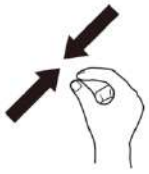
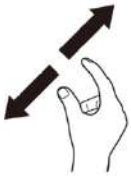
NOTE

To switch the keyboard input language, touch on the virtual keyboard and select your target language.

Controlling the System

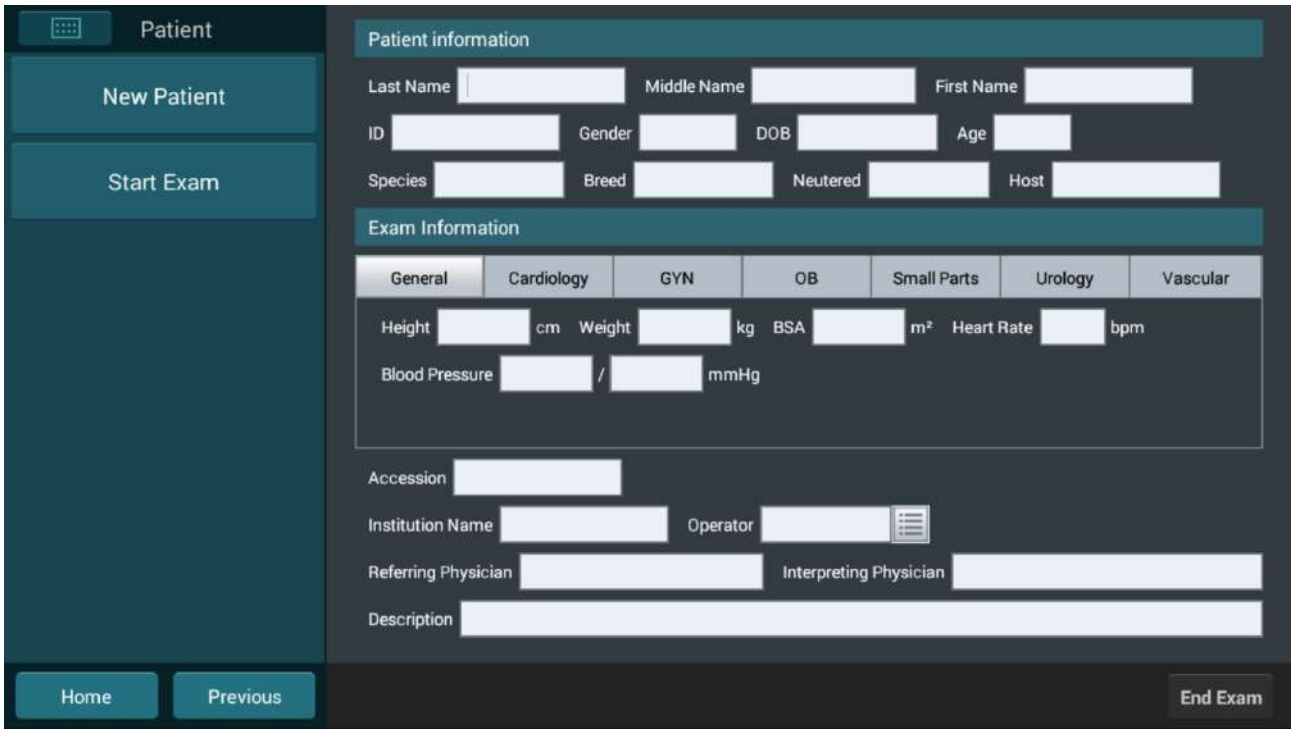
The system requires operations with multi-touch controls by finger movements called gestures. Alternatively, you can add pointing or input devices by connecting them to the USB ports on the system.

Table 19 Gestures

Touch	Touch and Hold	Drag	Flick
			
Double-Tap	**Two-Finger Tap**	**Pinch**	**Spread**
			

2.Adding New Patient

1. On the imaging screen, touch > **Patient**



2. Touch New Patient. Enter the patient information as much detailed as possible:

- Touch in a text entry field, and use the virtual keyboard to input contents.
- Touch Next on the keyboard to go to the next field.
- To finish and close the keyboard, touch ✓

3. The system saves patient information automatically when you touch **Start Exam**.

Updating Patient Information

1. During real-time scanning, touch > **Patient**. Existing information of the current patient displays on the Patient screen.
2. Enter the new information in the desired fields.
3. The patient information is saved automatically. Proceed with real-time scanning of this patient by touching **Start Exam**.

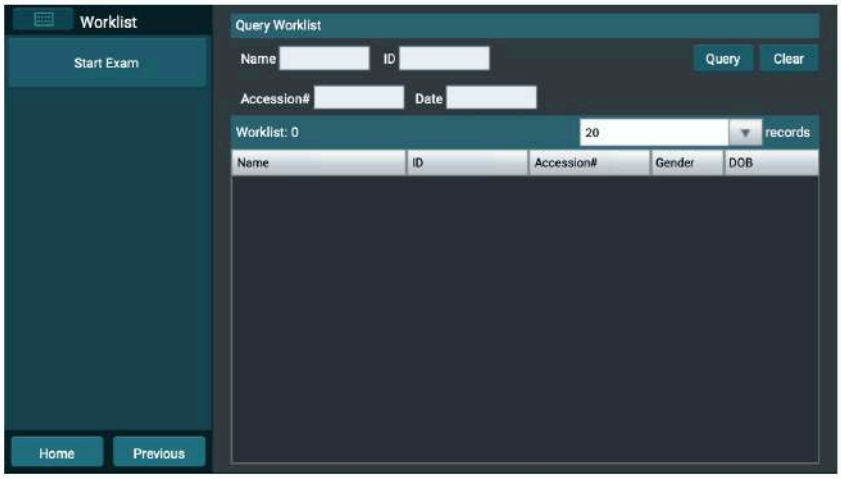
Loading a Worklist

The system conforms with the Digital Imaging and Communications in Medicine (DICOM) standard, which is the industrial standard for the communication and management of patient data between devices in the hospital. You can load patient information in a worklist via the DICOM server.

NOTE

For more information on configuring DICOM settings, see "DICOM Configuration" on page 53.

1. On the imaging screen, touch > **Worklist**.



2. Select the number of patients to scan on the worklist from the drop-down menu.
3. Select a patient, then touch **Start Exam** to start scanning.

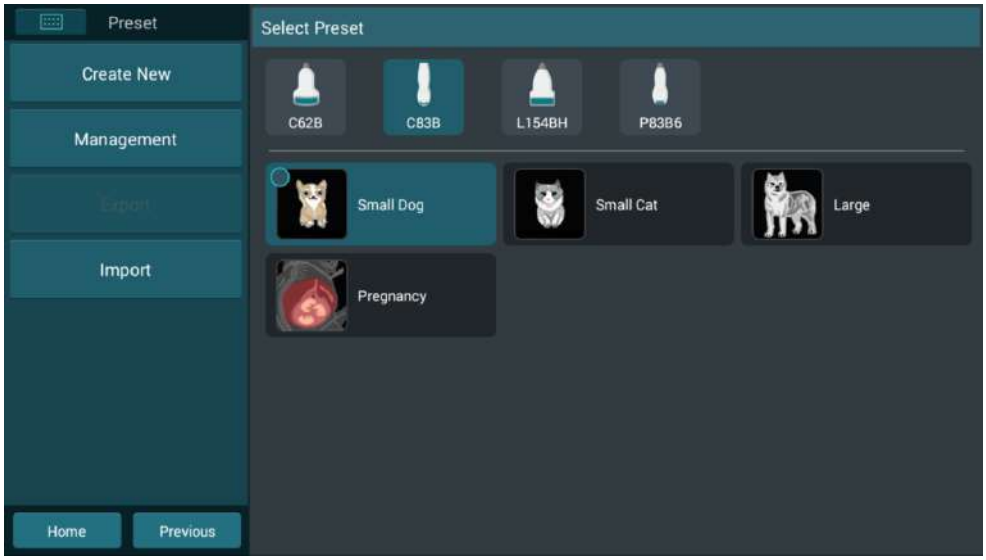
NOTE

To scan patients following a specific rule, enter the query criteria in any of the **Name/ID/Accession#/ Date** fields, and touch **Query** to start the query. Patients matching the query criteria will be listed on the screen.

Selecting a Preset

The system provides predefined presets for all supported transducers. Choosing an exam loads optimized presets for image control settings, based on the anatomy to be scanned, the transducer used, and the scan mode. The presets also specify the measurements appropriate for the exams. You can directly use the optimized presets, or adjust any of the image control settings as necessary for the specific patient and the specific exam.

1. On the imaging screen, touch > Preset. All the available presets compatible with the connected transducer display on the Preset screen.



2. Touch the preset to scan, and you will be redirected automatically to the real-time imaging screen.

Customizing a Preset

1. On the Preset screen, touch **Create New**.
2. Enter a name for the customized (currently used) preset and touch **Save**.

Modifying a Preset

If you have modified the parameters of an existing customized preset, go to the Preset screen and touch **Modify Current** to save changes.

Managing Presets

1. On the Preset screen, touch **Management**.

- Touch **Move**, and drag to re-arrange the order of the presets.
- To set a frequently used preset as default, touch **Set default** > the desired preset.
- To hide an unwanted predefined preset, touch **Hide & Show** and touch on the unwanted preset.
- To further edit customized presets, touch **Edit** and touch T on the preset to edit its name; touch 🗑 on the unwanted preset to delete it.

2. Touch **Save** to save changes.

Exporting and Importing Customized Presets

On the Preset screen, touch **Export** to export the selected presets to your external storage. Or touch **Import** to import customized presets from your external storage.

Splitting the Imaging Screen

The system allows splitting the imaging screen into two sections to view two current scans for a patient. You can acquire one scan for the patient, enable dual screen, then acquire another scan from a different angle, location or with a different scan mode. This function is only available in B, B+Color and B+Power modes.

When in B mode:

On the real-time imaging screen, touch **Dual**. The system immediately freezes the current scan, and copies the current settings for the image to the second screen. Two yellow bars will be added to the top/bottom of the currently active screen. To toggle between screens, touch **Toggle**. Only one screen can be active at a time.

You can compare then apply any image control settings and use scan modes independently to either screen. For example, you can acquire a 2D (B mode) scan, activate dual screen, then acquire a Color scan in the second screen.

When in B+Color or B+Power Mode:

On the real-time imaging screen, touch **Dual**. The system copies the current settings for the image to the second screen in B mode. Both screens are in real-time but you get a clearer view under the ROI in B mode.

Touching **Dual** again freezes the 2D real-time scan and turns it into a frozen B+Color or B+Power mode image.

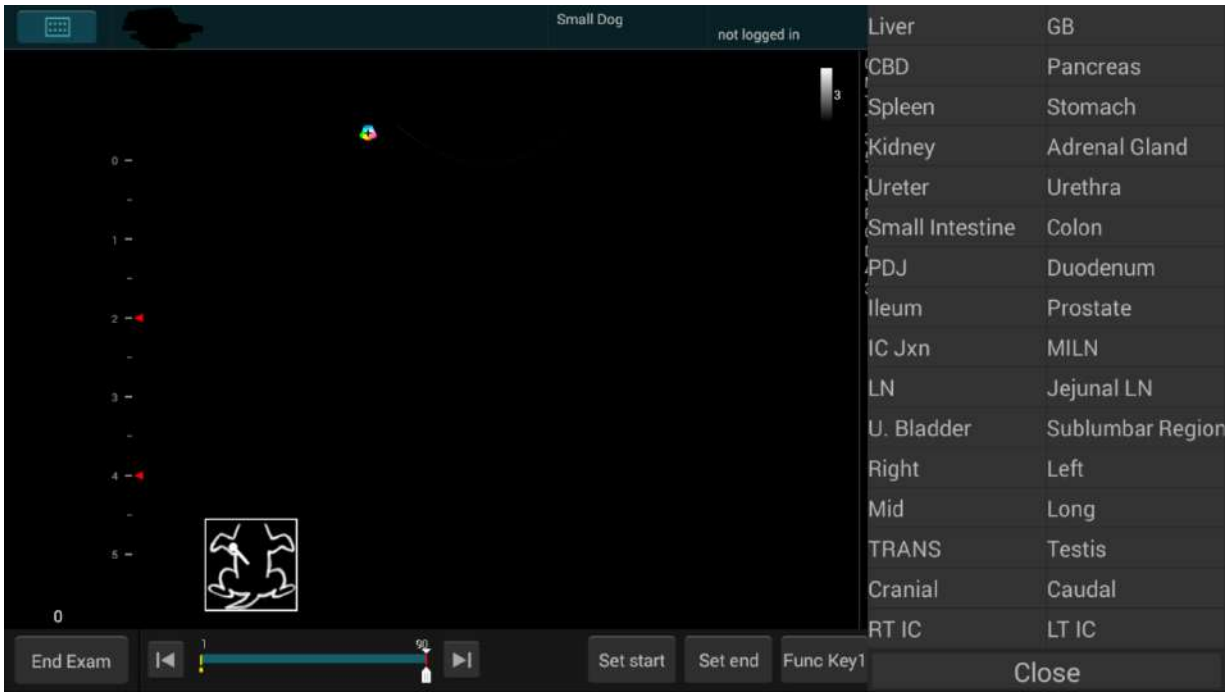
To leave the dual screen, touch **Dual**, or touch **Home** to return to the real-time B mode.

NOTE

To enable dual screen when the scan is frozen, touch **Compare**.

Adding Annotations

On the real-time, frozen or review imaging screen, you can to add annotations to the ultrasound images in order to explain the anatomy.



After you are done adding annotations, you can still move the annotated texts or arrows anytime by touching and dragging them to your desired location.

NOTES

- You can select whether to keep or erase the annotations added after you return to the live scan by touching > **Settings** > **Workflow** > **(Auto-clear Annotation after Unfreeze)** > select an option.
- When in Review mode, touch **Show Annot** +/- to set whether to show all or the last annotations, or to hide them all.
- To delete annotations, including texts and arrows, touch **Erase Annot** to erase the last annotation added. Repeat this action, if needed, to continue erasing annotations.
- To directly erase all annotations, touch and hold **Erase Annot**.

Arrow

1. Touch **Arrow**. An arrow appears at the text home position.
2. Touch anywhere on the imaging area, and drag the arrow to the desired location.
3. Release your finger to place the arrow. The arrow then turns green.
4. Touch anywhere on the imaging area, and drag to rotate the arrow.
5. Release your finger to place the arrow. The arrow turns yellow and is fixed.

Annot

Text

1. Touch **Annot**. A virtual keyboard and a text cursor (I-beam) appear at the text home position.
2. Type the texts directly. Touch anywhere on the imaging area to finish inputs.
3. Drag the text cursor to where you want the new texts to be, and release it to place the texts.

Setting the Text Home Position

You can choose a specified position in the image display as the starting location, which is the text home position.

1. Drag a set of annotated texts to the desired text home position.
2. Touch the texts directly, then touch to close the keyboard.
3. Touch **Set home**.

Label

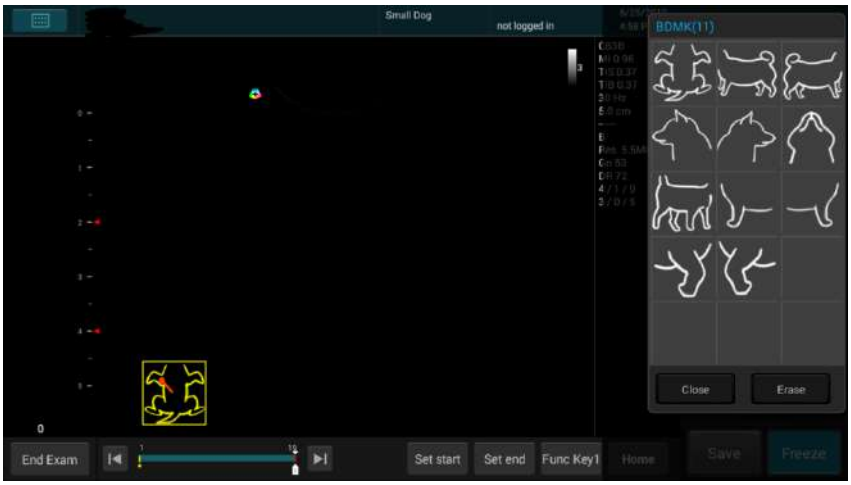
1. Touch **Label**. A predefined text menu appears at the control panel area
2. Select a text label to place it at the text home position, and touch **Close**.
3. Drag the label to where you want the texts to be, and release it to place the label.

NOTES

- The annotated texts or text labels are still editable. Touch a set of texts to display the virtual keyboard, and start editing the texts. Touch anywhere on the imaging area to finish editing.
- To restore the annotated texts or text labels to the default text home position, simply touch a set of texts, touch to close the keyboard, then touch **Go home**.

Body Mark

1. Touch **BDMK** to display the body mark menu.



2. A pictogram of the default body mark with a transducer indicator displays on the image. If you wish to change the body mark, select one from the **BDMK** menu that appears.

3. Touch anywhere on the image, drag the transducer indicator to the desired location on the body mark, then release your finger to place the indicator.
4. Touch anywhere on the image, move to rotate the transducer indicator, then release your finger to fix its angle.
5. Touch and hold the pictogram, and drag it to the desired location on the image.

NOTES

- You can change the default body mark by touching  > **Settings** > **BDMK** > (**Default BDMK for Application**) > **Edit** > select an option.
- To delete the body mark added, touch **BDMK** > **Erase**.

Adding Measurements

Measurements accompanying ultrasound images supplement other clinical procedures available to the attending physician. You can perform as many measurements as needed.

On the real-time imaging screen, touch **Freeze** to display a set of measurement buttons based on the scan mode selected. To perform a single type of measurement, touch the corresponding button.

To perform a set of predefined measurements from the Calculation Package, touch **Calc**

When you are measuring, the indicators/lines display in yellow, allowing you to adjust as many times as needed. When you are done with measuring, use any of the following methods to complete the

measurement. The indicators/lines then turn green, and the final measured results (values) appear on the top left side of the imaging screen.

- Two-finger tap on the scan area
- Proceed with the next measurement
- Touch **Save** to save the ultrasound image

NOTES

- To re-position the measured results to the imaging screen's **Left Top**, **Left Bottom**, **Right Top**, or **Right Bottom** side, touch **Result Pos +/-**.
- To set whether to show all or the last measured results, or to hide them all, touch **Show Result +/-**.
- To delete measurements, touch **Erase Measure** to erase the last measurement added. Repeat this action, if needed, to continue erasing measurements.
- To directly erase all measurements, touch and hold **Erase Measure**.
- You can select whether to keep or erase the measurements added after you return to the live scan by touching  > **Settings** > **Workflow** > (**Auto-clear Measurement after Unfreeze**) > select an option.

Measuring in B/Color/Power Modes

Distance

Measure a distance.

1. Touch **Distance**. A crosshair cursor appears on the image. Touch anywhere on the imaging area to drag the target cursor to where you want to start measuring and release it.
2. Touch anywhere on the imaging area to drag the target cursor to where you want to finish measuring, then release it.

Depth

Measure depth.

Touch **Depth**. A crosshair cursor appears on the image. Touch anywhere on the imaging area to drag the target cursor to where you want to finish measuring the depth, then release it.

Ellipse

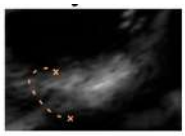
Measure a circumference.

1. Touch **Ellipse**. A crosshair cursor appears on the image. Touch anywhere on the imaging area to drag the target cursor to one end of the area you want to measure and release it to set the start point of measurement.
2. Touch anywhere on the imaging area to drag the target cursor to the other end of the desired area, and release it to set the end point of measurement.
3. Touch anywhere on the imaging area and drag out to increase or drag in to decrease the size of the circle.

Trace

Manually trace an irregular shape.

1. Touch **Trace**. A crosshair cursor appears on the image. Touch anywhere on the imaging area to drag the cursor to where you want to start measuring and release it.
2. Touch anywhere on the imaging area to drag the cursor along the outline of the object to trace.



3. When the tracing is nearly done, release the cursor and the system completes the loop by drawing a line from the current cursor position to the starting point.

Angle

Measure an angle.

1. Touch **Angle**. A crosshair cursor appears on the image. Touch anywhere on the imaging area to drag the target cursor to the desired location and release it to set the start point of measurement.
2. Touch anywhere on the imaging area to drag the first target cursor to the origin of the desired angle, and release it to draw the first line.
3. Touch anywhere on the imaging area to drag the second target cursor to create the second line extending out from the origin point, and release it to place the end point of measurement. The angle between the two lines is then formed.

Calculation Package

Perform a set of predefined measurements based on the scan mode/calculation method you select.

1. Touch **Calc** to open the **Calculation Package** menu.
2. Touch a desired calculation method. The items to measure display in a list of order under the selected method.
3. Touch the first item and the screen displays the corresponding cursor. Touch anywhere on the imaging area to drag it to perform measurement.
4. After you have finished with the measurement, touch the second item. The first item is checked automatically with the measured result displayed beside it.
5. Repeat step 3-4 to perform the rest of the measurements on the list, then touch **Close**.

Saving and Printing the Image

After adding annotations/measurements to the image, you can save or print the image.

Saving an Image Loop

On the real-time imaging screen, touch **Save** to save a default set of frames as an image loop. The saved image loop will be displayed in the thumbnail list.

Saving an Image

On the frozen imaging screen, touch **Save** to save the current frame as an image. The saved image will be displayed in the thumbnail list.

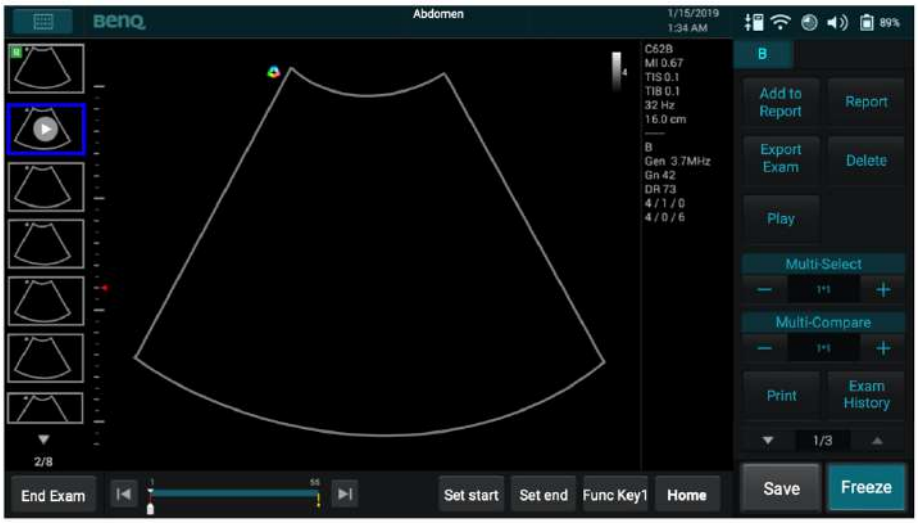
Printing an Image

On the frozen imaging screen, touch **Print** to print out the current image.

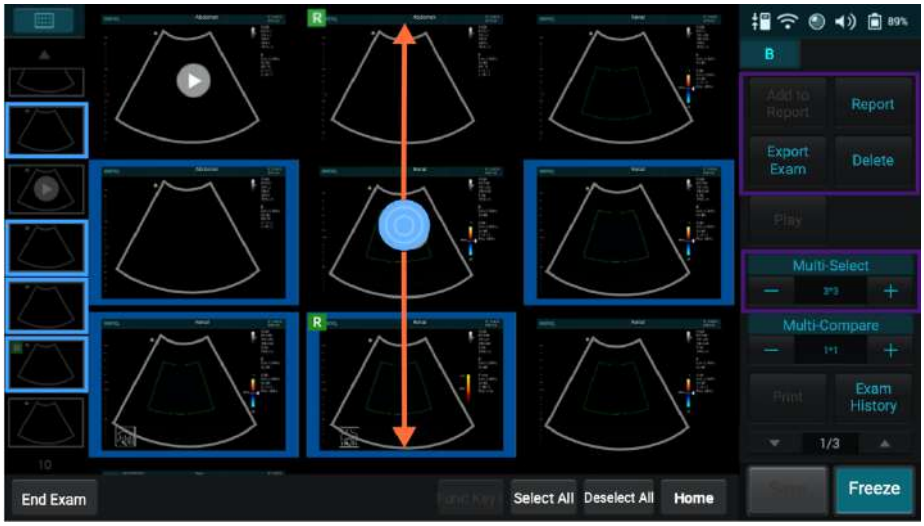
Reviewing the Image

On the real-time or frozen imaging screen, flick vertically on the thumbnail list to view the thumbnails of all the saved images/loops.

To further examine one or a set of images/loops, touch the thumbnail of the desired image or image loop to display the Review screen.



You can perform actions to more than one image/loop at a time.



1. On the Review screen, touch **Multi-Select +/-**.

2. Flick vertically on the thumbnail window and touch to select multiple images/loops as expected.
   - To quickly select all images, touch **Select All**.
   - To cancel all selections, touch **Deselect All**.
3. Touch an action button. For example, touch **Delete** to delete all selected images/loops.

4. Using Image Controls

B mode Image Controls

Overview

The system delivers 2-dimensional digital imaging (B mode) using 256-level gray map. This scan mode delivers excellent image uniformity, tissue contrast resolution, and steering flexibility in frequencies from 2 MHz to 15 MHz.

Adjusting Gain

Adjust amplification of the returning echoes, which adjusts the amount of echo information displayed in an image. The overall brightness of the image can be elevated, but the "noise" may also be added to the image with excessive increase in gain.

Touch **Gain +/-** or flick horizontally on the scan area to adjust the gain value.

Adjusting Frequency

Change the scan frequency to obtain higher resolution as frequency increases, or deeper penetration as frequency decreases.

To increase the frequency, touch **Resolution**. To decrease the frequency, touch **Penetration**.

Adjusting Time Gain Compensation (TGC)

Adjust the gain which compensates for the attenuation (a reduction in sound amplitude) of the echo signals in proportion to their depth (based on travel time).

Touch **TGC** to display the TGC sliders on the screen. To increase/decrease the gain at the desired section (depth) of the image, drag the corresponding slider to the right/left.

Adjusting the Scan Depth

Adjust the field of view. To view larger or deeper structures, increase the depth. To enlarge the display of structures near the skin line, decrease the depth. The system automatically adjusts the frame rate (FPS) and acoustic power indices (TI/MI) based on the scan depth.

Touch **Depth +/-** or flick vertically on the scan area to set the scan depth.

Adjusting the Focus Depth, Focal Zone and Focal Span

Focus optimizes the image by increasing the resolution for a specific area and is displayed by a red arrow marker indicated at the depth ruler. Depending on the transducer in use and the mode selected, multiple focus depths can be added. Increasing the number of focal zones decreases the frame rate. If the frame rate is not high enough, try decreasing the number of focal zones.

Touch **Focus +/-** to adjust the depth value. Touch **Focal Zone +/-** to select the desired number of focal zones. Touch **Focal Span +/-** to adjust the distance between the focal zones.

Adjusting Dynamic Range

Control the range of acoustic levels displayed in the image, which affects the contrast of the image.

Touch **DYN Range +/-** to adjust the amount of compression.

Using Tissue Harmonic Imaging (THI)

Reduce superficial artifact and provide better gray scale contrast by processing an integer multiple of the fundamental frequency, a harmonic wave.

Touch **THI** to enable this function.

Adjusting Persistence

Adjust the amount of frame averaging from real-time images or loops. Higher persistence produces less speckled and smoother image but reduces the temporal resolution.

Touch **Persist +/-** to adjust the value.

Adjusting Sharpness and Smoothing

Improve the sharpness of the image by enhancing the edge contrast and smoothening the tissue speckle.

Touch **QScan** +/- to adjust the value.

Adjusting Gray Map

Change how the amplitude is converted to brightness.

Touch **GSC +/-** to adjust the value.

Adjusting Chroma Map

Adjust the chroma (color tone and saturation) value with different brightness.

Touch **Chroma Map +/-** to adjust the tone.

Adjusting Steer Angle

Optimize the viewing area by adjusting the steer angle. This function works only with linear array transducers.

Touch **Steering +/-** to adjust the angle.

Adjusting the Sector Width and Position

Adjust the ROI of the imaging area for image width and image position. A smaller sector width increases the frame rate.

Touch **2D Size +/-** to adjust the width. Touch **2D Position +/-** to adjust the position.

Adjusting Power

Adjust the acoustic output power value to the expected target.

Touch **TX Power +/-** to adjust the value.

Using Trapezoidal Imaging

Increase the range of view of the ultrasound image when using a linear transducer.

Touch **Trap** to enable trapezoidal imaging.

Adjusting Density

Adjust the density of the scan lines. Higher density obtains better horizontal resolution with lower frame rate, while lower density obtains higher frame rate.

Touch **Density** repeatedly to select a desired line density.

Using Compound Imaging

Reduce speckles and improve contrast resolution.

- Frequency compounding: Combine multiple images acquired from different frequencies. Touch **FQBeam** to enable frequency compounding.
- Spatial compounding: Combine multiple images acquired from different beam angles. Touch **SQBeam** to enable spatial compounding.

Using Central Line

Display a dotted line drawn in the center of the transducer as a reference.

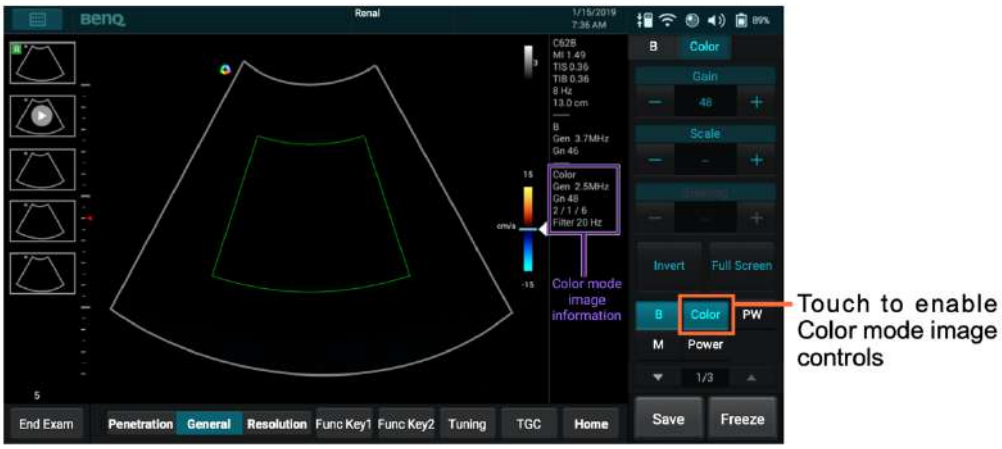
Touch **Central Line** to enable this function.

Color/Power Mode Image Controls

Overview

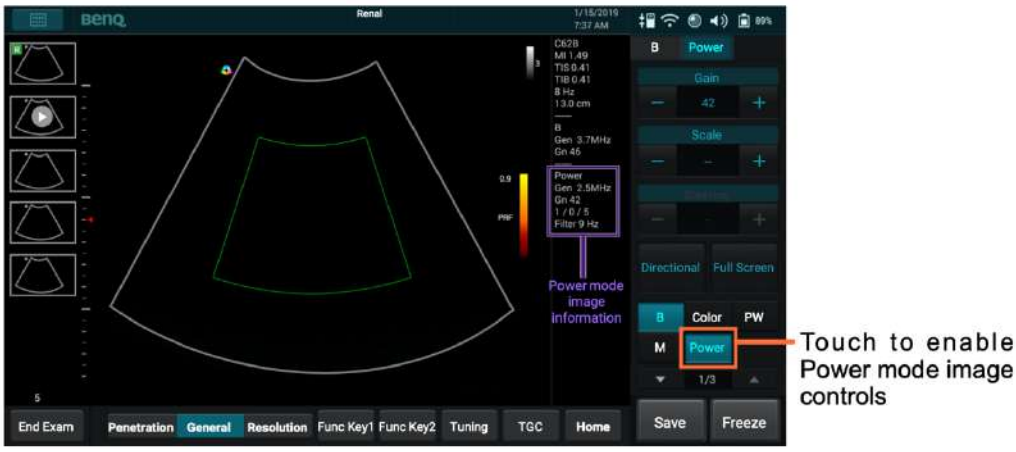
Color mode is used to detect the presence, direction, and relative velocity of blood flow by assigning color-coded information to these parameters. The color is depicted in a region of interest (ROI) that is overlaid on the 2D image. Non-inverted flow towards the transducer is assigned shades of red, and flow away from the transducer displays in shades of blue.

All forms of ultrasound-based imaging of red blood cells are derived from the received echo of the transmitted signal. The primary characteristics of this echo signal are its frequency and its amplitude (or power). The frequency shift is determined by the movement of the red blood cells relative to the transducer – flow towards the transducer produces a higher-frequency signal and flow away from the transducer produces a lower-frequency signal. Amplitude depends on the amount of moving blood within the volume sampled by the ultrasound beam. Large frequency shift generated by rapid flow is displayed in lighter colors, and smaller frequency shift in darker colors.



In Power (Doppler Power Image) mode, low flow rate in small vessels are clearly observed. Colors are carried out only to demonstrate the blood flow, but contain no velocity information, thus, offer no directional information.

Both Color and Power modes can work with other scan modes to form duplex and triplex modes.



Adjusting Velocity Range Scale

Adjust the velocity range of the color flow display. The maximum velocity range depends on the transducer in use and the location of the sample volume. Set the velocity range scale, which transformed from Pulse Repetition Frequency (PRF), high enough to prevent aliasing, and low enough to provide adequate detection of slow blood flow. Upon adjusting the scale, the velocity scale shown on the Color/Power wedge and the Wall Filter setting are changed accordingly.

Touch **Scale +/-** to adjust the value.

Inverting the Color Display

Invert the color display in relation to the blood flow direction in Color mode. Normally, the color red is assigned to positive frequency shifts (flow toward the transducer), and blue is assigned to negative frequency shifts (flow away from the transducer). Use this function to reverse this color assignment and invert the colors on the color wedge.

Touch **Invert** to invert the color scale.

Using Directional Power

Activate Directional Power in Power mode for use in applications where sensitivity and directional information are both required.

Touch **Directional** to enable this function.

Selecting a Color Map

Select which of five color maps is used to show Color Doppler data. Some maps use more colors than others, while some display in a smoother gradient than others.

Touch **Color Map +/-** to select a color map.

Adjusting Wall Filter

Reduce or eliminate unwanted low-frequency, high-intensity signals generated by movements of blood vessel walls or by rapid movement of the transducer. Set the wall filter high enough to ensure that the Color Doppler flash artifacts from tissue or wall motion are not displayed, but low enough to display slow flow. The adjustable range of the Wall Filter value is related to the current PRF value.

Touch **Wall Filter +/-** to adjust the value.

Applying the Smoothing Filter

Reduce color noise by applying a smoothing filter to the image.

Touch **Smoothing +/-** to adjust the value.

Adjusting the Color Priority

Define the amount of color displayed over bright echoes, and help confine color within the vessel walls.

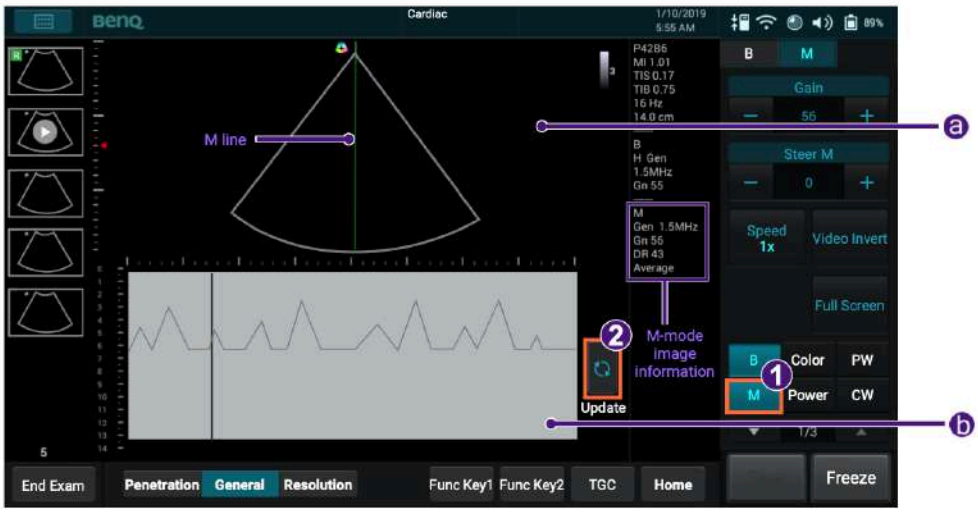
Touch **Reject +/-** to adjust the value.

M-mode Image Controls

Overview

M-mode imaging is used simultaneously with 2-dimensional (B mode) imaging to determine patterns of motion for objects within the ultrasound beam. M-mode displays scan data of the anatomy in the 2D Imaging window ⓐ, and the motion scan in the Time Series window ⓑ. The M-mode cursor line (M-line) appears vertically in the central area of the active 2D image, indicating the position of the M-mode beam. Typically, this mode is used for viewing motion patterns of the heart.

Drag the M-line to the target position to determine the presence of motion occurred along the singular line.



❶ Touch **M** to enable M-mode image controls.

❷ Touch to initiate the M-mode trace which produces a scrolling display of movement (along the vertical Y axis), plotted against time (along the horizontal X axis).

Using Steer M

Allow steering the sample volume to any angle you choose by adding multiple M-lines, rather than sampling in a strict vertical position. This function is particularly useful in cardiology applications.

1. Touch **Steer M +/-**.
2. A crosshair cursor appears on the image. Drag the cursor to where you want to start sampling and release it.
3. Drag the cursor to where you want to end sampling and release it.
4. Touch **Steer M +/-** to display a second crosshair cursor. Repeat step 2-3 to place the second line. Up to 3 M-lines can be added.

Adjusting Sweep Speed

Adjust how fast the timeline is scanned across the Time Series window.

Touch **Speed** repeatedly to select a desired velocity.

Selecting M Process

Select the detection method processing the M-mode trace display. The system provides retrieving average or peak scan data from the M-mode trace.

Touch **M Process +/-** to select a desired method.

Inverting the M-mode Trace Display

Invert the M-mode trace display in relation to brightness.

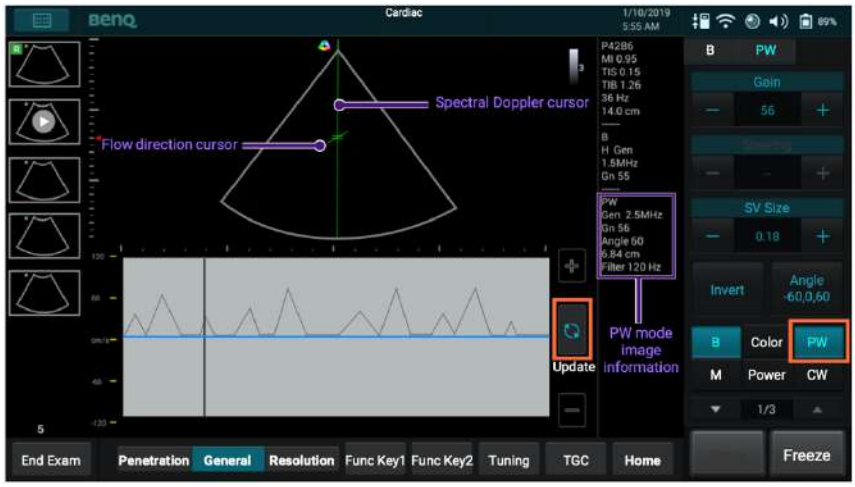
Touch **Video Invert** to swap the colors on the M-mode trace display.

Spectral Doppler Mode Image Controls

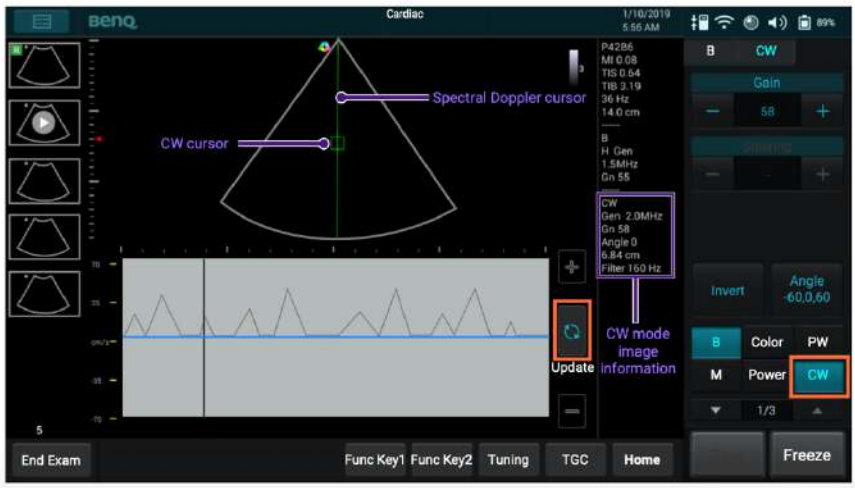
Overview

Pulsed-Wave Doppler (PW) and Continuous Wave Doppler (CW) are collectively called Spectral Doppler mode. A Spectral Doppler scan produces a series of pulses used to study the motion of blood flow selectively in the region of interest. PW/CW modes display scan data of the anatomy in the 2D Imaging window for monitoring the exact location of the sample volume, and display the PW/CW data acquired in the Time Series window. The X axis of the graph represents time, and the Y axis represents Doppler frequency shift. The shift in frequency between successive ultrasound pulses, caused mainly by moving red blood cells, can be converted into velocity and flow if an appropriate angle between the insonating beam and blood flow is known.

PW mode examines blood flow data selectively in a small region along a desired ultrasound cursor (the Spectral Doppler cursor), called the sample volume or range gate. A short line across the sample volume is called the Flow Direction cursor. This cursor line should be aligned to the blood flow direction when measuring the flow velocity. Drag the Spectral Doppler cursor horizontally and the sample volume vertically to the target position to determine the presence of blood motion.



CW mode examines the flow data along the Spectral Doppler cursor rather than a small region.



Adjusting Baseline

Adjust the zero baseline up or down in the Time Series window.

To adjust the baseline:

- Touch **Baseline +/-**.
- Touch and hold the baseline in Time Series window, then drag the baseline vertically to move it.

Adjusting Sample Volume (SV) Size

Adjust the SV size which controls the size of the Doppler region being examined in PW mode.

To adjust the SV size:

- Touch **SV Size +/-**.
- Touch and hold one finger on the Spectral Doppler cursor, then flick another finger up or down.

Adjusting Correction Angle

Adjust the correction angle to obtain accurate velocity. At angles greater than 70°, the error in the velocity calculation is usually too large to use.

- To toggle the angle between -60° and 60°, touch **Angle -60,0,60** repeatedly.
- Touch **Angle +/-** to adjust the angle to the desired value.
- To manually adjust the angle, touch and hold one finger on the Spectral Doppler cursor, then flick another finger to the left or right.

Updating the 2D Display

Select whether or not to continue scanning the anatomy while acquiring PW Doppler scan data. Touch **Duplex** or **Triplex** to enable/disable this function.

5. Troubleshooting

Symptom	Possible cause and corrective action
The system does not power on	• **Battery fully discharged.** Connect the AC power adapter. **• Power adapter does not function correctly.** > Check if the power adapter has green light illuminated. > Check if the AC plug is connected firmly and correctly to the power adapter and matches the plug type of your country. > Check if the power adapter is connected firmly and correctly to the system.
The system can't charge or experience short runtime between charges	**Power supply is damaged/battery reaches end of life.** > Allow the battery to charge overnight and check again the battery status. > Contact technical support.
Unsure of a function displayed in localized languages	> Switch the system language back to English from  > **Settings** > **General** > **Language**, and check again the function you want to use. > Contact technical support.
The system can't read/ write data from the microSD card	• **One or two USB storage devices are connected to the system at the same time.*** > Remove all the connected USB storage devices from the system. **• The microSD card is damaged.** > Insert the microSD card into a computer for inspection. **• The microSD card slot is damaged.** > Insert another microSD card into the system for inspection.
The system can't read/ write data from the USB storage device	• **Two USB storage devices are connected to the system at the same time.*** > Ensure the USB storage device you wish to read/write data from is connected to the system through the USB 3.0 port. **• The USB storage device is damaged.** > Insert the USB storage device into a computer for inspection. **• The USB ports are damaged.** > Insert another USB storage device into the system for inspection.
No image or abnormal display on the system screen	**The system screen is not functioning.** > Output the system display to an external monitor and check if images display normally on the external screen. > Contact technical support.
Image Artifacts occur on the imaging screen	**• Electrical interference occurs.** > Move the system away from any electromagnetic sources. > Remove the power adapter and other external devices (if any) from the system while keeping the transducer plugged for inspection. **• The transducer connected is damaged.** > Replace current transducer with another for inspection.
Touch screen is unresponsive or misconfigured	**• Touch screen is damaged.** > Inspect the panel surface carefully for cracks, cuts or any other damages. **• Software malfunctions.** > Connect a pointing device to the system through the USB port, and check if the pointer is displayed correctly on the screen.
Software installation failed	Check if the USB flash drives or the system's USB ports are damaged.

Symptom	Possible cause and corrective action
The Power button does not function	**The system power reaches a critically low state and is not connected to power.** > Connect the system to power.
The system is overheating	• Ventilation slots are blocked. > Place the system in a well-ventilated area. > Remove any dust particles or stains found on or nearby the ventilation slots. • The system's fans are not functioning. > Contact technical support.
The system encounters unexpected shutdowns several times	**A system disk error occurred.** > Reinstall the software. This requires assistance from technical support.
No audio or noise comes from the system speakers	• **The system is muted.** > Open the Quick Setup menu and adjust the volume. • **The speakers are damaged.** > Contact technical support.
HDMI does not function	**The HDMI cable/port is damaged.** > Use another HDMI cable for connection. > Connect the system to a computer through HDMI connection for inspection.
Bluetooth connection failed	• **The Bluetooth settings are not correct.** > Turn off the Bluetooth function, then turn it back on. • **The Bluetooth module is not functioning.** > Connect another Bluetooth device to the system for inspection.
DICOM connection failed	**The DICOM server is not responding or the DICOM settings are not correct.** > Go to  > **Settings** > **DICOM** > **Storage SCP** and touch **Edit** > **Test** for verification.
Ethernet does not function	• **The Ethernet settings are not correct.** > Contact your network administrator. • **The Ethernet cable/socket is damaged.** > Use another Ethernet cable for connection. > Connect the system to a computer through Ethernet connection for inspection.
Wireless connection failed	• **The wireless device is turned off or not functioning.** > Check the power of the wireless device. > Restart the wireless device. > Connect another wireless product to this device for inspection. • **The wireless network settings are not correct.** > Open the Quick Setup menu and check if the wireless network function is enabled. > Contact your network administrator.

*The system supports access to only one external storage device at a time. If you connect more than one external storage device, they function in the following priority order: USB 3.0 > USB 2.0 > microSD card.