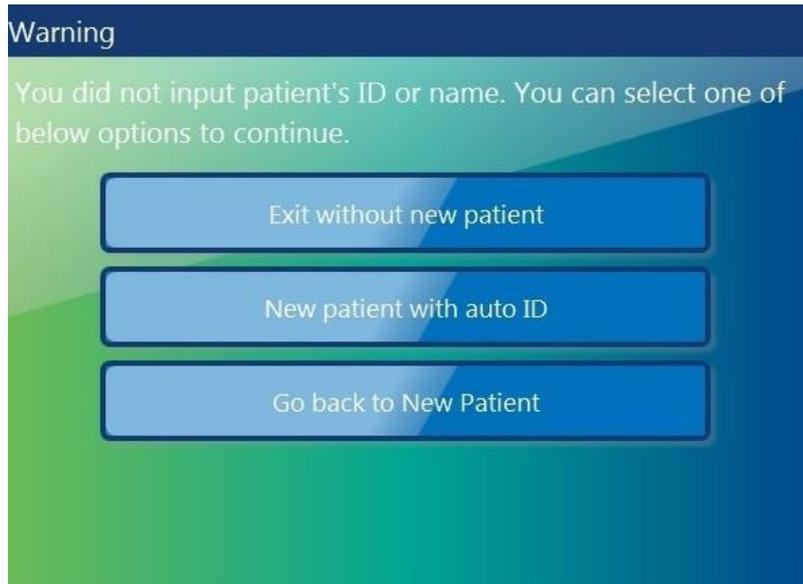


Note:

1. BSA is body's surface area, and will be automatically calculated when the data above (weight and height) is filled in.
2. The empty box is the data input field. After the relevant place is selected, the alphanumeric keyboard will appear and the alphanumeric keyboard can be selected to input data or characters.
3. Either birth date or age needs to be keyed in, the other one will be automatically calculated based on the time of the system. For this reason it is very important that the system time be correct. There are three gender options: N/A, male or female.
4. If the inputted ID is the same with the existed one, the system will give one warning message: There're some patient records match the creating patient, do you want to view details? The operator selects different options to continue: "Yes, review and select existed record", "No, create new record", "Go back new patient".

If there is no patient ID or name, select "v" on the touch panel and the system will display a message for three options to select from. The options are: "Exit without new patient", "New patient with auto ID" and "Go back to patient page". Select "New patient with auto ID" and the system will automatically give a number for new patient ID. Select "Exit without new patient" and the system will go back to real scan mode without patient ID. If "Go back to patient page" is selected, the system will go back to the new patient page.



4.1.1 General data section

Patient ID: ID number, max 30 characters.

Second ID: ID number, max 15 characters.

Family Name: patient's family name, max 20 characters.

Middle Name: patient's last name, max 20 characters.

First Name: patient's first name, max 20 characters.

Birth Day: patient's date of birth.

Age: patient's age (the age is calculated and displayed automatically after entering birth date).

Sex: N/A, female, male (pull down menu).

Perf. Physician: Name of the performing physician, max 30 characters.

Ref. Physician: Name of the referring physician, max 30 characters.

Operator: Name of the operator, max input is 30 characters.

4.1.2 Application data information section

General: This category has the basic patient information for many applications which include Abdomen, Cardiology, Vascular, Neurology, Small parts, Pediatrics and Orthopedics. In this section, enter height and weight, and then BSA (body surface area) will be calculated automatically.

OB: patient information for obstetrics.

GYN: patient information for gynecology.

UR: patient information for urology.

CARD: patient information for cardiac.

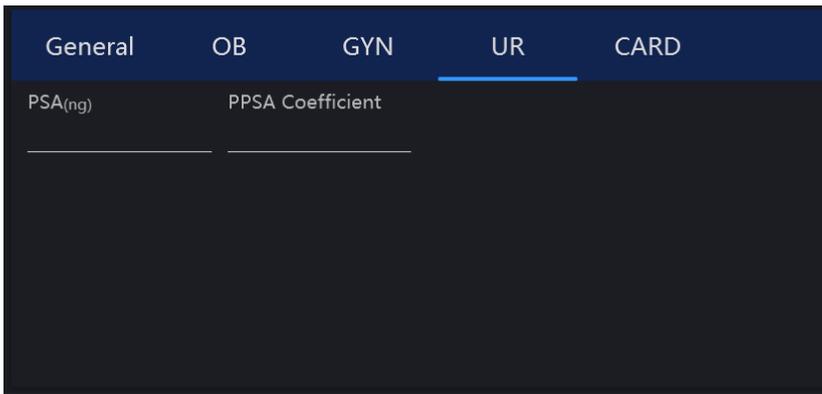
The OB application patient information section is as shown below:

Note:

1. LMP: last menstrual period, enter the first day of the last menstrual period.
2. BBT: basal body temperature, enter the date of the most recently recorded basal body temperature before the last menstrual period. Data cannot be entered in this field if LMP data was entered before. It is possible to enter data for either LMP or BBT. Then the EDD and GA will be calculated based on the LMP or BBT.
3. EDD: Physician should either enter the estimated date of delivery, or this can be automatically calculated after entering the LMP or BBT. If “EDD” is entered, the “LMP” and “GA” can be calculated.
4. GA: gestational age, automatically calculated after entering the LMP or BBT. Or input GA manually, get EDD automatically.
5. Gravida: enter the patient’s history of pregnancies.
6. Para: enter the patient’s history of live births.
7. AB: enter the patient’s history of abortions.
8. Ectopic: enter the patient’s history of ectopic pregnancies.
9. Fetus: select the number of fetus(es) (1 to 4).

GYN application patient information section is as shown below:

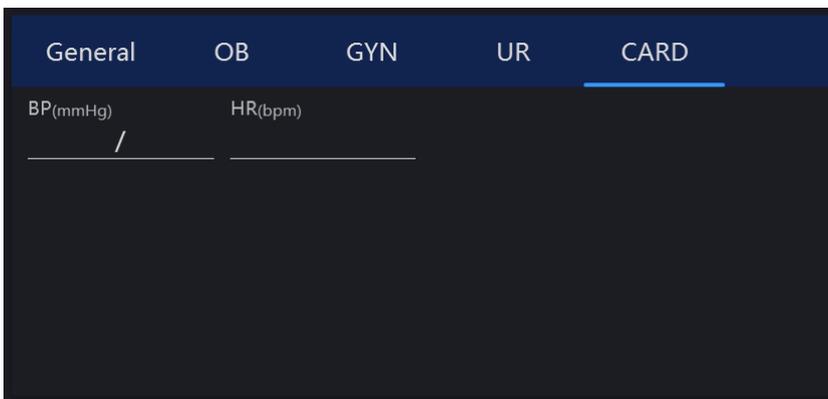
UR application patient information field is as shown below:



Note:

1. PSA: prostate specific antigen, enter the value of it.
2. PPSA Coefficient: enter the value of the predicted PSA coefficient.

CARD application patient information field is as shown below:



If the operator does not want to enter all the data, the examination can be started by selecting “B” or “Freeze” or selecting “V” on the touch panel.

Note:

If there is a temporary measurement and the image without entering any patient’s information and without storage, after “New Patient” or “Archive” is selected, an information dialog for option will appear. Select “OK”, enter “New Patient” page, input patient information to create one new patient, and the current image and the measurement will be stored in the new patient’s archive.

4.1.3 Indication Message

ID	Scenario	Indication message
1	Touch “v” button with no patient’s ID or name inputted in New Patient page.	You did not input patient’s ID or name. You can select one of below options for continue. Exit without new patient. New

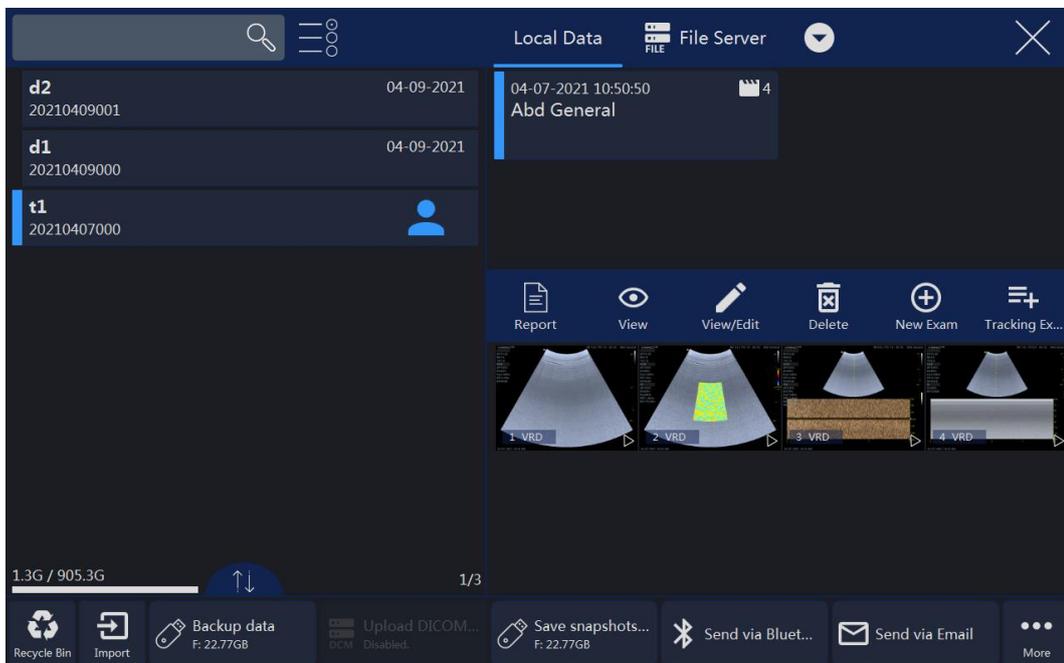
		patient with auto ID. Go back to New Patient.
2	Touch “√” in New Patient page if inputted patient ID is the same as one existed patient ID.	Patient ID already exists, do you want to continue? Yes, review and select exist record. No, create new record. Go back New Patient.
3	Touch “Archive” or “New Patient” if there is some unsaved data.	Do you want to attach the previous exam data to this new patient?
4	Select one or more patients, touch “Delete Patient” in Archive page.	Are you sure to delete the selected patient(s)?
5	Select one exam, touch “Delete Exam” in Archive page.	Are you sure to delete the selected exam(s)?
6	Export the same patients to the USB device.	There is exported data on the device and they will be totally deleted by following operation, do you want to continue?
7	There is no enough space on USB device when export patients’ data.	Export failed, no enough space left on USB or the device is removed.
8	The first time to use bluetooth.	New Bluetooth dongle plugged in, system will shut down for changes to take effect. Do you want to continue? Please wait for 10 seconds, then start the machine again.
9	Send one or more images through email in Archive, but email setting is not completed.	Email setting is not completed, please check it in "Sys Setting".
10	In Sys Setting/network, email body is empty, touch “Test”.	Email body is empty, continue to send?
11	In Sys Setting/network, email subject is empty, touch “Test”.	Email subject is empty, continue to send?
12	Change language, time zone and so on.	System will shut down for changes to take effect. Do you want to continue? Please wait for 10 seconds, then start the machine again.
13	In Sys Setting/Features, the inputted license is not valid.	System detects that the input license is invalid or is not for this machine, please contact manufacturer for support.
14	In Sys Setting/Features, the inputted license is valid.	Following options will be activated: Do you want to apply?

		If you choose OK, then license will be applied.
15	The system occurs unexpected exception.	Unexpected exception happens, the system will be shutdown. We are sorry about this.
16	Print one report while the printer is not connected.	Failed to print report, please check whether the printer is installed properly.
17	Touch "Reset" in Probe&App page.	The presets of current probe will be restored to factory default value, do you want to continue?
18	Save the changes in Probe&App page, or add one user-defined application.	Confirm to save?

4.2 Archive

"Archive" UI will be as shown below and the image screen is in the frozen status. Pressing "Freeze" at any time in this mode, the system will go back to the scan mode.

4.2.1 Initial Archive Menu



Note:

Patient/Exam:

1. After "End Exam" is selected, the current patient's examination will cease

the progress, at this moment there is no any patient is selected. The report of this examination cannot be stored, but can be printed, the information of this exam can't be edited in Archive, and the button "Edit" in worksheet will be gone. New exam can be added in "Archive", or new a patient to do examination.

2. Select "View/Edit", all patient information can be edited if the selected exam is not ended and the patient is added in 24 hours. But only relevant application category's data can be edited if the patient is added 24 hours ago.

3. Enable this button , more than one patient can be selected.

4. In the initial entering, the latest patient's information will be displayed. In order to search certain files, input the information in the search input field, and then select "Search" on alphanumeric keyboard to search according to the input

data. Touch , then select "Patient ID", "Name", "Last Scan" or other tabs, all patients in the list will be ordered as ascending or descending.

5. "Easy Compare": Select one image of one patient, select , the system exit "Archive" and enter dual display format, live scanning image is on the right or the image selected on the clipboard before enter "Archive", the image selected in "Archive" is on the left.

6. Select one image, click the trash icon to delete the image.

Management:

1. Save patient data or snapshots&video to USB, DVD or Server. Please refer chapter "Export patient or examination data".

2. Delete the selected patient file or files by selecting "Delete Patient".

3. Delete the selected examination file or files by selecting "Delete Examination".

Other Data Sources:

1. Select one or more patients and click the download button, patient data in USB, DVD or Sever can be download into patient list.

2. In order to search certain files, input the information in the search input field, and then select "Search" on alphanumeric keyboard to search according to the input data.

3. Images saved in other data sources can be played back and viewed.

4. Click the drop-down box to switch between different data sources.

4.2.2 New Examination from Archive menu

“New Exam” UI will be shown as shown below.

First Name Middle Name Family Name Accession Number

Patient ID 20190709148 Second ID

Date of Birth Age Gender N/A

Month-Day-Year y

General OB GYN UR CARD

PSA(ng) PPSA Coefficient

Operator

Perf.Physician

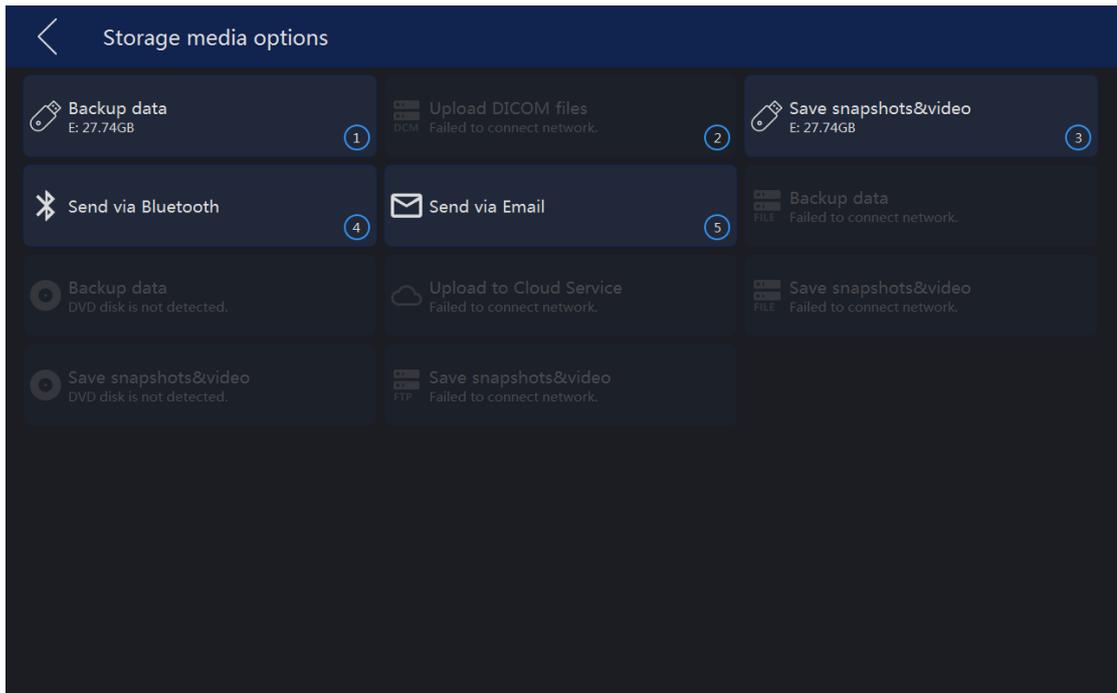
Ref.Physician

Note:

1. After “X” is selected, the system will go back to the “Archive” menu.
2. At any time after “Freeze” is pressed, the system will go to the scan mode in the original examination (not the new examination).
3. The previous information about the “Examination Physician”, the “Ref Physician” and the “Operator” data will display in the relevant areas by default. The operator can also edit them by selecting these fields. After these fields are selected, the alphanumeric keyboard will appear for input.

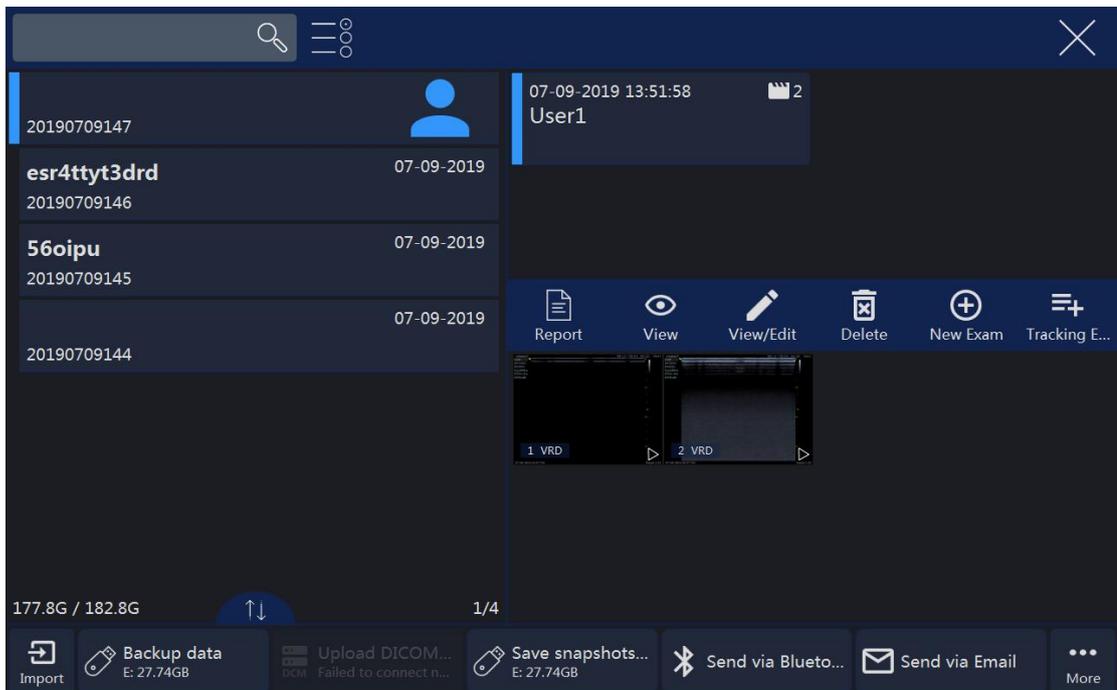
4.2.3 Export patient or examination data

Enter Archive, touch button “More...”.



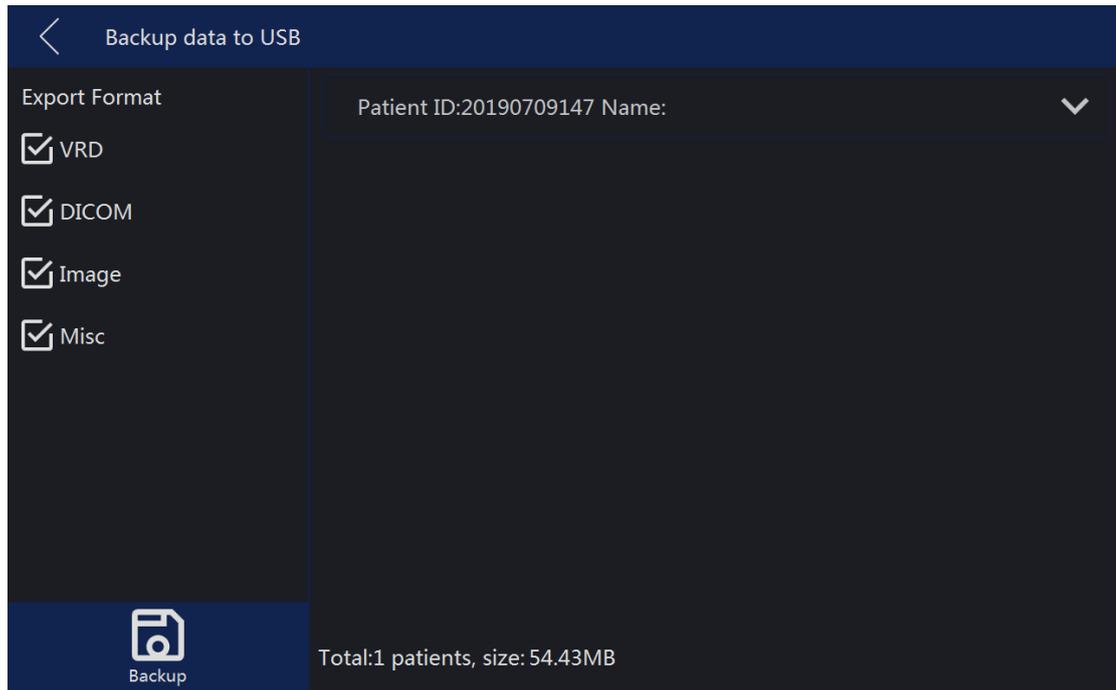
- USB items: One is for backup patient data, another is for snapshot&video.
- DVD item: One is for backup patient data, another is for snapshot&video.
- Server items: DICOM server is for uploading DICOM files. vCloud server is for uploading Remote Image data. File server is for backup patient data and snapshot&video. FTP server is for saving snapshots&video.

The position of these items can be moved. Touch the button and hold, then drag it to the destination position.



Select one or more patients in the “Archive”, enter “More...” page. Touching

highlighted “Backup data” or “Save snapshots&video” button, enter the relevant page.

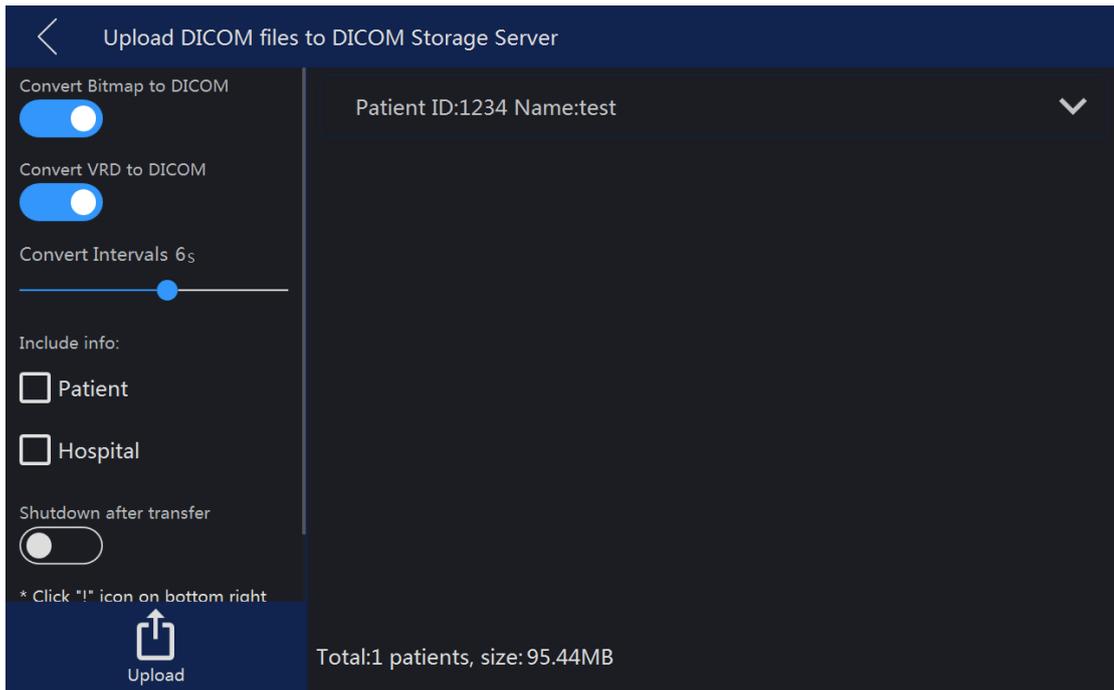


- “VRD”, “DICOM”, “Image” and “Misc” are selected as default. All these kinds data will be stored to the destination device.
- Select , button “Select All” is highlighted as default, all images are selected.
- If there are 2 USB disks, please select one of them.
- Touch “Start” to back up the selected patients’ data to the selected device, all selected images are saved.
- Patient data is saved in folder “VinnRepositoryV2”. For example, one patient named “Test”, ID is “123”, then the saving path will be: USB disk\VinnRepositoryV2\[Test]-[123]-[XXXX]. “[Test]-[123]-[XXXX]” is one subfolder of “VinnRepositoryV2” named by patient name and ID.
- The backup data can be imported to VINNO machine.



- Button “Select All” is highlighted as default, all images are selected.
- If there are 2 USB disks, please select one of them.
- After enable “Convert VRD to DICOM” or “Convert VRD to MP4”, convert all selected VRD format files to DICOM or MP4, then save the images to USB/DVD/FTP/File server. These images are still VRD format in this machine.
- Touch “Save” to store snapshots or video to the selected device.
- If the image format is AVI, save the video and the snapshot of the image to the media device.
- If the image format is VRD, DICOM or IMAGE, save the snapshot of the selected image to the media device.
- All these videos and snapshots saved in folder “PatientSnapshots”. For example, one patient named “Test”, ID is “123”, saved these videos and snapshots on 2016-2-19, then the saving path will be: USB disk\
PatientSnapshots\2016-2-19\[Test]-[123]-[XXXX]. “2016-2-19” is one subfolder of “PatientSnapshots” named by the date, and “[Test]-[123]-[XXXX]” is one subfolder of “2016-2-19” named by patient name and ID.

If this device is connected to one DICOM server, DICOM images can be uploaded to the server.



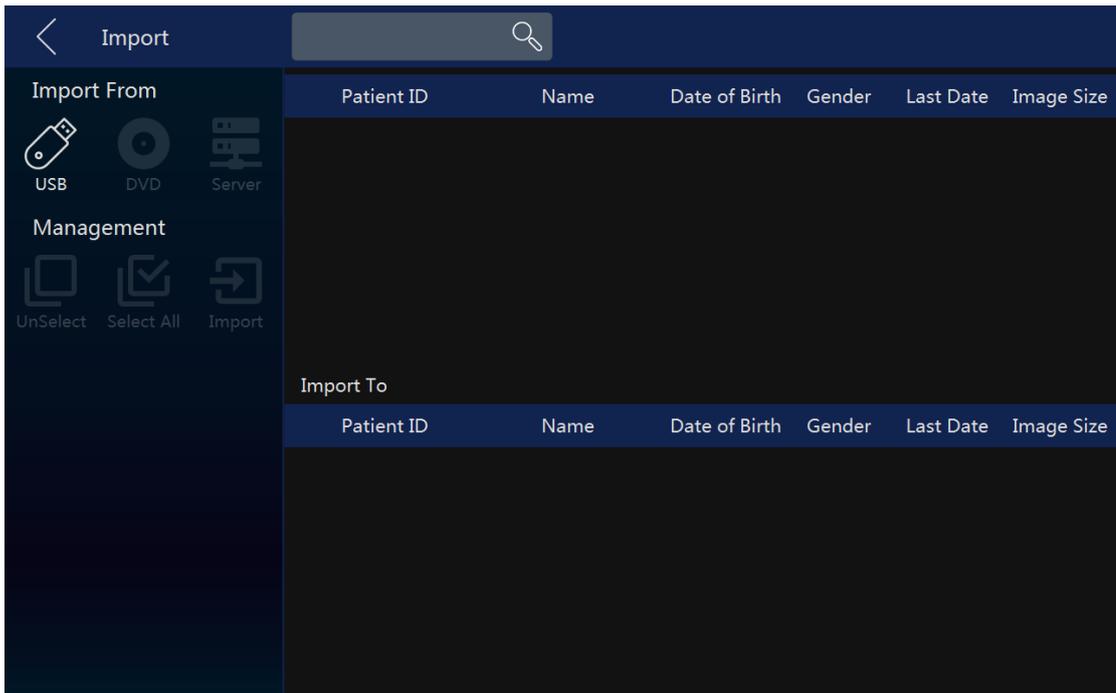
- Enable “Convert VRD to DICOM”, after start to upload images, all selected VRD images will be converted to DICOM images, then upload to DICOM server.
- Convert Intervals: 1-10 seconds. Set 6 seconds, convert the latest 6 seconds of one VRD image to DICOM image.
- Button “Select All” is highlighted as default, all images are selected.
- Touch “Upload” to upload images to the server.

4.2.4 Import patient or examination data

After “Import” in the “Archive” is selected, the system changes to be the menu shown as below. The operator can import the data and the information of the patients from the outside media. Only those data that stored through backup can be imported.

Selecting the importing media (USB, DVD or Server) and can also use the search function to find the specific information about the corresponding patient in the importing media. By selecting the file name, select the file, or by selecting “Select All” on the touch panel to select all files. Pressing “Import” to starts the import process.

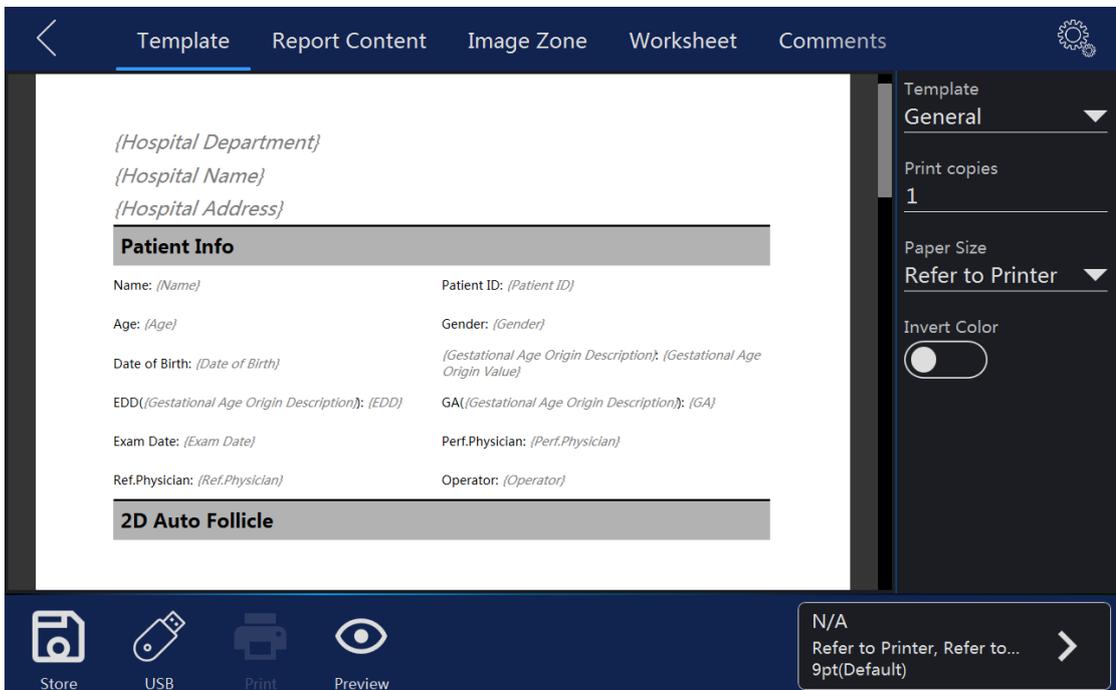
Go back to the “Archive” menu by selecting “<” and can go back to the scan mode by pressing “Freeze”.



Touch the arrow on the right side of the touch panel to obtain the examination file list. Then import one particular examination file from this menu.

4.2.5 Report

After “Report” in “Archive” is selected, or select “Report” on main menu, the touch panel screen goes to the menu as shown below.



Note:

1. The measurement worksheet will be generated automatically without

operator's operation.

2. The patient and the physician information will come from the database automatically. The information revised manually. After the relevant blank box is selected, the alphanumeric keyboard will appear in the bottom right to input the data. After edit the patient data, select "Preview", the updated data will display in the report.

3. In "Image Zone", select one or more images, select "Preview", the selected images will appear in the report.

4. If there is "OB Graph", it will be displayed in report too.

5. In "Worksheet" select one probe/application, all results will be displayed. Select "Preview", the results will appear in the report.

If the current patient's fetus number is 2 or more, and do some measurements with every fetus, then enable "Fetus Compare", all measurement results in every fetus will be listed in column.

6. In "Comments", the operator can input some comments here. Select "Preview", the comments will appear in the report.

7. In "Template", the operator can select "General", "OB" template, or different formats for multi images. Select "OB" template, in report there is some information of GA and EDD if do the related measurements.

8. Select "Store", this report can be saved.

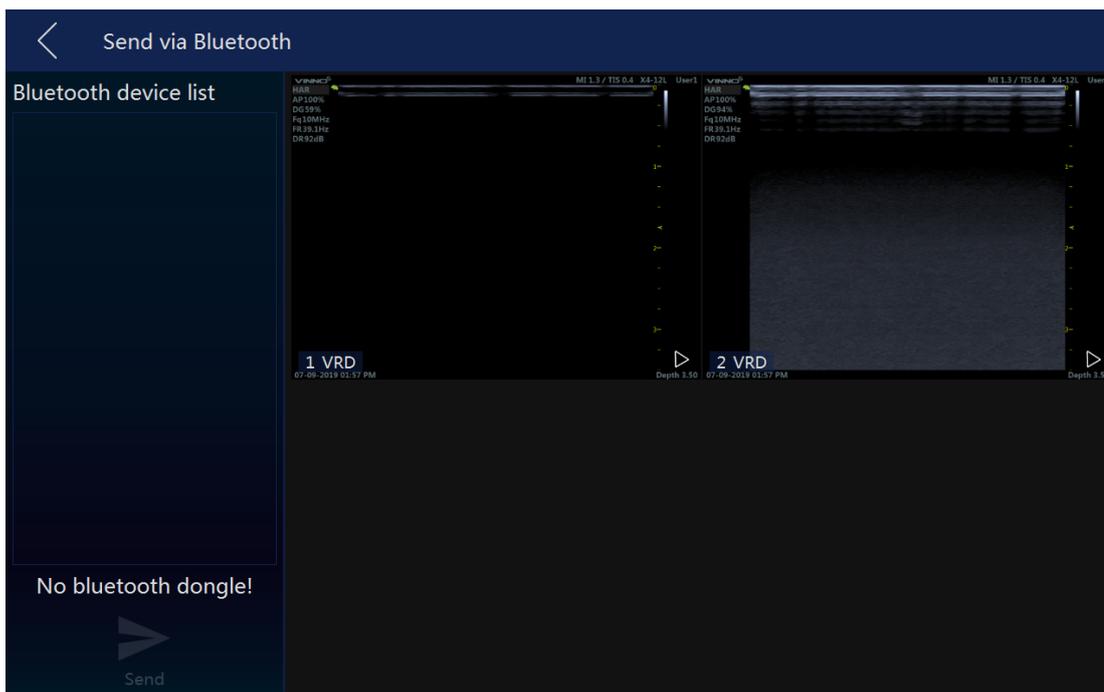
9. Select "Store to USB", save the report to one USB device.

10. Printer can be selected on the top left corner. Touch ">" to configure the settings of the selected printer.

11. Select  to enter configuration page, user can import user-defined template.

4.2.6 Bluetooth

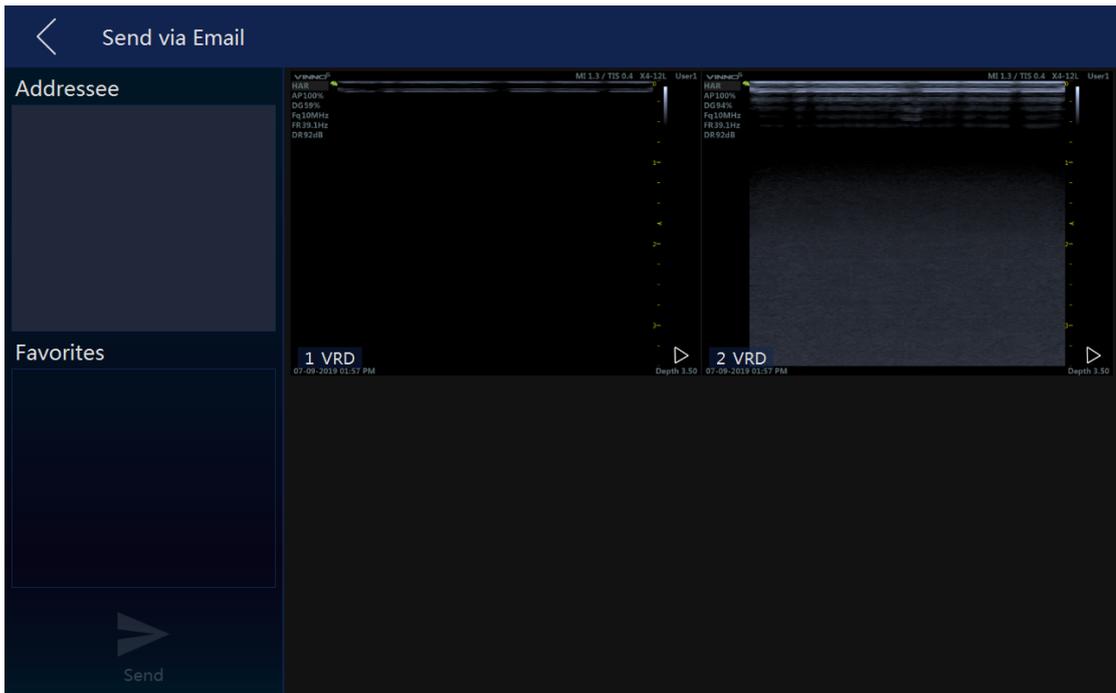
Plug in one Bluetooth dongle, select one patient in "Archive", touch "Bluetooth Send" button to enter Bluetooth page.



After scanning, list all nearby Bluetooth devices. Select one device, and select one or more images, touch “Send” to send the images to the selected device. Before send the images, the system will pair with the remote device first. If power saving mode of the system is on, the operator needs to restart the system when using Bluetooth at the first time. There is one bluetooth icon at the right bottom corner of the main screen when plug in the bluetooth dongle.

4.2.7 Email

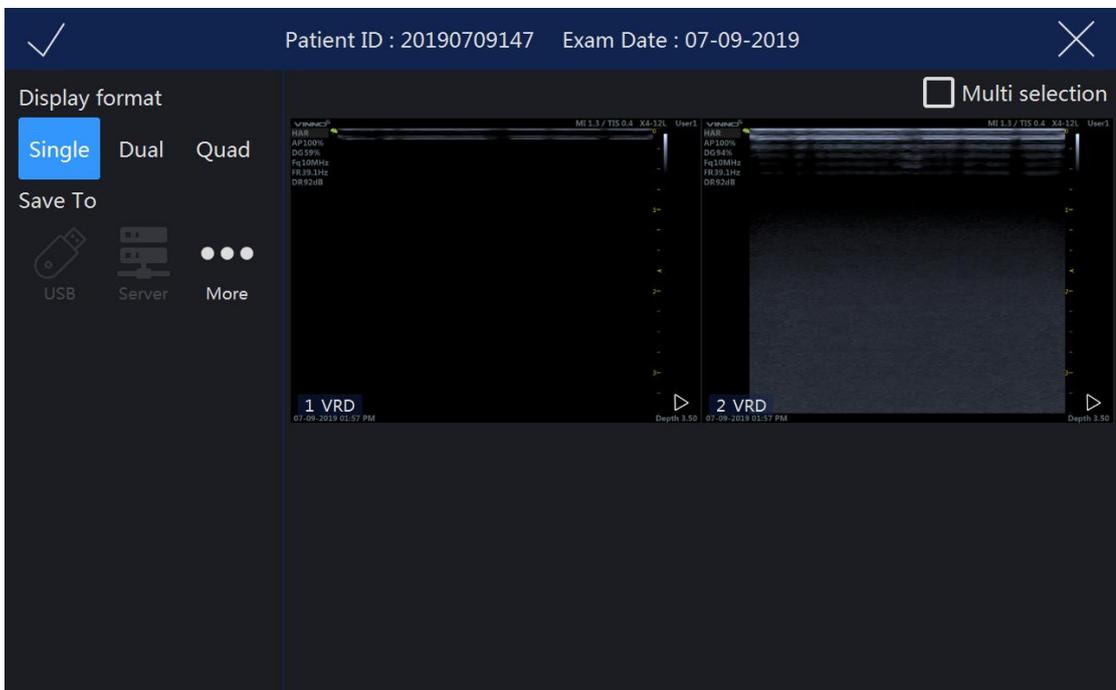
Before use Email, the operator needs to enable the network and set email settings in “Sys Setting”. Select one patient in “Archive”, touch “Email Send” button to enter Email page. Input one or more addressees, then select images, touch “Send” to send the images by email.



After send successfully, the addressee(s) will be saved in the list.

4.2.8 View menu

After “View” in the “Archive” is selected, the system goes to the view function and menu as shown below.



Note:

1. After entering the view mode, select the images, and then select “Single”, or “Dual”, or “Quad” to display the images in the different formats. Select the other

images and the different view modes to be displayed. “Single” means that the image screen will display the first selected image. “Dual” means that the image screen will display the last two selected images as the dual image display format. “Quad” means that the image screen will display the last four selected images as the quarter image display format.

Only VRD images can be displayed in dual or quad formats

2. After small images are selected, the image box will be highlighted. If “Multi selection” is enabled, the first select in the relevant image means selection, the second select means un-selection.
3. Select button “More” to enter “More” page, the operator can send images via Bluetooth/Email or save images to DVD. Touch these buttons to enter relevant pages.
4. By selecting “<”, go back to the “Archive”.
5. By pressing “Freeze” on the control panel, go back to the previous scan mode.

4.2.9 Worklist

After enable “Worklist” in system setting, there is a “Worklist” tab in “Archive”. And there is another tab “Local Data”, display all patients created on the local machine.

The system gets the patients from worklist server automatically when enter “Archive” if enable “Auto Load Worklist”. Choose one patient, select “Select Current” to start the exam. If capture some images, do some measurements or add some comments, the current patient will be saved to local data.

Choose the start and end date, then select “Search” to load all patients in this period. If select “Reset”, only load the patients of the day. If input patient ID or name then select “Search”, download the searched patient(s) from the worklist server.

4.2.10 Recycle Bin



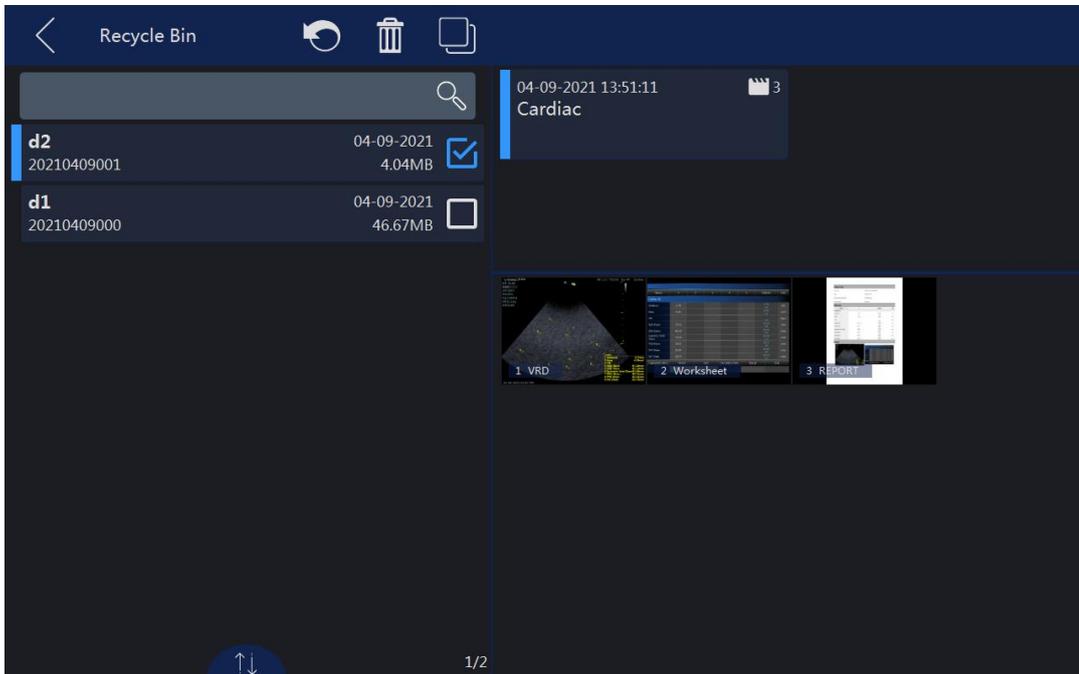
Click the icon of Recycle Bin  in the lower left corner of the interface to enter the function. The deleted patient files will appear in the Recycle Bin.

Restore: Select the patient information in Recycle Bin, if you click the Restore button, the selected file will be restored to the patient management list, if you click the delete button, the information will be permanently deleted.

Search: Users can enter keywords in the search input field, such as patient name,

ID, application and probe name, then click the search button to search the patient information according to the keywords.

View and replay: Click the image saved in patient data to play back and view.

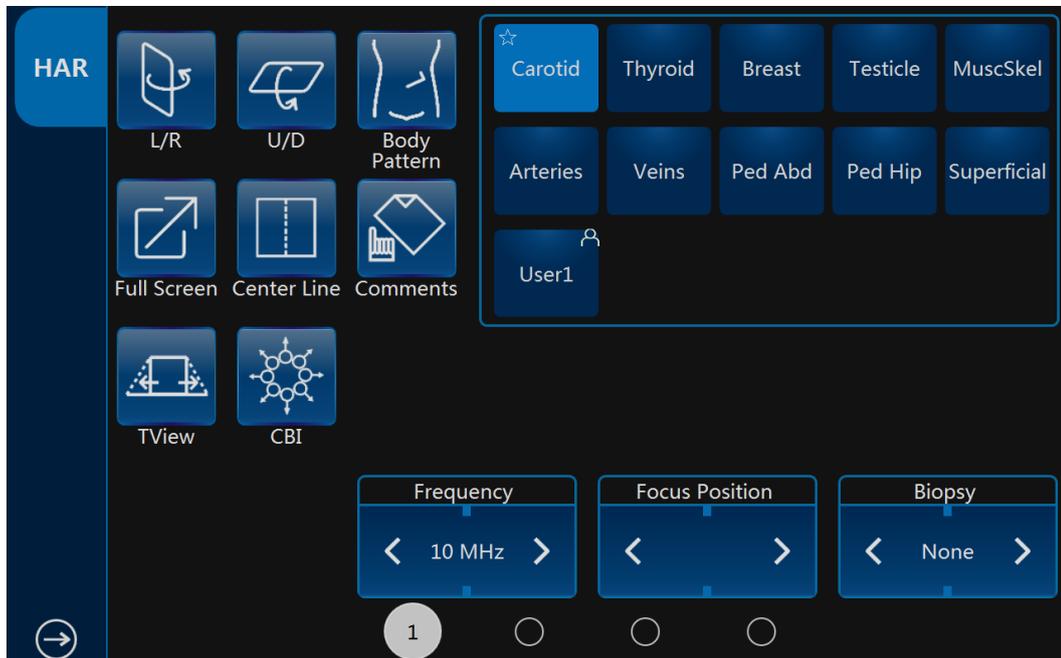


5 2D mode, M mode

5.1 2D Mode

5.1.1 Main menu

2D mode menu is as shown below. The parameters can be adjusted, such as “Frequency”, “Focus Position”, and slide the touch panel to the second and third page, more parameters can be adjusted.



Note:

1. All the scanning operations should be performed through the control panel, while all the image optimizing operations such as the image adjustment, annotation, settings, and data base management should be performed through the touch panel.
2. The numbers indicate the adjustable parameter. The default number depends on the application setting.
3. Enable “TView”, the image will be wider in the bottom than the top to obtain a wider vision.
4. “L/R” means to fold image from the left to the right or the right to the left. U/D means to fold image from the up to the down or the down to the up.
5. “Full Screen” can make the image to be zoomed as full screen size in order to enlarge the image. The image size is from the top to the bottom of the screen and the width is enlarged accordingly.

6. “VTissue” can automatically calculate the best acoustic velocity in tissue on the basis of the scanning data to improve the image quality. After this button is selected, it will be highlighted to show this function is active. Touch it again to remove this function and the echo speed will return to pre-set one.

7. No “VTissue” in HAR mode.

All available parameters are as follows:

Frequency:

By regulating this parameter, the operator can strike a balance between resolution and penetration. High frequency generally means a better resolution at the cost of a worse penetration.

Focus Position:

It is to select the depth of current focus or foci. The focus position is indicated on the right-hand side.

Focus #:

This allows the operator to select the number of foci. The number of foci depends on the probe selected.

VFusion: This function enhances the contrast resolution with better tissue differentiation and clear organ borders. When the level is 0, this function is switched off.

VSpeckle: This function reduces the speckle noise in the ultrasound image.
Notes: This process smooths the image, so potentially some structures can be smeared out.

Dynamic Range:

This allows the operator to enhance the grayscale to make the image easier to display.

Line density:

This helps to keep a balance between the image resolution and the frame rate. A higher line density means a better resolution, but a slower frame rate.

VSharpen:

By this function, the edge of the image can be more easily observed with the naked eye. The higher the level of VSharpen, the better the edge of the image can be.

Image Angle: This function can be used to change the scanning angle. A small angle can provide a faster frame rate, but the scanning area is smaller.

Persistence: Frame averaging can eliminate the image speckle of the 2D images. Several frame averaging levels can be set in this menu.

Gray Filter: Certain echo signals can be filtered by this function to avoid noise.

Smooth: This smoothens out the image by reducing the number of pixels.

Focus Width: Using this key to change the focus zone width.

Acoustic Power: This allows the operator to change the transmitted acoustic power.

Biopsy: After this button is selected, the biopsy guide line will display on the image screen. Some biopsies have different angles to be selected. If this is the case, the system will display the selectable angles for the operator to select from. Different probes feature different biopsy guide lines.

VNear: In the 2D touch panel menu, use the arrow in the “VNear” key to increase or decrease or switch off the level of compounding. When the level is 0, this function is switched off. When the level is 1, 2, 3, one more focus will be added if the position of the current focus(es) is >5 cm. If there are the most focuses, this function doesn't work.

NeedleEnhance: Only works with linear probes. To enhance the needle image when do biopsy. When this function is enabled, a red boundary line will be displayed to show the effective border which should not be crossed, rotating key “Rotation/Steer” changes its angle to match the needle, make sure the angle between the red line and the needle is 90°. Pressing key “Rotation/Steer” changes the direction.

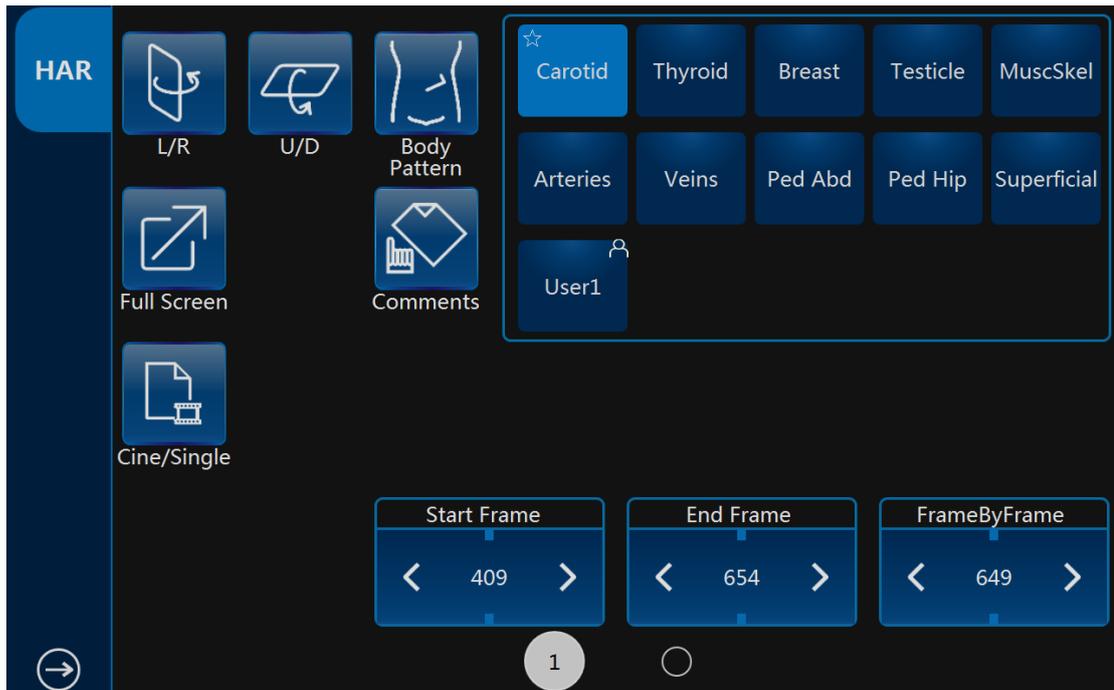
EdgeEnhance: Improving image quality and contrast by enhancing its edge and detail information and decreasing noise to improve SNR by diffusion filter.

TI: Select thermal index display which is one of TIS, TIB and TIC. TIS is the Soft Tissue Thermal Index. TIB is Bone Thermal index. TIC is Cranial Bone Thermal Index.

SGC (Scanline gain compensation): Gain compensation for tissue image scan line.

5.1.2 Freeze mode

In freeze mode, the touch panel UI appears as shown below. The stored image can be optimized by adjusting the parameters or changing the maps when needed.



Note:

1. In Freeze mode, no adjustment is available for the “Frequency”, “Focus Position”, “Focus #”, “Line Density”, “VSharpen”, unlike the live B image.
2. Cine/Single: allows images to be switched to display as either cine mode or single-image mode. The highlighted button means the cine mode and non-highlighted button means the single-image mode.
3. Start Frame, End Frame: controls which frame to start from and which to end in order to display continuously as a loop.
4. Speed: controls the cine speed as 400%, 200%, 100%, 60%, 50%, 40%, 20%.
5. In freeze mode, switch to CF/PDI or PW/CW freeze mode (if available) for adjustment by selecting mode buttons on the upper section of the screen.

5.2 Operation

5.2.1 General operation

Gain: With rotation of the “B” key on the control panel, the overall brightness of 2D image is adjusted. All incoming echoes are amplified with the same digital gain value regardless of the depth. Turning “Gain” control clockwise makes the entire image brighter, and counterclockwise makes the image less bright. The digital gain value is displayed on the screen.

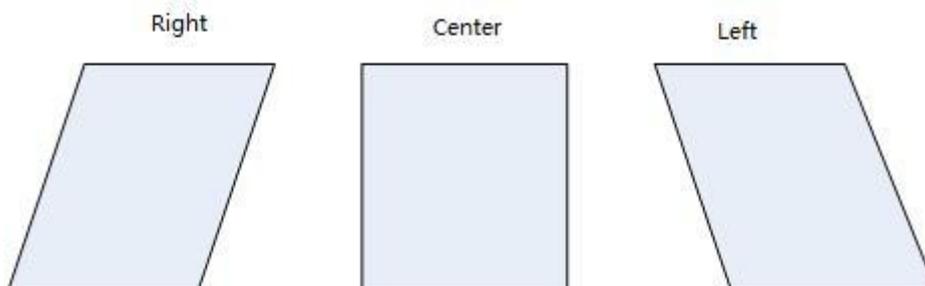
Depth: Rotating “Depth” on the control panel can move the different depth of the image. This change can only be in real time scan mode. When turned clockwise, the depth range of the 2D image is enlarged and the display size of the image is reduced to display the entire depth range. When turned counterclockwise, the depth range of the image is reduced and the display size of the image is magnified.

Note: 1. Maximum and minimum depth varies according to the different probes used.

2. Actual depth is displayed in the information header.

TGC slides controls: Using the “TGC” slides control keys on the control panel can vary the gain in the certain depth of the 2D image. Sliding to the left decreases the gain in the corresponding specific 2D depth. Sliding to the right increases the gain in the corresponding specific 2D depth.

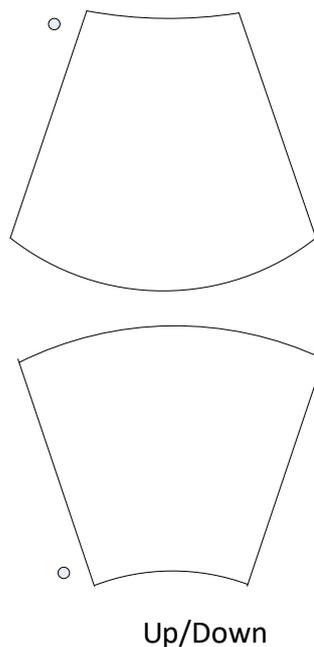
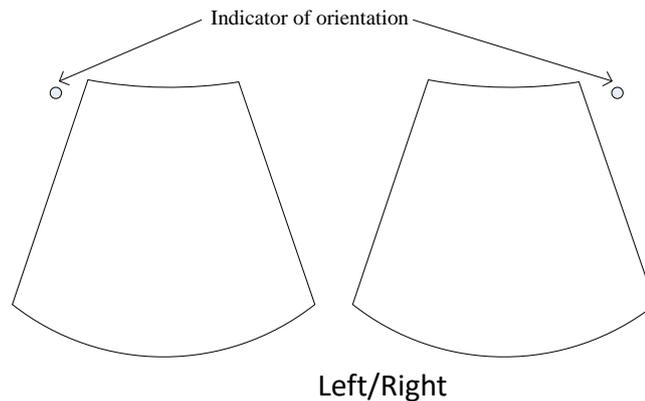
B Steer: 2D image can be steered right direction, center (no steer), left direction. The drawing below is shown as reference. B steer only exists in the linear probes.



2D Automatic Optimization: The “Auto” key on the control panel can optimize the contrast resolution according to the histogram of the scan area. After “Auto” is pressed, this causes the automatic optimization of the gray scale to enhance the contrast. After “Auto” is pressed again, the automatic optimization function is switched off. When the auto function is active, the key is highlighted.

Harmonic Imaging: The harmonic imaging reflects the harmonic of the nominal transmitted frequency, such as double, threefold and fourfold. It gives the better grayscale contrast compared to the standard ultrasound imaging. Pressing “HAR” leads harmonic imaging. After switched on, this key is highlighted.

L/R and U/D: They allow the operator to fold the image from left to right or right to left and up to down or down to up as shown below for reference.



Trapezinis vaizdas padidins nuskaitymo sritį, kad operatorius matytų daugiau. Pavyzdžiui, linijinio zondo nuskaitymo vaizdas yra stačiakampis, tačiau šiai funkcijai suveikiant, nuskaitymas vaizdas pasikeis į trapeciją, kurios apačioje yra didesnis nuskaitymo vaizdas.

5.2.2 Trapezoid View

4.1.3.

Trapezoid view will enlarge the scanning area in order to let the operator see more. For example, the linear probe scanning image is a rectangle, but after this function works, the scanning image will change to a trapezoid which has a larger scanning view in the bottom.

After “TView” on “B” mode menu is selected, this button will be highlighted and the scanning image will be trapezoid shape to have a wider view in the bottom.

5.2.3 PView

Panoramic view function provides the ability to construct and view a static 2D image which is wider than the field of view of the selected probe. It constructs an extended image from the individual image frames as the operator moves the probe along the surface of the skin.

5.2.3.1 Operation

1. Select “PView” on the touch panel to enter “PView” mode.
2. To start acquiring the image, select “Start”. Then move the probe slowly, steadily and in uniform motion lengthwise. Make sure that the probe stays in one plane throughout the scan. The image is stored as you perform the scan and can be monitored during acquisition.
3. To complete the scan, select “Stop”.
4. Press “Reacquisition” to clear the extended image and return to the normal image, and the operator can start again. Selecting the “Exit” on the touch panel goes back to the normal image scan.



CAUTION

The quality and usefulness of the extended images is impacted by the probe motion. The incorrect technique can generate a defective image. A good quality extended image is characterized by the smooth edges and a clear direction. All structures visible in properly scanned 2D images can be easily identified.

An extended image of poor quality can be recognized by its rough and curved edges. Also, it may contain sections showing noise and defects next to sections of clear structures.

If any extended image of poor quality has been generated, the scan has to be repeated and the poor image considered as useless. Any measurement based on a poor image is to be considered not correct.

Note that the accuracy of measurement in the extended images is limited and can be lower than measurement on the B images. It is not recommended to use this measurement: be aware that any diagnostic conclusion must not be made based on panoramic image alone and needs to be checked with other diagnostic

procedures.

Precaution for uniform motions as follows:

- Make sure that there is enough gel along the scan path.
- Move the probe slowly and steadily.
- It must be ensured that the probe during the acquisition of the extended image always remains in contact with the skin.
- Keep the motion within the same scan plane and do not change the direction of movement during the scan.
- Deeper scanning needs slower motion of the probe due to more data acquisition needed.

Display the speed of probe moving at the upper left corner of the main screen. The value of the speed is green if it is less than 3 cm/s. It is yellow if it is bigger than 3 cm/s and less than 5 cm/s. It is red if it is bigger than 5 cm/s.

If “Enable PView Advanced Features” is enabled in “Sys Setting” rotate “Zoom” key, PView image can be zoomed out/in, and its position can be changed by moving the trackball.

5.2.4 Map

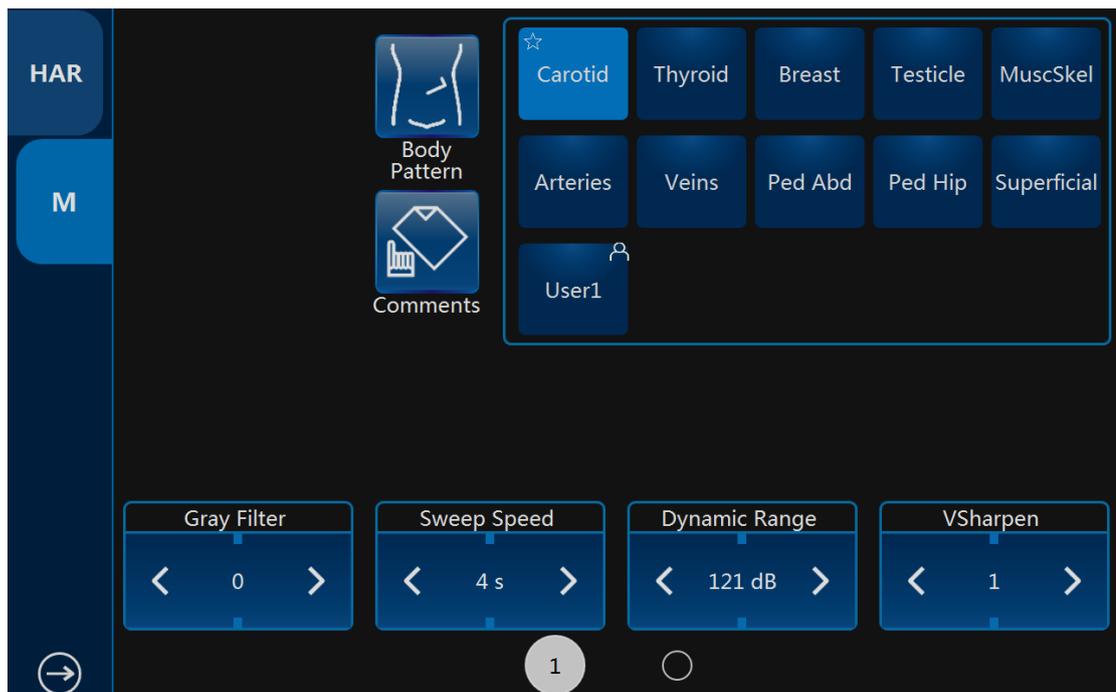
The gray map determines the displayed brightness of an echo. With a different gray map, a harder or softer image can be obtained. Image gray can be adjusted both in the freeze and scan mode.

5.3 M Mode

The “M” mode imaging provides the echo information of motion with change of time derived from a stationary ultrasound beam. “M” mode is used along with a 2D image, with one line through the 2D image which is called the “M” cursor. This cursor identifies the position of the ultrasound beam. The motion of the echo information at this position over time is to display “M” mode.

5.3.1 M mode

Activation of M mode: By pressing “M” on the control panel, the system goes to “M” mode. Use the trackball to move the “M” cursor left or right by moving the trackball left or right. 2D and “M” mode stopped by pressing “Freeze” on the control panel. The main menu on the touch panel is as shown below:



Display format: Operator can change the display format by selecting it on the touch panel. In format, there are two kinds of display. One is side by side, while the other one is up and down. In each type of the format, different splits between “B” and “M” traces displays can be selected. In side by side format, there are three kinds: “H 1/2”, “H3/4” and “Full”. In up and down, there are three kinds: “V2/3”, “V1/2”, and “V1/3”.

Dynamic Range: This allows the operator to enhance the grayscale range to make it easier to display pathology.

Acoustic Power: This can adjust the transmit power.

Sweep Speed: This can adjust the different sweep speeds.

Gray Filter: It determines the threshold above which the ultrasound echoes are displayed on the screen in order to suppress the smaller echoes. The Gray Filter value is displayed in the relevant information area on the touch panel.

VSharpen: This allows the existing information easily visible through the digitally processing.

Gain: This can adjust the overall brightness of the “M” mode trace. The adjustment of the “Gain” control determines the amplified amount which applied to the received echoes. “M” gain function only influences the M trace. With clockwise, the entire image becomes brighter. With counterclockwise, the entire image becomes less bright.

Curve MAM: The feature supports drawing smoothed curve for Multiline and Color MAM . Multiline MAM supports to draw four lines at most.

5.3.2 Freeze in M mode

After “Freeze” on the control panel is pressed, the image will be in the single frame display status. The operator can move the trackball horizontally to recall the stored M sequence. By selecting “Single/Cine” on the touch panel can be changed to the Cine mode. After this button is selected, this button will be highlighted. The 2D image will be automatically replayed. The start frame and end one can be changed in the 2D menu. By moving the trackball, the 2D image can be reviewed frame by frame.

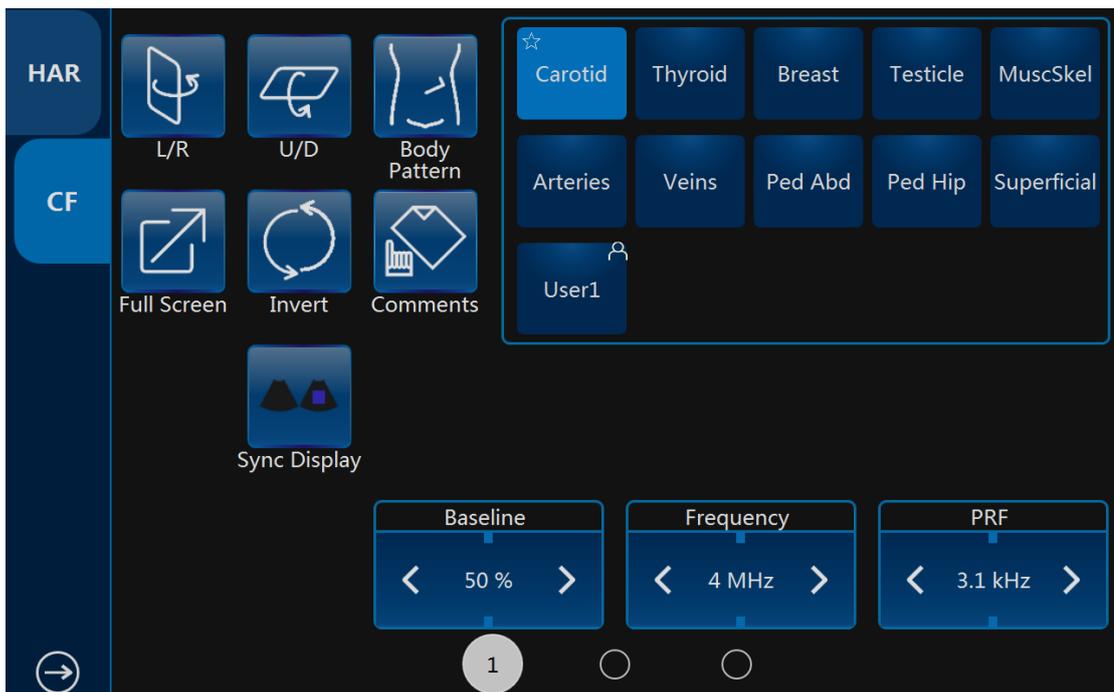
6 CF (Color Flow Mode) / PDI (Power-Doppler Mode)

The Color Flow imaging and Power Doppler imaging uses the Doppler principle to build the image. It gives the information about blood flow velocity, direction, quality and timing. This information is used to overlay a color image onto the 2D grayscale scan image.

6.1 CF mode operation

6.1.1 Main menus of CF mode

The activation of CF mode: Pressing “CF” on the control panel will activate the “CF” mode. Then, the “CF” box appears in the active 2D image. “Gain” is controlled by rotation of this key. After this key is pressed, the menu appears on the touch panel (scan mode) as shown below.



Note:

1. All main functions for scanning operations will come from the control panel. The touch panel function keys are mainly focused on the image adjustment, annotation, setting, and database management.
2. The “B” button is for the operator to switch to “B” mode parameter change. If “PW” or “CW” is on, the “PW/CW” button on the touch panel can let the

operator switch to “PW/CW” screen for parameter change.

3. The “PDI” mode does not have an “Invert” button.

4. Slide the touch panel to the left to obtain more parameters.

Frequency: This setting controls the transmit frequency. With a higher frequency, the lower flow velocities are displayed better at the given PRF, but the penetration depth is reduced. With a lower frequency, the sensitivity in depth will be increased.

PRF: The Pulse Repetition Frequency (PRF) governs the displayed velocity range. Increasing the PRF will increase the range of velocity. High PRF will avoid aliasing of blood. However, higher PRF will have a loss of sensitivity to low flow velocities.

Wall Filter: Wall motion filters are used to eliminate the vessel wall motion and the cardiac motion noise that is low in the velocity and high in the intensity.

Packet Size: It controls the number of samples gathered for a single color flow vector. This allows the operator to improve the color sensitivity and accuracy of color averaging if increasing the packet size or increase the frame rate if decreasing the packet size.

Color Level: This function eliminates the small color noise or motion artifact signals.

L/R: After this button is selected, the image will be folded from left to right and right to left.

U/D: After this button is selected, the image will be folded from up to down and down to up.

Invert: This function inverts the color display in relation to the direction of the flow. Normally the red color represents flow to the probe and the blue color represents away from the probe. After inverting, the color will represent different.

Color map: Those allow the operator to select different color-coding for blood flow display (similar to the post-processing curves with gray scale of B image).

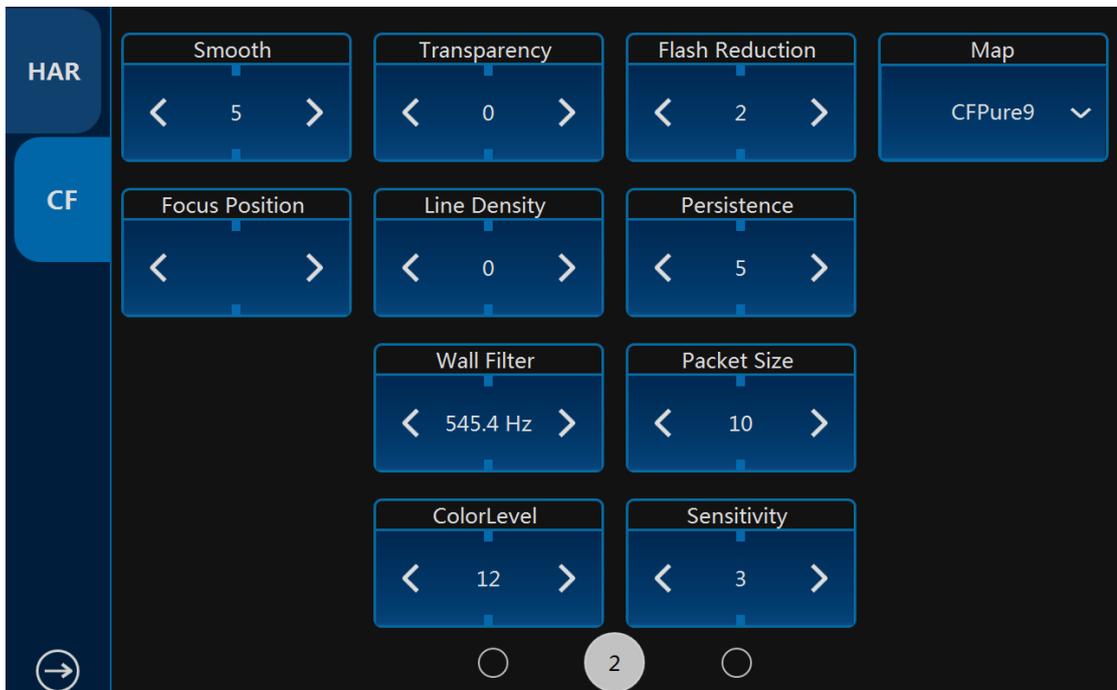
Line density: It determines the line density within the “CF” box.

Sync Display: After this button is selected, there will be two images on main screen, the left one is 2D image, the right one is 2D+CF image.

Radiant Flow: The feature is only supported in CF/PDI mode. After this button is selected, the image of flow will be radiant and three-dimensional.

Sync ROI: After the button is selected, the width of image is the same as CF ROI.

In order to have more parameters to change, slide the touch panel to the left to enter the more parameter menu as shown below:



Note: Slide the touch panel to the right to go back normal “CF/PDI” mode menu.

Persistence: It smooths the image by performing a temporal averaging which improves the appearance of the color image.

Flash Reduction: It reduces movement artifacts in the image.

Line density: Higher line density will improve the resolution and the reduce frame rate.

Base Line: It can be used to prevent aliasing in one flow direction similar to the Doppler baseline shift. Shifting baseline will enlarge the velocity range in one direction.

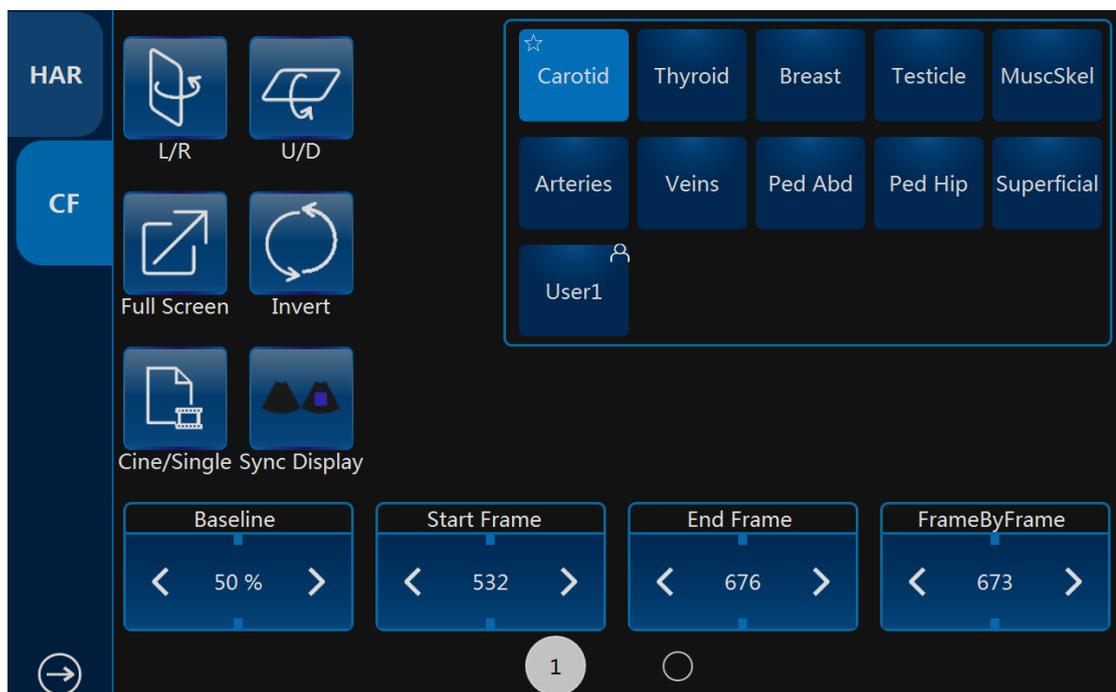
Transparency: Indicates the visibility of background image.

Acoustic Power: It adjusts transmit acoustic power. The higher acoustic power has better penetration.

Steer: Steer the CF ROI box right direction, center (no steer), left direction.

BiPlane probe: It only supported BP4-9 probe, and can be used under these items: "Uterus/Rectum/Prostate". Users can sync display and switch Linear/Convex probe by clicking line/Conv button on touch panel.

After "Freeze" on the control panel is pressed, the system enters frozen mode and the touch panel UI will change to the one below. Using the trackball reviews the image frame by frame similar to the "B" mode no matter whether it is in the cine or single mode. The image in the cine mode or single frame mode can be reviewed by selecting "Cine/Single" on the touch panel. In single mode, the last frame is displayed in the initial entrance.



Note:

1. In Frozen mode, there will be no panoramic view function.
2. Start Frame, End Frame: control which frame to start from and which to end in order to display continuously as a loop.
3. Speed: control cine speed as 400%, 200%, 100%, 60%, 50%, 40%, 20%.
4. In frozen mode, "B" or "PW/CW" mode (if available) can be switched, for adjustment by selecting the mode buttons on the top left.

6.1.2 CF box position and size

The ability to change the "CF" mode box size and the position can provide the flexibility in imaging. After "ROI" highlighted (pressed from the normal status), trackball movement will change the box size. Right/left movement will increase/decrease the box size from side by side view. Up/down movement of

the trackball will increase/decrease the box size from up and down view.

When “ROI” on the control panel is not highlighted (default status), the trackball movement will change the position of the color box.

6.1.3 CF mode gain control

Rotating “CF” can adjust the “CF” mode digital gain in order to change the sensitivity. If “CF” gain control is too low, it will be difficult to detect the small abnormalities in flow and will possibly result in an underestimation of the large flow disturbances. If “CF” gain control is too high, the noise will be introduced and disturb normal flow detection. So “CF” gain needs to be adjusted properly to ensure continuous flow display, and also be set as high as possible unless the random color speckle appears.

Similar to the other gain key, clockwise increases and counterclockwise decreases gain.

6.2 Power Doppler (PDI)

Power Doppler is intended to compensate some deficit of the Color Doppler. Its advantages comparing Color Doppler are less dependent on the incident angle, no aliasing, less dependent on the direction, and sensitive to slow flow.

After “PDI” on the control panel is pressed, the system will enter “PDI” mode. The “CF” rotation key will impact gain of “PDI” by clockwise or counterclockwise rotation. Similar to the other rotators, clockwise increases the gain and counterclockwise decreases the gain.

The layout is similar with the color mode. However, the color bar will have a difference; in the color mode, the color bar has two colors to indicate the flow direction (To probe is red, away from probe is blue). “PDI” color bar does not have the direction information and it indicates the power of flow. “PDI” menu is similar with the color mode. However, all velocity-determined functions are not available in “PDI”; for example, there is no “Invert” button.

The operation of “PDI” is similar to Color Doppler too and can refer to “CF” mode operation.

7 PW and CW mode (Spectral Doppler Mode)

The spectral Doppler describes the Doppler shift signal within a sample volume. It displays scroll from left to right and displays the spectral distribution of Doppler shift frequency over time. The frequency or velocity values appear on the vertical axis and time along the horizontal axis. The strong or weak signal is displayed as varying shades of gray. The strong signals are displayed as bright while the weaker signals are less bright.

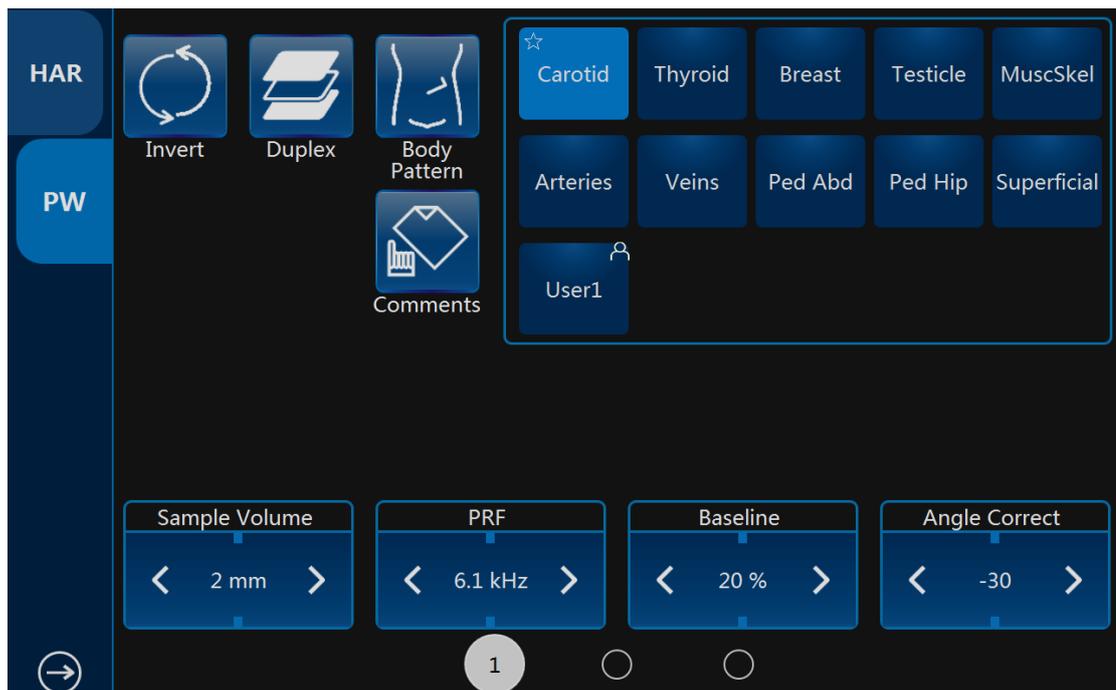
7.1 PW mode (Pulsed Wave Doppler)

A sample volume cursor is located on the “PW” cursor and it indicates where, along the ultrasound beam, the spectral analysis is being performed.

7.1.1 Operation of PW mode (main menu)

After “PW” on the control panel is pressed, the system will enter “PW” mode. “PW” rotation key will increase or decrease the gain by clockwise and counterclockwise.

The main menu is as shown below:



Note:

1. If “CF” or “PDI” mode is inactive, the relevant “CF/PDI” button will not be displayed. Only when “CF” or “PDI” is on, “CF/PDI” and “B” buttons on the top left are in active mode for ready to switch.

Duplex and Triplex:

When the system is in “2D+ CF + PW” mode, it will have “Duplex” and “Triplex” scanning mode. “Duplex” mode means that the system only activates “2D + CF” or “2D + PW”. If “2D+ CF” mode is active and real time scanning, the “PW” will be a static image. In this time, the touch panel will go to the “CF” mode. By selecting the top left side mode keys can switch menu mode. If “2D + PW” mode is active and real time scanning mode, “CF” mode will be a static image. In this time, the touch panel will go to the “PW” mode. The operator can press “Enter” on the control panel to switch between one of them. “Triplex” mode means that the system will have real time scanning for both “2D+CF” and “PW”. The operator can select “Duplex” or “Triplex” button on the touch panel to activate the mode accordingly. Only one of “Triplex” and “Duplex” mode can be activated and highlighted in one time. The default setting (“Duplex” or “Triplex”) depends on the application.

Sample volume position and width:

In “PW”, a specific area along the ultrasound beam is sampled. This is called the sample volume, which is located on the ultrasound beam and is displayed as two lines perpendicular to the beam line. The location and the size of the volume can be changed.

The location can be adjusted by the trackball. Moving the trackball up, the sample volume will move up, and moving the trackball down, the sample volume will move down. Moving the trackball left or right will move the PW cursor left or right.

PW automatic optimization:

To perform the auto optimization by pressing “Auto” on the control panel. After this key is pressed, the system will automatically detect the highest flow velocity and adjust the velocity scale (PRF) accordingly in order to display the velocity in full scale properly. At the same time, the baseline will be shifted in order to display the full spectrum.

Display format:

Display format: Operator can change the display format by selecting it on the touch panel. In format, there are two kinds of display. One is side by side, while the other one is up and down. In each type of the format, different splits between “B” and “PW” traces displays can be selected. In side by side format, there are three kinds: “H 1/2”, “H3/4” and “Full”. In up and down, there are three kinds: “V2/3”, “V

1/2” and “V1/3”. The “V2/3” display format is as shown below.

Invert:

This function inverts the “PW” spectrum display in relation to the direction of flow. The displayed spectrum is inverted around the baseline. The velocity or frequency scale changes accordingly. After “Invert” on the touch panel is selected, this function will work. Spectrum above baseline is the blood flow towards the transducer and spectrum below baseline is the blood flow away from the transducer in normal orientation. In invert status, the orientation will be opposite.

Trace Direction:

The operator can also select different trace directions to be “Above”, “Below” or both of them. “Above” means that the trace will be along the curve of the spectrum above the baseline. “Below” means that the trace will be along the curve of the spectrum below the baseline. Selecting both of them means that the trace will be along the curve of the spectrum above and below the baseline. The corresponding evaluation is automatically displayed on the monitor and updated in every heart cycle.

There are vertical dotted lines to indicate the latest 1-5 cycle(s), the number of cycle is configured by “Heart Cycle” in PW page. “+” means the peak of the spectrum.

Trace Mode:

Operator can select trace mode to be “Max”, “Mean”, or both of them. If none of them is highlighted, auto trace is disabled.

Heart Cycle: 1-5 cycles can be selected.

Trace Sensitivity:

Select the trace sensitivity to balance the sensitivity and artifacts. The high sensitivity settings may cause artifacts. The low sensitivity may cause smoothing to some incident events.

Acoustic Power:

By pressing “Acoustic Power” on the touch panel can change the transmit power. The high acoustic power output has better penetration.

PRF:

The velocity range on display is controlled by the pulse repetition frequency (PRF). As the PRF increases, the velocity measurable range is increased too. As the display scale increases, the maximum Doppler shift information can be increased. Possible the maximum sampling frequency can be automatically adapted based on the sample volume depth.

After the certain level of PRF is exceeded, the system is activated into “HPRF” (high PRF mode) mode which can increase the maximum measurable flow velocity further.

The normal maximum measurable flow velocity is determined by the measuring depth of the sample volume. In order to further increase measurable flow velocity to reach the normal limitation, one or more additional sample volumes is added along with the ultrasound beam cursor as the virtual sample volume. The blood flows recorded by the virtual sample volume are overlaying the actual Doppler signal of the main sample volume.

Baseline:

The change of “PW” spectrum baseline can enlarge the velocity range in one direction. The displayed velocities or the frequencies on the upper and lower edge of the screen show the maximum measuring velocity range.

Steer:

PW line can be steered. Only works with linear probes.

Angle Correct:

To obtain the optimum resolution and the accuracy from the Doppler measurements, the angle which is between the ultrasound beam and the blood flow should be maintained between 0 and 20 degrees in order to display the vessel in longitudinal section and the angle cursor must be positioned parallel to the vessel axis. Pressing key “Rotation/Steer” the angle changes 15° every time.

Sweep Speed:

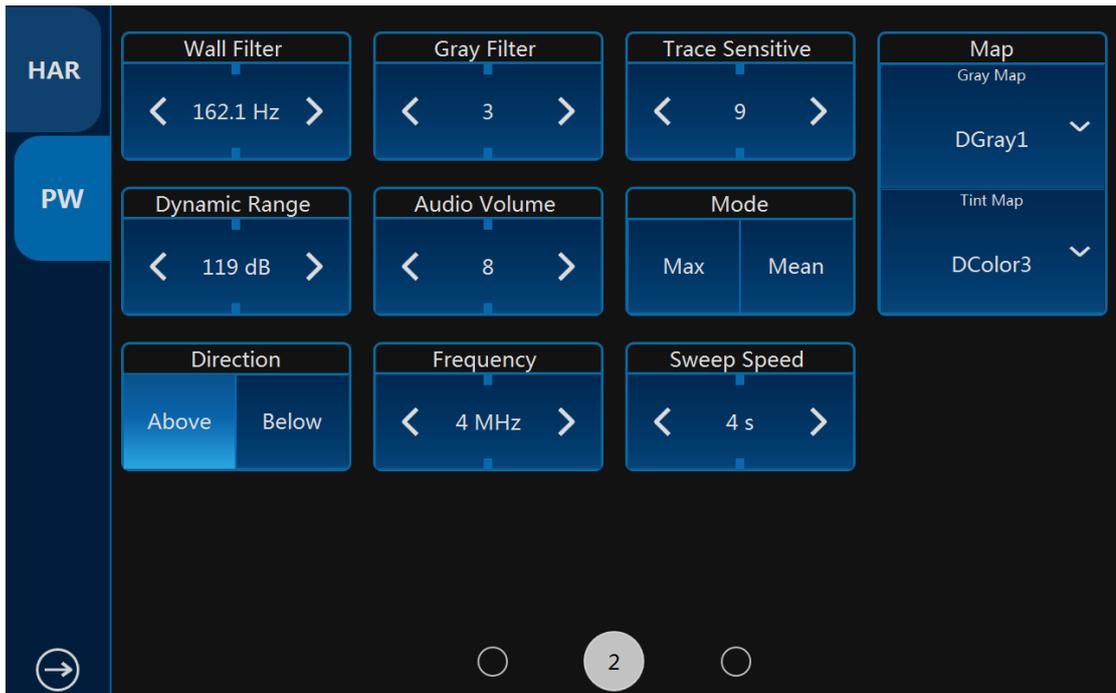
The faster sweep speed may be useful to analyze flow curves.

Others:

“Frequency” and “Wall Filter” can be adjusted the same as color mode.

7.1.2 Operation of PW mode sub menu

Sliding the touch panel to the left, the submenu will display as shown below:



Audio Volume:

This allows to change the volume of the audio signal for the “PW” spectrum.

Gray Filter:

In order to eliminate low level echoes caused by noise, the operator can adjust this value to remove the certain level of echoes before processing.

Dynamic Range:

The “Dynamic range” refers to the compression of the grayscale information into suitable range for the display. It can enhance a certain grayscale range which makes it easier to display pathology. When increasing dynamic range, this will decrease the brightness to more gray shades and less contrast. When decreasing the dynamic range, it will increase the brightness to be less gray shades and more contrast.

Spectrum Optimize:

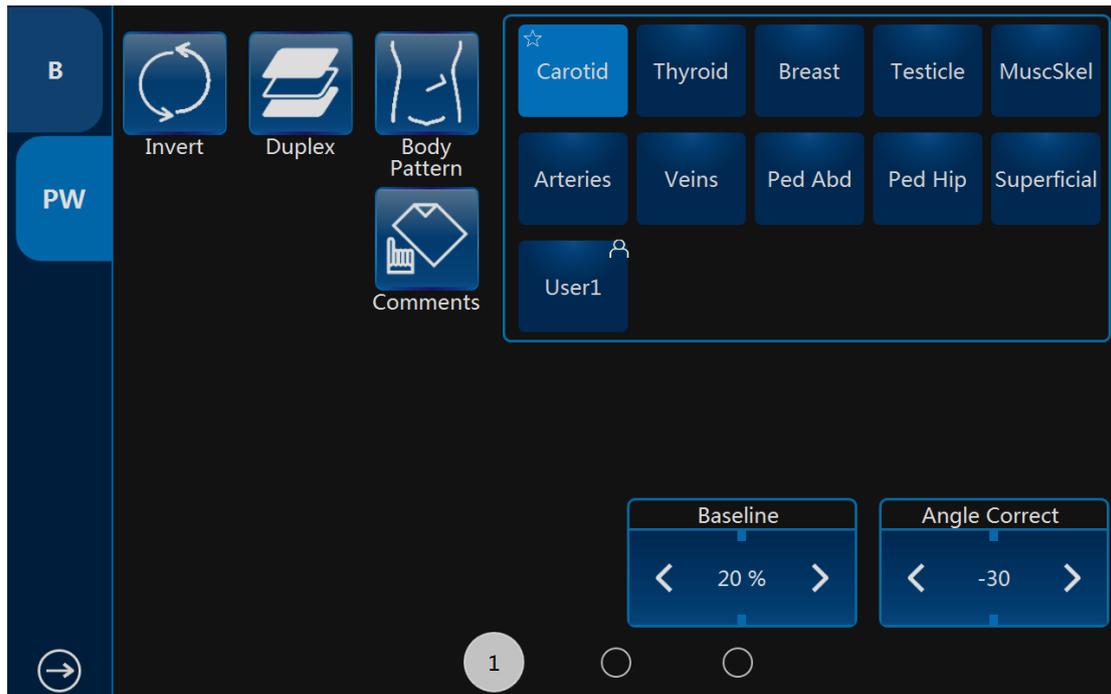
It processes several near-by spectra to optimize spectrum display. The identified number indicates a number of spectra to be processed.

7.2 CW mode (Continuous Wave Doppler)

“CW” mode operation is same as “PW” mode, which can refer “PW” mode operation steps. The main difference between “CW” and “PW” is that “CW” can detect much faster flood shifts.

7.3 Freeze in PW/CW

After “Freeze” on the control panel is pressed, the image will be in single frame display status. To recall stored “PW/CW” sequence by moving the trackball horizontally. If selecting “Duplex”, and pressing “Freeze”, both the 2D and “PW” image will freeze. At this moment, selecting “B” on the top of the touch panel to switch to B menu, the “B” image loop can be recalled.

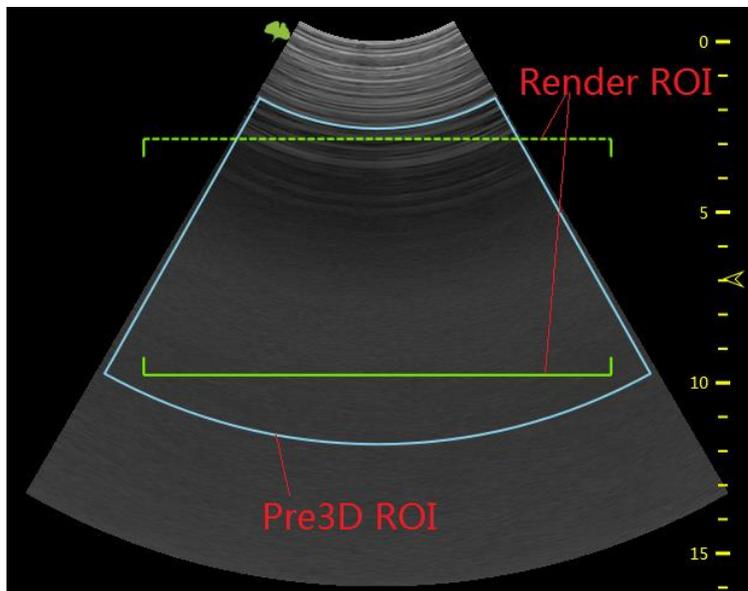


8 3D/4D

8.1 Static 3D

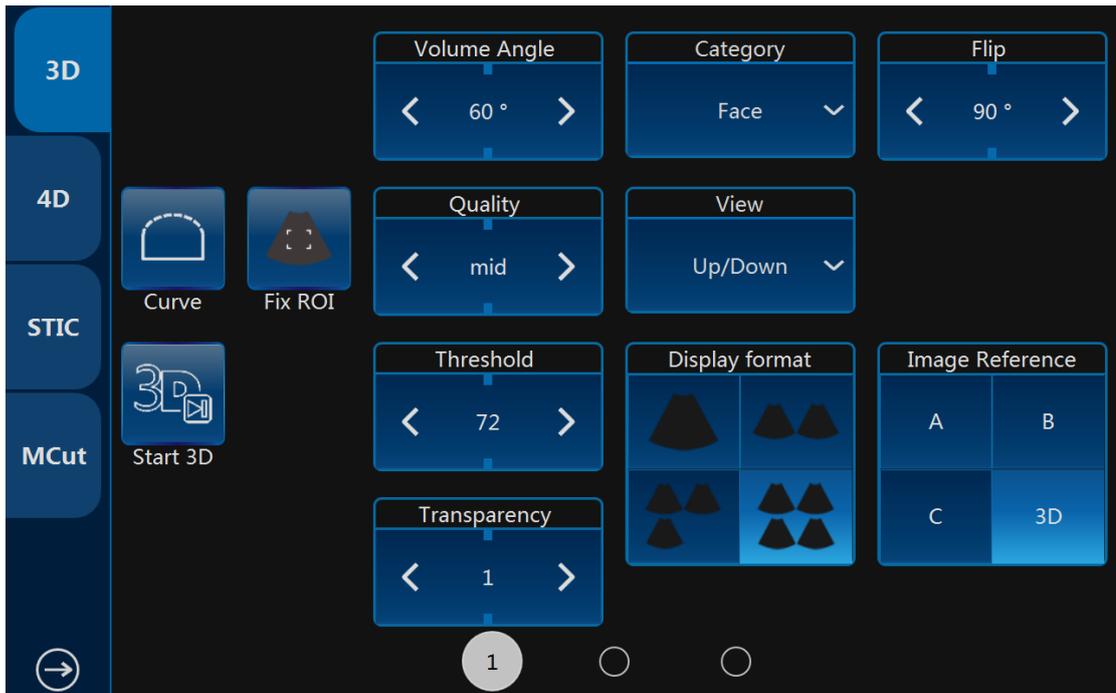
8.1.1 Workflow

- Pressing “4D” to enter “3D/4D” mode. In “4D” mode, select “3D”, “4D”, or “MCut” button to switch different modes. Entering one mode can adjust the ROI.



Pre3D ROI is blue, and render ROI is green. Move the trackball to change the position of pre3D ROI and render ROI. Enable “ROI” key, pre3D ROI becomes dotted line, at this moment, the sizes of both pre3D ROI and render ROI can be changed by moving the trackball.

Press “Enter” key to fix pre3D ROI, its color becomes yellow, and render ROI becomes blue. At this moment only render ROI’s position can be changed by moving the trackball. Press “Enter” key again, the below line of render ROI becomes dotted line too, and the size of render ROI can be changed by moving the trackball.



Notes:

1. Slide the touch panel from the left edge, more parameters can be adjusted.
2. VSspeckle: Speckle noise reduction level.
3. Quality: Resolution level – “high”, “good”, “mid”, “low”, the default setting is “good”. “Low” means a fast sweep speed and low scan density. High means a slow sweep speed and a high scan density, with have the best volume resolution.
4. Threshold: This means the minimum level of gray displayed. The scan echo which is lower than the threshold will be suppressed in order to make the volume image cleaner and with less noise.
5. Transparency: This can adjust the transparency in detail during the surface rendering mode.
6. Volume Angle: This means 4D probe scanning angle in traditional 4D probe; it will control the overall scan area or thickness; if there is a very small angle with high quality, then it will have a high contrast volume image.
7. After “Comments” on the touch panel is selected, the touch screen will go to the “Comments” menu. At this time, the touch panel image format is same as image screen. After finished, select “Exit” to go back to the previous menu.
8. After “Body pattern” on the touch panel is selected, the touch screen will go to the “Body Pattern” menu in order for the operator to select the body pattern

and move the probe indicator direction in the body pattern.

9. Category: Different categories can be selected in the pull-down menu, the available categories are different with different applications.

10. Curve: Enable “Curve” to change the shape of render ROI by moving the trackball.

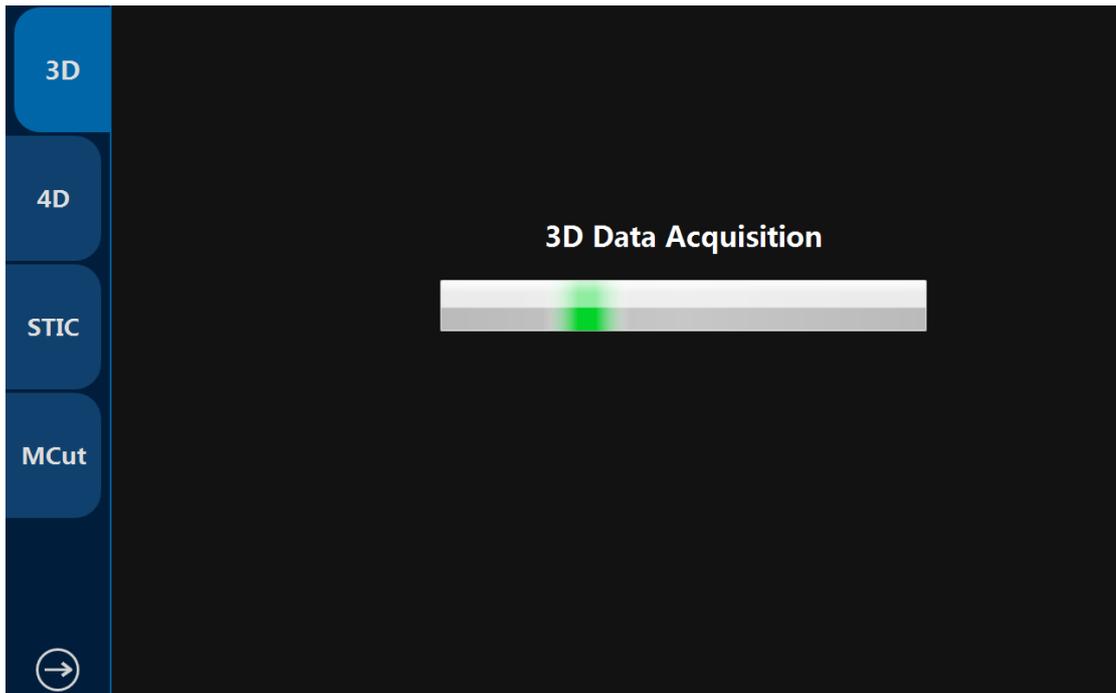
After data acquisition finished, render ROI’s shape can be changed as the same. Enable “ROI” key, change the size of render ROI by moving the trackball. But if “3D” is selected for “Image Reference”, neither render ROI nor curve ROI can be changed.

11. Fix ROI: Enable it, ROI can’t be edited ROI again, but the center point of the image can be moved.

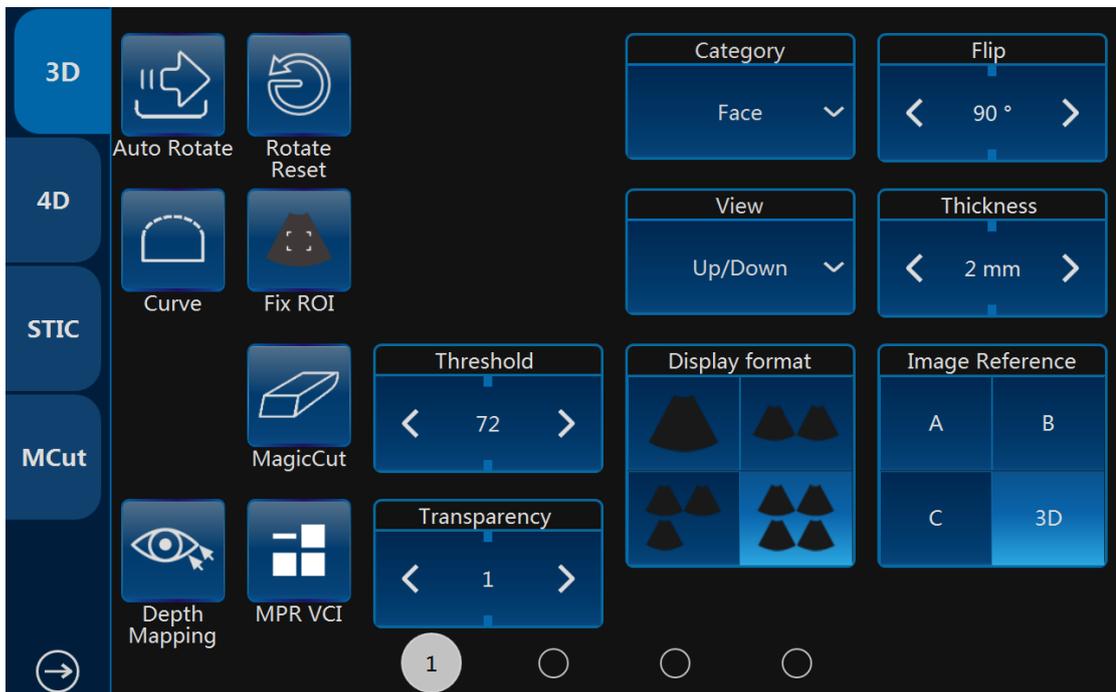
12. Flip: The image can be flipped 90,180 or 270 degree.

13. The data acquisition mode can be selected. There are kinds of rendering modes: general and HQ.

- The 3D display format can be changed. One is the full screen image display mode, and the other consists of two or four image displays ---- A, B, C plane and 3D rendering.
- The rendering view angle can be selected, from front to back, or from back to front, or from right to left, or from left to right, or from up to down, or from down to up. This selection button will be on the touch panel.
- Select “Start3D” on the touch panel to start 3D data acquisition or press “4D” on the control panel to start data acquisition. During data acquisition, the touch panel will show a status bar to indicate the progress of data acquisition. The image screen will only display the scanned images continuously at the same speed as the 4D probe sweep. The operator needs to hold the probe well in order to obtain a good data acquisition.
- Select a gray map by touching the relevant gray map button.
- Select a 3D map by touching the relevant 3D map button.



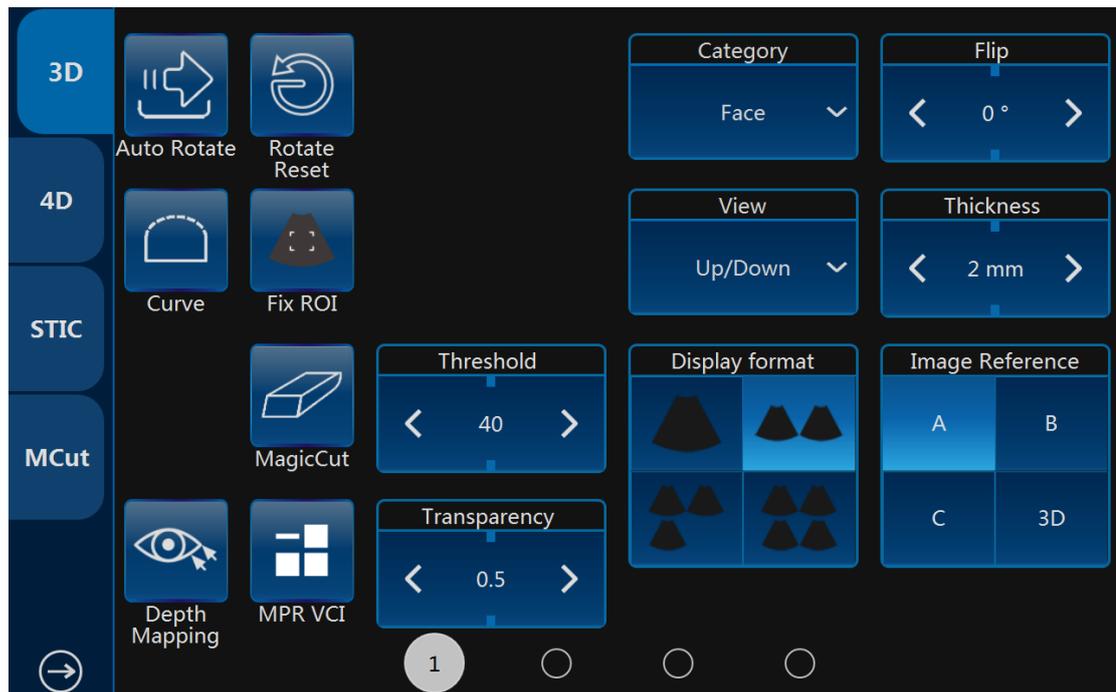
- After data acquisition has finished, the 3D image display format is based on the one which was selected before data acquisition.



Notes:

1. After selected in “HQ Surface/HQ Grad/HQ Silhouette” acquisition mode, the touch panel menu is displayed as above. There is one adjustment button “DR Light” to adjust the rendering light position for a different rendering appearance.
2. In this mode, other rendering modes still can be selected.

If general acquisition mode is selected, the touch panel menu is displayed as shown below:



Notes:

1. Slide the touch panel from the left edge, more parameters can be adjusted.
2. Movement step: It will impact the rotation angle step in 3D image when enable "Auto Rotate". By selecting a high number, the movement will be faster.
3. After the 3D image is activated and highlighted, one of the X, Y and Z directions will be active, while the others are inactive. The active one is highlighted and the "Rotation/Steer" key on the control panel can only rotate the 3D image in the corresponding direction accordingly (X, Y, or Z direction). The operator can select X, Y or Z direction by selecting the corresponding key. After "A", "B" or "C" plane is activated and highlighted, the "Rotation/Steer" key can shift "A", "B", "C" plane and rotate 3D image.
4. The highlighted image position reference key ("A", "B" or "C" plane, or "3D") indicates which image is active for adjustment. Select the image on the main screen, the image reference on the touch panel will jump to the relevant plane.
5. The "Threshold" and "Transparency" can be changed after 3D data acquisition.
6. Speed: This controls playback speed; 100 will be same as a real scan, and then 75, 50, 25.
7. Slice position: allows a displacement of the center along the intersection

lines of the sectional planes A, B or C.

Reference image A: The sectional plane migrates from the front to the rear through the volume body.

Reference image B: The sectional plane migrates from the left to the right through the volume body.

Reference image C: The sectional plane migrates from the top to the bottom through the volume body.

8. View: These define the rendering orientation from which to view 3D.

9. Auto Rotate: It lets the 3D image continuously rotate along the rotation direction. After selected, this button will be highlighted. If it is selected again, it will be inactive. Speeding up/down key will change the rotation speed in order to give the operator more time to see the images.

10. After data acquisition, the system is in frozen status. After "Freeze" is pressed at this time, the system will go back to the 3D initial status.

11. HQ Surface/HQ Grad/HQ Silhouette: Touch this button to obtain a high-quality rendering image.

12. There are two render types: Gray and GrayInv. The "Gray" type is rendering echogenic tissue structure. On the contrary, "GrayInv" rendering type intends to display hypoecho structures, bladder, uterus tec.

Rendering approaches: In the rendering group keys, there are two different rendering methods. One is "Surface mode", the other is "Perspective mode". Each method has several approaches. Only one of the approaches can be selected at one time. Each approach's explanation is as follows:

-Surf Texture: Surface rendering mode based on Marc Levoy's research, which displays the surface of the object.

-Surf Smooth: Apply smooth filter to the volume data, which displays a smoothed surface of the object.

-Grad Light: Surface rendering with the Phong light model, which displays the surface of the object with light on it.

-Transp Max: Displays only voxels with high echo response.

-X-ray: Displays all voxels with equal probability.

-Transp Min: Displays only voxels with low echo response.

-Light: Displays the object by its distance to the observer.

13. Gray map: Select a gray map by touching the relevant gray map button.

14. 3D map: Select a 3D map by touching the relevant 3D map button.

15. Rotate Reset: Reset the image if it is rotated.

- The image position can be changed by moving the trackball, the direction is same as the trackball.
- To change the ROI size the same as other modes by using the “ROI” key on the control panel and trackball.
- In dual or quad image display format, there are rotation axes on image “A,” “B,” “C”.
- In single image display format, only 3D rendering image displays on the image screen
- “Rotation/Steer” key will rotate the 3D image by X, Y or Z axis. X, Y and Z can be selected on the touch panel.
- There is a direction indicator in each plane image in order to identify the direction match with probe orientation. In A Plane, one mark indicates the scan start point against the probe mark.
- In 3D mode, “Comments” and “Body Pattern” can be activated.
- Slide the touch panel to the next page, select “Single” display format, drag the 3D image, it will rotate along the finger. Touch 3D image once, come out axis Z guide, drag the 3D image along the circle, it will rotate along Z axis. If select “Dual” or “Quad” drag the 2D image, it can be moved, drag the 3D image, it will rotate as in single mode. The 2D image and 3D image both can be zoomed in/out by two fingers.

8.1.2 3D MCut

- Touching “3D MCut” to go to multi-slices display.
- Interval: Adjusts the interval distance between each slice.
- Slice Number: Different slice number can be selected: 4x4, 3x3, 2x2.
- Cut Plane: Smaller image size due to display screen limitation. The operator can select which plane (A, B or C) is to be cut by “Cut Plane” group keys. The first displayed image is the selected plane with slice line.
- Rotation direction: “Rotation/Steer” key will rotate the MCut image by X, Y or Z axis. X, Y and Z can be selected on the touch panel.
- Rotate M, PW, CF keys can also rotate the images, M is corresponding X direction, PW is corresponding Y direction, CF is corresponding Z direction.
- Pressing “Freeze” on the control panel to go back to the initial 3D mode status. After data acquisition, the system is in the frozen status as all operations are based on already acquired data.
- Pressing “B” to go back to the normal 2D mode.

8.1.3 Free View

- Touching “FreeView” to go to Freeview mode.

- Direction: Adjusts the direction in which Freeview unfolds the slice.
- Route: Different kinds of slice route control.
 - Line: straight line pattern, start by mouse click, end by mouse click.
 - Curve: curve pattern, start by mouse click, end by mouse double-click.
- Clear: Undo the slice route by press “Clear” button on keyboard. For Curve Pattern it will undo the last segment of curve. Long pressing “Clear” key to undo the whole Curve pattern before finish it.
- Image Reference: Change the reference image at the left side of the screen.
 - Press “A” will show sagittal plane;
 - Press “B” will show coronal plane;
 - Press “C” will show transverse plane.
- Slice Thickness: Freeview is not only able to do different regular or irregular plane, but also able to dissect the volume with variable plane thickness by adjusting “Slice Thickness”.
- Rotate M, PW, CF keys can also rotate the images, M is corresponding X direction, PW is corresponding Y direction, CF is corresponding Z direction.
- 3D Map: Map configure for plane image at right side.
- Gray Map: Map configure for reference image at left side.
- Pressing “Freeze” on the control panel to go back to the initial 3D mode status. After data acquisition, the system is in the frozen status as all operations are based on already acquired data.

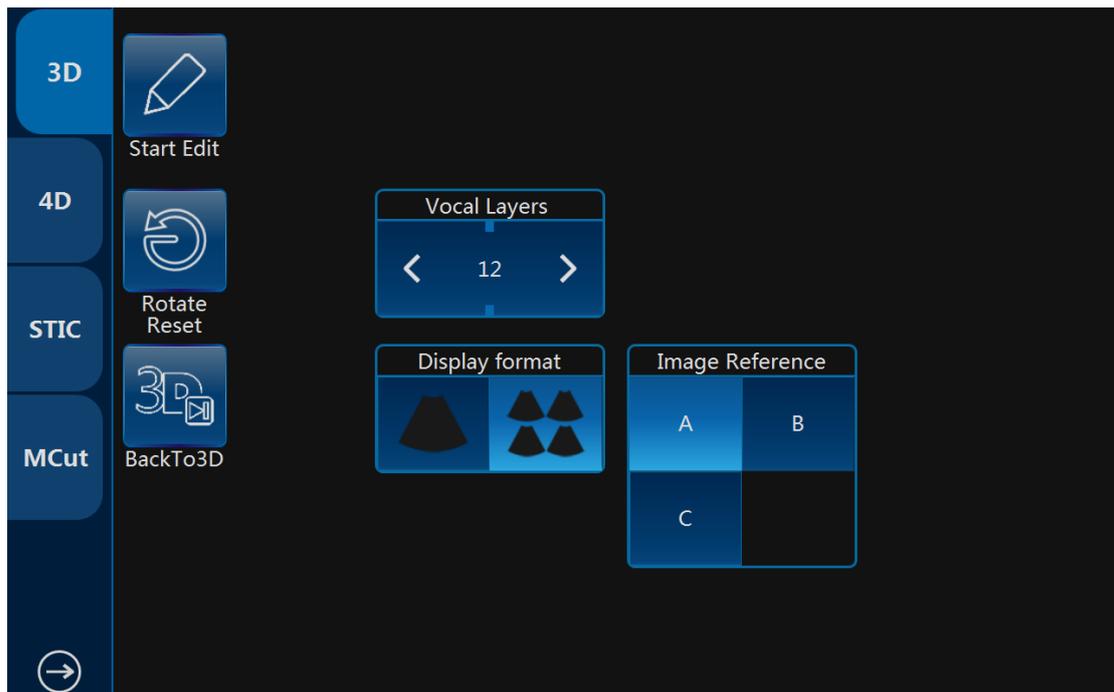
Press “B” on the control panel to go back to the normal 2D mode.

8.1.4 MagicCut

- Touching “MagicCut” to go to MagicCut mode.
- Erase Mode: Adjusts the way to edit the volume. There are four edit methods.
 - Small Circle: small rubber to erase finely.
 - Big Circle: big rubber to erase coarsely.
 - Inside Lasso: edit volume by Lasso, inside the Lasso will be erased.
 - Outside Lasso: edit volume by Lasso, inside the lasso will be kept, while others will be erased.
- Undo: Undo the last edit operation. Support multiple “Undo” operations until the whole volume is recovered, no edit left.
- Redo: Retrieve the edit undid by “Undo” operations.
- Reset: Reset the volume to original state.

8.1.5 VOCAL

Touch “VOCAL” after 3D data acquisition, enter VOCAL page. Before enter “VOCAL” please select the reference image (A, B or C) to generate the contours.



Vocal layers: 8, 12, 16, 20, 24, 28, 32, the number of generated contours.

Touch “Start Edit” to start generating the contours. There is a default contour, and also one contour can be outlined manually. Touch “Clear” to erase the existed contour, then new contour can be outlined. Touch “Next” to display the next layer. Touch “Previous” to back to the last layer, edit the contour.

All contours are outlined, touch “Done” to finish the progress, the result is displayed on the monitor.

Re-Edit: Back to the first layer, the contour is still existed, it can be reviewed and edited.

Redo: Start the progress from the beginning again, all contours are erased.

Shell:

1. After finished editing the contours;
2. Touch “Show Thickness” button, the 3D image will show two shell contours;
3. Pull up/down “Thickness” key, the thickness of the shell can be adjusted;
4. If you touch “Redo” button, the image will be restored to its original state;
5. Touch “Thickness” button again to exit the feature.

Threshold Analysis:

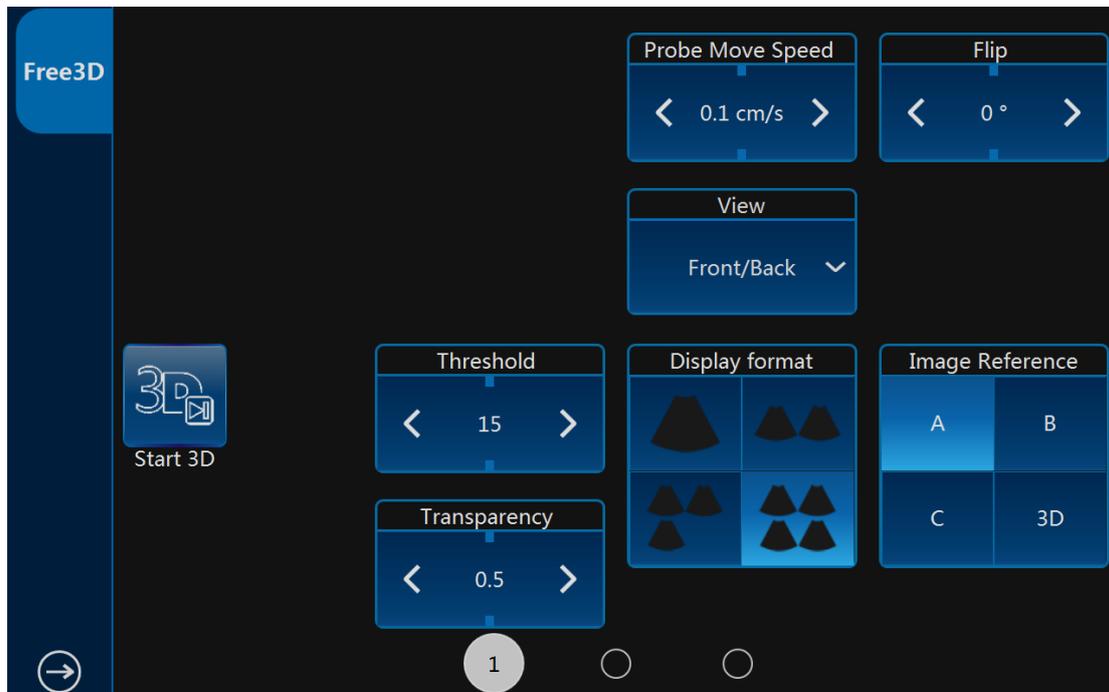
1. Touch “Show Threshold” button, the volume of the part above the threshold and below the threshold will be shown on the screen;
2. Pull up/down “Threshold” key to adjust it, the higher the value, the more signals are removed;
3. Touch “Threshold” button again to exit the feature.

Histogram:

1. Touch “Histogram” button after calculating the volume, the automatically calculated histogram will be displayed on the touch screen;
2. Touch “Histogram” button again to exit.

8.1.6 Free3D

Select one LINEAR probe, press “4D” key to enter Free3D page.



- No “Curve” and “Fix ROI” in pre-Free3D mode.
- There is only render ROI in Free3D.
- “Probe Speed”: the speed of moving probe.
- During data acquisition, touch “End Free3D” to end acquisition manually.
- Other operations in Free3D are the same as operations in 3D.

8.1.7 Auto Follicle in 3D



1. Touch  after 3D data acquisition to start automatically calculate the volume of follicles.



2. Choose follicle left or right, and click the button 
3. The system will automatically recognize the follicles, and automatically calculate the volume of follicles
4. The result will show on the touch screen

Follicle L: 2 (mm)

	ds	dm	dv	dx	dy	dz
	44.1	25.0	4880.1	25.0	31.0	19.0
	36.4	20.0	2893.1	29.0	15.0	16.0



- Click **BackTo3D** to back 3D mode.
- Follicle Edit: Pick, Add, Remove, Split, Merge.

8.1.8 Niche View



Touch **Niche View** to enter “Niche View” page as below:

The Niche View interface includes a sidebar on the left with buttons for 3D, 4D, STIC, and MCut. The 3D button is highlighted and labeled 'BackTo3D'. A 'Rotate Reset' button is located in the top center. The main area contains several control panels: 'VSpeckle 2D' with left and right navigation arrows and the number '3'; 'Model type' with 'Upper' and 'Lower' options; 'Map' with dropdown menus for 'BSmooth0' and 'BCool0'; 'Display format' with two icons representing different views; 'Rotation Direction' with a dropdown menu set to 'Y'; and 'Image Reference' with a 2x2 grid of buttons labeled 'A', 'B', 'C', and 'N'.