

Humerus Length



To measure humerus length, make one distance measurement:

1. Select **HL**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the humerus length in the Results Window.

Nuchal Translucency (NT)

To measure nuchal translucency, make one distance measurement:

1. Select **NT**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the nuchal translucency in the Results Window.

NOTE: *Nuchal Translucency is not available through the factory default. To enable Nuchal Translucency, add NT to the measurement folder in Utility -> Measure -> M&A -> Add measurement (Insert).*

Occipitofrontal Diameter



To measure occipitofrontal diameter, make one distance measurement:

1. Select **OFD**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the occipitofrontal diameter in the Results Window.

% Stenosis

In B-Mode, you can calculate % Stenosis by diameter or by area. See '% Stenosis' on page 7-69 for more information.

Spinal Length (SL)



To measure spinal length, make one distance measurement:

1. Select **SL**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the spinal length in the Results Window.

Transverse Abdominal Diameter



To measure transverse abdominal diameter, make one distance measurement:

1. Select **TAD**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the transverse abdominal diameter in the Results Window.

Transverse Cerebellar Diameter



To measure transverse cerebellar diameter, make one distance measurement:

1. Select **TCD**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the transverse cerebellar diameter in the Results Window.

Thorax Transverse Diameter



To measure thorax transverse diameter, make one distance measurement:

1. Select **ThD**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the thorax transverse diameter in the Results Window.

Tibia Length



To measure tibia length, make one distance measurement:

1. Select **Tibia**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the tibia length in the Results Window.

Ulna Length



To measure ulna length, make one distance measurement:

1. Select **Ulna**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the ulna length in the Results Window.

Volume

See 'Volume' on page 7-71 for more information.

M-Mode Measurements

In M-Mode you can measure % stenosis, A/B ratio, and heart rate.

% Stenosis

In M-Mode, you measure % Stenosis by diameter. See '*% Stenosis*' on *page 7-77 for more information*.

A/B Ratio

In M-Mode you can measure A/B ratio by diameter, time, or velocity. See '*A/B Ratio*' on *page 7-78 for more information*.

Heart Rate

See '*Heart Rate*' on *page 7-79 for more information*.

Doppler Mode Measurements

You can use Doppler mode to study fetal blood flow in the heart, umbilical cord, placenta, and middle cerebral arteries. OB/GYN Doppler mode also allows you to study uterine and ovarian blood flow.

The OB/GYN vessel study includes the following vessels:

- Aorta (Ao)
- Umbilical
- Placenta
- Desc. Aorta
- Uterine (right and left)
- Middle Cerebral Artery (MCA) (right and left)
- Ovarian (right and left)

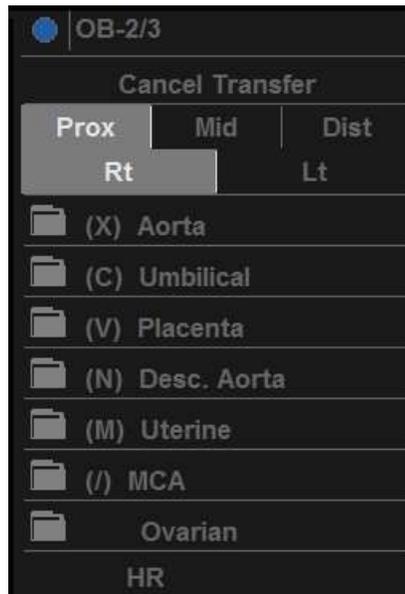


Figure 9-2. OB/GYN Vessels

Doppler Mode Measurements (continued)

For each of these studies, you can make any of the following measurements. See 'Doppler Mode Measurements' on page 7-80 for more information.:

- Peak Systole (PS)
- End Diastole (ED)
- Minimum Diastole (MD)
- Heart Rate
- TAMAX
- Pulsatility Index (PI)
- Resistive Index (RI)
- PS/ED Ratio
- ED/PS Ratio
- Acceleration
- AT
- TAMEAN
- Volume Flow
- PV

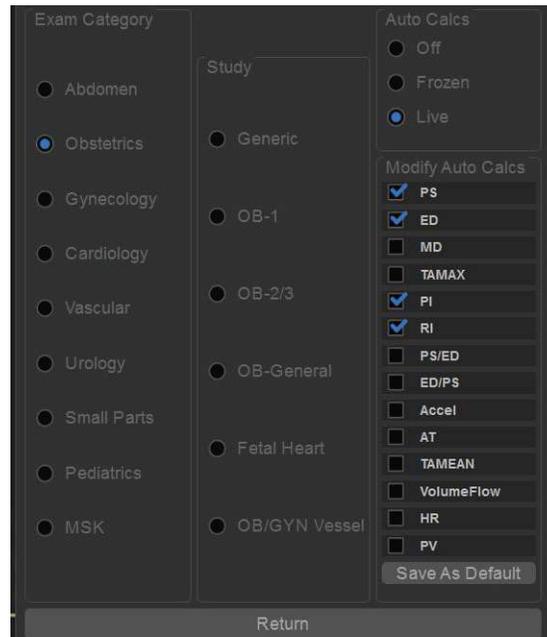


Figure 9-3. OB/GYN Vessel Menu

To select OB/GYN vessel measurements

OB/GYN Vessel measurements use the auto sequence feature. With this feature, when you select a folder for the vessel you want to measure, the system automatically starts the first measurement. It then continues with each of the other measurements in that study.

1. Select the folder for the vessel you want to measure.
The system shows all the measurements for that vessel. The caliper for the first measurement is automatically displayed.
2. Make the measurement.
After you complete each measurement, the system starts the next measurement. After the last measurement is complete, the system returns to the OB/GYN Vessel.

Your system is set up to show the measurements that you usually make for each vessel. To make a measurement that is not shown for the selected vessel:

1. Select the folder for the vessel you want to measure.
2. Select Show All.
The system display all possible vessel measurements.
3. Select the desired measurement.

OB Report

The OB Report lists patient information, and all measurement and calculation data.

To view the OB Report:

1. Press the **Report** key on the control panel.

The report appears as follows.

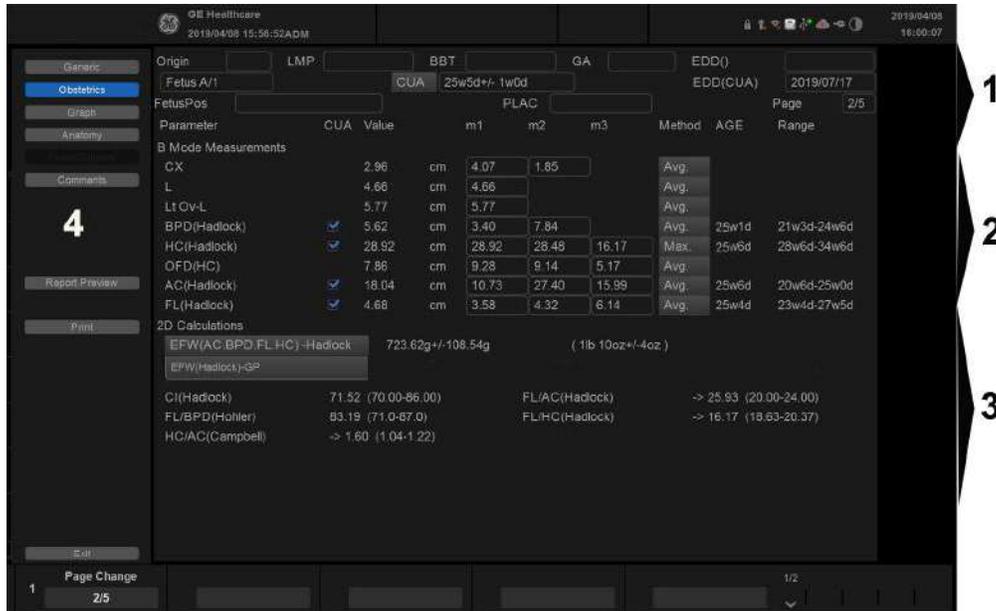


Figure 9-4. OB Report

The OB Report has four sections of information:

1. Patient data
2. Measurement information
3. Calculation information
4. Report menu list

Patient data

The Patient data section, at the top of the report, lists information from the Patient Data Entry screen.

You can select the following fields:

- FetusNo – if this is a multi-gestational patient, you can select the fetus in this field. You can also adjust the **Fetus** selection to change the fetus.
- CUA/AUA – select the ultrasound age calculation method
 - Composite Ultrasound Age (CUA) – regression calculation
 - Average Ultrasound Age (AUA) – an arithmetic average

You can select the method in this field, or adjust the **Select CUA/AUA** control.

NOTE: CUA/AUA is only available when you select USA OB Type in Utility -> System -> System Measure menu.

You can enter information in the following fields:

- FetusPos – type information about the fetus position.
- PLAC – type information about the placenta.

Measurement information

This section lists the results of all measurements.

- CUA or AUA – If this field is checked, the system uses the measurement to calculate the ultrasound age.
- Value – The measured value. If more than one measurement was made for an item, the system uses the specified method (average, maximum, minimum, or last) to determine this value.
- m1–m3 – Up to three measurement values for each item. If you make more than three measurements, the report uses the last three.
- Method – When there is more than one measurement for an item, this specifies the method used to calculate the measurement value listed in the Value column. Choices are average, maximum, minimum, last, or off. To change the method:
 - a. Move the **Trackball** to the Method field.
 - b. Press **Set**.
 - c. Move the **Trackball** to select from the list.
 - d. Press **Set**.
- AGE – The fetal age for this measurement.
- Range – The typical range of fetal age for this measurement.

Calculation information

This section of the report provides calculation choices and lists calculation results.

- EFW – lists the parameters used to calculate EFW. This is followed by the calculation result.

To change which parameters are used:

- a. Select this field or press **Select EFW**.
- b. Select the desired parameters.

- EFW GP – lists the source used to calculate EFW–GP (growth percentile). This is followed by the growth percentile.

To change the source:

- a. Select this field or press **Select GP**.
- b. Select the desired source.

The remaining calculation information shows ratios for several measurements, and the Cephalic Index (CI).

The report shows if any of the ratios are out of range (OOR). Out of range indicates one of the following:

- The measurement is out of the normal range based on the gestational age that is calculated from the LMP. The system determines OOR from the ultrasound age compared to the gestational age. The gestational age is calculated from the last menstrual period or the estimated delivery date.
- The measurement is outside of the range for the data used in the calculation. That means that the measurement is either less than or more than the range of measurements used to determine fetal age based on the measurement.

For more information about how to use the report, see 'Viewing and Editing Worksheets' on *page 7-61* for more information.

Report Menu list

Use following report menu list to switch between different summary reports.

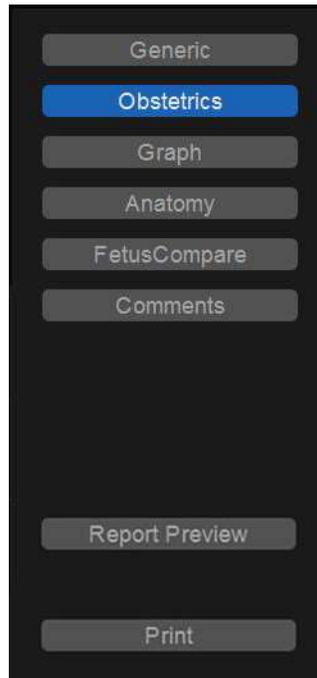


Figure 9-5. Report menu list

Anatomical Survey

Overview

The Anatomy page provides a checklist of the Fetus.

The screenshot displays the 'Anatomical Survey' interface. At the top, it shows 'GE Healthcare' and the date '2019/06/30 07:53:16ADM'. Below this, there are input fields for 'Origin' (set to 'LMP'), 'LMP', 'BBT', 'GA', 'EDD(LMP)', 'Fetus A/1', 'FetusPos', and 'PLAC'. The main area is divided into three columns: 'ANATOMY', 'APPEARANCE', and a column with 'Normal' and 'Clear' buttons. The 'ANATOMY' column lists: HEAD, SPINE, KIDNEYS, BLADDER, and LOWER EXTREMITIES. The 'APPEARANCE' column lists: FOUR CHAMBER VIEW, STOMACH, CORD INSERTION, and UPPER EXTREMITIES. Each item has a corresponding input field. An 'Exit' button is located at the bottom left.

Figure 9-6. Anatomical Survey

Editing

- To activate the Anatomical Survey, select **Anatomy** on the OB Report screen.
- Fill the required field.

Table 9-2: Anatomical Survey

Field	Description
Fetus Pos	Indicate the fetal position within the uterus.
PLAC	Identify the location of the placenta.
Normal	Select to set all the values in the checklist to "Normal".
Abnormal	Select to set all the values in the checklist to "Abnormal".
Scanned	Select to set all the values in the checklist to "Scanned".
Clear	Select to clear all the values in the checklist.

Select **Exit** to return to the Scan screen.

NOTE: *The patient specific contents input on the Anatomical Survey page are returned to the factory default settings after starting a new patient.*

OB Graphs

Overview

OB Graphs allow you to assess fetal growth compared to a normal growth curve. When a patient has completed two or more ultrasound exams, you can also use the graphs to look at fetal trending. For multi-gestational patients you can plot all fetuses and compare the growth on the graphs.

The Versana Active provides the following two basic types of graphs:

- **Fetal Growth Curve graphs** – show one measurement per graph. These graphs show the normal growth curve, positive and negative standard deviations or applicable percentiles, and ultrasound age of the fetus using the current measurement. For multi-gestational pregnancies, you can view all fetuses. If previous exam data is available, the graph can show fetal trending.
- **Fetal Growth Bar graph** – shows the ultrasound age and the gestational age based on patient data. Plots all measurements on one graph.

To View OB Graphs

To view OB graphs:

1. Press **Report** key on the control panel.
2. Select **Graph** in the report menu list.

Fetal Growth Curve Graph



Figure 9-7. Fetal Growth Curve Graph

The horizontal axis shows the fetal age in weeks. The system determines this age from the data on the Patient Data Entry screen. The vertical axis shows one of the following:

- For measurements, mm or cm
- For ratios, percent
- For fetal weight, grams

Fetal Growth Curve Graph (continued)

The Fetal Growth Curve Graph shows the following information for the selected measurement:

- The normal growth curve
- The standard deviations or relevant percentiles
- The gestational age of the fetus, using patient data (vertical dotted line)
- Using the current ultrasound measurement data, where the fetus is on the growth curve

The legend at the bottom of the graph shows the symbols and colors that indicate data for fetal trending (Past and Present) and multiple gestation (Fetus).

To select the measurement

To select which measurement you want to display on the Fetal Growth Curve Graph, do one of the following:

- To select a specific measurement:
 - a. On the graph display, move the **Trackball** to the Measurement Type field and press **Set**.
The system displays a list of measurements.
 - b. Move the **Trackball** to select the desired measurement and press **Set**.
The system displays the Fetal Growth Curve Graph for the selected measurement.
- To scroll through all Fetal Growth Curve Graphs, adjust the **Fetus** control on the second menu.

Fetal Growth Curve Graph (continued)

To select the age to use

To plot the fetus age, the system allows you to use the gestational age (GA) from the LMP, or to use the composite ultrasound age (CUA). To select, adjust the **Select GA** control. The information in the left column changes between CUA and GA(EDD), and the data may change.

To view a single or four graphs

You can view either a single Fetal Growth Curve Graph or you can view four graphs at the same time. To select each view, press **Single** or **Quad**.

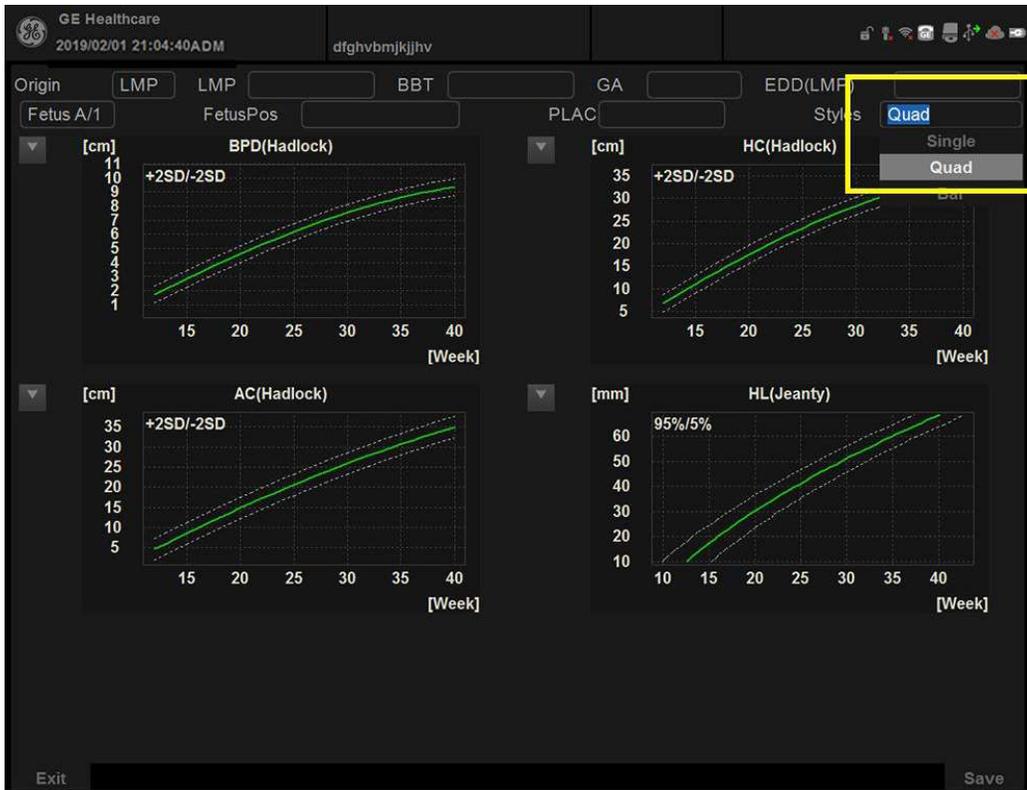


Figure 9-8. Fetal Growth Curve Graph: Quad View
The measurement values are displayed at the bottom of the graph.

Fetal Growth Curve Graph (continued)

To change measurements in quad view

When you view four graphs simultaneously, you can select which four you want to see. To change each graph in quad view:

1. On the graph display, use the **Trackball** to move the cursor to the small box that is upper left of each graph, then press **Set**.

The system displays a list of measurements.

2. Move the **Trackball** to select the desired measurement and press **Set**.

The system displays the Fetal Growth Curve Graph for the selected measurement.

To scroll through all Fetal Growth Curve Graphs, adjust the **Graph Change** control.

3. Select **Save** button to save the current quad view.

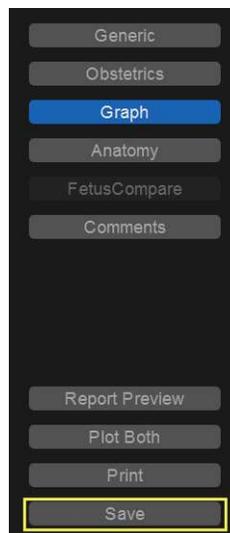


Figure 9-9. Select Save Button

Fetal Trending

When you have ultrasound data for more than one exam for a patient, you can use the data to look at fetal trending on the Fetal Growth Curve Graphs.

1. Select **Graph** and select the desired Fetal Growth Curve Graph.
2. Select **Plot Both**.

The system automatically finds the data from previous ultrasound exams, and displays it on the graph with the present data.

The legend at the bottom of the graph shows the symbols and colors that indicate Past and Present data.

To edit patient data

When you are working with graphs, you can change or enter the following patient data.

- GA(LMP) – this field is computed using the LMP date on the Patient Data Entry screen. To change this field:
NOTE: You can only change this field on the Fetal Growth Curve Graph in single view.

- a. Move the **Trackball** to the field, which is left of the graph. To select the field, press **Set**.
The system displays a window with the GA weeks and days.
- b. To select each field, move the **Trackball** to move to the field and press **Set**.
- c. Type the correct weeks or days.
- d. Select OK.

The system makes the following changes:

- GA (LMP) is now GA (GA) and shows the age you entered.
- In the Patient Data section, the GA changes.
- In the Patient Data section, The EDD (LMP) changes to EDD(GA) and shows an updated date, using the GA you entered.

The LMP is erased.

- FetusPos – type information about the fetus position.
- PLAC – type information about the placenta.

To return from a graph to the scan display

After viewing graphs, to return to the scan display, do one of the following:

- On the graph display, select Exit.
- Press Freeze/Report on the control panel.

Fetal Growth Bar Graph

The fetal growth bar graph shows current exam measurements and the normal growth range based on the gestational age. It shows all measurements on one graph.

To view the Fetal Growth Bar Graph:

1. Press **Report**.
2. Select **Graph**.
3. Select **Bar**.



Figure 9-10. Fetal Growth Bar Graph

- The horizontal axis shows the gestational weeks.
- The red vertical line shows the gestational age using the patient data.
- The blue dotted vertical line shows the ultrasound age using the current measurements.
- The yellow x shows the ultrasound age for each measurement.
- The green rectangle shows the normal age range for the measurement.

You cannot do fetal trending or view multiple gestation data on the bar graph.

OB-Multigestational

Multiple Fetus

Versana Active allows you to measure and report multiple fetus development. The system can report a maximum of four fetuses.

To enter the number of fetuses

If more than one fetus is imaged during the exam, select the number of fetuses in the Patient Data Entry Menu.

The screenshot shows the Versana Active Patient Data Entry Menu. The 'OB' tab is selected. The 'Fetus #' field is highlighted with a yellow box, and a dropdown menu is open showing the numbers 1, 2, 3, and 4. The number 4 is selected and highlighted in blue. Other fields include LMP, BBT, EDD by LMP, GA by LMP, Gravida, Para, AB, Ectopic, Operator (ADM), Exam Description, Accession #, Perf.Physician, and Ref.Physician. There are 'Past Exam' and 'Clear' buttons at the bottom right.

Figure 9-11. Fetus Number

When you start an OB exam, the system automatically fills in the Fetus # field with 1. To change the number:

1. Move the cursor to the fetus number and press **Set**.
The number is highlighted.
2. Select the correct number and press **Set**.
The system displays a message to confirm that you want to change the fetus number.
3. Select **Yes**.

To identify each fetus

For measurements, calculations, and report displays, the system labels each fetus A, B, C, or D. Each fetus is identified by a letter and the total number of fetuses. For example, fetus A/4 is fetus A from a total of 4.

When scanning, you can enter information about the fetus position and placenta location. You can enter the information in the Patient Data section of the reports and the graphs. You can type up to 20 characters in the FetusPos field and 16 characters in the PLAC fields.

The screenshot shows the Patient Data section of the OB Report interface. At the top left, it displays 'GE Healthcare' and the date/time '2019/04/08 17:30:49ADM'. To the right is the patient ID '190408-173047'. Below this, there are several input fields: 'Origin' with a dropdown menu showing 'LMP', 'LMP' with a text input field, 'BBT' with a text input field, 'GA' with a text input field, and 'EDD(LMP)' with a text input field. Below these are 'Fetus A/4' with a dropdown menu, 'CUA' with a text input field containing '25w5d+/- 1w0d', and 'EDD(CUA)' with a text input field containing '2019/07/17'. At the bottom, there are 'FetusPos' and 'PLAC' fields, both with text input fields. The page number 'Page 2/6' is visible in the bottom right corner.

Figure 9-12. Patient Data section of the OB Report

To select a fetus

During measurements and calculations, to change between fetuses, do one of the following:

- Adjust the **Fetus** selection.
- Move the **Trackball** to move to the Summary Window and select the fetus.

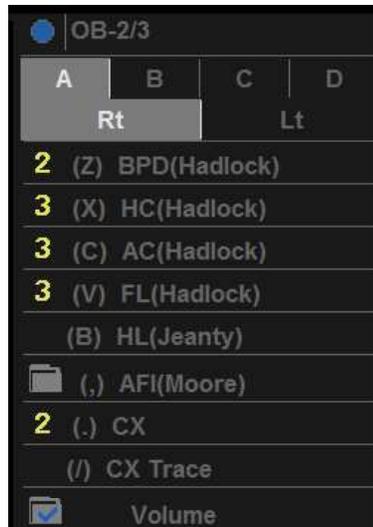


Figure 9-13. Summary Window: Multiple fetus

You can change between fetuses at any time during the exam.

NOTE: *After you change to the next fetus, any measurements you make are recorded and reported to that fetus. If you have any active measurement or calculation that is not completed when you change the fetus, the system cancels the measurement or calculation.*

To view multiple fetuses data on graphs

You can view multiple gestation data on fetal growth curve graphs. After you have made measurements for each fetus, select **Graph**.

1. To view the graph for each fetus, do one of the following:
 - Adjust the **Fetus** selection.
 - In the Patient Data section, move the **Trackball** to highlight the FetusNo field. In the list of fetuses, move the **Trackball** to select the fetus you want, and press **Set**.
2. To display data for multiple fetuses on the same graph, select **Fetus All**.

The legend at the bottom of the graph shows the symbols and colors that represent each fetus.

To compare multiple fetus data on a worksheet

With multiple fetuses, you can list and compare measurements of the fetuses on the report.

Select **Report**, then select **Fetus Compare**.

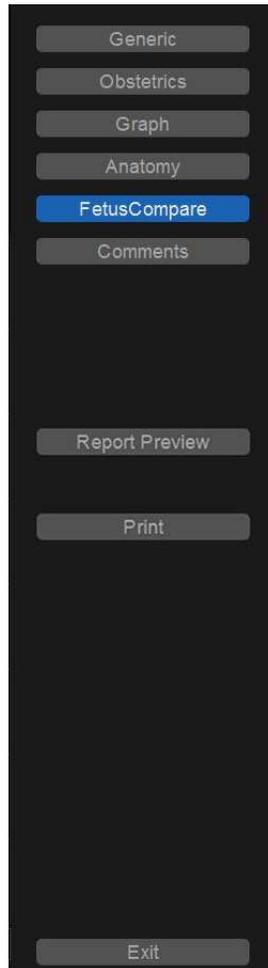


Figure 9-14. OB Worksheet Display

To compare multiple fetus data on a worksheet (continued)

When you select **Fetus Compare**, the system lists the measurement results for each fetus on the worksheet.

Origin	LMP	BBT	GA	EDD(GA)
Fetus Compare	A	B	C	D
CUA	25w5d+/- 1w0d			34w0d+/- 3w0d
EDD(CUA)	2019/07/17			2019/05/20
EFW	644.52 g			
BPD(Hadlock)	5.62 cm			
GA	23w1d			
HC(Hadlock)	28.92 cm			
GA	31w6d			
OFD(HC)	7.86 cm			
AC(Hadlock)	18.04 cm			
GA	22w6d			
FL(Hadlock)	4.68 cm			
GA	25w4d			
HL(Jeanty)				5.88 cm
GA				34w0d

Figure 9-15. Worksheet Display with Fetus Compare

OB Table Editor

Overview

You can add user programmable OB tables to the system.

OB Table Settings Menu

You add OB Tables in the Measurement & Analysis menu. To open the menu:

1. Enter **Utility** -> **Measure**, then select **M&A**.
2. Check the Exam Category. Make sure that Obstetrics is selected.

If it is not selected, select Obstetrics and continue selecting the folders until the appropriate area is selected as to where this new OB Table will be entered. For example, select Obstetrics, then select OB-2/3. If there are further folders within OB-2/3, select that appropriate folder.

OB Table Settings Menu (continued)

- On the monitor display, select the OB Table tab.
The system displays the OB Table settings menu.

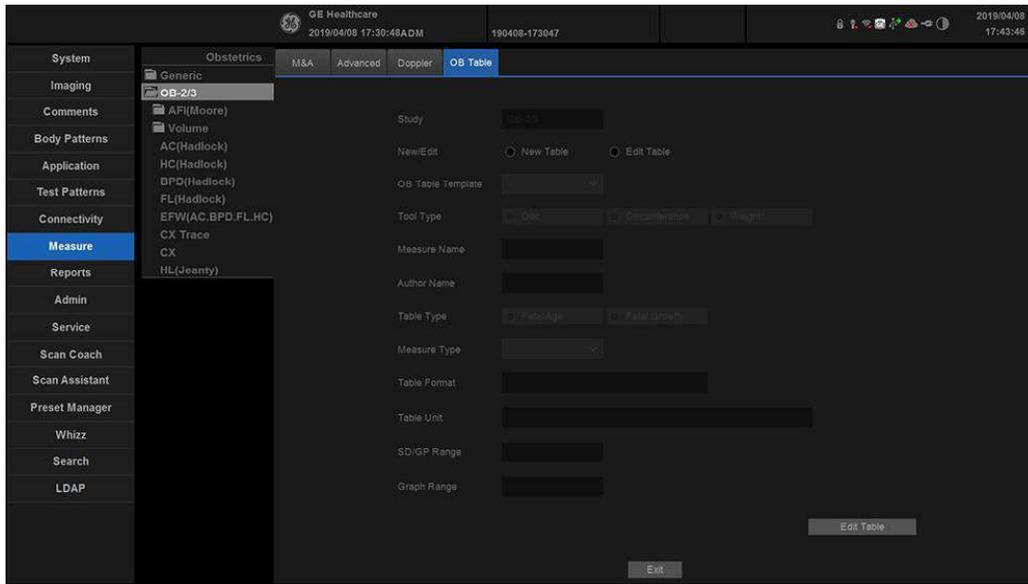


Figure 9-16. OB Table settings

OB Table Settings Menu (continued)

4. The OB Table settings menu lists OB Table parameters. Specify the following parameter values as appropriate:
- **Study:** Shows the study to which this measurement table belongs.
 - **New/Edit:** To create a new OB table, select New Table. To edit an existing user-programmable OB table, select Edit Table.

NOTE: You cannot edit the system's OB Tables.

- **OB Table Template:** To create a new OB table, select the Template (1 - 7) which you want to use as the basis of the user programmable OB Table. See 'OB Table Templates' on page 9-66 for more information. To edit an existing user OB table, select the desired OB table to edit.
- **Tool Type:** Select the type of measurement: Distance or Circumference.
- **Measure Name:** Type the name of measurement that will display on the menu.
- **Author Name:** Type the author's name.
- **Table Type:** If necessary, select the Table Type: Fetal Age or Fetal Growth.
- **Measure Type:** Select a measurement type that can be used to calculate EFW, for example BPD.

NOTE: Measure Type is used only when calculating EFW.

NOTE: The following items are display only: Table Format, Table Unit, SD/GP Range, and Graph Range. The system determines these values automatically, based on the type of OB table you are creating.

5. After specifying all parameter values, move the **Trackball** to *Edit Table* and press **Set**.

The system displays the Edit Menu.

NOTE: If any of the OB table parameters are not correct, the Edit Menu is not displayed.

OB Table Templates

Tool Type:

- Distance: 2D Caliper
- Circumference: 2D Ellipse, 2D Trace, 2D Caliper

Template 1

Table 9-3: Template 1 (based on Hadlock)

Template 1: SD Range Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	Week	Week
	Table Range	1SD		
	Graph Range	1SD		
Measurement Result	Value [cm]			
	GA [#w#d]			
	Min [#w#d]			
	Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	Week	mm	Week
	Others are same as above			

Template 2

Table 9-4: Template 2 (based on Tokyo)

Template 2: SD Range Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	Day	Day
	Table Range	1SD		
	Graph Range	1SD		
Measurement Result	Value [cm]			
	GA [#w#d]			
	SD: day(+/-)			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	Day	mm	Day
	Others are same as above			

Template 3

Table 9-5: Template 3 (based on Osaka)

Template 3: SD Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	Day	mm
	Table Range	1SD		
	Graph Range	1SD		
Measurement Result	Value [cm]			
	GA [#w#d]			
	SD: $sd=(mv-pv)/sd$			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	Day	mm	mm
	Others are same as above			

Template 4

Table 9-6: Template 4 (based on several European tables)

Template 4: 5%-95% Table					
Fetal Age Table	Table Format	MEAS	MIN	MEAN	MAX
	Table Unit	mm	WeekDay	WeekDay	WeekDay
	Table Range	5%:95%			
	Graph Range	5%:95%			
Measurement Result	Value [cm]				
	GA [#w#d]				
	GP [%] GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,				
	EDD (Date)				
	GA-Min [#w#d]				
	GA-Max [#w#d]				
	Fetal Growth Table	Table Format	AGE	MIN	MEAN
Table Unit		WeekDay	mm	mm	mm
Table Range		5%:95%			
Graph Range		5%:95%			

Template 5

Table 9-7: Template 5 (based on several European tables)

Template 5: 5% - 95% Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	WeekDay	mm
	Table Range	1SD		
	Graph Range	5%:95%		
Measurement Result	Value [cm]			
	GA [#w#d]			
	GP [%]			
	GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	WeekDay	mm	mm
	Table Range	1SD		
	Graph Range	5%:95%		

Template 6

Table 9-8: Template 6 (based on several European tables)

Template 6: 10% - 90% Table					
Fetal Age Table	Table Format	MEAS	MIN	MEAN	MAX
	Table Unit	mm	WeekDay	WeekDay	WeekDay
	Table Range	10%-90%			
	Graph Range	10%-90%			
Measurement Result	Value [cm]				
	GA [#w#d]				
	GP [%] GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,				
	EDD (Date)				
	GA-Min [#w#d]				
	GA-Max [#w#d]				
Fetal Growth Table	Table Format	AGE	MIN	MEAN	MAX
	Table Unit	WeekDay	mm	mm	mm
	Table Range	10%-90%			
	Graph Range	10%-90%			

Template 7

Table 9-9: Template 7 (Based on several European tables)

Template 7: 10% - 90% Table				
Fetal Age Table	Table Format	MEAS	MEAN	SD
	Table Unit	mm	WeekDay	mm
	Table Range	1SD		
	Graph Range	10%:90%		
Measurement Result	Value [cm]			
	GA [#w#d]			
	GP [%]			
	GP is calculated by Fetal Growth Table. If you did not edit Growth Table, GP is not calculated by the system,			
	EDD (Date)			
	GA-Min [#w#d]			
	GA-Max [#w#d]			
Fetal Growth Table	Table Format	AGE	MEAN	SD
	Table Unit	WeekDay	mm	mm
	Table Range	1SD		
	Graph Range	10%:90%		

OB Table Edit Menu

The data you enter in the OB Table Edit Menu depends on whether the table type is Fetal Age or Fetal Growth.

Fetal Age Table

If you are creating or editing a Fetal Age table, the OB Table Edit Menu is as follows:

Measure: OB-20 Author Name: DDD

Parameters

Min Value: 10 Max Value: 200 Interval Value: 5

MEAS(mm)	MEAN(Week)	SD(Week)
10.00		
15.00		
20.00		
25.00		
30.00		
35.00		
40.00		
45.00		
50.00		
55.00		
60.00		
65.00		

Buttons: Cancel Exit To Save

Figure 9-17. OB Table Edit Menu: Fetal Age Table

Complete the field

1. Input value to Min, Max and Interval of the Parameters field.
The system automatically fills in the MEAS column.
Input value to the columns of MEAN and SD.

NOTE: To move between the fields in the table, use the up, down, left, and right arrow keys.

NOTE: You must enter a minimum of two rows of data. Any lines with a blank cell are not saved.

To save the Table Data, move the **Trackball** to Exit to Save and press **Set**. If you want cancel this table, move the **Trackball** to move to Cancel and press **Set**.

Fetal Growth Table

If you are creating or editing a Fetal Growth table, the OB Table Edit Menu is as follows:

The screenshot shows a software interface for editing an OB Table. At the top, there are two input fields: 'Measure' with the value 'OB-2/3' and 'Author Name' with the value 'DDD'. Below these is a 'Parameters' section with three input fields: 'Min Value', 'Max Value', and 'Interval Value'. The main part of the interface is a table with three columns: 'AGE(Week)', 'MEAN(mm)', and 'SD(Week)'. The table has several rows, with the first row highlighted. At the bottom of the interface, there are two buttons: 'Cancel' and 'Exit To Save'.

Figure 9-18. OB Table Edit Menu: Fetal Growth Table

Complete the field

1. Input value to the required columns.

NOTE: To move between the fields in the table, use the up, down, left, and right arrow keys.

NOTE: You must enter a minimum of two rows of data. Any lines with a blank cell are not saved.

2. To save the Table Data, move the **Trackball** to Exit to Save and press **Set**. If you want to cancel this table, move the **Trackball** to Cancel and press **Set**.

After you complete the OB table, it is now available for the selected study. To use the measurement, you must assign it to a menu. See 'Measurement and Calculation Setup' on page 7-13 for more information.

EFW for OB User Table/Formula Editor

EFW Table Editor

You can edit an EFW Formula at the OB Table Editor.

1. Select Utility -> Measure -> OB Table.
2. Select the appropriate parameters and press **Edit Table**.
 - a. New/Edit: Select “New Table”
 - b. OB Table Template: Select appropriate template.
 - c. Tool Type: Select “Weight”
 - d. Measure Name: Enter measurement name.
 - e. Author Name: Enter author’s name.
 - f. Table Type: Select “Fetal Age”

The screenshot shows the 'OB Table Editor' interface. At the top, there are tabs for 'M&A', 'Advanced', 'Doppler', and 'OB Table'. The 'OB Table' tab is selected. Below the tabs, there are several configuration options:

- Study:** A text input field containing 'OB-2019'.
- New/Edit:** Two radio buttons: 'New Table' (selected, labeled 'a') and 'Edit Table'.
- OB Table Template:** A dropdown menu showing 'Template1' (labeled 'b').
- Tool Type:** Three radio buttons: 'Dist', 'Circumference', and 'Weight' (selected, labeled 'c').
- Measure Name:** A text input field containing 'EFWE-1' (labeled 'd').
- Author Name:** A text input field containing 'DDD' (labeled 'e').
- Table Type:** Two radio buttons: 'Fetal Age' (selected, labeled 'f') and 'Fetal Growth'.
- Measure Type:** A text input field.
- Table Format:** A text input field containing 'MEAN MEASUREMENTS'.
- Table Unit:** A text input field containing 'grams/1000 grams'.
- SD/GP Range:** A text input field containing '500'.
- Graph Range:** A text input field containing '500'.

At the bottom right, there is an 'Edit Table' button. At the bottom center, there is an 'Exit' button.

Figure 9-19. OB Table Tab Screen

EFW Table Editor (continued)

3. Edit the table data and press **Exit To Save**.

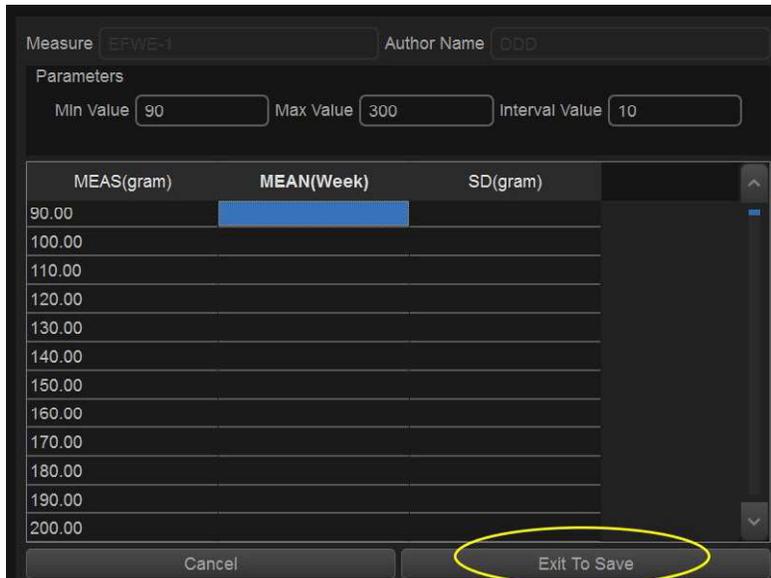


Figure 9-20. OB Table Editor Screen

EFW Formula Editor

Select the M&A tab and select **Edit Calc**. The Modify User CALC window displays.

Select the user table previously added from the User Defined pull-down menu and press **OK**.

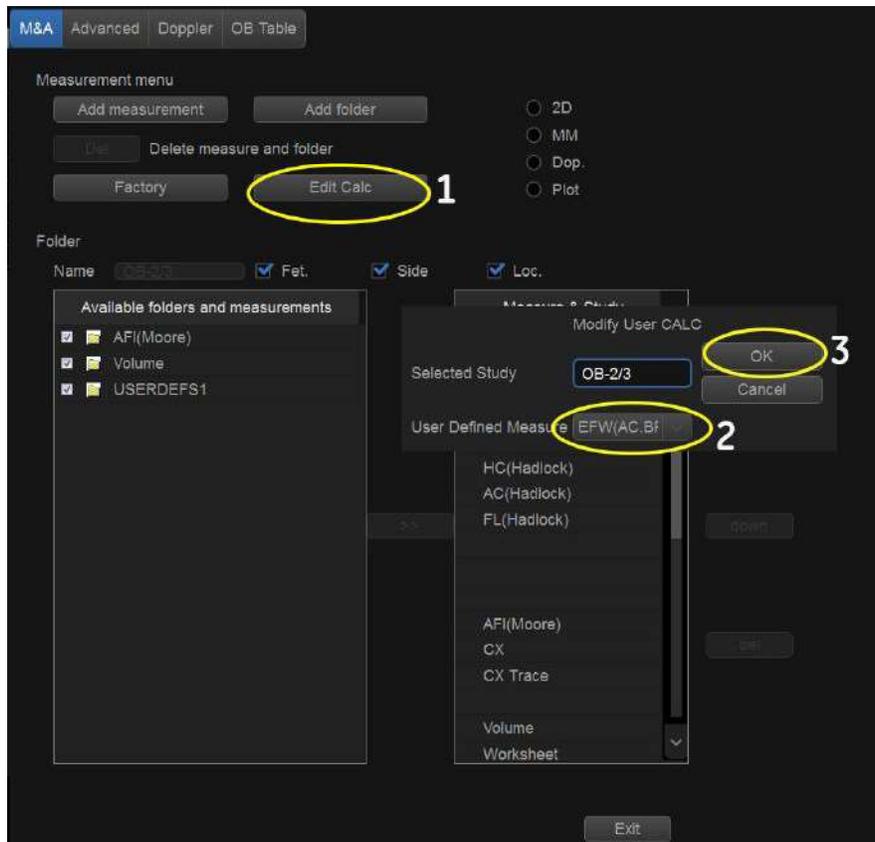


Figure 9-21. Modify User CALC window

NOTE: When you edit a formula, be careful of the following points.

- If you want to calculate EFW by centimeter, add “*100” to the {parameter}.
- If EFW is calculated in grams, add “/1000” to the formula.

or example,

$$10^{(1.56\{AC[Hadlock]\} * 100 + 0.08 * \{FL[Hadlock]\} * 100)} / 1000$$

GYN Measurements

Introduction

The Gynecology exam category includes the following three studies:

- Generic. This study is common to all exam categories. See 'Generic Measurements' on *page 7-66 for more information*.
- General Gynecology. This study includes uterine, ovarian, ovarian follicle, and endometrium measurements.
- OB/GYN Vessel. This study includes the following vessels: uterine, ovarian, umbilical, middle cerebral artery, aorta, placenta, and descending aorta.

NOTE: *The calculation formulas are listed in the Advanced Reference Manual.*

To Start a Gynecology Exam

To begin a gynecology exam, you enter patient data or, if the patient data from a previous exam is saved in the system, find the patient information.

For details about how to start an exam, See 'To Start an Obstetrics Exam' on *page 9-4 for more information*.

After you complete the patient information, you can begin the scan.

1. To change from the Patient screen to the Scan screen, do one of the following:
 - On the keyboard, press **Esc**.
 - Select **Scan**.
 - On the Control Panel, select **Freeze**.
 - On the Control Panel, press the B-Mode key.

The system displays the Scan screen.

2. To choose the appropriate probe, select the probe on the **Probe** page.
3. On the Control Panel, press **Measure**.

The default Gynecology study is displayed on the menu.

B-Mode Measurements

In B-Mode, you make the measurements in the General Gynecology study. These measurements include:

- Uterine length, width, and height
- Ovarian length, width, and height
- Ovarian follicle
- Cervix
- Endometrium thickness

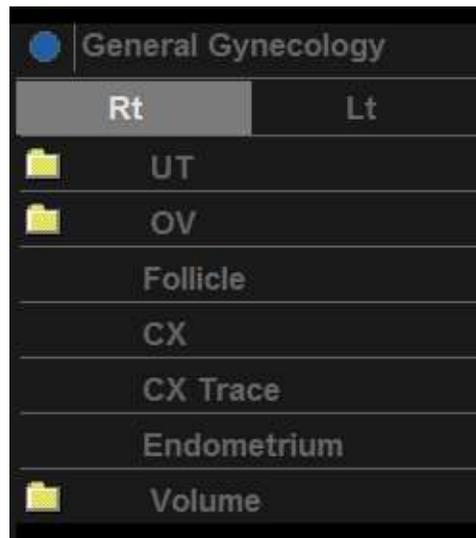


Figure 9-22. General Gynecology study

Follicle measurements

You can make left and right ovary follicle measurements from one, two, or three distances.

One distance

1. To select the left or right, adjust the **Side** selection.
2. Select **Follicle**; an active caliper displays.
3. To position the active caliper at the start point, move the **Trackball**.
4. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
5. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
6. To complete the measurement, press **Set**.
7. Press **Clear**.
The system displays the ovary follicle measurement in the Results Window.

Follicle measurements (continued)

Two distances

1. To select the left or right, adjust the **Side** selection.
2. Select **Follicle**; an active caliper displays.
3. Make the first distance measurement:
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
 - c. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.
The system displays the distance value in the Results Window and displays an active caliper.
4. To make the second distance measurement, repeat steps a–d above.
5. Press **Clear**.
The system displays the ovary follicle measurement in the Results Window.

Follicle measurements (continued)

Three distances

1. To select the left or right, adjust the **Side** selection.
2. Select **Follicle**; an active caliper displays.
3. Make the first distance measurement:
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
 - c. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.
The system displays the distance value in the Results Window. After the first and second distance measurement, the system displays an active caliper.
4. To make the second and third distance measurement, repeat steps a–d above.

After the third measurement, the system displays the ovary follicle measurement in the Results Window.

Endometrium thickness

To measure the endometrium thickness, make one distance measurement.

1. Select **Endometrium**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the endometrium thickness in the Results Window.

Ovary length, width, and height

You can measure the length, width, and height of the left and right ovaries. Each measurement is a typical distance measurement made in the appropriate scan plane.

Typically, length and height are measured on the sagittal plane while the width is measured on the axial/transverse plane.

To measure ovarian length, width, or height:

1. Scan the patient's right or left ovary in the appropriate plane.
2. To select left or right, adjust the **Side** selection.
3. Select the **OV** folder, then select **OVL**, **OVW**, or **OVH**.
4. Perform a standard distance measurement:
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper, if preset accordingly.
 - c. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.
The system displays the distance value in the Results Window. After the first and second measurement, the system displays an active caliper for the next measurement.
5. To make the second and third distance measurements, repeat steps 3–4.

After you complete the length, width, and height measurements, the system displays the ovarian volume in the Results Window.

Uterus length, width, and height

Each of these is a standard distance measurement. Typically, length and height are measured on the sagittal plane while the width is measured on the axial/transverse plane.

To measure uterus length, width, or height:

1. Scan the patient in the appropriate scan plane.
2. Select the **UT** folder, then select **UT L**, **UT W**, or **UT H**.
An active caliper displays.
3. Perform a standard distance measurement:
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
 - c. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.
The system displays the distance value in the Results Window. After the first and second measurement, the system displays an active caliper for the next measurement.
4. To make the second and third distance measurement, repeat steps 2–3.

After you complete the third distance measurement, the system displays the uterine volume in the Results Window.

Cervix measurements

You can make cervix measurements from one distance or spline trace.

One Distance

1. Select **CX**; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
6. The system displays the cervix measurement in the Result Window.

Spline Trace

1. Select **CX Trace**; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the trace start point, press **Set**. The first caliper turns yellow. The second caliper appears at the same position as the first caliper and is green.
4. To position the second caliper, move the **Trackball** and press **Set**. The third caliper appears at the same position.
The spline trace requires at least three points to draw the trace. Continue setting the points of the trace until the desired points are set.
5. Press **Set** again after the last caliper is fixed to finalize the spline trace. All points are removed from the line and the spline trace turns yellow.

NOTE: *Pressing **Set** twice finishes the trace measurement.*

6. The system displays the cervix measurement in the Result Window.

Chapter 10

Cardiology

Describes how to perform cardiac measurements and calculations.

Cardiology Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Scanning a New Patient' on *page 4-10 for more information*.

Any measurement can be repeated by selecting that measurement again from the menu.

Cardiology Measurements

Overview

Cardiology measurements offer two different types of measurement studies, Generic and Cardiac.

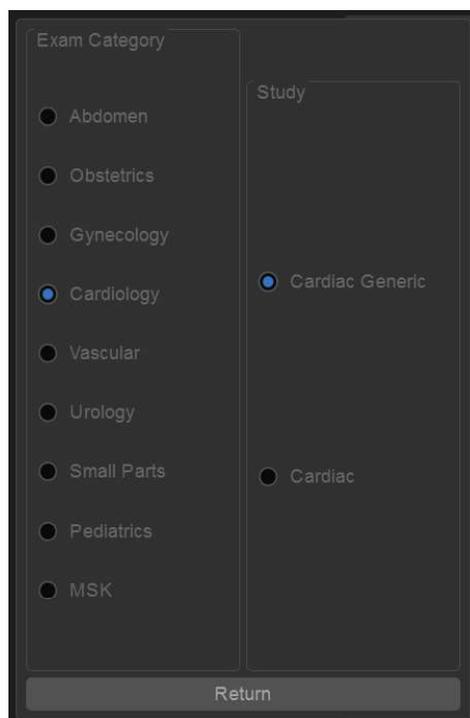


Figure 10-1. Cardiac Exam Calc

- Generic – Each exam category has a Generic study. The Generic studies provide you quick access to measurements.
- Cardiac – This study includes all cardiac measurements.

Naming Format for Cardiac Measurements

When you make a measurement, you select the abbreviation for the measurement on the menu. Most abbreviations are made using acronyms. The following table lists acronyms used for naming cardiac measurements.

Table 10-1: Cardiology Abbreviations

Acronym	Name
% STIVS	% Interventricular Shortening
A	Area
Acc	Acceleration
AccT	Flow Acceleration Time
ALS	Aortic Leaflet Separation
Ann	Annulus
Ao	Aorta
AR	Aortic Regurg
Asc	Ascending
ASD	Atrial Septal Defect
AV	Aortic Valve
AV Cusp	Aortic Valve Cusp Separation
AVA	Aortic Valve Area
AV-A	Aortic Valve Area by Continuity Equation
BSA	Body Surface Area
CI	Cardiac Index
CO	Cardiac Output
d	Diastolic
D	Diameter
Dec	Deceleration
DecT	Deceleration Time
Desc	Descending
Dur	Duration
EdV	End Diastolic Volume
EF	Ejection Fraction
EPSS	E-Point-to-Septum Separation

Table 10-1: Cardiology Abbreviations

Acronym	Name
EsV	End Systolic Volume
ET	Ejection Time
FS	Fractional Shortening
FV	Flow Volume
FVI	Flow Velocity Integral
HR	Heart Rate
IVRT	IsoVolumetric Relaxation Time
IVS	Interventricular Septum
L	Length
LA	Left Atrium
LAA	Left Atrium Area
LAD	Left Atrium Diameter
LPA	Left Pulmonary Artery
LV	Left Ventricle
LVA	Left Ventricular Area
LVID	Left Ventricle Internal Diameter
LVL	Left Ventricle Length
LVM	Left Ventricular Mass
LVPW	Left Ventricle Posterior Wall
ML	Medial to Lateral
MPA	Main Pulmonary Artery
MR	Mitral Regurgitation
MV	Mitral Valve
MVcf	Mean Velocity Circumferential Fiber Shortening
MVO	Mitral Valve Orifice
OT	Outflow Tract
P	Papillary Muscles
PA	Pulmonary Artery
PAP	Pulmonary Artery Pressure
PDA	Patent Ductus Arteriosis

Table 10-1: Cardiology Abbreviations

Acronym	Name
PEP	Pre-Ejection Period
PFO	Patent Foramen Ovale
PG	Pressure Gradient
PHT	Pressure Half Time
PI	Pulmonary Insufficiency
PISA	Proximal Isovelocity Surface Area
PR	Pulmonic Regurgitation
PV	Pulmonic Valve
PV-A	Pulmonic Valve Area by Continuity Equation
PVein	Pulmonary Vein
PW	Posterior Wall
Qp	Pulmonic Flow or CO
Qs	Systemic Flow or CO
RA	Right Atrium
RAA	Right Atrium Area
Rad	Radius
RAD	Right Atrium Diameter
RPA	Right Pulmonary Artery
RV	Right Ventricle
RVA	Right Ventricle Area
RVAW	Right Ventricle Anterior Wall
RVD	Right Ventricle Diameter
RVID	Right Ventricle Internal Diameter
RVL	Right Ventricle Length
RVOT	Right Ventricle Outflow Tract
s	Systolic
SI	Stroke Index
ST	Shortening
SV	Stroke Volume
SVI	Stroke Volume Index

Table 10-1: Cardiology Abbreviations

Acronym	Name
T	Time
TA	Tricuspid Annulus
TAML	Tricuspid Annulus Medial to Lateral
TR	Tricuspid Regurgitation
TV	Tricuspid Valve
TVA	Tricuspid Valve Area
Vcf	Velocity Circumferential Fiber Shortening
Vel	Velocity
VET	Valve Ejection Time
Vmax	Maximum Velocity
Vmean	Mean Velocity
VSD	Ventricular Septal Defect
VTI	Velocity Time Integral

In this manual, the abbreviation for each measurement is listed in parenthesis after the measurement, as follows:

- Aortic Root Diameter (**Ao Diam**)
- Left Ventricle Posterior Wall Thickness, Diastolic (**LVPWd**)

For example, to measure the Aortic Root Diameter, you select **Ao Diam**.

Cardiac Measurements

This section lists cardiac measurements and the steps to perform them. The measurement information in this section is organized by mode, then by region of interest, and then by type of measurement. The organization is as follows:

- Mode; there is a section for B-Mode, M-Mode, Color Flow Mode, and Doppler Mode. There is also a Combination Mode section, which includes calculations that are a result of measurements made in more than one mode.
- Within each mode section, there are sections for region of interest, such as aorta or mitral valve.
- Within each region of interest section, there are sections for type of measurement, such as one distance, two distance, trace, or velocity flow trace. Each measurement type section lists all cardiac measurements that are that type, and then describes the steps to perform that type of measurement.

Some measurements, such as Aortic Root Diameter or Aortic Valve Cusp Separation, can be made in B-Mode or M-Mode. The information for these measurements is included in both B-Mode and M-Mode sections.

NOTE: *You can select the diastole frame/systole frame (ED/ES or ES/ED) with the assigned control.*

Steps to perform a measurement

Making a one distance measurement

1. Select the measurement; an active caliper displays.
2. To position the active caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
5. To complete the measurement, press **Set**.
The system displays the measurement in the Results Window.

Making two distance measurements

1. Select the measurement; an active caliper displays.
2. Make the first distance measurement:
 - a. To position the active caliper at the start point, move the **Trackball**.
 - b. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
 - c. To position the second active caliper at the end point, move the **Trackball**.
A dotted line connects the measurement points.
 - d. To complete the measurement, press **Set**.
The system displays the distance value in the Results Window. After the first measurement, the system displays an active caliper.
3. To make the second distance measurement, repeat steps a–d above.
The system displays the measurements and ratio in the Results Window.

Steps to perform a measurement (continued)

Making a trace measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the trace start point, press **Set**.
The system displays a vertical dotted line.
4. To trace the measurement area, move the **Trackball**.
A line shows the traced area.
5. To complete the measurement, press **Set**.
The system displays the measurement in the Results Window.

Making a slope measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.
The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper at the end point, move the **Trackball**.
A dotted line shows the slope.
5. To complete the measurement, press **Set**.
The system displays the slope measurement in the Results Window.

Steps to perform a measurement (continued)

Making a time interval measurement

1. Select the measurement.
The system displays an active caliper and a vertical dotted line.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the first caliper, press **Set**.
The system displays a second active caliper.
4. To position the caliper at the end point, move the **Trackball**.
5. To complete the measurement, press **Set**.
The system displays the time interval in the Results Window.

Making a velocity flow trace measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the trace start point, press **Set**.
The system displays a vertical dotted line.
4. To trace the envelope, move the **Trackball**.
A line shows the traced area.
5. To complete the trace, press **Set**.
The system displays a second vertical dotted line.
6. To position the second dotted line at the start of the next envelope, move the **Trackball**.
7. To complete the measurement, press **Set**.
The system displays the measurement in the Results Window.

Steps to perform a measurement (continued)

Making a peak velocity measurement

1. Select the measurement; an active caliper with a vertical dotted line displays.
2. To position the caliper at the desired measurement point, move the **Trackball**.
3. To complete the measurement, press **Set**.

The system displays the velocity measurement in the Results Window.

Making a time interval/slope measurement

1. Select the measurement; an active caliper displays.
2. To position the caliper at the start point, move the **Trackball**.
3. To fix the start point, press **Set**.

The system fixes the first caliper and displays a second active caliper.

4. To position the second caliper at the end point, move the **Trackball**.

A dotted line shows the slope.

5. To complete the measurement, press **Set**.

The system displays the time interval and slope measurements in the Results Window.

B-Mode Measurements

Aorta

One distance measurement

- Aortic Root Diameter (**AO Diam**)
- Aortic Arch Diameter (**AO Arch Diam**)
- Ascending Aortic Diameter (**Ao Asc Diam**)
- Ascending Aortic Diameter (**Ao Asc Diam**)
- Aorta Annulus Diameter (**Ao Annulus Diam**)
- Aorta Isthmus (**Ao Isthmus**)
- Aorta ST Junction (**Ao st junct**)

Aortic Valve

One distance measurement

- Aortic Diameter (**Ao Diam**)
- Aortic Valve Cusp Separation (**AV Cusp**)
- Aortic Valve Diameter (**AV Diam**)

One trace measurement

- Aortic Valve Area Planimetry (**AVA Planimetry**)
- Transverse Aortic Valve Area (**Trans AVA (d), Trans AVA (s)**)

Left Atrium

Two distance measurements

- Left Atrium Diameter to AO Root Diameter Ratio (***LA/AO Ratio***)

One distance measurement

- Left Atrium Diameter (***LA Diam***)
- Left Atrium Length (***LA Major***)
- Left Atrium Width (***LA Minor***)

One trace measurement

- Left Atrium Area
 - Diastolic (***LAA (d)***)
 - Systolic (***LAA (s)***)

One trace measurement and one distance measurement

- Left Atrium Volume, Single Plane, Method of Disk
 - Diastolic (***LAEDV A2C***) (***LAEDV A4C***)
 - Systolic (***LAESV A2C***) (***LAESV A4C***)

Left Ventricle

NOTE: *The user can select the Straight/Line (polygonal line) with the LV study tool. Adjust the appropriate control on the Primary Menu Key to make the selection.*

One distance measurements

- Left Ventricle Mass Index
 - Diastolic (**LVPWd**)
 - Systolic (**LVPWs**)
- Left Ventricle Volume, Teichholz
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Volume, Cubic
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Internal Diameter
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Length
 - Diastolic (**LVLd**)
 - Systolic (**LVLs**)
- Left Ventricle Outflow Tract Diameter (**LVOT Diam**)
- Left Ventricle Posterior Wall Thickness
 - Diastolic (**LVPWd**)
 - Systolic (**LVPWs**)
- Left Ventricle Length (**LV Major**)
- Left Ventricle Width (**LV Minor**)

Left Ventricle (continued)

One trace measurements

- Left Ventricle Outflow Tract Area (**LVOT Diam**)
- Left Ventricle Area, Two Chamber
 - Diastolic (**LVA (d)**)
 - Systolic (**LVA (s)**)
- Left Ventricle Area, Four Chamber
 - Diastolic (**LVA (d)**)
 - Systolic (**LVA (s)**)
- Left Ventricle Area, Short Axis
 - Diastolic (**LVA (d)**)
 - Systolic (**LVA (s)**)
- Left Ventricle Endocardial Area, Width (**LVA (d)**)
- Left Ventricle Epicardial Area, Length
 - Diastolic (**LVAepi (d)**)
 - Systolic (**LVAepi (s)**)

One time interval measurements

- Heart Rate, Teichholz
- Heart Rate for Two Chamber study
- Heart Rate for Four Chamber study
- Heart Rate for Two Chamber Area-Length study
- Heart Rate for Two Chamber Method of Disk study
- Heart Rate for Four Chamber Area-Length study
- Heart Rate for Four Chamber Method of Disk study
- Heart Rate for Bi-Plane Method of Disk study

Left Ventricle (continued)

Two distance measurements

- Ejection Fraction, Teichholz (**LVIDs**)
- Ejection Fraction, Cubic (**LVIDs**)
- Left Ventricle Posterior Wall Fractional Shortening (**LVPWs**)
- Left Ventricle Stroke Index, Teichholz (**LVIDs**, and Body Surface Area)
- Left Ventricle Fractional Shortening (**LVIDs**)
- Left Ventricle Stroke Volume, Teichholz (**LVIDs**)
- Left Ventricle Stroke Volume, Cubic (**LVIDs**)

Body surface area and stroke volume measurements

- Left Ventricle Stroke Index, Single Plane, Two Chamber, Method of Disk (**LVIDd**, **LVIDs**)
- Left Ventricle Stroke Index, Single Plane, Four Chamber, Method of Disk (**LVIDd**, **LVIDs**)
- Left Ventricle Stroke Index, Bi-Plane, Bullet
- Left Ventricle Stroke Index, Bi-Plane, Method of Disk (**LVA_d**, **LVA_s**)

The system calculates body surface area from the patient's height and weight.

Left Ventricle Study

- Diastolic (**LV_d**)
- Systolic (**LV_s**)

The Left Ventricle study automatically sequences the following measurements:

- Interventricular Septum (**IVS_d**, **IVS_s**)
- Left Ventricle Internal Diameter (**LVID_s**, **LVID_d**)
- Left Ventricle Posterior Wall Thickness (**LVPW_s**, **LVPW_d**)

Mitral Valve

One distance measurements

- Mitral Valve Annulus Diameter (*MV Ann Diam*)
- E-Point-to-Septum Separation (*EPSS*)

One trace measurement

- Mitral Valve Area by Pressure Half Time (*MVA By PHT*)
- Mitral Valve Area Planimetry (*MVA Planimetry*)

Pulmonic Valve

One distance measurement

- Pulmonic Valve Annulus Diameter (*PV Ann Diam*)
- Pulmonic Diameter (*Pulmonic Diam*)

Right Atrium

One distance measurement

- Right Atrium Diameter, Length (*RA Major*)
- Right Atrium Diameter, Width (*RA Minor*)

One trace measurements

- Right Atrium Area (*RA Area*)
- Right Atrium Volume, Single Plane, Method of Disk (*RAAd*)
- Right Atrium Volume, Systolic, Single Plane, Method of Disk (*RAAs*)

Right Ventricle

One trace measurement

- Left Pulmonary Artery Area (**LPA Area**)
- Right Pulmonary Artery Area (**RPA Area**)

One distance measurements

- Right Ventricle Internal Diameter
 - Diastolic (**RVIDd**)
 - Systolic (**RVIDs**)
- Right Ventricle Diameter, Length (**RV Major**)
- Right Ventricle Diameter, Width (**RV Minor**)
- Right Ventricle Wall Thickness
 - Diastolic (**RVAWd**)
 - Systolic (**RVAWs**)
- Right Ventricle Outflow Tract Diameter (**RVOT Diam**)
- Left Pulmonary Artery (**LPA**)
- Main Pulmonary Artery (**MPA**)
- Right Pulmonary Artery (**RPA**)

System

One distance measurements

- Interventricular Septum Thickness
 - Diastolic (**IVSd**)
 - Systolic (**IVSs**)
- Inferior Vena Cava (**IVC**)
- Main Pulmonary Artery Diameter (**MPA Diam**)
- Systemic Vein Diameter (**Systemic Diam**)
- Patent Ductus Arteriosis Diameter (**PDA Diam**)
- Patent Foramen Ovale Diameter (**PFO Diam**)
- Pericardial Effusion Diastole (**PEd**)
- Ventricular Septal Defect Diameter (**VSD Diam**)
- Atrial Septal Defect Diameter (**ASD Diam**)

Body surface area and stroke volume measurements

- Interventricular Septum (IVS) Fractional Shortening (**IVSs**)
The system calculates body surface area from the patient's height and weight.

Tricuspid Valve

One distance measurements

- Tricuspid Valve Annulus Diameter (**TV Ann Diam**)
- Tricuspid Valve Area (**TV Area**)

Auto EF Measurements (Option)

Automated Ejection Fraction (AutoEF) is a semi-automatic measurement tool used for measurement of the global EF (Ejection fraction). The AutoEF tool is used as an optional decision support tool.

The AutoEF tool tracks and calculates the myocardial tissue deformation based on feature tracking on B-mode cine loops.

AutoEF is performed on either one or both apical 4-chamber or 2-chamber views, in any order.

The result is presented as Ejection Fraction value for each view and average Ejection Fraction for the whole LV. All values are stored to the worksheet after the results are approved (see 'Tracking Validation' on page 10-31).

NOTE: *The AutoEF tool is intended for adult cardiology and is not intended to be used in pediatrics cardiology.*

Acquisition

1. Create an exam, connect the ECG device and make sure to obtain a stable ECG trace.
2. Acquire B-mode cine-loops of an Apical 4 chamber view (4-ch) and an Apical 2 chamber view (2-ch).
 - The frame rate should be between 37 and 80 frames per second. A higher frame rate is recommended for high heart rate.
 - Versana Active should be configured to store at least 100 ms before and after each heart cycle.
 - If the acquisition has more than one heart cycle, the analysis will be done on the second last heart cycle.
 - The entire myocardium should be visible.
 - A depth range that includes the entire left ventricle should be used

NOTE: *The AutoEF processed image loop runs slower than the actual cardiac motion. To see the loop in correct playback speed, exit AutoEF.*

Starting AutoEF

1. Recall any one of the stored views and press **Measure**.
2. In the Measurement menu, select **AutoEF**.

The View selection menu is displayed.

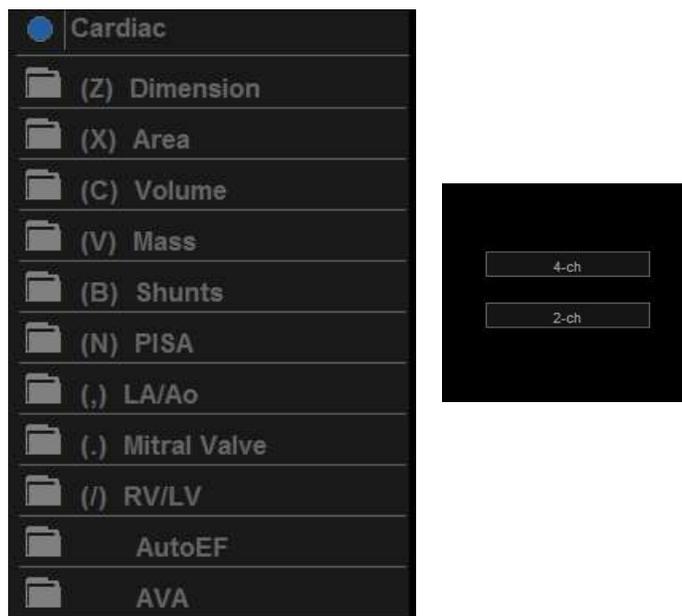


Figure 10-2. View Selection Menu

3. Select the name of the current view: 4-ch or 2-ch. A ROI is defined and tracked through the entire heart cycle as detailed below.

Defining the endocardial border (EB)

When selecting a view to analyze, the system automatically displays a frame where the endocardial border is usually clearly visible. The system automatically displays the ROI for tracking on the screen and the tissue tracking starts. When the tracking is completed and displayed, you can either accept the results or recalculate/redraw the endocardial border (EB).

Selecting “Recalc”

When selecting Recalc, you have the option to correct the EB manually or to revert to the semi-automatic 3 Point EB definition mode. (To revert to semi-automatic mode, press Auto ROI.) If you adjust any point in the EB and wait a few seconds, the system automatically starts reprocessing.

You can also choose another frame to redefine the EB. To choose another frame, turn off the YOYO function, and adjust the Left/Right marker.

It is also possible to define an EB in semi-automatic 3 Point mode.

Defining Endocardial Border (EB) in semi-automatic 3 Point mode

To define the endocardial border, place three points at the endocardial border; two annular points at the base and one at the apex. Follow the indications displayed on the screen when placing the three points.

After placing the third point on the Apex, an endocardial border will automatically be traced (Figure 10-3 on page 10-26).

After Selecting 3 Points, the old EB is cleared from the screen and you can redefine a new EB using the 3 Point EB Definition method as described above.

NOTE: *Correct border tracing is important for an accurate EF measurement. The system has an adaptive border tracing function: using the endocardial three points as a guide, the system will analyze the image and automatically adapt the border tracing to an optimal position.*

NOTE: *The YOYO function is turned on to help finding the correct location for the points.*

Editing the endocardial border trace

1. If required, use the Edge Shift Left/Right controls to delineate separately the left or right portions of the endocardial border visually as best as possible.
2. If required, move the trackball cursor over the border trace, select an anchor point (red circle), press SET and correct the trace by dragging the anchor point to a new location (Figure 10-4 on page 10-27). The shape of the border trace will update accordingly.
3. In case you wish to start over, press 3 Points and re-position the 3 points defining the basal and apex points.

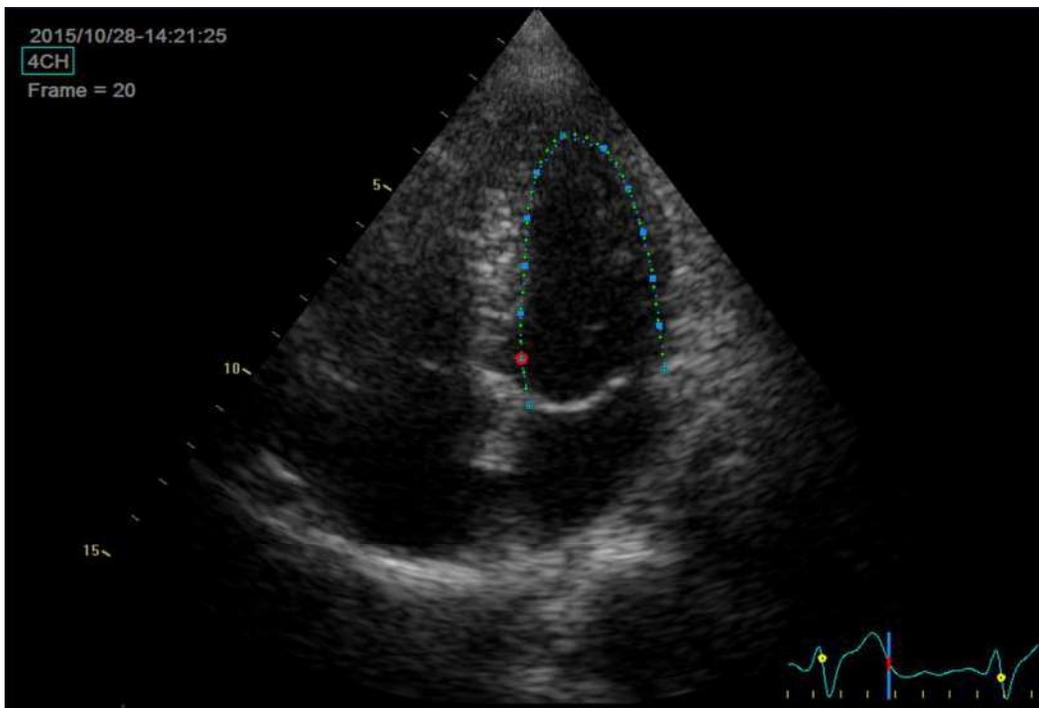


Figure 10-3. Defining a ROI

Editing the endocardial border trace (continued)

4. Place the trackball cursor over the desired point.
5. Selected Point is marked by a red circle.
6. Click over the red circle, it will turn to a square.

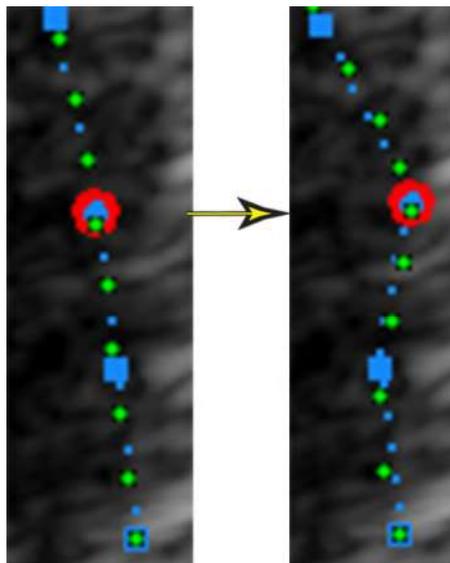


Figure 10-4. Selected anchor point on the inner border trace

7. Move the square to re-align the border trace.
8. Press the **Process** button when ready.

NOTE: *Data processing is configured by default to start automatically if the cursor is not moved for a few seconds. If the trace needs to be adjusted, make sure to make the changes immediately after the ROI is displayed.*

EF results screen

When processing is complete, the EF results screen is displayed (Figure 10-5 on page 10-29).

NOTE: *The bi-plane results (BiP) will only appear on screen (Figure 10-5) after measuring both 2-Ch and 4-Ch views.*

The AutoEF processed image runs slower than the original loop speed. In order to see the loop in correct playback speed, exit AutoEF.

The running loop is shown on the left. A green dotted line marks the inner border of the chamber. In case of poor tracking, the system will automatically display parts of the border in red.

The system will automatically pick the frames with the maximal area (ED) and minimal area (ES) and place them on the right area of the display.

The End Diastolic volume (EDV) and end Systolic Volume (ESV) is calculated and shown above each frame.

The resulting EF calculation is displayed on the top of the screen.

EF results screen (continued)

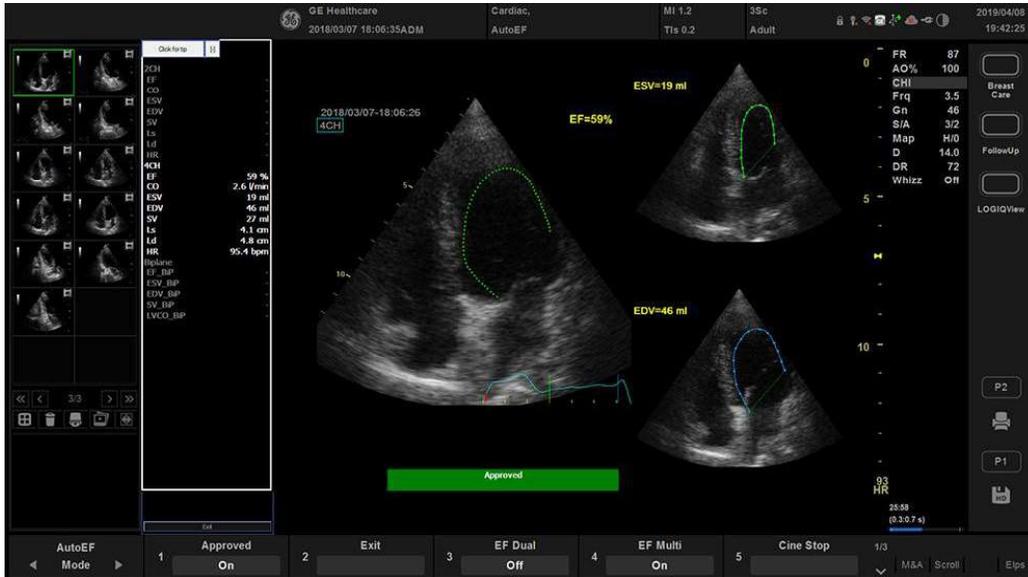


Figure 10-5. AutoEF Result Multi Screen

EF results screen (continued)



Figure 10-6. AutoEF Results Dual Screen - Alternative screen mode

Tracking Validation

The tracking must be visually controlled and validated. If the tracking results are visually correct press the red Approve button. The button turns green and is labeled Approved. The calculated values will be stored and appear in the worksheet.

The following can be done if tracking needs correction:

- Press **EF Dual** to enlarge ES and ED frames and position them side-by-side (Figure 10-6 on page 10-30).
- You may manually select a different ED frame or ES frame using the ED frame or ES frame rotary.
- You may edit any misaligned point on either ED or ES frames. This is done by:
 - a. Placing the trackball cursor over the desired point.
 - b. Clicking over the red circle, it will turn to a square.
 - c. Pressing **Set** and moving the square to re-align the border trace.
 - d. The ESV, EDV and EF will be recalculated accordingly.

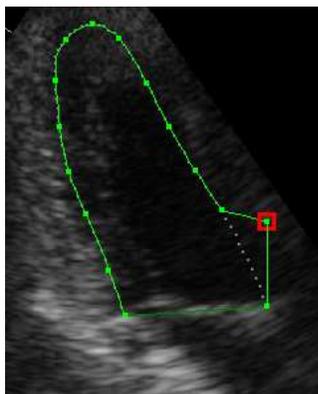


Figure 10-7. Border trace edit

Tracking Validation (continued)

- e. In case these results are incorrect, you may go back to the previous step by pressing the Recalc button and editing the endocardial border ('Defining the endocardial border (EB)' on *page 10-24*).
- f. In case editing the endocardial border is too difficult, you may start all over again by pressing Auto ROI and retrace the border ('Defining the endocardial border (EB)' on *page 10-24*).

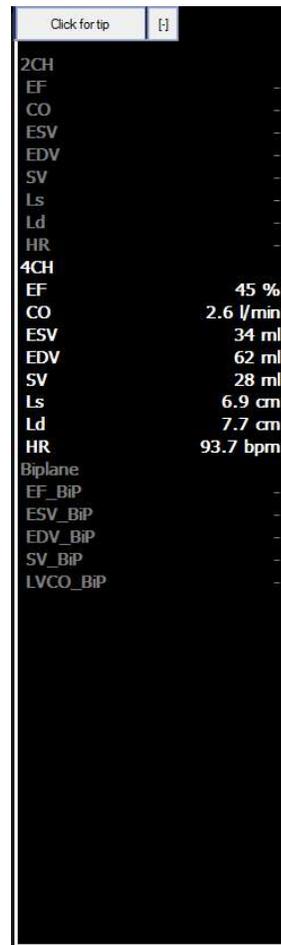
Possible causes of poor tracking

Poor tracking quality could result from a variety of causes. The common causes for bad tracking are:

- Erroneous placement of the basal points when defining the border. If the basal points are placed too far from the annular region, the border segments at the annular base will not move together with the underlying 2D image throughout the entire heart beat.
- Erroneous placement of the apex point when defining the border. The point should be placed so that the resulting border trace covers mainly the endocardium. If the apex point is placed too high, the border trace will mainly cover the epicardium resulting in poor tracking.
- Too much clutter. Images with too much static clutter will result in poor tracking.

Results

For each of the views, a results screen containing the EF calculation, appears (Figure 10-5 on page 10-29) in a mini-report. The mini-report appears on the left side of the results window.



The screenshot shows a vertical list of cardiac measurements. The '4CH' section contains numerical values for EF, CO, ESV, EDV, SV, Ls, Ld, and HR. The 'Biplane' section lists several measurements with dashes as values.

View	Measurement	Value
2CH	EF	-
	CO	-
	ESV	-
	EDV	-
	SV	-
	Ls	-
	Ld	-
	HR	-
4CH	EF	45 %
	CO	2.6 l/min
	ESV	34 ml
	EDV	62 ml
	SV	28 ml
	Ls	6.9 cm
	Ld	7.7 cm
	HR	93.7 bpm
Biplane	EF_BiP	-
	ESV_BiP	-
	EDV_BiP	-
	SV_BiP	-
	LVCO_BiP	-

Figure 10-8. Mini Report

Results (continued)

The results are summarized in the worksheet and in the report. AutoEF calculations are displayed with a Q in the worksheet to designate these are from an Auto measure.

The screenshot shows the GE Healthcare software interface for Cardiac AutoEF. The main display area contains a table of cardiac parameters and their values. The parameters are listed in the left column, and their values are in the middle column. The right column shows the method used for each parameter, with 'Last' indicating the most recent measurement. The table is as follows:

Parameter	Value	Method	m1	m2	m3	m4	m5
HR 4Ch Q	94 bpm	Last	95	94			
LVVED 4Ch Q	62 ml	Last	46	62			
LVVES 4Ch Q	39 ml	Last	19	39			
LVEF 4Ch Q	37 %	Last	59	37			
LVSV 4Ch Q	23 ml	Last	27	23			
LVCO 4Ch Q	2.2 l/min	Last	2.6	2.2			
LVLS 4Ch Q	6.9 cm	Last	4.1	6.9			
LVLD 4Ch Q	7.7 cm	Last	4.8	7.7			

The interface also includes a 'Worksheet Mode' section at the bottom, showing 'Page Change 2/3' and '1/2'.

Figure 10-9. Results in Worksheet - Page 1

Results (continued)

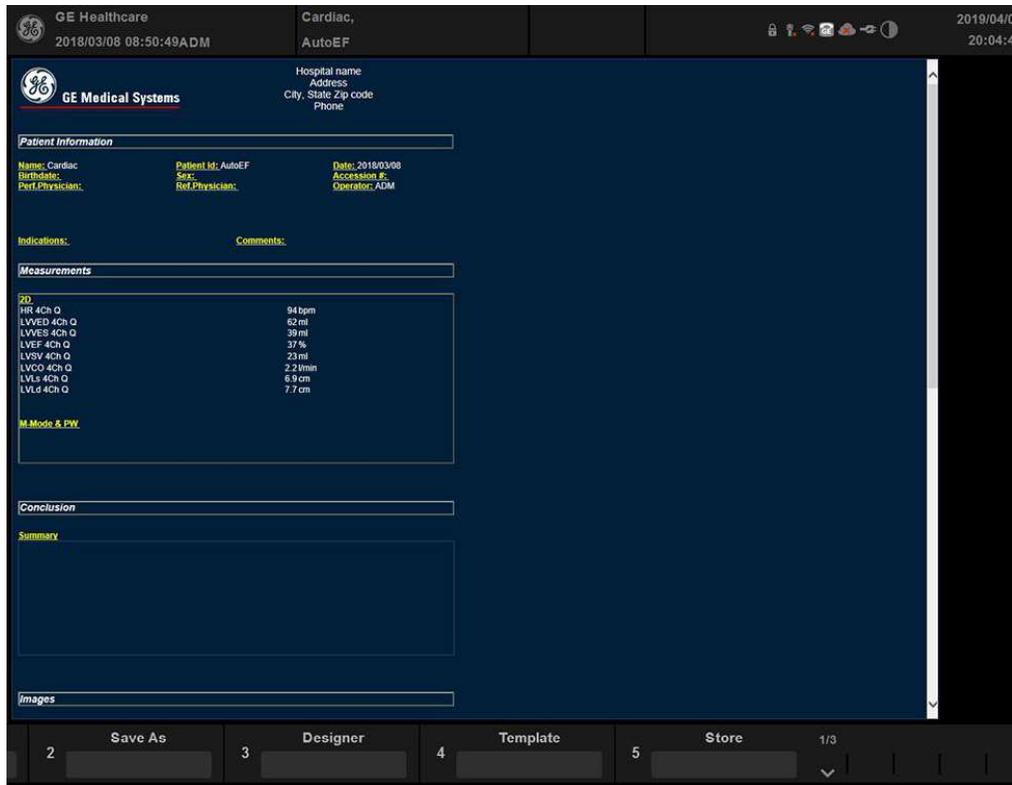


Figure 10-10. Results in Report template

Exit AutoEF

Press **Exit** to end AutoEF.

Pressing Report, Patient or Scan also closes the AutoEF package.

NOTE: Do not disable any sub-measurement of AutoEF in Utility --> Measure, as this will disable the whole set of AutoEF measurements.

NOTE: For consistent results, do not delete individual AutoEF measurements from the worksheet. Always delete a full column.

M-Mode Measurements

Aorta

One distance measurement

- Aortic Root Diameter (**AO Root Diam**)

Aortic Valve

One distance measurements

- Aortic Valve Cusp Separation (**AV Cusp**)

Left Atrium

One distance measurement

- Left Atrium Diameter (**LA Diam**)

Two distance measurement (ratio)

- Left Atrium Diameter to AO Root Diameter Ratio (**LA/AO**)

Left Ventricle

One distance measurements

- Left Ventricle Volume, Teichholz
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Volume, Cubic
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Internal Diameter
 - Diastolic (**LVIDd**)
 - Systolic (**LVIDs**)
- Left Ventricle Posterior Wall Thickness
 - Diastolic (**LVPWd**)
 - Systolic (**LVPWs**)

One time interval measurement

- Heart Rate, (R-R)
- Left Ventricle Ejection Time (**LVET**)
- Left Ventricle Pre-Ejection Period (**LVPEP**)
- Velocity Circumferential Fiber Shortening (**Vcf**)

Left Ventricle Study

The Left Ventricle study (**LV Study**) automatically sequences the following measurements:

- Interventricular Septum (**IVSd, IVSs**)
- Left Ventricle Internal Diameter (**LVIDd, LVIDs**)
- Left Ventricle Posterior Wall Thickness (**LVPWd, LVPWs**)

Mitral Valve

One distance measurements

- E-Point-to-Septum Separation (**EPSS**)

One slope measurements

- Mitral Valve Anterior Leaflet Excursion (**D-E Excursion**)
- Mitral Valve D-E Slope (**D-E Slope**)
- Mitral Valve E-F Slope (**E-F Slope**)

Right Ventricle

One distance measurements

- Right Ventricle Internal Diameter
 - Diastolic (**RVIDd**)
 - Systolic (**RVIDs**)
- Right Ventricle Wall Thickness
 - Diastolic (**RVAWd**)
 - Systolic (**RVAWs**)

One time interval measurements

- Right Ventricle Ejection Time (**RVET**)
- Right Ventricle Pre-Ejection Period (**RVPEP**)

Right Ventricle Study

The Right Ventricle study (**RV study**) automatically sequences the following measurements:

- Right Ventricle Internal Diameter (RVIDd, RVIDs))

Pulmonic Valve

One time interval measurements

- QRS complex to end of envelope (**Q-to-PV close**)

System

One distance measurements

- Interventricular Septum
 - Diastolic (**IVSd**)
 - Systolic (**IVSs**)
- Pericardial Effusion (**PEd**)

Two distance measurement:

- Interventricular Septum (IVS) Fractional Shortening (**LVD - LVS / LVD x 100**)

Tricuspid Valve

One time interval measurements

- QRS complex to end of envelope (**Q-to-TV close**)

Doppler Mode Measurements

Aortic Valve

Velocity flow trace measurements

- Aortic Insufficiency Mean Pressure Gradient (**AI Trace**)
- Aortic Insufficiency Peak Pressure Gradient (**AI Vmax**)
- Aortic Insufficiency Mean Velocity (**AI Trace**)
- Aortic Insufficiency Mean Square Root Velocity (**AI Trace**)
- Aortic Insufficiency Velocity Time Integral (**AI Trace**)
- Aortic Valve Mean Velocity (**AV Trace**)
- Aortic Valve Mean Square Root Velocity (**AV Trace**)
- Aortic Valve Velocity Time Integral (**AV Trace**)
- Aortic Valve Mean Pressure Gradient (**AV Trace**)

One peak velocity measurements

- Aortic Valve Peak Pressure Gradient (**AR Vmax**)
- Aortic Insufficiency Peak Velocity (**AR Vmax/AI Vmax**)
- Aortic Insufficiency End-Diastolic Velocity (**ARend Vmax/Alend Vmax**)
- Aortic Valve Peak Velocity (**AV Vmax**)
- Aortic Valve Peak Velocity at Point E (**AV Vmax**)
- Aorta Proximal Coarctation (**Coarc Pre-Duct**)
- Aorta Distal Coarctation (**Coarc Post-Duct**)

One slope measurements

- Aortic Valve Insufficiency Pressure Half Time (**AR PHT**)
- Aortic Valve Flow Acceleration (**AV Trace**)
- Aortic Valve Pressure Half Time (**AV Trace**)

Aortic Valve (continued)

One time interval measurements

- Aortic Valve Acceleration Time (**AV AccT**)
- Aortic Valve Deceleration Time (**AI PHT**)
- Aortic Valve Ejection Time (**AVET**)
- Aortic Valve Heart Rate
- Time

Two time interval measurement

Slope through aortic valve trace:

- Aortic Valve Acceleration to Ejection Time Ratio (**AVET**)
- Aortic Valve Area according to PHT

Left Ventricle

One peak velocity measurements

- Left Ventricle Outflow Tract Peak Pressure Gradient (***LVOT maxPG***)
- Left Ventricle Outflow Tract Peak Velocity (***LVOT Vmax***)

One velocity flow trace measurements

- Left Ventricle Outflow Tract Mean Pressure Gradient (***LVOT Trace***)
- Left Ventricle Outflow Tract Mean Velocity (***LVOT Trace***)
- Left Ventricle Outflow Tract Mean Square Root Velocity (***LVOT Trace***)
- Left Ventricle Outflow Tract Velocity Time Integral (***LVOT Trace***)

One time interval measurements

- Left Ventricle Heart Rate (***LVOT Trace***)
- Left Ventricle Ejection Time (***LVET***)

Mitral Valve

NOTE: When measuring the MV E/A velocity, Auto/Manual trace can be modified with the appropriate Primary Menu Key control.

One velocity flow trace measurements

- Mitral Valve Regurgitant Flow Acceleration (**MV Trace**)
- Mitral Valve Regurgitant Mean Velocity (**MV Trace**)
- Mitral Regurgitant Mean Square Root Velocity (**MR Trace**)
- Mitral Regurgitant Mean Pressure Gradient (**MR Trace**)
- Mitral Regurgitant Velocity Time Integral (**MR Trace**)
- Mitral Valve Mean Velocity (**MV Trace**)
- Mitral Valve Mean Square Root Velocity (**MV Trace**)
- Mitral Valve Velocity Time Integral (**MV Trace**)
- Mitral Valve Mean Pressure Gradient (**MV Trace**)

One peak velocity measurements

- Mitral Regurgitant Peak Pressure Gradient (**MR Vmax**)
- Mitral Valve Peak Pressure Gradient (**MV Vmax**)
- Mitral Regurgitant Peak Velocity (**MR Vmax**)
- Mitral Valve Peak Velocity (**MV Vmax**)
- Mitral Valve Velocity Peak A (**MV A Velocity**)
- Mitral Valve Velocity Peak E (**MV E Velocity**)

One slope measurements

- Mitral Valve Area according to PHT (**MV PHT**)
- Mitral Valve Flow Deceleration (**MV DecT**)
- Mitral Valve Pressure Half Time (**MV PHT**)
- Mitral Valve Flow Acceleration (**MV AccT**)

Mitral Valve (continued)

Two distance measurement

- Mitral Valve E-Peak to A-Peak Ratio (A-C and D-E) (***MV E/A Ratio***)

One time interval/slope measurements

- Mitral Valve Acceleration Time (***MV AccT***)
- Mitral Valve Deceleration Time (***MV DecT***)

One time interval measurement

- Mitral Valve Ejection Time (***M VET***)
- Mitral Valve A-Wave Duration (***MV A Dur***)
- Mitral Valve Time to Peak (***MV TTP***)
- Time

Two time interval measurement

Body surface area and stroke volume measurements:

- Stroke Volume Index by Mitral Flow (***MV Trace***)

The system calculates body surface area from the patient's height and weight.

One distance and two velocity measurement:

- Mitral Valve Area from Continuity Equation (***MV Vmax***)

Pulmonic Valve

One peak velocity measurements

- Pulmonic Insufficiency Peak Pressure Gradient (**PI Vmax**)
- Pulmonic Insufficiency End-Diastolic Pressure Gradient (**PR Trace**)
- Pulmonic Valve Peak Pressure Gradient (**PV Vmax**)
- Pulmonic End-Diastolic Pressure Gradient (**PR Trace**)
- Pulmonic Insufficiency Peak Velocity (**PR Vmax**)
- Pulmonic Insufficiency End-Diastolic Velocity (**PRend Vmax**)
- Pulmonic Valve Peak Velocity (**PV Vmax**)
- Pulmonic End-Diastolic Velocity (**PV Trace**)

One velocity flow trace measurements

- Pulmonary Artery Diastolic Pressure (**PV Trace**)
- Pulmonic Insufficiency Mean Pressure Gradient (**PR Trace**)
- Pulmonic Valve Mean Pressure Gradient (**PV Trace**)
- Pulmonic Insufficiency Mean Velocity (**PR Trace**)
- Pulmonic Insufficiency Mean Square Root Velocity (**PR Trace**)
- Pulmonic Insufficiency Velocity Time Integral (**PR Trace**)
- Pulmonic Valve Mean Velocity (**PV Trace**)
- Pulmonic Valve Mean Square Root Velocity (**PV Trace**)
- Pulmonic Valve Velocity Time Integral (**PV Trace**)

Pulmonic Valve (continued)

One slope measurements

- Pulmonic Insufficiency Pressure Half Time (***PR PHT***)
- Pulmonic Valve Flow Acceleration (***PV AccT***)

One time interval measurements

- Pulmonic Valve Acceleration Time (***PV AccT***)
- Pulmonic Valve Ejection Time (***PVET***)
- Pulmonic Valve Pre-Ejection Period (***PVPEP***)
- QRS complex to end of envelope (***Q-to-PV close***)
- Time

Two time intervals measurements

- Pulmonic Valve Acceleration to Ejection Time Ratio (***PV AccT, PVET***)
- Pulmonic Valve Pre-Ejection to Ejection Time Ratio (***PVPEP, PVET***)

Right Ventricle

One peak velocity measurements

- Right Ventricle Outflow Tract Peak Pressure Gradient (***RVOT Vmax***)
- Right Ventricle Systolic Pressure (***RVOT Vmax***)
- Right Ventricle Outflow Tract Peak Velocity (***RVOT Vmax***)

One velocity flow trace measurement

- Right Ventricle Diastolic Pressure (***RVOT Trace***)
- Right Ventricle Outflow Tract Velocity Time Integral (***RVOT Trace***)

One time interval measurement

- Right Ventricle Ejection Time (***PVET***)

System

One peak velocity measurements

- Pulmonary Artery Peak Velocity (***PV Vmax***)
- Pulmonary Vein Velocity Peak A (reverse) (***P Vein A***)
- Pulmonary Vein Peak Velocity
 - End-Diastolic (***P Vein D***)
 - Systolic (***P Vein S***)
- Systemic Vein Peak Velocity
 - End-Diastolic (***PDA Diastolic***)
 - Systolic (***PDA Systolic***)
- Ventricular Septal Defect Peak Velocity (***VSD Vmax***)
- Atrial Septal Defect Peak Velocity (***ASD Vmax***)

One velocity flow trace measurements

- Pulmonary Artery Velocity Time Integral (***Pulmonic VTI***)
- Systemic Vein Velocity Time Integral (***Systemic VTI***)

One time interval measurements

- Pulmonary Vein A-Wave Duration (***P Vein A Dur***)
- Time
- IsoVolumetric Relaxation Time (***IVRT***)
- IsoVolumetric Contraction Time (***IVCT***)

Two peak velocity measurements

- Pulmonary Vein S/D Ratio (***P Vein D, P Vein S***)
- Ventricular Septal Defect Peak Pressure Gradient (***VSD maxPG***)

Two velocity flow trace measurements:

- Pulmonic-to-Systemic Flow Ratio (***Qp/Qs***)

Tricuspid Valve

One peak velocity measurements

- Tricuspid Regurgitant Peak Pressure Gradient (**TR Vmax**)
- Tricuspid Valve Peak Pressure Gradient (**TV Vmax**)
- Tricuspid Regurgitant Peak Velocity (**TR Vmax**)
- Tricuspid Valve Peak Velocity (**TV Vmax**)
- Tricuspid Valve Velocity Peak A (**TV A Velocity**)
- Tricuspid Valve Velocity Peak E (**TV E Velocity**)

One velocity flow trace measurements

- Tricuspid Regurgitant Mean Pressure Gradient (**TR Trace**)
- Tricuspid Regurgitant Mean Velocity (**TR Trace**)
- Tricuspid Regurgitant Mean Square Root Velocity (**TR Trace**)
- Tricuspid Regurgitant Velocity Time Integral (**TR Trace**)
- Tricuspid Valve Mean Pressure Gradient (**TV Trace**)
- Tricuspid Valve Mean Velocity (**TV Trace**)
- Tricuspid Valve Mean Square Root Velocity (**TV Trace**)
- Tricuspid Valve Velocity Time Integral (**TV Trace**)

One time interval measurements

- Tricuspid Valve Time to Peak (**TV TTP**)
- Tricuspid Valve Closure to Opening (**TCO**)
- Tricuspid Valve A-Wave Duration (**TV A Dur**)
- QRS complex to end of envelope (**Q-to-TV close**)

Tricuspid Valve (continued)

One slope measurements

- Tricuspid Valve Pressure Half Time (***TV PHT***)

One velocity flow trace and one area measurement

- Stroke Volume by Tricuspid Flow (***TV SV***)

Two peak velocity measurement

- Tricuspid Valve E-Peak to A-Peak Ratio (***TV E/A Velocity***)

Color Flow Mode

Aortic Valve

One distance measurements

- Proximal Isovelocity Surface Area: Regurgitant Orifice Area (**PISA AR**)
- Proximal Isovelocity Surface Area: Radius of Aliased Point (**PISA AR**)

One velocity flow trace measurements

- Proximal Isovelocity Surface Area: Regurgitant Flow (**PISA AR**)
- Proximal Isovelocity Surface Area: Regurgitant Volume Flow (**PISA AR**)

One peak velocity measurement

- Proximal Isovelocity Surface Area: Aliased Velocity (**PISA AR**)

Mitral Valve

One distance measurements

- Proximal Isovelocity Surface Area: Regurgitant Orifice Area (**PISA MR**)
- Proximal Isovelocity Surface Area: Radius of Aliased Point (**PISA MR**)

One velocity flow trace measurements

- Proximal Isovelocity Surface Area: Regurgitant Flow (**PISA MR**)

One peak velocity measurement

- Proximal Isovelocity Surface Area: Aliased Velocity (**PISA MR**)

Cardiac Worksheet

After you make cardiac measurements, you can review all the data on the cardiac worksheet. To view the worksheet, select the **Report** on the control panel.

The cardiac worksheet has a heading for each mode, and for each folder. In Figure 10-11, the mode heading is B-mode Measurements, followed by Cube/Teichholz. Each measurement from that folder is listed next. The next folder is then listed, in this example, RV/LV.

The screenshot shows a software interface for cardiac measurements. At the top, it displays 'GE Healthcare', 'Cardiac, AutoEF', and the date/time '2019/02/01 21:04:40ADM'. Below this are input fields for 'Height', 'Weight', and 'BSA', and a 'Page' indicator showing '3/5'. The main section is titled 'B Mode Measurements' and contains a table of parameters and their values.

Parameter	Value	Method	m1	m2	m3	m4	m5
B Mode Measurements							
LA/Ao							
LA Diam	5.53	cm	Avg.	5.53			
Ao Diam	4.25	cm	Avg.	4.25			
LA/Ao	1.30			1.30			
Ao/LA	0.77			0.77			
AV Cusp	5.39	cm	Avg.	5.39			

Figure 10-11. Cardiac Worksheet: Page 1

If a worksheet has more data on a second page, to view the next page, select **Page Change**.

To return to scanning, select the **Report** or press **Esc**.

Worksheet information

The information on the cardiac worksheet is as follows:

- **Parameter** – This column lists the mode, the measurement folder, and the specific measurement.
- **Value** – The measured value. If more than one measurement was made for an item, the system uses the specified method (average, maximum, minimum, or last) to determine this value.
- **m1-mN** - All measurement values for each item. If you make more than six measurements, the worksheet has a scroll bar to show all values (cardiac worksheet only).
- **Method** – When there is more than one measurement for an item, this specifies the method used to calculate the measurement value listed in the Value column. Choices are average, maximum, minimum, or last. To change the method:
 - a. Move the **Trackball** to the Method field.
 - b. Press **Set**.
 - c. Move the **Trackball** to select from the list.
 - d. Press **Set**.

For more information about working with worksheets, See 'Viewing and Editing Worksheets' on *page 7-61 for more information*.

Setting up and Organizing Measurements and Calculations

When you receive your Versana Active system, the studies and measurements are organized for typical work flows. If you want, you can change this set up. You can change studies, create studies, and specify which measurements and calculations are in each study. You can change the measurements that are available on the Primary Menu Key. The Versana Active allows you to quickly and easily set up your system so that you can work most efficiently.

For information about how to customize studies and measurements, See 'Measurement and Calculation Setup' on *page 7-13 for more information.*

When you make cardiac measurements, the results you see in the Results Window and the Worksheet can vary, depending on what you have set up in the Utility screens.

Generic Study

The Cardiology B Mode Generic exam category includes the following measurements:

- Area (Trace)
- Volume
- Volume (d)
- Volume (s)
- Dist (Distance) Ratio
- Area Ratio
- R-R

The Cardiology M Mode Generic exam category includes the following measurements:

- LV Study
- LA/Ao
- RV Study
- D-E Excursion
- Slope Caliper
- Caliper
- Time
- HR
- Dd/Ds Study

The Cardiology Doppler Mode Generic exam category includes the following measurements:

- Point
- Manual Trace
- MV E/A Ratio
- PHT
- Time
- HR

Cardiac Doppler Measurements

Cardiac Output (CO)

To measure CO (Cardiac Output), make a velocity measurement in the Doppler Spectrum. A FCA (Flow Cross-Sectional Area) is measured on the vessel in B-Mode. These two measurements are used to calculate SV (Stroke Volume). Finally, a HR (Heart Rate) measurement is taken in the Doppler Spectrum. SV and HR are then used to calculate cardiac output.

1. Select **CO** from either the B-Mode or Doppler menu.
The caliper (horizontal dotted line) appears in the Doppler spectrum.
2. Measure the Stroke Volume.
After the stroke volume measurements have been completed, a vertical line caliper appears in the Doppler spectrum.
3. Measure the Heart Rate. See 'Heart Rate' on *page 7-79 for more information*.

CO (Cardiac Output) is computed from the SV and HR values and is displayed.

Automatic CO calculation

If the following measurements have previously been made in any order, CO (Cardiac Output) automatically calculates when it is selected from the Calculation menu:

- Velocity in Doppler Mode
- Functional Cross Sectional Area in B-Mode (Circumference/Area)
- Heart Rate in Doppler Mode

E/e' Ratio

The ratio of early transmitral velocity to early diastolic velocity of the mitral annulus (E/e') is measured in Doppler Mode and TVD mode.

1. First, measure MV E/A Velocity to get "E".
2. Measure e'.

NOTE: *The system displays "e" in place of "e'" on the menu.*

3. The system calculates E/e' ratio automatically.

Stress Echo (Option)

Introduction

The Versana Active Ultrasound system provides an integrated stress echo package, with the ability to perform image acquisition, review, image optimization, and wall segment scoring and reporting for a complete, efficient stress echo examination.

The stress package provides a protocol template for the two types of stress exams (exercise and pharmacological stress).

In addition to preset factory protocol templates, templates can be created or modified to suit your needs.

You can define various quad screen review groups, in any order and combination, that will suit your normal review protocol.

When reviewing stress examination images, the images are viewed at their original image quality, and different post-processing and zoom factors may be applied to the images under review for effective image optimization.

The protocol template may be configured for Continuous Capture.

A stress echo examination consists of three steps:

- Selection of a stress test protocol template
- Image acquisition
- Stress Analysis

NOTE: *If WallMotion Segment Score is not displayed on the screen, select the "WallMotion" preset in the Utility -> Measure -> M&A -> Plot -> Available Folders and Measurements.*

Getting started with a stress study

1. After selecting the appropriate application and probe and connecting ECG, press the user defined key for **Stress echo**. The protocol screen displays the layout of the default stress protocol for the current probe. This layout is also known as a template.

Table 10-2: Protocol Tab

Parameter	Description
Analyze	Display the Analysis screen
Template Editor	Display the template editor screen
Add Level	Add Level to the template
Delete Images	Delete the selected image
Move Image	Move the selected image to the another cell
Sync. Select	Synchronize the selected images.
End CC	End Continuous Capture
Begin/Cont.	Begin or continue the acquisition
Template	Display the template list
T1	Display/Hide the timer T1
T2	Display/Hide the timer T2
Cancel	Cancel Stress Echo

Getting started with a stress study (continued)

- To use the current template, press **Begin/Cont.** to initiate scanning.
To use another template, press **Template**. The template list displays.

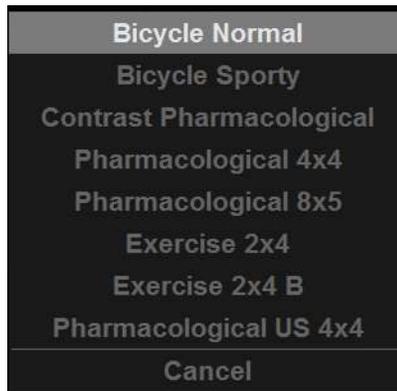


Figure 10-12. Template List

- Trackball** to the desired template and press **Set**.

Getting started with a stress study (continued)

4. The selected template displays.

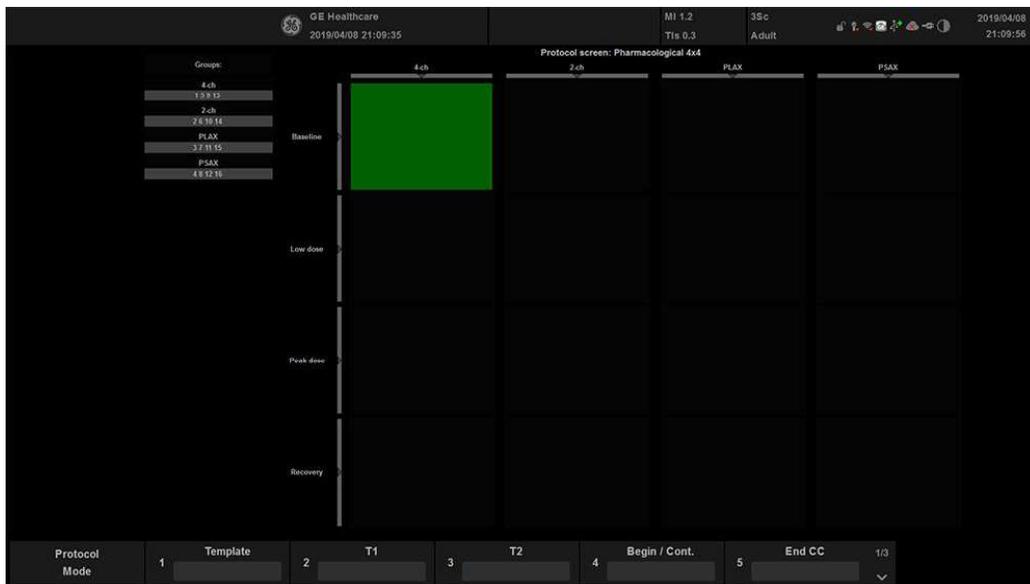


Figure 10-13. Template (Example)

- a. Level
 - b. Projection
 - c. Current Acquisition (green)
5. Press **Begin/Cont.** to initiate scanning using the new template.

Image acquisition

Images are acquired in a pre-defined order, according to the selected template. The highlighted (green) cell of the template matrix, displayed in the Clipboard window, indicates which view is currently being acquired.

The names of the view and levels for the current cell are displayed on the top left corner of the image area and under the template matrix.

Acquisition Screen

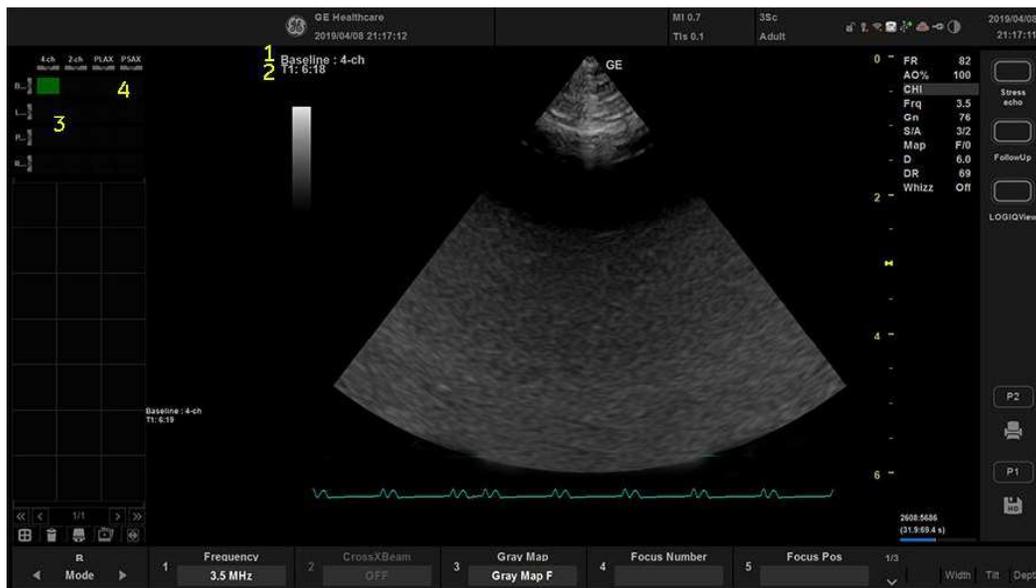


Figure 10-14. Acquisition Screen

1. Current View Level
2. Timer
3. Template Matrix
4. Current View (Green cell)

Starting acquisition

1. Select the template.
2. Press **Begin/Cont.**
3. Perform a scan that conforms with the view that is highlighted in the template matrix on the Clipboard window.
4. Press P1 key.
 - If the actual stress level is configured to preview the cine loop before storing, use the cine loop controls to select the most appropriate heart cycle and if desired adjust the loop markers. Press **P1** again to save the selected cine loop.

or

If you do not want to store the cine loop, press **Freeze** to cancel. Return to the scan screen.
 - If the actual stress level is not configured to preview the cine loop before storing, the system automatically stores the last heart cycle.

Stress levels can be configured for side-by-side display/ comparison of the reference loop from baseline or previous level and the loop to acquire.

5. After storing the cine loop, the system automatically highlights the next view in the matrix to be acquired.
6. Repeat previous steps until all required views are completed.
7. If you select Auto Start Analysis on the Template Editor for this template, a dialogue asking “Do you want to start protocol analysis now?” displays when the last acquisition is complete. If you select Yes, the Stress Echo Analysis screen is displayed.

The template used can be configured so that analysis automatically starts by displaying the first protocol group. The wall segment scoring diagrams for each view is displayed in the Parameter window on the left side of the screen.

Starting acquisition (continued)

If **Stress echo** is selected during acquisition, the following Protocol Mode displays.

Table 10-3: Protocol Mode during acquisition

Parameter	Description
Stop	Stop Stress Echo.
Pause	Pause Stress Echo. The template matrix continues in display. Even if you press P1, the cine loop does not store to the matrix.
Select Cycles	The Continuous Capture Selection screen is displayed (only available in Continuous Capture mode).
Analyze	Enter Analysis screen.
Template	Enter Template screen.
Add Level	Add level to the template.
T2	Display (Start)/Hide Timer T2.

Selecting a view during acquisition

A fixed protocol is provided for scanning, based on the selected template. The system automatically highlights the next view to be acquired in the template matrix, as images are stored. However, the order of scanning may be changed manually as follows:

Manual selection of a view during acquisition

1. Use the **Trackball** or the **arrow keys upwards and downwards** on the alphanumeric keyboard to move the cursor to the cell that represents the view to be acquired. The selected cell in the template matrix, highlighted in red, indicates the non-default position. When blinking, it contains a previously-stored acquisition.
2. Scan and save the selected loop as explained in the previous section.

After storage, the system automatically highlights the next available view to be acquired.

Moving an acquired image

An image can be moved from one cell to another during acquisition.

Procedure 1

1. When in the Protocol screen, press **Move Image**.
2. Use the **Trackball** to move the cursor to the desired image.
3. Press **Set**.
4. Use the **Trackball** to move the cursor to the destination cell.
5. Press **Set**. The image is moved from the source cell to the destination cell.

Procedure 2

1. In the Protocol screen, use the **Trackball** to move the cursor to the cell containing the image to move (source cell).
2. Press and hold down **Set**.
3. With the **Set** key still depressed, move the **Trackball** to the desired cell.
4. Release the **Set** key. The image is moved from the source cell to the destination cell.

If the destination cell contains an image, the images from the source and destination cells is exchanged when moving an acquired image.

Timers

Two timers can be displayed in the Stress mode acquisition screen, beside the template matrix.

Timers

- T1 displays the elapsed time from the start of stress examination.
- T2 starts when entering live scanning on the second stress level.

Both T1 and T2 timers can be manually stopped and restarted during the acquisition.

The display of T1 and T2 is user-configurable.

NOTE: *If you activate the Timer in Stress Echo, the T1 timer is displayed in the lower left-hand corner of the image area after exiting Stress Echo.*

Continuous Capture mode

Continuous Capture mode enables the user to perform acquisition continuously for all views at any level depending on the selected template configuration. Continuous Capture consists of temporary saving images acquired in a storage buffer. To enable best possible use of the limited storage buffer capacity, a Pause/Capture mode is provided, as opposed to the normal Freeze/Scan mode. The Pause mode enables scanning and live display on the screen, without any capture, thereby leaving the buffer available.

To run Continuous Capture, the user has to select a template where this feature is activated.

The buffer bar

When entering a level with Continuous Capture enabled, a buffer bar displays in the window.

The Buffer bar displays the following information:

- The scanning state
 - Pause (live scanning without storing)
 - Capture (live scanning with storing to buffer)
- The percentage of the buffer that is filled
- The buffer filling progression showed by a filling gage
- The capturing sessions, reflected by the red lines along the buffer bar



Figure 10-15. Buffer Bar

Controlling the capture process

When entering a stress level with Continuous Capture enabled, the system is automatically set in Pause mode.

1. Press **P1** to start image capture.
“Capture” is displayed in the buffer bar, the gage starts filling and the percentage of filled memory buffer increases.
2. Press **P1** again to stop capture.
“Pause” is displayed in the buffer bar.

When 90% of the memory buffer is filled up, the text display in the buffer bar turns red.

The system enters Freeze mode automatically once the buffer is full and the captured loops display in the Continuous Capture selection screen.

Activating Continuous Capture

1. Do all your pre-stress acquisitions in the Cardiac application.
2. Press the user defined key for **Stress echo**. The Protocol screen displays.
3. Press **Template**. The template list displays.
4. Select the template **Exercise 2x4** from the list.
5. Press **Begin/Cont.**
6. Acquire the resting loops in all four views.
*NOTE: Use the **P1** key to store the images.*
7. Once the fourth loop is acquired, the system enters into a waiting mode where Continuous Capture is in a pause state awaiting the patient to exercise.
8. When the patient is back on the bed, press **P1**. The Continuous Capture acquisition starts.
9. Acquire all your views.
The memory buffer gage increases. When memory exceeds 90%, the percent number turns red.
10. Press **Freeze** to finish.

Activating Continuous Capture (continued)

11. Press **Select Cycle**.

The Continuous Capture selection screen displays.

If the buffer is full, the system automatically displays the Continuous Capture Selection screen.

Refer to the next section if additional image acquisitions are necessary after the buffer is full.

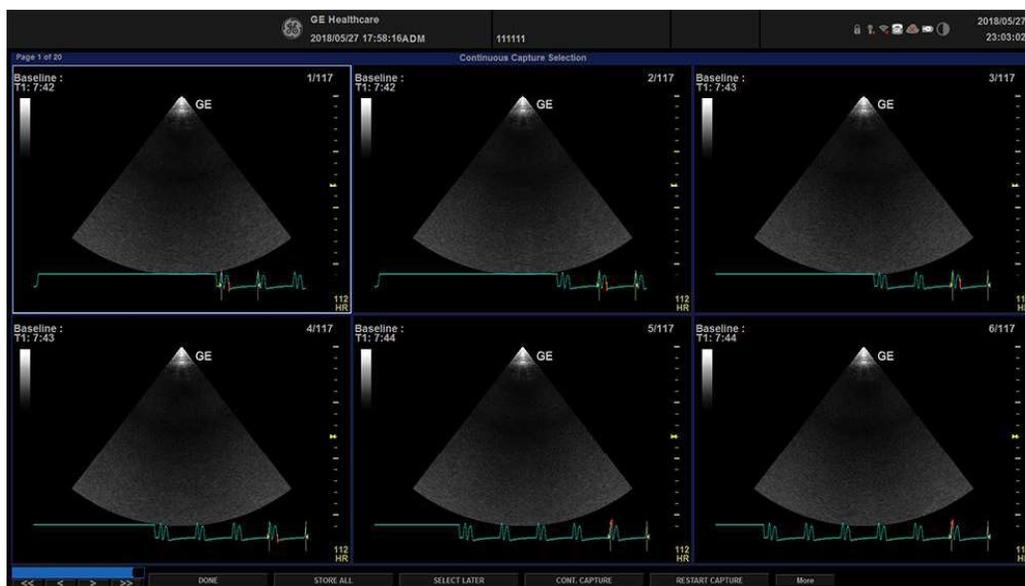


Figure 10-16. Continuous Capture Selection Screen

Activating Continuous Capture (continued)

12. Assign the cine loops to the four views.
 - a. **Trackball** to the desired loop.
 - b. Press **Set**. A drop-down menu appears with the available choices.
 - c. **Trackball** to the appropriate view.
 - d. Press **Set**.

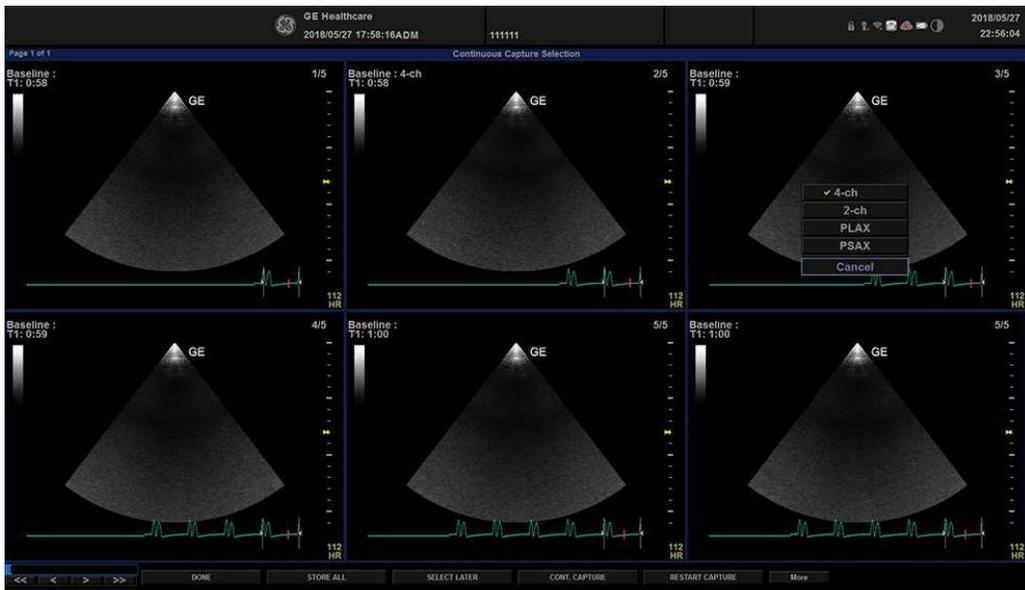


Figure 10-17. Drop-down Menu

- e. Continue these steps until all views are selected.

NOTE: To access additional cycles, use the arrow keys on the lower left portion of the select cycle screen.

Activating Continuous Capture (continued)

- f. Select **Done** when complete. A dialogue window displays, asking whether the entire Continuous Capture acquisition should be saved.

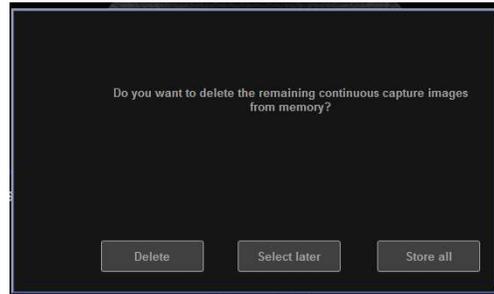


Figure 10-18. Dialogue Window

13. Press **Delete** to discard the loop or press **Store all** to keep the entire loop.
14. Perform Analysis and scoring.

Continuous Capture with additional image acquisition

If the buffer is filled up before all the image acquisitions are done, additional loops can be stored in the clipboard before doing image assignment to the views.

1. Perform the Continuous Capture. See 'Activating Continuous Capture' on *page 10-69 for more information*. (Steps 1 to 11).
2. In the Continuous Capture selection screen, press **Select Later**.
The Continuous Capture screen displays.
3. Perform the additional acquisition.
4. In order to resume the stress echo exam and assign loops for the views from the Continuous Capture buffer, press the user defined key for **Stress echo**. Then press **Template**. If not displayed, select the template **Exercise 2x4** from the template list.
5. Click the continuous capture images on the Protocol Template screen.
The Continuous Capture selection screen displays.
6. Assign the cine loops to the view. See 'Activating Continuous Capture' on *page 10-69 for more information*. (Step 12 a - f).
7. Press **Delete** to discard the loop or press **Store all** to keep the entire loop.
The normal procedure is to discard the loop. The loop is very big and requires a lot of disk space.
8. Perform Analysis and Scoring.

Postponed image assignment

The assignment of the cine loops to the view can be done on a later stage on a stored Continuous Capture acquisition.

1. Perform the Continuous Capture. See 'Activating Continuous Capture' on *page 10-69 for more information*. (Steps 1 to 11).
2. Press **Store all**.
The entire Continuous Capture acquisition is stored. The examination can be ended and the image assignment, analysis and scoring can be done later.
3. Re-open the examination, if necessary.
4. Press the user defined key for **Stress echo**. Then press **Template**. The Protocol screen displays.
5. Click the continuous capture images on the Protocol Template screen.
The Continuous Capture selection screen displays.
6. Assign the cine loops to the view. See 'Activating Continuous Capture' on *page 10-69 for more information*. (Step 12 a - f).
7. Select **Done**.
8. Perform analysis and scoring.

Restart capture from the Continuous Capture Selection

- Press **Restart Capture**.

The recording in memory is deleted and the Continuous Capture starts again.

Resume Continuous Capture

- Press **Continue Capture**.

Resumes Continuous Capture recording (only if the Continuous Capture buffer is not full).

Assigning and storing the cine loop

The cine loops captured in the buffer are assigned to the stress protocol views and stored from the Continuous Capture selection screen.

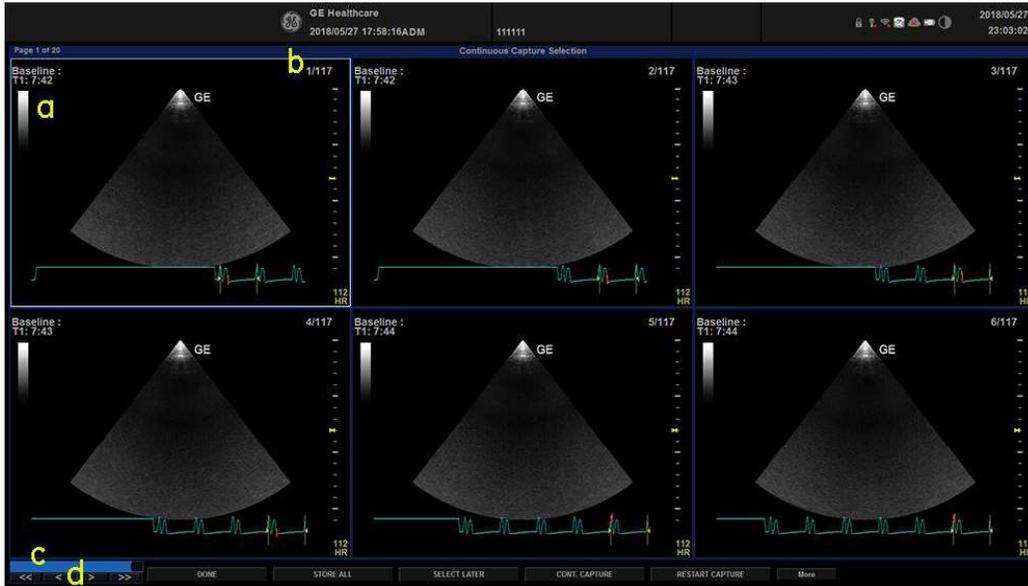


Figure 10-19. Continuous Capture Selection Screen

- a. Highlighted loop
- b. Cycle number and total number of cycles
- c. Blue Gauge: Position of the highlighted loop within buffer area.
- d. Navigation Controls: << < > >> (back to first selection, back to previous selection, forward to next selection, and forward to final selection).

Assigning a cine loop to a view

1. Use the **Trackball** to move the cursor to the desired cine loop in order to assign it to a particular view of the stress template.
The frame of the loop is highlighted.
2. Press **Set**.
A pop-up menu displays with the view names of the template.

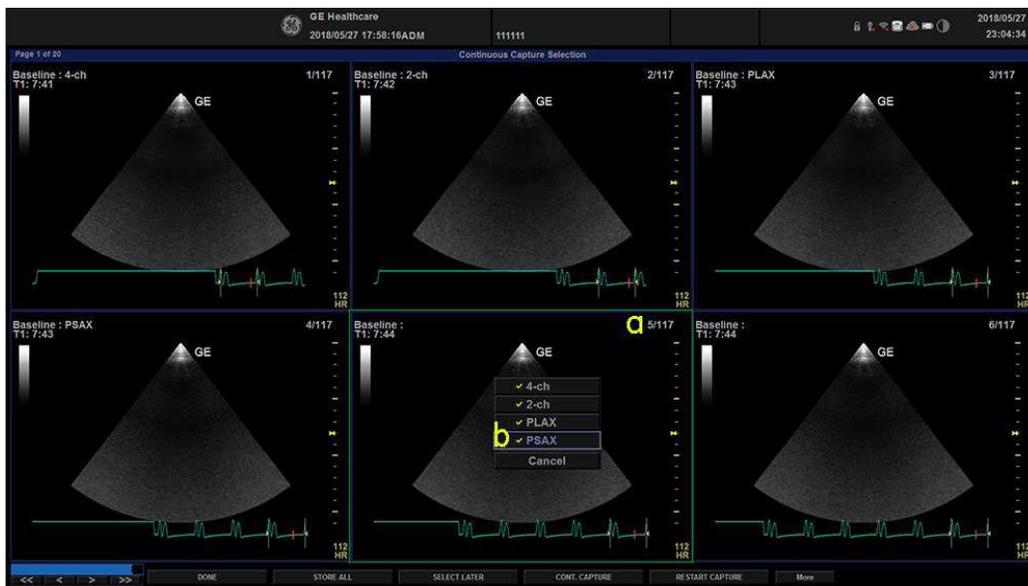


Figure 10-20. Loop Assignment

- a. Already assigned view
- b. Views pop-up menu

NOTE: *A checkmark appears on the Views pop-up after you have assigned a view to an image.*

Assigning a cine loop to a view (continued)

3. Use the **Trackball** to select the required view name.
4. Press **Set**.
The name of the view displays above the timers in the window.
5. Repeat steps 1 through 4 to assign loops to the other views of the level.
6. Press **Done** when complete.
A dialogue window displays asking whether the entire Continuous Capture acquisition should be saved.
7. Press **Delete** to discard the loop or press **Store all** to keep the entire loop.
The normal procedure is to discard the loop. The loop is very big and requires a lot of disk space.

Post Acquisition Features

Post acquisition, you can utilize Raw Data to adjust the following in B-Mode:

- Zoom
- SRI HD
- Rejection
- Frame Average
- TGC
- Maps
- Dynamic Range
- Gain
- Rotation

You can also take measurements post Stress Echo acquisition.

Analysis

Analysis consists of viewing previously saved loops and assigning scores to each cardiac segment, in order to quantify the function of the muscle or wall segment.

Depending on the protocol configuration, the analysis stage can start manually or automatically after completion of the stress test. In this case, the usual procedure consists of sequentially opening all image groups (if defined) and performing scoring from image to image.

The quad screen is the standard display for comparing heart cycles. The heart cycle loops in the display are synchronized to enable comparison. Each loop in the quad screen can be magnified, using the zoom control.

Image Selection for Analysis

Images can be selected manually or from a pre-defined group in the Protocol screen.

Selection of Images from a group

If groups of images have been defined in the protocol template, you can select a group of images for analysis and sequentially analyze all images from all groups from within the Analysis screen.

1. In a stress examination, press **Template**. A preview of the acquisition displays.
2. Press **Analyze**. A pre-defined group appears in the display with a Wall Segment window on the left.
3. To advance to other groups, use the **Trackball** to move the cursor to the arrows at the bottom of the Wall Segment window. Select an arrow to advance to another group. For further clarification, see callout F in Figure 10-21.

Manual selection of images from Analysis screen

1. When currently in the protocol analysis screen in the Stress analysis quad screen, hold down the **SHIFT** key while performing Steps 2 through 4.
2. Use the **Trackball** to move the cursor to the first image to select in the template matrix.
3. Press **Set**. The frame of the selected loop is in the Stress analysis screen and the next window in the quad screen is automatically selected.
4. Repeat step 2 and 3 to select other images.
5. Depress **SHIFT**.

Manual selection of images in the Protocol screen

1. In a stress examination, press **Template**. A preview of the acquisition displays.
2. Use the **Trackball** to move the cursor to the first image to select.
3. Press **Set**. The frame of the selected loop highlights.
4. Repeat Steps 2 and 3 to select other images.
5. Press **Analyze** to open images in the Analysis screen.

Scoring acquired loops

1. After image selection, press **Analyze**.
The Stress Echo analyze screen displays.

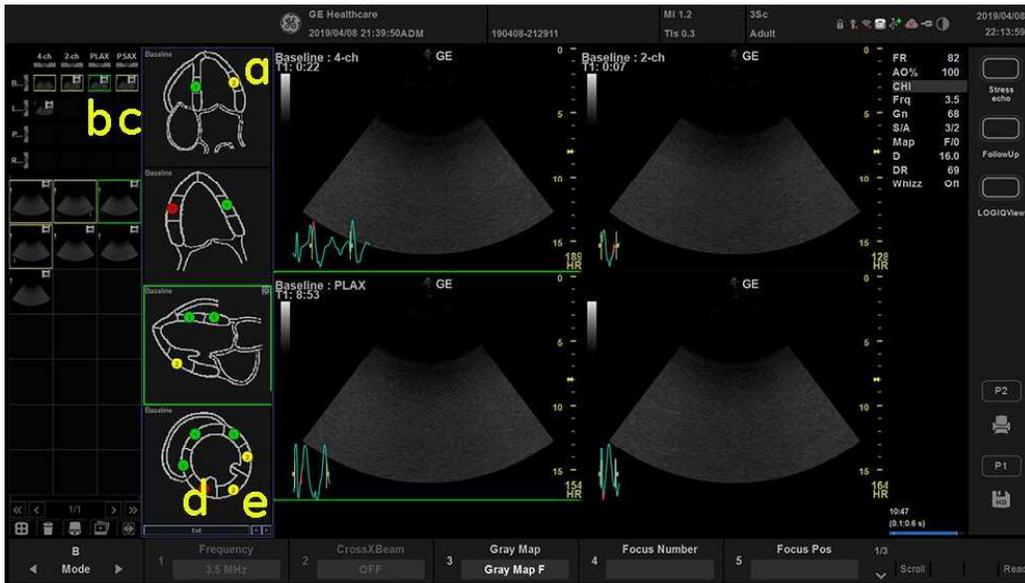


Figure 10-21. Analysis Screen

- a. Wall segment diagram
- b. Selected loop (Highlighted frame)
- c. Displayed loops (Highlighted frames)
- d. Exit Wall motion scoring
- e. Change page or enter next image group

Scoring acquired loops (continued)

2. Use the **Trackball** to move the cursor to a segment in one of the scoring diagrams and press **Set**.
The Score pop-up list displays.
3. Use the **Trackball** to move the cursor to a score.
4. Press **Set**.
The score displays in the relevant segment area in the diagram.

NOTE: *To edit a score, select it and choose a new score.*

5. Repeat step 1 through 3 to score relevant segments.
6. Press the **Change Page** arrow to display the next group of images.
7. Repeat step 1 through 3 to score relevant segments on the new loops.

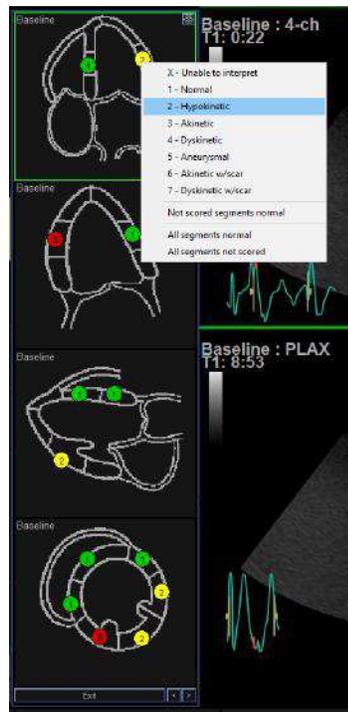


Figure 10-22. Segment Scoring

NOTE: *Since Cine changes into sync mode, subsequent scans are also synchronized. Exit sync mode from the Cine menu.*

Editing/Creating template

The stress package provides protocol templates for exercise as well as pharmacological stress examinations.

The user can create new templates or modify existing templates to suit the individual needs. Up to ten projections and fourteen stress levels can be created in a template.

Templates created may be temporary, used only during the current examination, or saved as new templates, for future use and reference.

The editions that may be performed include:

- Adding/Deleting levels and projections.
- Assigning new labels to levels and projections.
- Defining level options.
- Defining new groups.

Templates are edited/created from the Template editor screen.

Entering the Template editor screen

1. Press the user defined key for **Stress echo**.
2. Press **Template**. The template list displays.
3. Use the **Trackball** to select the Template Editor.
4. Press **Set**. The Template Editor screen displays.

OR

1. Press the user defined key for **Stress echo**.
2. Press **Template Editor** on the primary menu. The Template Editor screen displays.

Template Editor screen overview



Figure 10-23. Template Editor Screen

Table 10-4: Template

Parameter	Description
Template	Select a pre-defined template from the pull-down menu. The protocol template preview updates accordingly.

Table 10-5: Protocol Template Preview

Parameter	Description
Protocol Template Preview	<ul style="list-style-type: none"> Displays an updated preview of the template accordingly to the settings applied. To change Projection and Stress level labels, select a pre-defined label from the pull-down menu or press Set in the actual label field and type a new name.

Table 10-6: Template Settings

Parameter	Description
Template Settings	<ul style="list-style-type: none"> • Cycles: select the number of cine loop heart cycles to store for each level from the pull-down menu or enter the desired value manually. • Continuous Capture: Checking this parameter enables continuous image acquisition throughout the level. The images acquired are temporarily stored in the system's storage buffer. • Preview of store: Checking this parameter enables review and adjustment of cine loops before store. • Show reference: Checking this parameter displays a dual screen with the reference level (first or previous level) on the left and the live image on the right.

Table 10-7: Scan Mode

Parameter	Description
Scan Modes	<ul style="list-style-type: none"> • 2D, Color, PW (Pulsed Wave Doppler), CW (Continuous Wave Doppler), MM (M-Mode), Color MM, Color PW, Color CW

Table 10-8: Other options

Parameter	Description
Other Options	<ul style="list-style-type: none"> • Grid Size: Enter the number of levels and projections for the selected template. • Timers: If you check this parameter, starts T1 and T2 timers automatically. • Auto-start analysis: If you check this parameter, displays the Stress Echo Analysis when the last acquisition is performed. • Show Systole in Analysis: When selected, the systolic part of the cardiac or ECG cycle is only displayed. The whole cycle is not displayed. • Smart Stress: Check Smart Stress to store a subset of the image acquisition settings (e.g., Zoom, Gain, Compress, etc.) for each view in the protocol. Smart Stress enables you to set image acquisition settings for each view at a baseline level and automatically get the same image settings in the corresponding views in the next levels. • Reference image: When Show Reference is selected, selects either corresponding baseline loop or corresponding loop from the previous level to be displayed as reference image during acquisition.

Table 10-9: Pre-defined groups

Parameter	Description
Pre-defined groups	<ul style="list-style-type: none"> • Shows the image groups created. • New group: Creates a new image group. Select the desired images on the template preview. • Update group: Edits a selected group after new loop selection on the template preview. • Delete group: Deletes a selected group.

Selecting a base template to edit

1. Select the base template from the template pull-down menu on the upper left corner.
2. Press **Set**.
The selected template displays in the protocol template preview field, showing the levels, projections and their labels.

Adding/Deleting levels and projections

1. Enter the number of levels and projections in the Grid size field.
The new grid size displays in the protocol template preview field.
2. Press **New Template** to create a new template.
or
Press **Save Template** to update the base template.

Display timers

1. Check the box(es) to display timer(s) as specified.
NOTE: The timers can also be started or stopped at any time during stress examination by using the T1 and T2 Primary Menu key.

Start analysis automatically

1. Check **Auto Start Analysis** to display the Stress Echo Analysis screen when the last acquisition is performed.

Smart Stress

1. Check Smart Stress to store and automatically reuse a subset of the image acquisition settings in the baseline level view in the corresponding views in the next levels.

Configuring levels

The following options can be set up for each level:

Number of cycles to be stored in the cine loop:

1. Enter or select the desired number in the Cycles field.

Continuous Capture

1. Check Continuous Capture if continuous image acquisition throughout the level is desired.

When Continuous Capture is selected, preview of the cine loop and reference display during acquisition are not possible.

Preview of store

1. Check Preview of store if review and adjustment of cine loops before storage is desired.

Show reference

1. Check Show reference if the display of the corresponding reference loop is desired during acquisition (Dual screen mode).

Adding a group

1. In the Protocol template preview field, select the cells to be part of the group.
2. In the Pre-defined group field, press **New group**.
A dialogue box displays to ask the user to enter a name for the new group.
3. Enter the group name.
4. Press **OK**. The new group displays in the pre-defined group field.

Updating an existing group

1. In the Pre-defined group field, select the group to edit.
The selected cells are highlighted in the Protocol template preview field.

NOTE: The selected group is highlighted by a Green frame.

2. Either select a new cell(s) to add to the group or deselect an existing cell(s) to remove from the group.
3. Press **Update group**.

The display in the Protocol template preview field is updated accordingly.

Deleting a group

1. In the Pre-defined group field, select the group to delete.

NOTE: The selected group is highlighted by a Green frame.

2. Press **Delete group**.

The group is removed from the list in the pre-defined group field.

Specifying Scan Mode for each Projection

1. Specify the Scan Mode for each Projection: 2D (B-Mode), Color Flow Mode, M-Mode, Color M-Mode, PW Mode, Color PW Mode, CW Mode, or Color CW Mode.

Saving the Template

You can save the template using controls at the bottom of the Template Editor page, or use the controls on the primary menu.

Table 10-10: Template Editor Saving Options

Parameter	Value
New Template	Select this option to create an entirely new template.
Save As Template	If you would like to create a new template based on the existing template with your modifications, select to Save this Template As, and give it a name.
Save Template	Select this option to save the default template with your modifications.
Delete Template	Select this option to delete a template.

Wall Motion Segment Setup

You can set up the following parameters for Wall Motion Segment in the Utility screen (Utility--> Measure--> Advanced--> Cardiac).

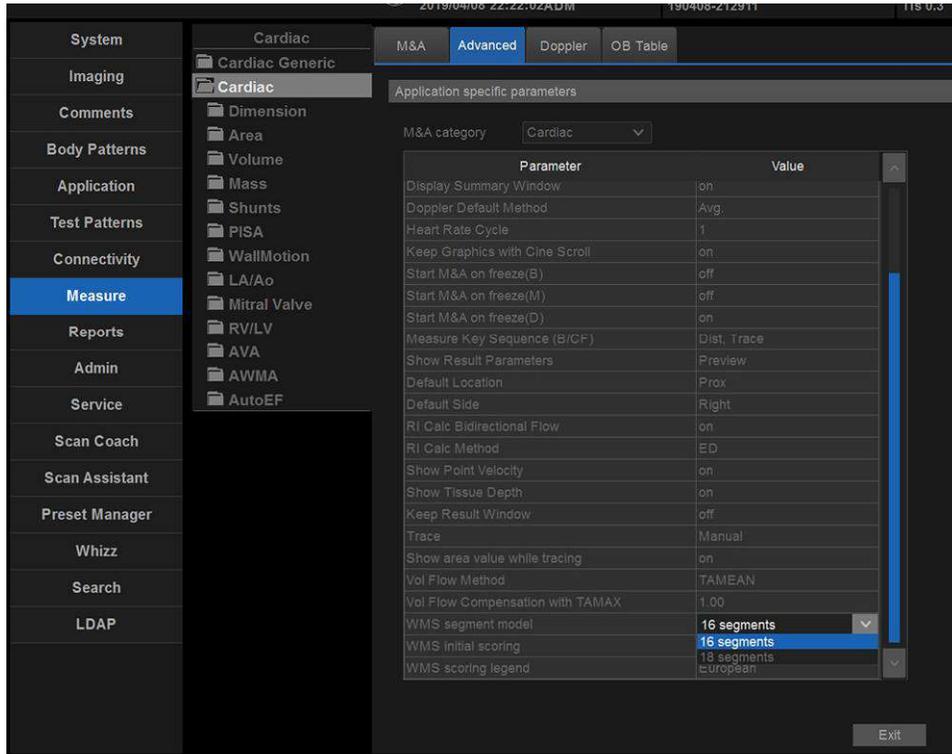


Figure 10-24. Cardiac Wall Motion Segment Setup

Table 10-11: Wall Motion Segment Parameters

Parameter	Value
WMS freeze loop at ES	Specify to freeze the Loop at End Systole
WMS Segment Model	Select 16 or 18 segments
WMS initial scoring	Undefined or Normal
WMS scoring legend	ASE, ASIA or European

Utility Application Settings for Protocol

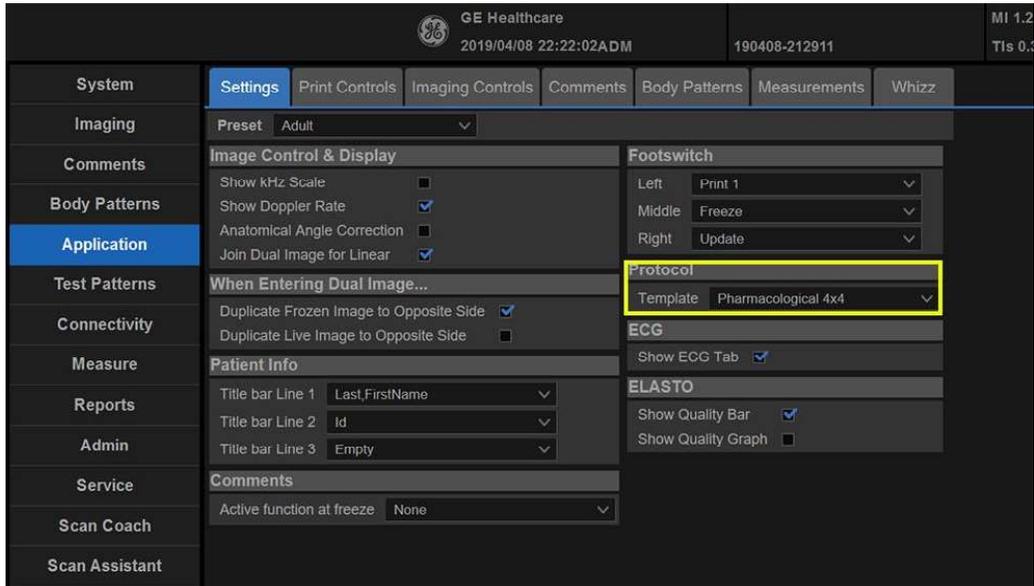


Figure 10-25. Protocol Setup

Table 10-12: Protocol Parameters

Parameter	Description
Template	Select the default template.

Report

If you set up the Wall Motion Analysis field on the Report, you can insert the results.

Select Report to view either the Bull's Eye or Cut Plane Report.

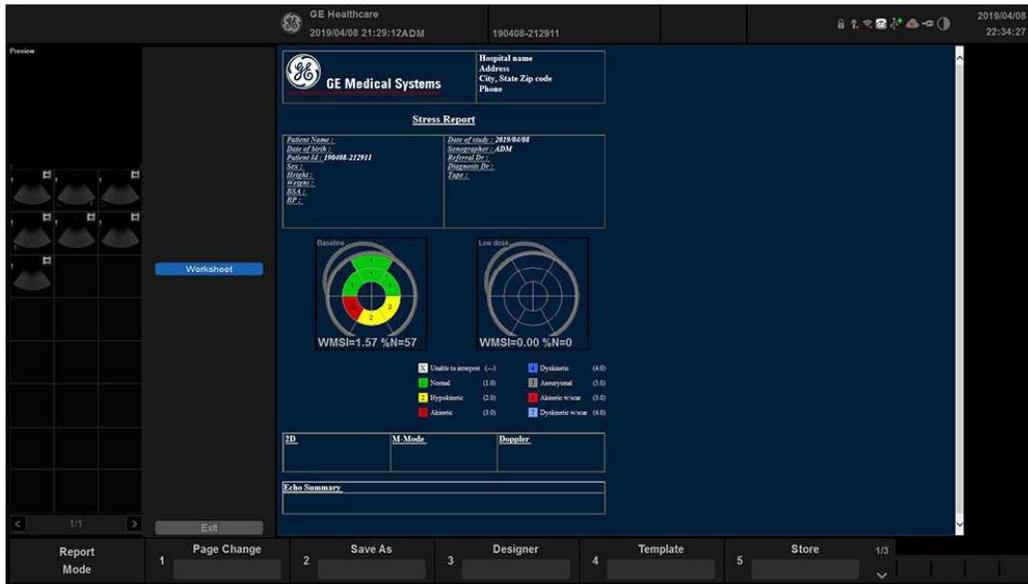


Figure 10-26. Bull's Eye Report Sample

Report (continued)

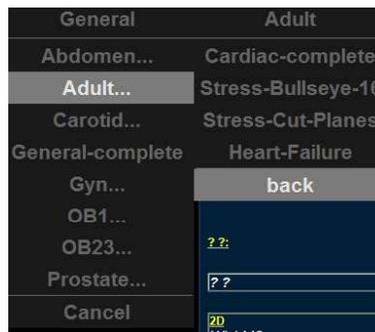


Figure 10-27. Cut Planes Report Example



HINTS

Select either Bull's Eye or Cut Plane on the Reports--> Adult Template.



ECG Option

Overview



DO NOT USE the physiological traces of the Versana Active Ultrasound system for diagnosis and monitoring.



- ECG electrodes should not make contact with other conductive parts, including earth.
- After the defibrillator stimulates the patient, the ECG needs 4 to 5 seconds for recovery.
- The quality of the ECG trace depends on the stability and conductivity of the electrodes during the test, especially during high stages when the patient's movements can cause artifacts.
- Make sure that the lead wires do not swing.
- The device is not waterproof. Do not expose the device to water or any kind of liquid. Maintain in a dry place:
 - The exterior of the recorder may be wiped clean with a soft cloth. Do not use harsh cleaning agents to clean the unit. Do not immerse the unit in any liquid.
 - Clean the cables with a hospital approved cleaning procedure such as those recommended by AAMI or AORN. Do not immerse cables in water.
 - Worn or damaged patient cables are the most common cause of poor ECG signals. ECG signals (or wave patterns) that consistently contain noise or artifact may suggest need for ECG wire or cable replacement.
 - Store the device in a dry place.
 - Always protect the recorder from coming into contact with moisture. In rain or snow conditions, protect the recorder from bad weather elements by wearing the recorder inside a coat.

ECG connecting

The ECG module is connected to the system via USB ports.



Figure 10-28. Connecting ECG to the system

ECG Trace Monitor Display

The scanned image is synchronized with the ECG trace. In Doppler or M-Mode, the traces are synchronized with that particular mode's sweep.

The user can control the gain, position and sweep speed of the traces.

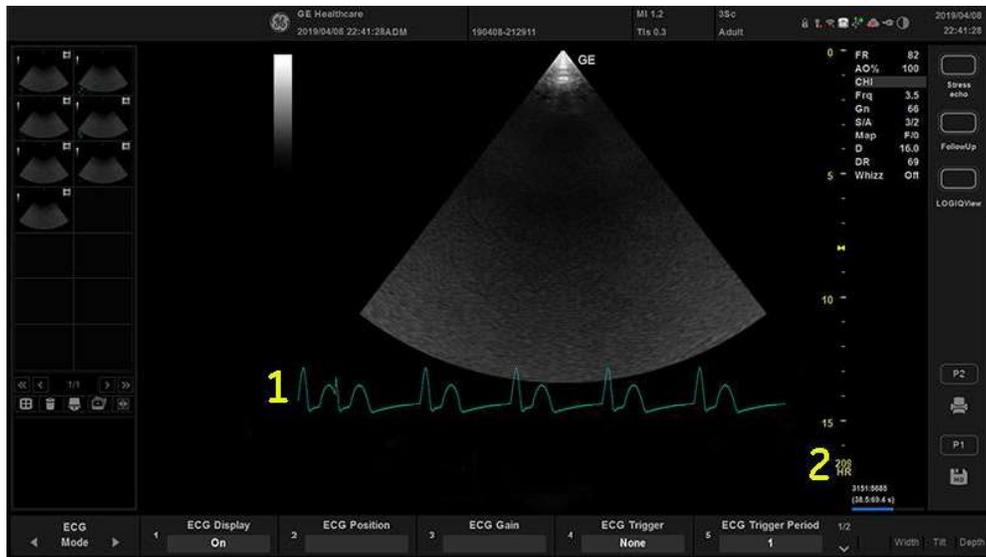


Figure 10-29. ECG Trace Display

1. ECG
2. Auto Heart Rate Display

ECG menu

The ECG menu provides for control of the input signals.

Without the ECG option, the ECG menu is not displayed.



Figure 10-30. ECG Primary Menu

ECG menu (continued)

Table 10-13: ECG parameters

Parameter	Description
Sweep Speed	Change the speed of the trace. The sweep speed of the physio signal on the B-Mode image can be set independent of the timeline (Doppler and M-Mode) sweep speed.
ECG Trigger	<p>Enables intermittent imaging based on the ECG. The trigger location(s) relative to the R trigger are set with the Delay Time key.</p> <ul style="list-style-type: none"> Press ECG Trigger and select one of the options (None, Trig1, Trig2, and Both) and adjust the delay time using the Delay Time key. <p>ECG Trig 1 specifies the delay (ms) from R-wave to triggered frame. ECG Trig 2 specifies the delay from R-wave to second frame. Both activates ECG Trig 1 and ECG Trig 2 simultaneously. Trig 2 must be greater than Trig 1 for dual triggering (Both) to be active.</p>
ECG Display	Provides the ability to turn on the ECG trace and Auto Heart Rate for display on the monitor.
ECG Trigger Period	<p>The control specifies the number of heart cycles (R-waves) that are skipped between ECG triggers.</p> <p>The default is 1 or no skipping.</p>
Delay Time	<p>In ECG Trigger Mode: If only ECG Trig1 or ECG Trig2 is selected via the ECG Trigger key, the Delay Time key controls the R-Delay time of the active trigger. If both triggers are selected (Both), press this key to toggle ECG Trig1 and ECG Trig2 and rotate the key to change the delay time. Once the trigger is set, the snap shot image is displayed each time the update line passes the active trigger(s).</p> <p>In Timer Trigger Mode: Adjusting the key changes the delay time between images.</p>
ECG Gain/Position	<p>Allows for the amplitude control of the ECG trace or allows for the vertical positioning of the ECG trace on the image display.</p> <p>Press the key to toggle between Gain and Position. The default is Gain.</p>

Chapter 11

Vascular

Describes how to perform Vascular measurements and calculations.

Vascular Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

Patient information must be entered before beginning an exam. See 'Scanning a New Patient' on *page 4-10 for more information*.

Any measurement can be repeated by selecting that measurement again from the menu.

Vascular Measurements

Introduction

Vascular measurements offer several different types of measurement studies:

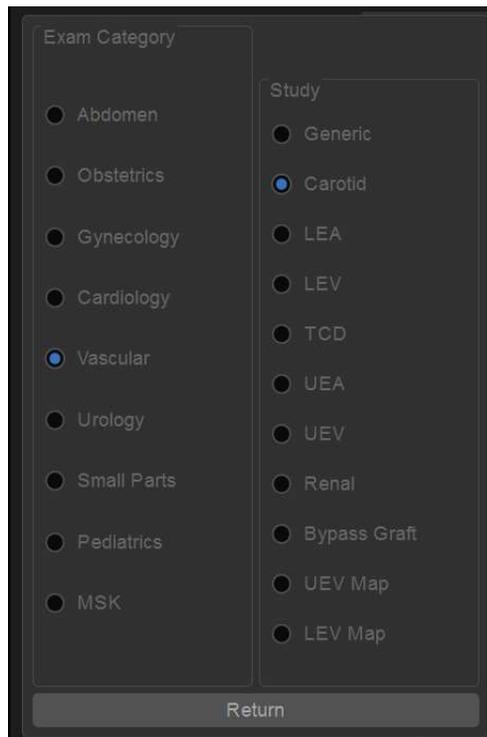


Figure 11-1. Vascular Exam Category

Introduction (continued)

- Generic – Common to all applications. See 'Generic Measurements' on *page 7-66 for more information.*
- Carotid
- LEA (Lower Extremity Artery)
- LEV (Lower Extremity Vein)
- TCD (Trans Cranial Doppler)
- UEA (Upper Extremity Artery)
- UEV (Upper Extremity Vein)
- Renal
- Bypass Graft
- UEV (Upper Extremity Vein) Map
- LEV (Lower Extremity Vein) Map

To change an exam calc:

1. Press **Second Menu** on the primary menu.
2. To select another exam study, select the desired exam study folder.

A vascular study is a group of particular vessels. You can customize the vessel exam calcs in the configuration menu. See 'Measurement and Calculation Setup' on *page 7-13 for more information.*

When you use Auto Vascular calculation, you use the vessel keys to post-assign vascular calculations. When you are not using Auto Vascular calculation, the vessel key is used for manual measurement.

IMT Measurement

You can measure the average of the intima media thickness for use as the index of arterial sclerosis.

IMT can be measured both on the posterior and the anterior walls of the vessel.

NOTE: *Due to the physical properties of ultrasound imaging, the posterior IMT measurement is generally more accurate than the anterior IMT measurement.*

IMT Measurement - Auto

Auto IMT automatically measures the thickness of the Intima Media on the far and near vessel walls. Near Wall IMT is the distance between the trailing edges of the adventitia and intima; the Far Wall IMT is the distance between the leading edges of the adventitia and intima.

Set up the parameters you want to record on the report on the Utility -> Measure -> M&A page while are in the Carotid application. Select CCA/ICA/BIF -> IMT Far/Near -> Parameter (Average, Max, Min., Standard Deviation, Points, or Distance).

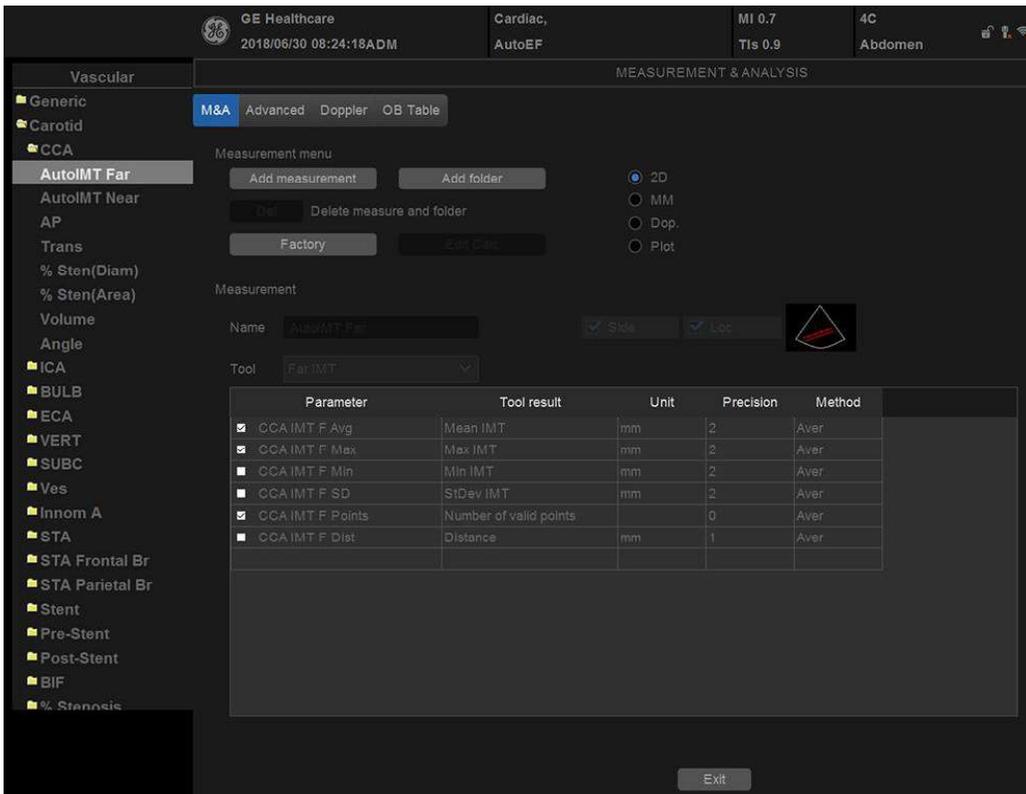


Figure 11-2. Configuring Auto IMT

IMT Measurement - Auto (continued)

In the Vascular Carotid application, the Auto IMT measurement is available.

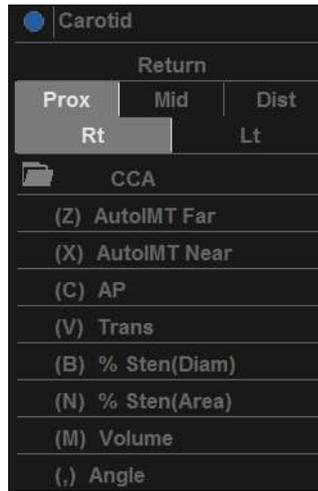


Figure 11-3. Auto IMT menu

The following controls are available.

Table 11-1: Auto IMT description

Parameter	Description
IMT Far	Select to begin the Far Field IMT measurement.
IMT Near	Select to begin the Near Field IMT measurement.
Length/Offset Rotary	Push to save Length/Offset as a preset. -40/+40 Length. At zero, you can freely adjust the length, but only vertically. Press key to save value as default. Offset distance, -20 (Left) / +20 (Right)
Overall / IMT Trace Fit / Intima	Adjusts (re-measures) the IMT automatically measured by the system.
Rt / Lt Side	Select Left / Right Side.
Cursor Select	Allows you to update cursor placement.

IMT Measurement - Auto (continued)

To measure the IMT,

1. In the Carotid application, press **Freeze**, press **Measure**.
2. Select the appropriate IMT measurement. For example, if measuring the IMT of the far wall of the right common carotid artery, select Rt CCA folder, and then **IMT Far**.
3. Use the **Trackball** to set the length. Or use the **IMT Length / IMT Offset** control to set the length and offset distance. The Offset key controls how far away from the vertical line the measurement starts. Length is the length of the tool itself. If set to zero, you can adjust it anywhere on the image.
4. Press **Set**.

You can either adjust the trace prior to pressing P1 key or press P1 key to store the image which also saves the measurement to the Report.

To adjust the trace, use the **IMT Overall** control. The Trace fit (up/down) adjusts the inter luminal line whereas the overall (rotate) adjusts both IMT lines.

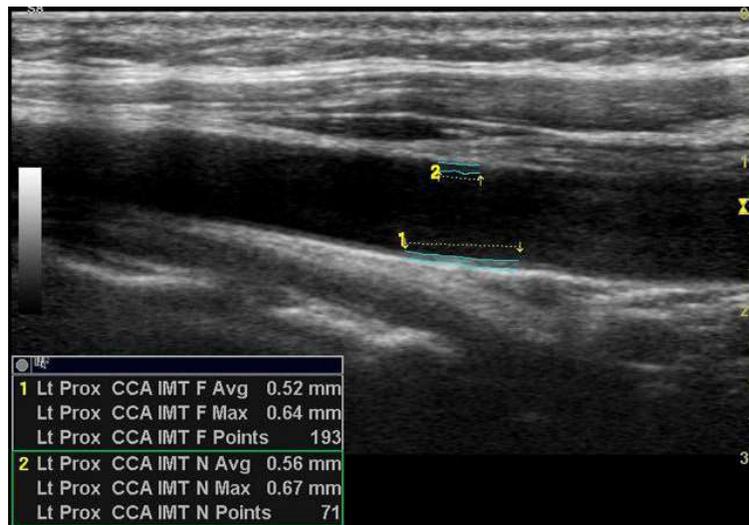


Figure 11-4. Example of Auto IMT Far Measurement

IMT Measurement - Auto (continued)

5. Position the cursor, then select **IMT Near**.
6. Use the Trackball to set the length. Or use the Length / Offset control to set the length and offset distance.
7. Press **Set**. "Store image to accept IMT measurement" displays in the message area. If the traces fit both layers of the wall, approve the measurement by press the P1 key to store the image.

To adjust the trace prior to pressing P1 key, use **Cursor Select** on the primary menu. The measurement is saved to the Report.

NOTE: *Since the IMT measurements are done semi-automatically, the operator has to approve the detection by visual inspection before storing the results in report.*

Auto Vascular Calculation Overview

Auto Vascular Calculation enables the Versana Active to detect and identify a cardiac cycle. It allows you to assign measurements and calculations during live timeline imaging, while the image is frozen, or in CINE. Peak values are detected for venous flow.

During cardiac cycle detection, the system identifies the cardiac cycle using calipers, vertical bars, and/or highlighting of timeline data. Use of identifiers is based on measurements and calculations selected by an operator for the current application. The system may place calipers at early systolic peak, peak systole, minimum diastole and end diastole. Vertical bars may also be placed to indicate the beginning and end of the cardiac cycle. The peak and/or mean trace may be highlighted. You can edit the cardiac cycle identified by the system or select a different cardiac cycle.

You can select the calculations to be displayed in the M&A Result window during live scanning or on a frozen image. These calculations are displayed at the top of M&A Result Window located adjacent to the image. These calculations are presettable by application which means you can set up the default calculations to be displayed for each application.

Auto Vascular Calculation

Activating Auto Vascular Calculation

To activate Auto Vascular Calculation, select **Auto Calc** from Live (calculations displayed on the real-time image) or Freeze (calculations displayed on the frozen image).

To deactivate Auto Vascular calculation, select **Off**.

Setting up Auto Vascular Calculation Parameters

- **Selecting Auto Trace**
You can select to have a continuous auto trace of the max or mean velocities.
 - Select Max or Mean from **Trace Method** in Utility -> Imaging -> PW page.
- **Selecting Trace Direction**
Trace Direction lets you use peak timeline data above, below, or composite (above and below) the baseline.
 - Select Above, Below, or Both to set the peak timeline data in Utility -> Imaging -> PW page.
- **Modify Calculation**
 - a. Press PW key on the control panel.
 - b. Select **Modify Auto Calcs** on the primary menu. Or select **Second Menu** after pressing Measure key. The Modify Calculation menu is displayed.
 - c. Select which measurements and calculations are to be displayed in the Auto Vascular calculation window.

You can select the following parameter: PS, ED, MD, HR, TAMAX, PI, RI, Accel, PS/ED, ED/PS, AT, Volume Flow, PV.

Auto Vascular Calculation (continued)

Auto Vascular Calculation Exam

1. Preset the system.
2. Perform the scan and press **Freeze**.
3. Activate Auto Vascular Calculation.

The system performs a calculation automatically.



Figure 11-5. Auto Vascular Calculation

Auto Vascular Calculation Exam (continued)

The Auto Vascular calculation is assigned to particular vessel measurements.

1. Press **Measure** to display the Measurement menu.
2. Select the location of the vessel (Prox, Mid, or Dist) and Side (Right or Left).
3. Select the desired vessel name from the menu.

Selected vessel measurements are automatically assigned with the Auto Vascular calculation. The results are then displayed in the Results Window.

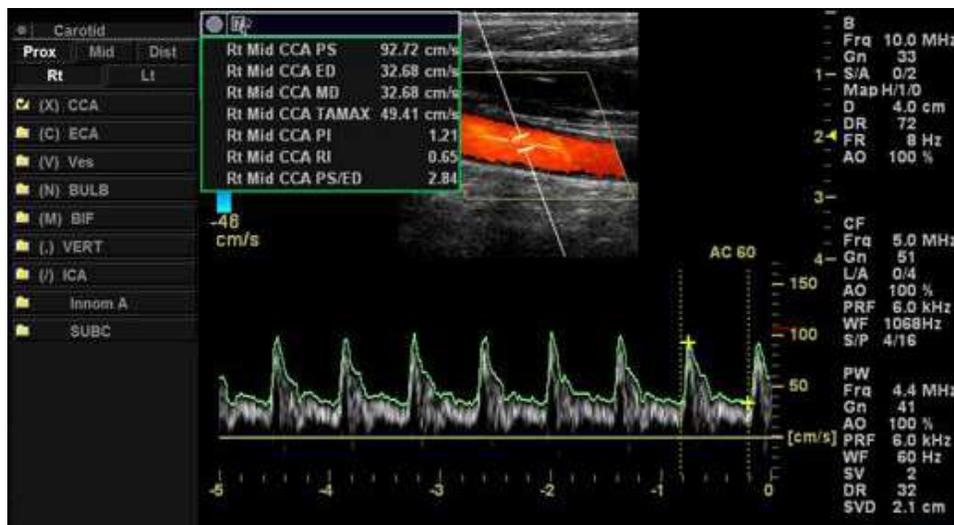


Figure 11-6. Assigned Vessel

NOTE: When you want to cancel the assignment, you can use the **Cancel Transfer**. See 'Cancel Transfer' on page 7-81 for more information.

Auto Vascular Calculation (continued)

During the course of an exam, the cardiac cycle may be indicated between two yellow bars; the peak trace and the mean trace may appear in green; calculation indicators appear on the spectral trace as a caliper identifier (these vary, depending on the selected calculation in the Results Window).

The right-most, most complete cycle is typically chosen to be the selected cardiac cycle. You can select a different cardiac cycle.

To select a different cardiac cycle:

- Move through CINE memory with the Trackball until the desired cardiac cycle is selected by the system.
- Use the **Cycle Select** control to cycle to a different cardiac cycle.

NOTE: You need several good cycles in front of the new cardiac cycle for this to be successful. Oftentimes, this is problematic near a freeze bar.

NOTE: You need several good cycles in front of the new cardiac cycle for this to be successful. Oftentimes, this is problematic near a freeze bar.

To move the systole or diastole position:

- Use the **Cursor Select** control to move the start systole position or the end diastole position.

Manual Vascular Calculation

You can perform the following calculations manually when Auto Doppler Calculation is not activated.

1. Press **Measure**.
If necessary, you can select another Exam Calc and then select parameters from Modify Calculation.
2. Select the location of the vessel (Prox, Mid, or Dist) and Side (Right or Left).
3. Select the desired vessel folder.
The Measurement menu is displayed.

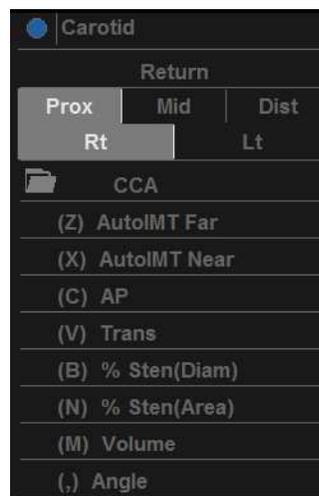


Figure 11-7. Measurement Menu Example

4. Make the required measurements according to the system, or select your preferred measurements.

Manual Vascular Calculation (continued)

For each vessel in Doppler mode, you can make any of the following measurements. See 'Doppler Mode Measurements' on *page 7-80 for more information.*:

- Peak Systole (PS)
- End Diastole (ED)
- Minimum Diastole (MD)
- Heart Rate
- TAMAX
- TAMEAN
- Pulsatility Index (PI)
- Resistive Index (RI)
- S/D Ratio
- D/S Ratio
- Acceleration (Accel)
- Acceleration Time (AT)
- Volume Flow
- Peak Value (PV)

To select vascular measurements

Your system is set up to show the measurements that you usually make for each vessel. To make a measurement that is not shown for the selected vessel:

1. Select the folder you want to measure.

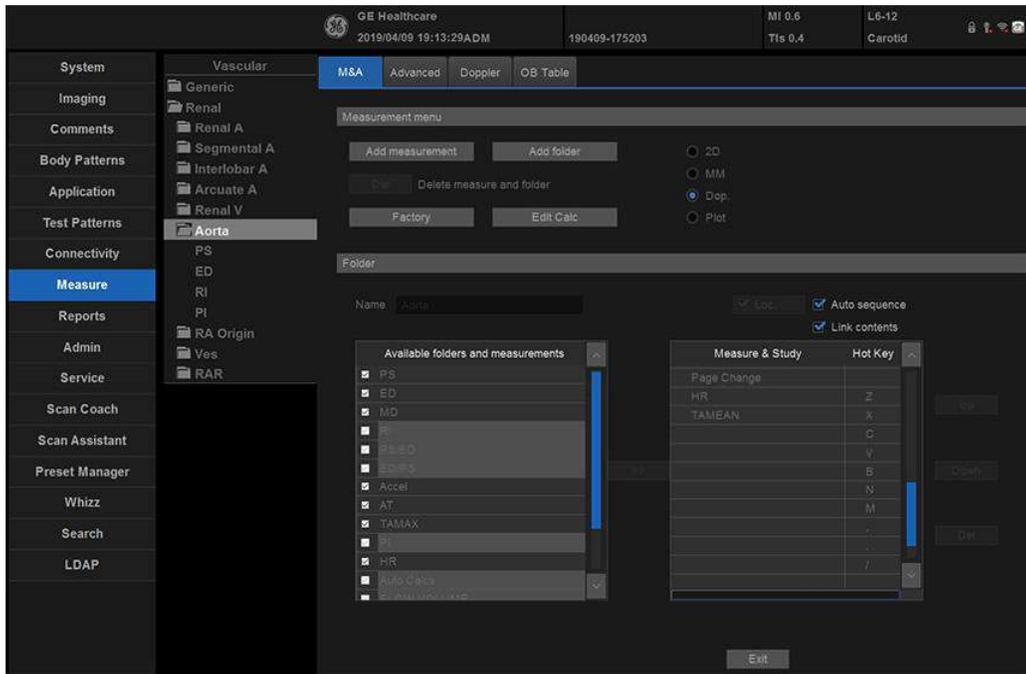


Figure 11-8. Aorta folder - example

2. The system displays all possible vessel measurements.

To select vascular measurements (continued)

3. Select the desired measurement.

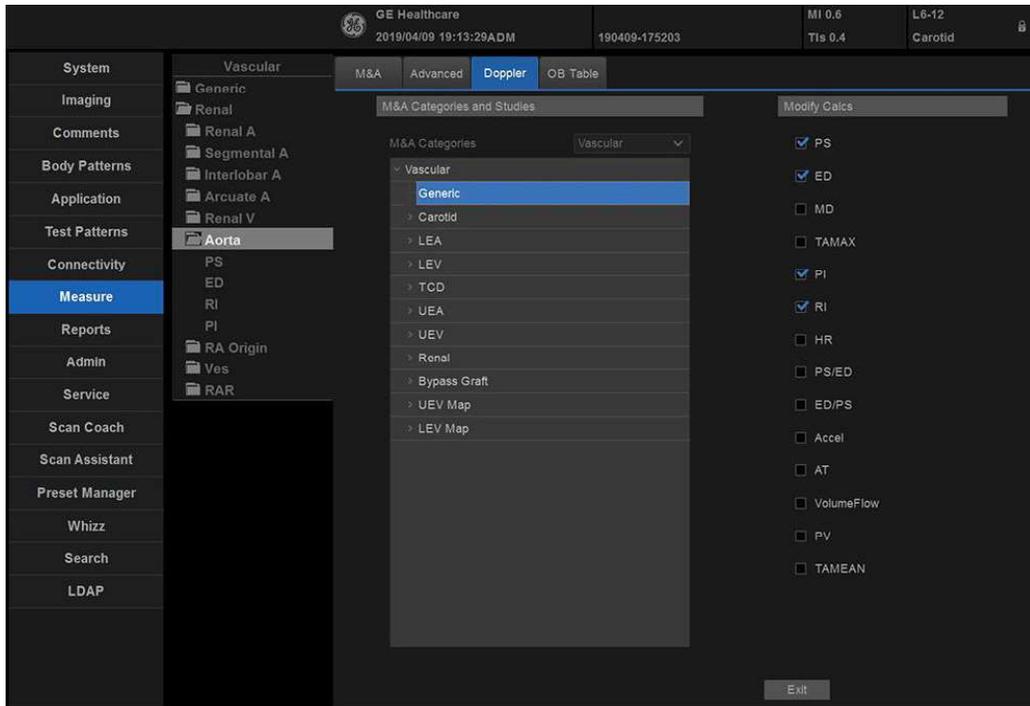


Figure 11-9. Vascular Measurements

NOTE: The following instructions assume that you first scan the patient and then press **Freeze**.

Naming format for vessels

When you want to measure a vessel, you select the folder for the vessel. Many vessel folders are labeled with an abbreviation. The following table lists abbreviations used for naming vascular vessels.

Table 11-2: Vascular Vessel Abbreviations

Acronym	Name
ACA	Anterior Cerebral Artery
AComA	Anterior Communicating Artery
ATA	Anterior Tibial Artery
ATV	Anterior Tibial Vein
Axill	Axillary Artery
Axill V	Axillary Vein
BA	Basilar Artery or Brachial Artery
Ba V	Basilic Vein
Br V	Brachial Vein
CCA	Common Carotid Artery
Ceph V	Cephalic Vein
CFV	Common Femoral Vein
CHA	Common Hepatic Artery
Com Femoral	Common Femoral Artery
CIA	Common Iliac Artery
CIV	Common Iliac Vein
Com Iliac A	Common Iliac Artery
DFA	Deep Femoral Artery
DFV	Deep Femoral Vein
Dors Pedis	Dorsalis Pedis
DPA	Dorsalis Pedis Artery
ECA	Exterior Carotid Artery
EIA	External Iliac Artery
EIV	External Iliac Vein
FV	Femoral Vein
GSV	Greater Saphenous Vein

Table 11-2: Vascular Vessel Abbreviations

Acronym	Name
ICA	Internal Carotid Artery (Transcranial Doppler)
ICA	Inferior Carotid Artery (Carotid Artery)
IJV	Internal Jugular Vein
IMA	Inferior Mesenteric Artery
Inn	Innominate
IVC	Inferior Vena Cava
LSV	Lesser Saphenous Vein
MCA	Middle Cerebral Artery
Mcub V	Median Cubital Vein
Mid Hep V	Middle Hepatic Vein
MRA	Main Renal Artery
PCA	Posterior Cerebral Artery
PCoMA	Posterior Communicating Artery
Peron	Peroneal
POP	Popliteal
PTA	Posterior Tibial Artery
PTV	Posterior Tibial Vein
RA	Radial Artery
SMA	Superior Mesenteric Artery
SMV	Superior Mesenteric Vein
SUBC	Subclavian Artery
SUBC V	Subclavian Vein
SFA	Superficial Femoral Artery
TCD	Transcranial Doppler
TIPS	Transjugular Intrahepatic Portosystemic Shunt
UA	Ulnar Artery
VERT	Vertebral Artery

Vascular Worksheet

Overview

The vascular report is structured to automatically display vascular measurements made at specific anatomical sites. The report can also display an average, last, maximum, or minimum value of the latest three measurements. Calculated ratios are automatically summarized and displayed.

To view the Vascular Worksheet

1. Press **Measure**.
2. Select **Report**.

The system displays the report.

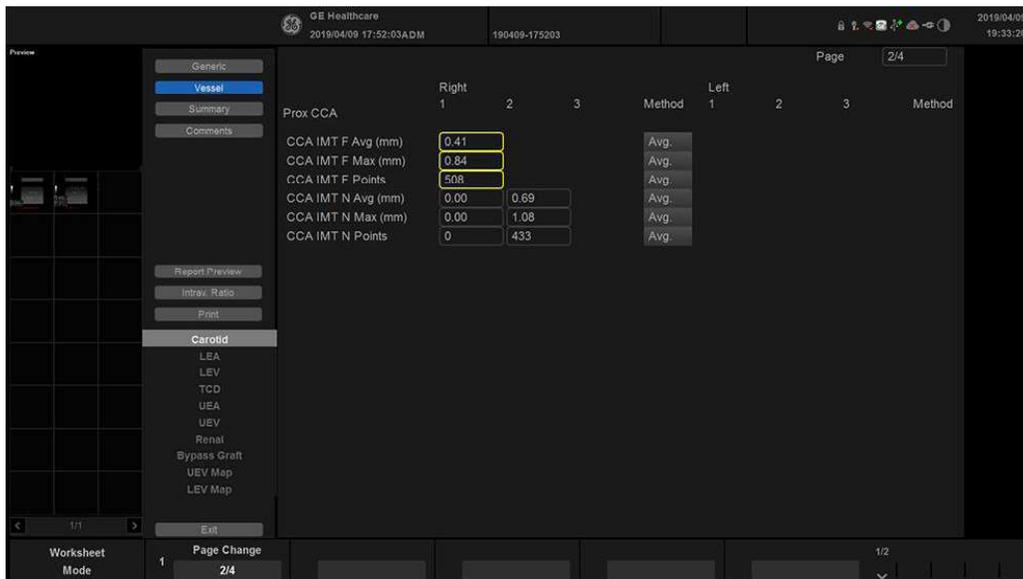


Figure 11-10. Vascular Worksheet - Example

To view the Vascular Worksheet (continued)

Only measured parameters are displayed. Location information is labeled with vessel name first. Measured parameters of the vessel are grouped under the vessel label.

Selected value by method is highlighted, however, when the average method is selected, the highlighted cursor is removed.

When an entire vessel measurement does not have sides (left or right), the side label is not displayed in that vessel study report.



HINTS

Some fields on the report are view only, and others you can change or select. To easily see which fields you can change or select, move the **Trackball**. As the cursor moves over a field that you can change or select, the field is highlighted.

Report Display

1. **Generic:** Select this key to display the Generic Report. Generic study measurements/calculations, such as volume and velocity, are displayed on this report.
2. **Vessel:** Select this key to display the Vessel Report. Values can be edited from this page.
3. **Summary:** Select this key to display the Vessel Summary.
4. **Comments:** Select this key to display the Examiner's comment window. See 'To edit a worksheet' on *page 7-62 for more information*.
5. **Delete Value:** Use to delete a value (each measurement value). See 'To edit a worksheet' on *page 11-23 for more information*.
6. **Exclude Value:** Use to exclude a value from the result line. See 'To edit a worksheet' on *page 11-23 for more information*.
7. **Intravessel Ratio:** Select this key to display the Intravessel Ratio Calculation window. See 'Intravessel ratio' on *page 11-28 for more information*.
8. **Page Change:** If a report has more data, to view the next page, adjust the Page Change control.

To edit a worksheet

To change data on a report:

1. Press **Report**.
2. To position the cursor at the field you want to change, move the **Trackball**.

Press **Set**. The field is highlighted.

3. Type the new data in the field and move the cursor to another place. Press **Set**. The new data is displayed in blue and asterisk are appended to value and resultant value to indicate that it was manually entered.

The average measurements, calculations and ratios are automatically updated to reflect the edited values.

	Right			
	1	2	3	Method
CCA				
CCA IMT F Avg (mm)	1.68			Avg.
CCA IMT F Max (mm)	2.00			Avg.
CCA IMT F Points	379			Avg.
ECA				
PS (cm/s)	12.9	20.1*		*
ED (cm/s)	12.4	18.4		*
MD (cm/s)		14.0		*
TAMAX (cm/s)		31.2		*
PI		1.09*		*
RI		0.08*		*
PS/ED		1.1*		*
AC (deg)	0	0*		*

Figure 11-11. Display of the edited value

NOTE: *If the user moves the cursor to the edited value and presses the **Set** key once, the value returns to the original value before the edit.*

To edit a worksheet (continued)

To delete data:

1. Select **Report**.
2. To position the cursor at the field you want to delete or exclude, move the **Trackball**.
The field is highlighted.
3. Select **Delete Value** from the primary menu.

For Example:

1. If the user measured RI 4 times, however, latest 3 sets of measurements were displayed in the report.

Table 11-3: Example of Latest Measurements in Report

Result Number	#2	#3	#4
PS	0.500	0.600	0.700
ED	0.100	0.200	0.300
RI	0.800	0.667	0.571

1. Then, the user deleted PS value of #3 from the report.
2. The whole set of #3 measurements is deleted from the report and #1 set of measurements is shifted and displayed as below.

Table 11-4: Example of Report after Value Deleted

Result Number	#1	#2	#4
PS	0.400	0.500	0.700
ED	0.000	0.100	0.300
RI	1.000	0.800	0.571

To edit a worksheet (continued)

To exclude data:

When the user selects a particular value on the Report and selects **Exclude Value**, this value is excluded from result line and resultant value is re-calculated without this value and also calculation values using this value is 'blank'.

1. Select **Vessel Worksheet**.
2. To position the cursor at the field you want to delete or exclude, move the **Trackball**.
Press **Set**. The field is highlighted.
3. Select **Exclude Value** from the primary menu.
4. The data in the field is not visible and is not included in report calculations as below.
5. To add back in a previously excluded value:

Select **Exclude Value** from the primary menu. The value(s) are now visible and included in the report calculations.

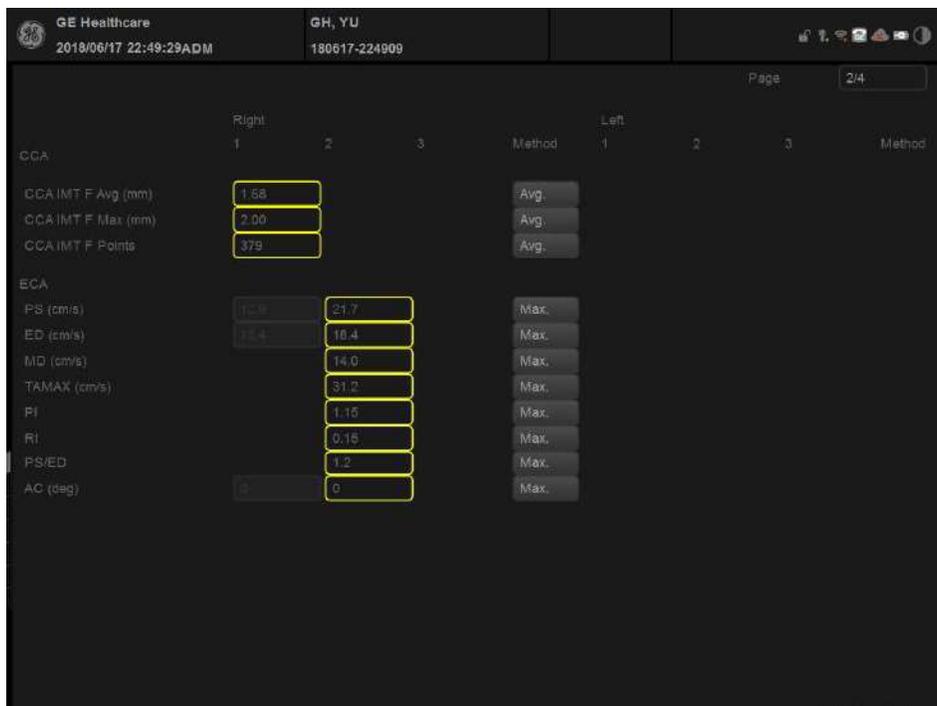


Figure 11-12. Display of the excluded value

To edit a worksheet (continued)

The user can select the method for calculating the cumulative value.

This value is only calculated by using displaying values. If the user takes parameters more than 3 times, the last 3 values are used for this calculation.

1. Move cursor to method column and press **Set**.
2. The pull-down menu is displayed. Move the cursor to any one of methods and press **Set**. The selected method is displayed in the column.



Figure 11-13. Pop-up menu of methods

Examiner's Comments

To type a comment on a report:

1. Select **Comments** on the report screen.
2. Type comments about the exam.
3. To close the Examiner's Comments window, select **Report Preview**. The comments appear on the report.

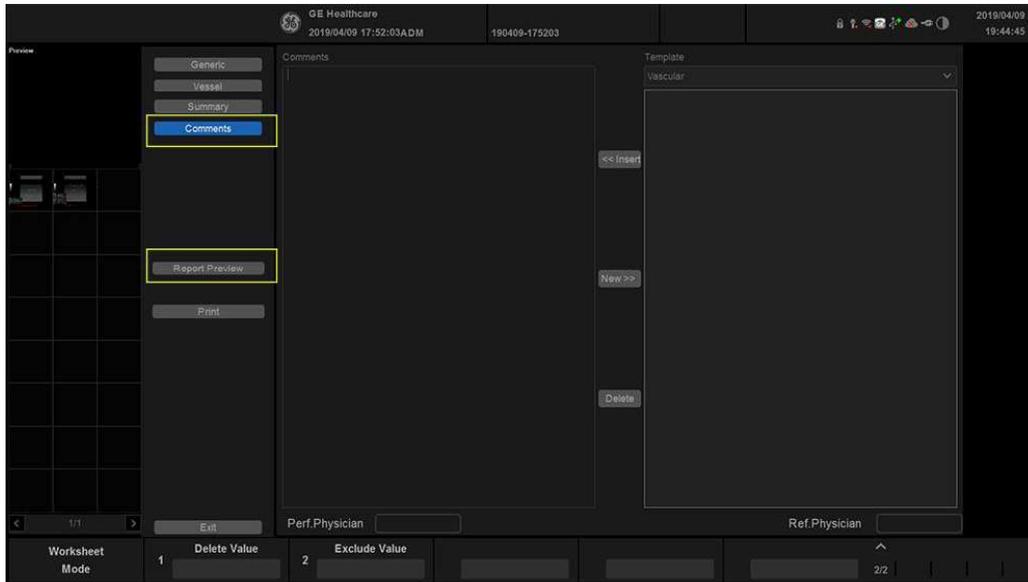


Figure 11-14. Examiner's comments field

Intravessel ratio

To calculate Intravessel ratio, you need a measurement of assessing pressure and stenotic velocities.

1. Select **Intrav. Ratio** to display the pop-up window in the header section of the report.



Figure 11-15. Intravessel Pop-up Window

2. Select the first velocity.

The value is displayed in the window.

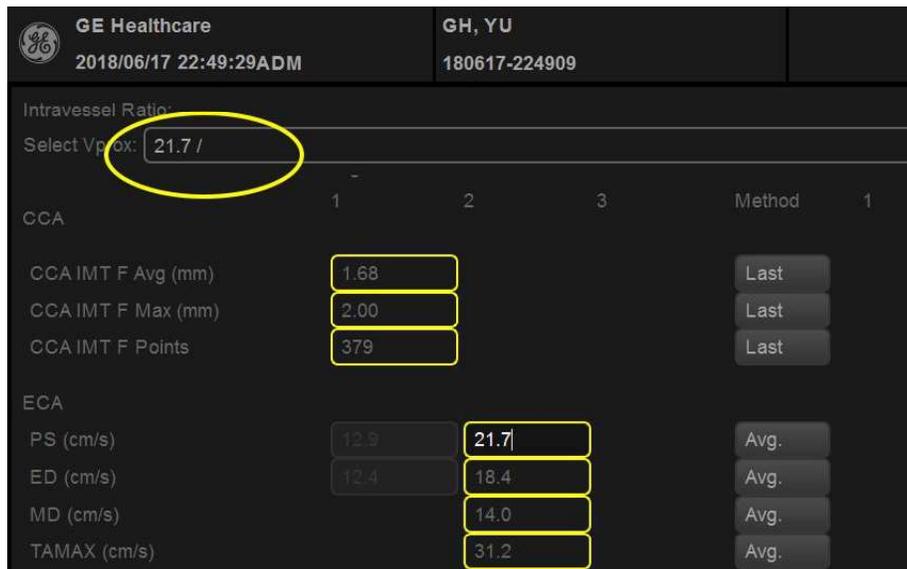


Figure 11-16. Intravessel ratio one

Intravessel ratio (continued)

3. Select the second velocity.

The second value and Result value are displayed in the window.

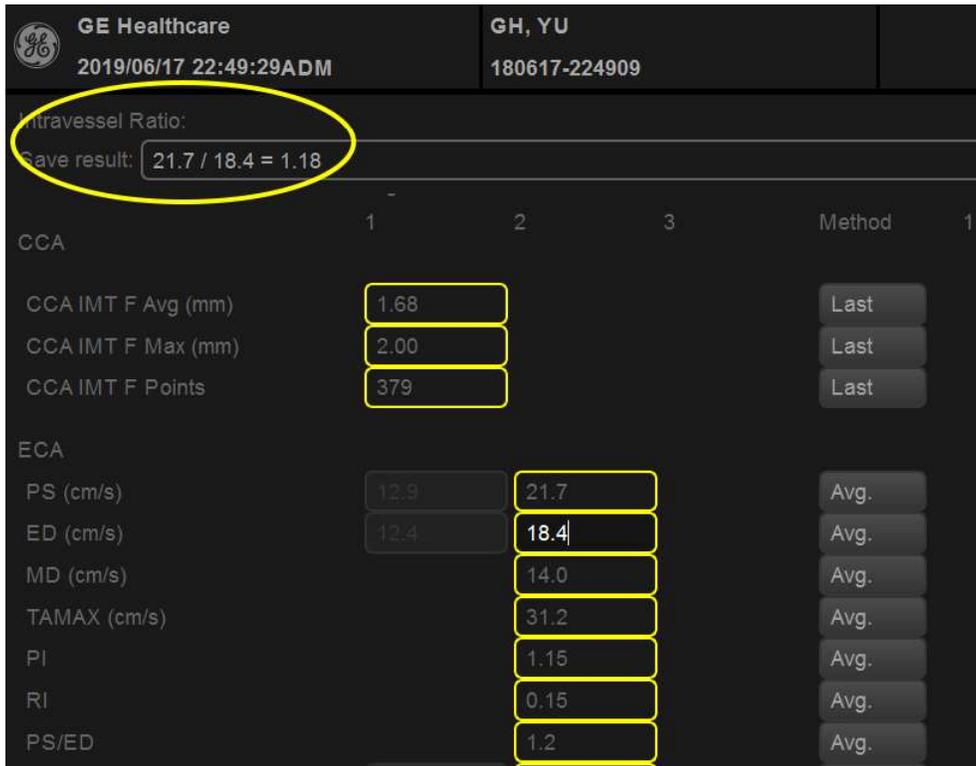


Figure 11-17. Intravessel ratio two

- To save the Intravessel ratio to the Vessel Summary, move the cursor to **Save** and press **Set**.
- To clear values, move the cursor to **Clear** and press **Set**.
- To cancel and exit Intravessel ratio, move the cursor to **Cancel** and press **Set**.

NOTE: *Intravessel Ratio is only displayed and saved in the Vessel Summary as Intra-Ratio.*

Vessel Summary

The Summary is designed to automatically display measurements made at specific anatomical sites. Calculated ratios are automatically summarized and displayed.

The Summary can be displayed at any time during the exam by selecting **Summary** from the Vascular report menu.

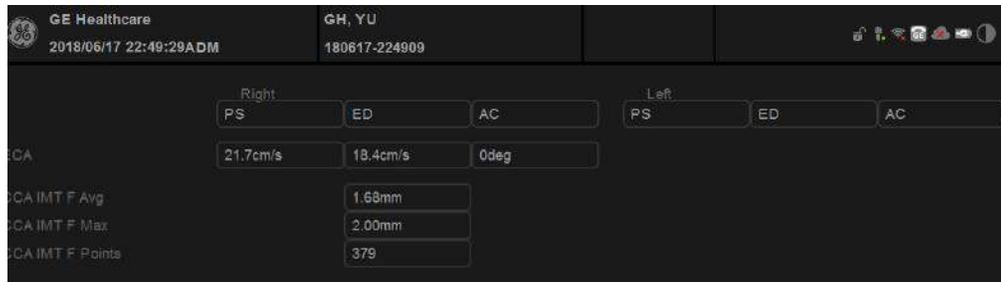


Figure 11-18. Vessel Summary - Example

Vessel Summary (continued)

1. The first row, indicating Right or Left, is not displayed when the side is not defined in the vessel. In the third column on the second line, you select the calculations. Move the cursor to the third column, and the pop-up menu is displayed. The selected parameter is displayed in every third column.

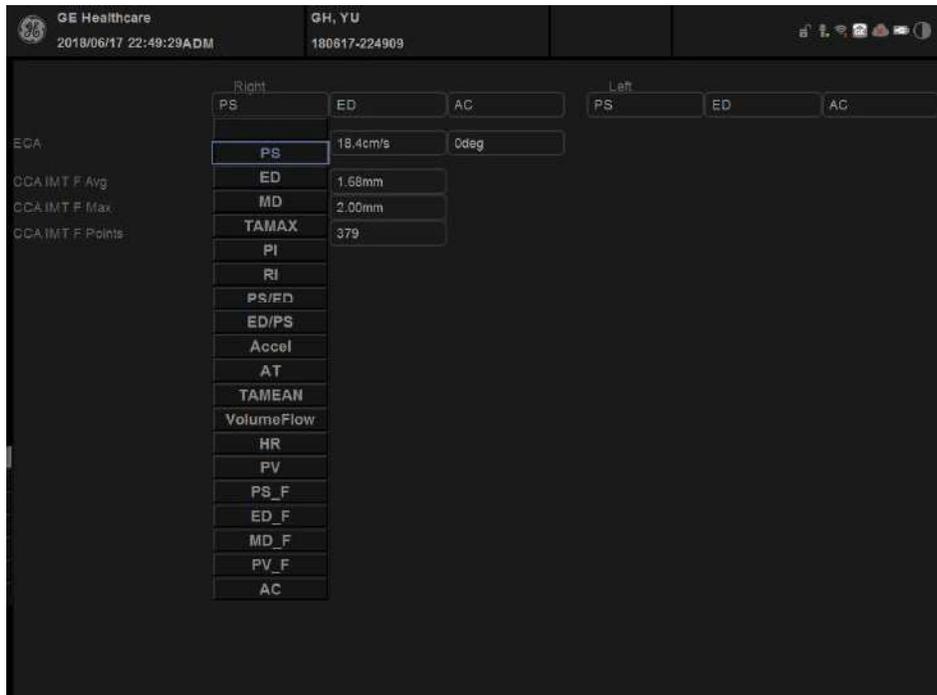


Figure 11-19. Pop-up menu

2. Vessel Name with location information.
3. Check Box. Use to select the vessel velocity for calculating the vessel ratio (ex. ICA/CCA). You can only select one location (position) in a vessel.
4. Result value column. This value cannot be changed or excluded from this page.
5. Calculation name and result. ICA/CCA: The ICA/CCA ratio selects the highest systolic ICA and CCA velocities when calculating this ratio, and displays the velocities.

Carotid Study

In the configuration page for ICA/CCA ratio, you can specify which portion of the CCA vessel (Prox, mid, distal) is chosen. You can override the selections on the Vessel summary.

The ICA/CCA ratio is able to be configured for either systole or diastole.

The vertebral vessel also has systole and diastole selections. In the summary page, there is a box to select flow reversal for vertebral flows. The choices are Ante (Antegrade), Retr (Retrograde), and Abs (Absent).

To select the method:

Move cursor to the box and press **Set**. After the pop-up menu (Blank, Ante, Retr, Abs) is displayed, select from a menu of choices. The selected choice is displayed in the column.

The box is independent of Left and Right.

Renal Artery Study

For renal arteries, you can calculate RENAL/AORTIC ratio (RAR) based on peak systolic velocities.

You can combine the two renal summary pages, and have a heading to separate the different measurements (main renal, intra renal). You can scroll between the measurements. The most commonly used, the main renal artery, is the default.

Lower Extremity Artery Study

For the lower extremity artery, you need an intra vessel ratio (assessing pre vs. stenotic velocities). You can specify which (ratio is stenotic/pre).

The intra-vessel ratio needs to be available for all vascular measurements. This appears on the report only if used.

Recording Worksheet

The report can be saved as you would any ultrasound image. Once it is displayed on the screen, it can be recorded on the DVR, printed on the B/W printer, stored on media with the Image Archive option.

Chapter 12

Urology

Describes how to perform Urology measurements and calculations.

Urology Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Beginning an Exam' on *page 4-2 for more information*.

Any measurement can be repeated by selecting that measurement again.

The system retains all measurements, but the report retains only the last six measurements of each type.

Urology Calculations

Introduction

Urology measurements offer three different types of measurement studies:

- Generic—Common to all applications. See 'Generic Measurements' on *page 7-66 for more information.*
- Urology
 - This chapter describes Urology B-Mode measurements.
 - The Urology M-Mode measurements are common to other applications. See 'M-Mode Measurements' on *page 7-77 for more information.*
 - The Urology Doppler measurements are common to other applications. See 'Doppler Mode Measurements' on *page 7-80 for more information.*
- Pelvic Floor. See 'Pelvic Floor Measurements' on *page 12-10 for more information.*

To change a study:

1. Press the **Second Menu** button, the Urology exam category menu is displayed.
2. To select another study, select the desired study.

Urology B-Mode Measurements

In B-Mode, the Generic Exam Calcs for Urology includes the following measurements:

- % Stenosis
- Volume
- Angle
- A/B Ratio

See 'B-Mode Measurements' on page 7-68 for more information.

The following measurements are located specifically in the Urology Exam Calcs. Those specific measurements (Bladder Volume, Prostate Volume and Renal Volume) are listed on the following pages.

Press **Measure** key. Then select the **Second Menu** button, the following category is displayed.

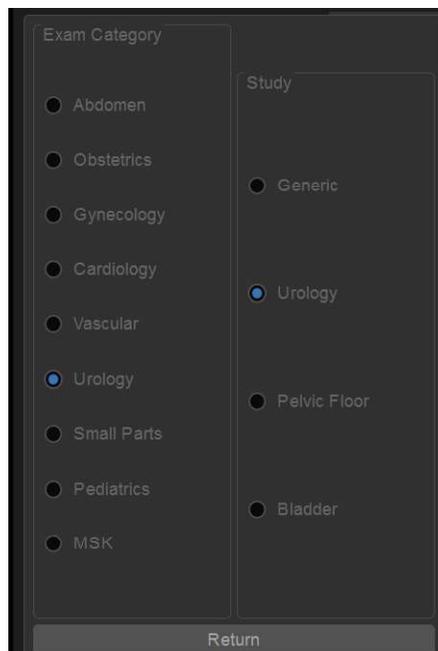


Figure 12-1. Urology Exam Calcs B-Mode

NOTE: *Bladder(0.7) Vol, Bladder Vol, Post Void Vol, Prostate Vol, Renal Vol, Renal (0.8) Vol and Volume can be displayed if preset at the Utility -> Measure screen.*

Bladder Volume

This calculation uses a standard distance measurement. Length is typically measured in the sagittal plane. Width and height are measured in the axial plane.

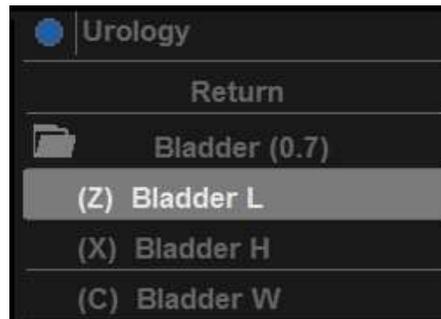


Figure 12-2. Bladder Volume

To measure Bladder Volume:

1. Scan the patient in the appropriate scan plane.
2. Select the **Bladder** folder, an active caliper displays.
3. Perform a standard distance measurement.
The system displays the distance value in the Results Window.
4. To make the second and third distance measurement, repeat steps 2–3.

After you complete the third distance measurement, the system displays the bladder volume in the Results Window.

Prostate Volume

This calculation uses a standard distance measurement. Length is typically measured in the sagittal plane. Width and height are measured in the axial plane.

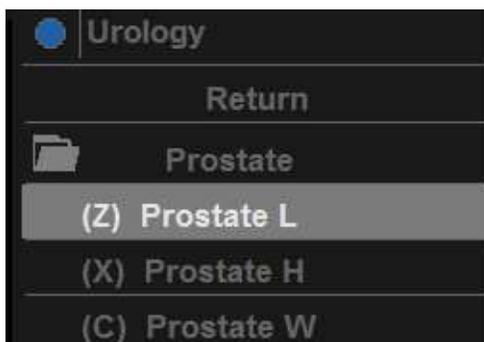


Figure 12-3. Prostate Volume

To measure Prostate Volume:

1. Scan the patient in the appropriate scan plane.
2. Select the **Prostate** folder, an active caliper displays.
3. Perform a standard distance measurement.
The system displays the distance value in the Results Window.
4. To make the second and third distance measurement, repeat steps 2–3.

After you complete the third distance measurement, the system displays the prostate volume in the Results Window.

Prostate Volume (continued)

PSA Measurement

If you enter the value of PSA (Prostatic Specific Antigen) and PPSA Coefficient at the Urology Patient screen, PSAD and PPSA are automatically calculated.

The values are displayed on the Report (if set appropriately on the Report Designer page).

The screenshot shows a software interface for the Urology Patient Screen. At the top, there is a navigation bar with tabs for ABD, OB, GYN, CARD, VAS, UR (highlighted), SMP, PED, MSK, and THOR. Below the navigation bar, the screen is divided into two main sections. The left section contains input fields for PSA (0.000 ng/ml), PPSA Coefficient 1 (0.12), and PPSA Coefficient 2 (0.12). The right section contains dropdown menus for Operator (ADM), Exam Description, Accession #, Perf.Physician, and Ref.Physician, along with a Clear button at the bottom right.

Figure 12-4. Urology Patient Screen

Prostate Volume (continued)

1	Prostate L	5.40 cm
2	Prostate H	4.85 cm
3	Prostate W	5.10 cm
	Prostate Vol	69.98 ml
	PSAD	0.00
	PPSA(1)	8.40
	PPSA(2)	8.40
	d	15.86 cm
	L	0.00 cm

Figure 12-5. Measurement result window

PSAD: Prostatic Specific Antigen (PSA) Density – defined as:
 $PSAD = PSA/Volume$

PPSA: Predicted Prostate Specific Antigen – defined as: PPSA
 $= Volume \times PPSA \text{ Coefficient}$

Report

- For the prostate volume calculation, you can select the method “m1, m2...” in addition to Avg., Max., Min. and Last.
- The value of PSA and PPSA are displayed.

GE Healthcare		GH, YU							
2019/06/17 22:49:29ADM		180617-224909							
PSA	0.000ng/ml	PPSA Coef(1)	0	PPSA Coef(2)	0	Page	2/3		
Parameter	Value	m1	m2	m3	m4	m5	m6	Method	
B Mode Measurements									
Bladder L	1.30	cm	1.30					Avg.	
Bladder H	3.16	cm	3.16					Avg.	
Bladder W	1.96	cm	1.96					Avg.	
Bladder Vol	5.63	ml	5.63						

Figure 12-6. Urology Report

Renal Volume

This calculation uses a standard distance measurement. Length is typically measured in the sagittal plane. Width and height are measured in the axial plane.

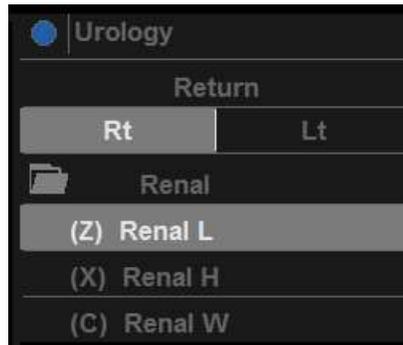


Figure 12-7. Renal Volume

To measure Renal Volume:

1. Scan the patient in the appropriate scan plane.
2. Select **Side**.
3. Select the **Renal** folder, an active caliper displays.
4. Perform a standard distance measurement:
The system displays the distance value in the Results Window.
5. To make the second and third distance measurement, repeat steps 2–3.

After you complete the third distance measurement, the system displays the renal volume in the Results Window.

Pelvic Floor Measurements

Pelvic floor measurements can be performed in the Pelvic Floor study. The measurements are located in the Exam Calc folder in the Urology preset.



Figure 12-8. Pelvic Floor Measurements

Bladder Neck Rest

Obtain an image with the patient at rest (relaxed).

1. Create a straight line (zero or baseline) to line up with the inferior/posterior of symphysis pubis bone.
2. Once the baseline is positioned, a caliper appears. Position the caliper at the anterior margin of the bladder neck. A positive number displays since the caliper is placed below the baseline.
3. A distance is calculated in millimeters.

Pelvic Floor Measurements (continued)

Bladder Neck Stress

Obtain an image after the patient performs the Valsalva maneuver.

1. Create a straight line (zero or baseline) to line up with the inferior/posterior of symphysis pubis bone.
2. Once the baseline is positioned, a caliper appears. Position the caliper at the anterior margin of the bladder neck.

If the bladder neck is below the baseline, the Bladder Neck Stress is a positive number. If the bladder neck is above the baseline (closer to the transducer face), the number is negative.

Bladder Neck Descent (BND)

The Bladder Neck Descent is a calculation that should be calculated after measuring the Bladder Neck Rest and Bladder Neck Stress.

$BND = \text{Bladder Neck Rest} - \text{Bladder Neck Stress}$

NOTE: If the Bladder Neck Stress is a negative number, it becomes positive and is added to the bladder neck rest measurement.

Detrusor Wall Thickening (DWT)

Three distance measurements of the bladder wall dome are calculated into a mean dimension and displayed in millimeters.

Uterine Descent Max

1. Create a straight line (zero or baseline) to line up with the inferior/posterior margin of symphysis pubis bone.
2. Measure using a 2-caliper dimension to the inferior position of the uterus in a stress image and display in millimeters

Pelvic Floor Measurements (continued)

Rectal Ampulla Descent Max

1. Create a straight line (zero or baseline) to line up with the inferior/posterior margin of symphysis pubis bone.
2. Measure using a 2-caliper dimension to the inferior position of the rectal ampulla in a stress image and displayed in millimeters

Rectocele Depth

Two 2-caliper diameter measurements to measure depth and width of the rectocele. Displayed in millimeters.

Levator Hiatus Stress

Two 2-caliper diameter measurements and calculate an area displayed as cm squared.

Residual Urine

Two 2-caliper diameter measurements calculate as: (x) times (y) times 5.9 minus 14.9 equals Residual Volume displayed in ml.

Auto Bladder Volume Measurement (Whizz On)

Auto Bladder Volume automatically measures the Bladder Volume. It's main application is to measure three longest orthogonal lines (L, H and W) from two bladder slices.

It provides "Auto Bladder LxH" and "Auto Bladder W" to take L, H and W values, then automatically calculate the Bladder Volume.

Set up the parameters you want to record on the report in Utility -> Measure -> M&A page -> Select the Auto Bladder Volume Tool.

The following controls are available.

Table 12-1: Auto Bladder Volume description

Parameter	Description
L	L value from bladder slice.
H	H value from bladder slice.
W	W value from the bladder slice.
Vol	Bladder volume value calculated by $0.7 \times L \times H \times W$ or $0.5 \times L \times H \times W$.

Auto Bladder Volume Measurement (Whizz On) (continued)

To measure the bladder volume while whizz is turned on:

1. Select Bladder application.
2. Enter **Utility** -> **Whizz** -> **Whizz** page, check **Preset** as Bladder and select **Auto IQ Optimization**, **Auto Measurement** and **Auto Annotation**.



Figure 12-9. Utility -> Whizz -> Whizz page

3. Press Whizz key on the control panel to turn on Whizz.

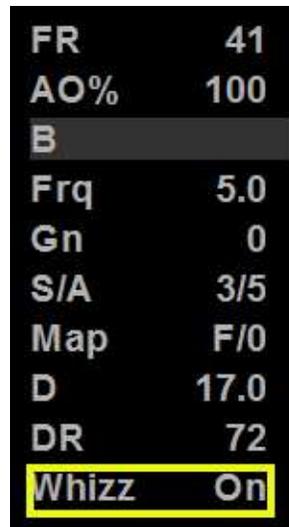


Figure 12-10. Whizz On

Auto Bladder Volume Measurement (Whizz On) (continued)

4. Activate the M&A package, press **Measure**.
5. Auto Bladder(0.7) is selected automatically. If user wants to select Auto Bladder(0.5), press **Return** to continue.
6. Place the caliper anywhere outside the bladder and position it. Press **Set**.
7. The first caliper is anchored in place and rectangle appears, free to adjust.
Move the second caliper to the right or to the left to generate a dotted rectangle connecting the two cursors.
8. Press **Set** and complete the measurement. Annotation of Bladder will appear automatically in the screen.

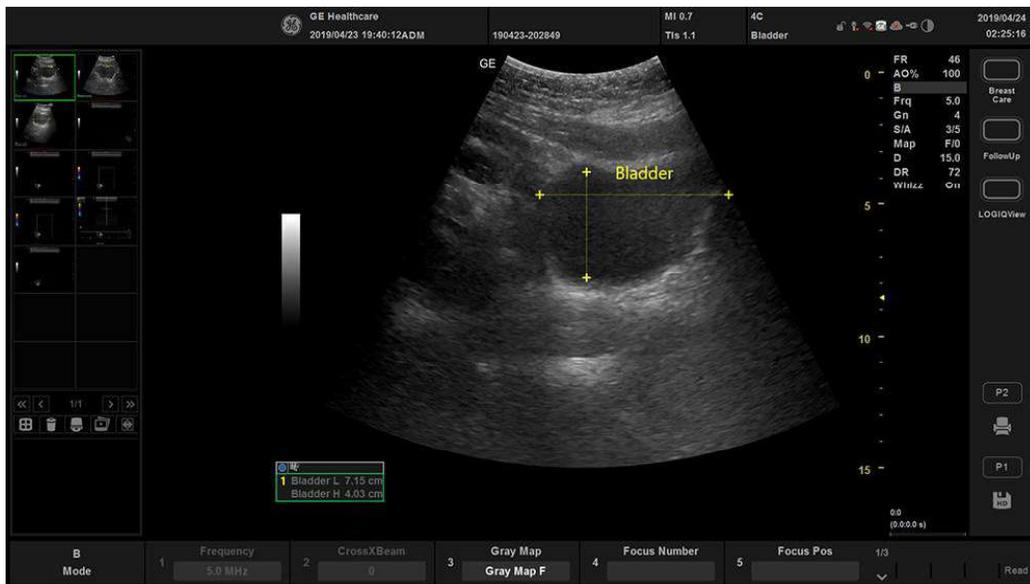


Figure 12-11. Auto bladder L & H

Auto Bladder Volume Measurement (Whizz On) (continued)

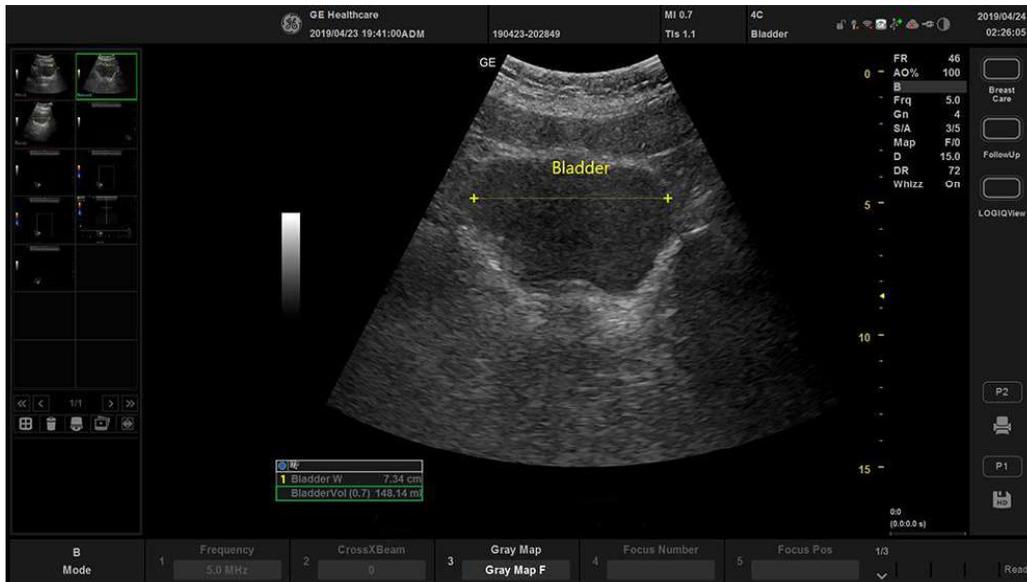


Figure 12-12. Auto Bladder Width

9. After a measurement, the length of lines are displayed in the result window as “Bladder L/H/W and Bladder Vol”.
10. User could select and adjust the calipers of lines by “Cursor Select”.

NOTE: Do not select the region of interest including many non-bladder area. Do not select the region of interest inside the bladder area.

NOTE: The accuracy for auto bladder volume measurement is $\pm 30\%$.

Chapter 13

Pediatrics

Describes how to perform Pediatrics measurements and calculations.

Pediatrics Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

General Guidelines

New Patient information must be entered before beginning an exam. See 'Beginning an Exam' on *page 4-2 for more information*.

Any measurement can be repeated by selecting that measurement again.

The system retains all measurements, but the report retains only the last six measurements of each type.

The six report measurements can be averaged and the average used in other calculations.

Pediatrics Calculations

Overview

Pediatrics measurements offer two different types of measurement studies:

- Generic. The Generic Calculations study is common to all applications. See 'Generic Measurements' on *page 7-66 for more information.*
- Pediatric Hip (PedHip).
 - This chapter describes Pediatrics B-Mode measurements.
 - The Pediatrics M-Mode measurements are common to other applications. See 'M-Mode Measurements' on *page 7-77 for more information.*
 - The Pediatrics Doppler measurements are common to other applications. See 'Doppler Mode Measurements' on *page 7-80 for more information.*

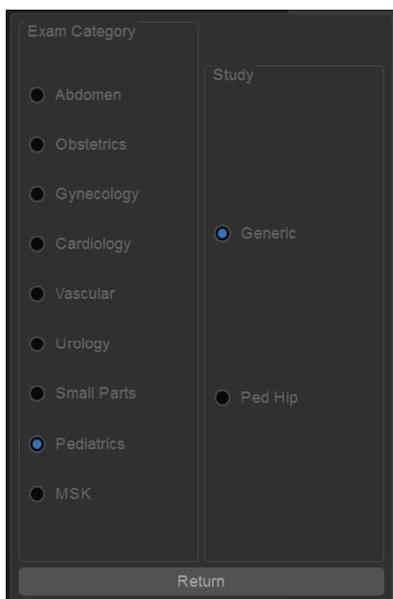


Figure 13-1. Pediatrics Exam Category

Pediatrics

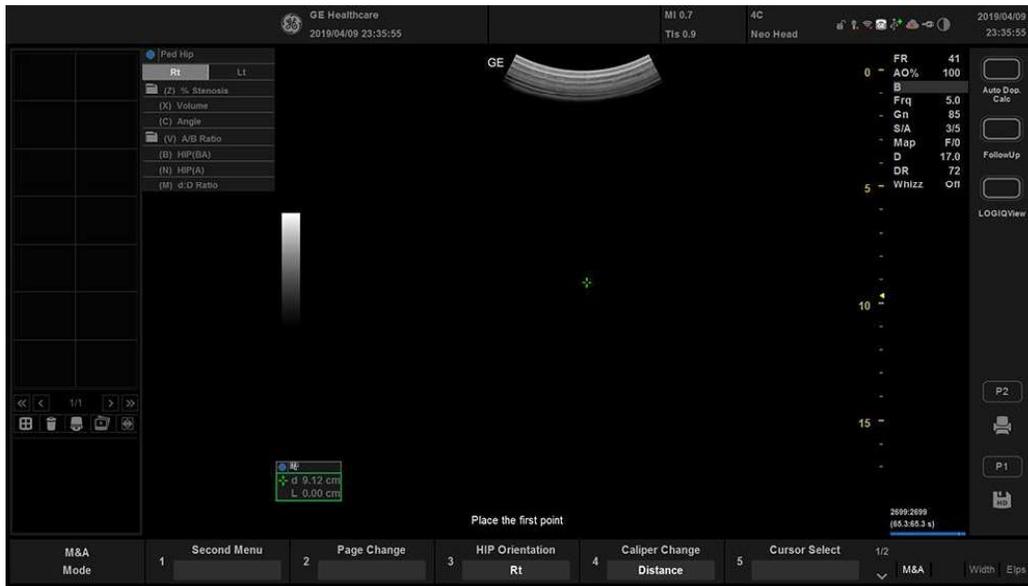


Figure 13-2. Pediatrics B-Mode Measurement

Hip Dysplasia Measurement

The HIP calculation assists in assessing the development of the infant hip. In this calculation, three straight lines are superimposed on the image and aligned with the anatomical features. The two angles are computed, displayed, and can be used by the physician in making a diagnosis.

The three lines are:¹

1. The baseline connects the osseous acetabulum convexity to the point where the joint capsule and the perichondrium unite with the iliac bone.
2. The inclination line connects the osseous convexity to labrum acetabulare.
3. The Acetabulum roof line connects the lower edge of the osilium to the osseous convexity.

The α (Alpha) angle is the supplement of the angle between 1 and 3. It characterizes the osseous convexity. The β (Beta) angle is the angle between lines 1 and 2. It characterizes the bone supplementing additional roofing by the cartilaginous convexity.

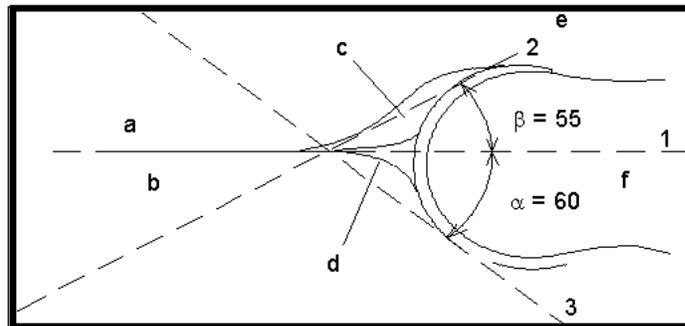


Figure 13-3. Hip Dysplasia

Anatomical Landmarks	
a. Ilium	d. Bony Roof
b. Iliac Bone	e. Cartilaginous acetabular roof
c. Labrum	f. Femoral Head

¹Source: R GRAF, journal of Pediatric Orthopedics, 4: 735-740(1984)

Hip Dysplasia Measurement (continued)

To make a Hip Dysplasia measurement:

1. Select either the **right** or **left side** (orientation) and then select **HIP**.
A horizontal dotted line displays.
2. To place the baseline, move the **Trackball**. Position the crosshairs edge at the osseous convexity of the ilium.
3. To rotate or change inclination, adjust the **Ellipse** control or **Hip Rotate**.
4. To fix the baseline, press **Set**.
The system displays a second dotted line at an angle.
5. To place the line along the inclination line of the osseous convexity to labrum acetabulare, move the **Trackball**.
6. To rotate or change inclination, adjust the **Ellipse** control or **Hip Rotate**.
7. To fix the second measurement line, press **Set**.
The system displays a third dotted line at an angle.
8. To place the caliper along the acetabular roof line, move the **Trackball**.
9. To rotate or change inclination, adjust the **Ellipse** control or **Hip Rotate**.
10. To fix the third measurement line and complete measurement, press **Set**.
The system displays the hip measurements (α and β) in the Results Window.

Alpha HIP

The Alpha HIP measurement measures the angle between the iliac baseline and the bony roof line. To make an Alpha HIP measurement:

1. Select either the **right** or **left side** (orientation) and then select **Alpha HIP**.
A horizontal dotted line displays.
2. To place the baseline, move the **Trackball**. Position the crosshairs edge at the osseous convexity of the ilium.
3. To rotate or change inclination, adjust the **Ellipse** control or **Hip Rotate**.
4. To fix the baseline, press **Set**.
The system displays a second dotted line at an angle.
5. To place the caliper along the acetabular roof line, move the **Trackball**.
6. To rotate or change inclination, adjust the **Ellipse** control or **Hip Rotate**.
7. To fix the second measurement line, press **Set**.
The system displays the alpha hip measurement (α) in the Results Window.

d:D Ratio Measurement

The d:D Ratio measurement measures the percentage of the femoral head coverage under the bony roof. To make this measurement:

1. Select either the **right** or **left side** (orientation) and then select **d:D Ratio**.
A horizontal dotted line displays.
2. Use the **Trackball** to place the baseline along the ilium. Position the crosshairs edge at the osseous convexity of the ilium.
3. Use the **Ellipse** control to adjust or change inclination or **Hip Rotate**.
4. Press **Set** to fix the baseline.
5. The system displays a circle representing the femoral head. Use the **Trackball** to position the circle.
6. Use the **Ellipse** control to size the femoral head circumference.
7. Press **Set** to fix the femoral head circumference.

The system displays the d:D ratio for the femoral head in the Results Window.

Chapter 14

ReportWriter

Describes how to generate reports.

Standard Report Pages

Introduction

The Versana Active enables the generation of patient reports based on the examination performed and the analyses that were made during the exam. The reports are generated using the data stored in the system with pre-selected template.

You may edit a report while performing the exam; customize, delete, or add measurements; and save changes until you use the Store command. Once Stored, the reports are read-only.

It is recommended that the data be saved often, and then carefully reviewed before the report is Stored. Use the worksheet to facilitate the review and adjust data before storing a report. The final report can be printed on a standard printer.

Creating a report

Reports summarize the data obtained in the examination. They can contain data, images, and cine loops.

Once generated, the report can be viewed, images can be added, and the patient's personal data can be modified. The examination data itself CANNOT be changed.

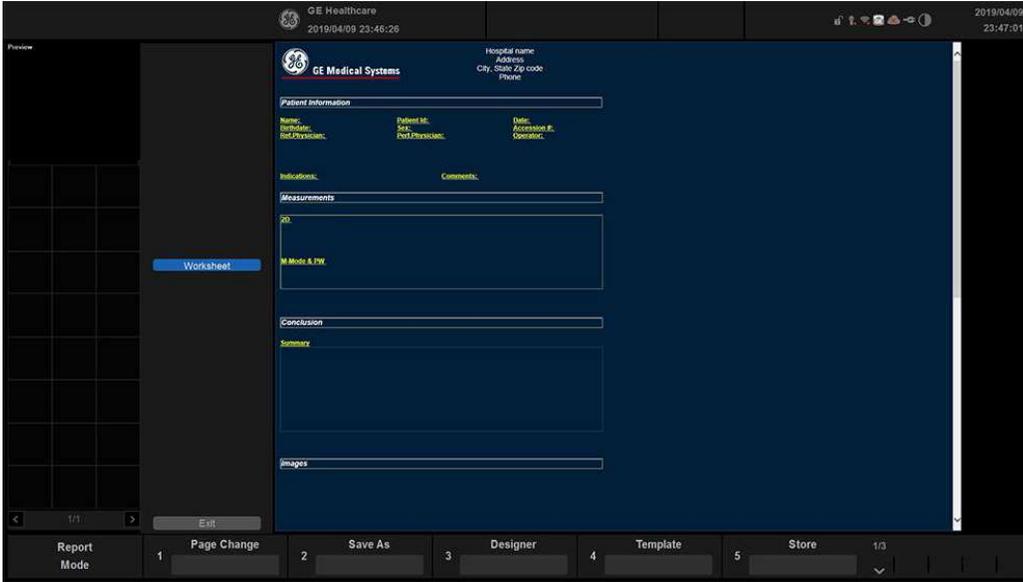


Figure 14-1. Report Example

Activating the Report

1. Select **Report** on the keyboard.
2. Select **Report Preview**.

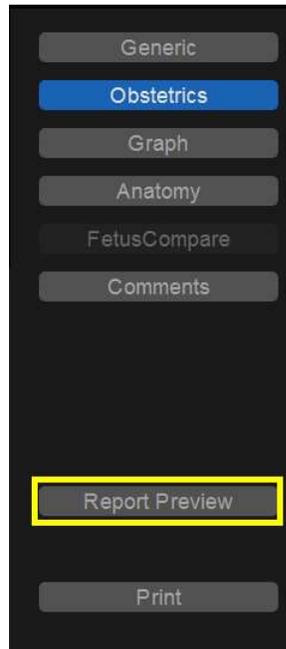


Figure 14-2. Report Menu Display Example

3. The system displays the default report for the current application on the monitor.
The information entered during the examination is automatically filled in the appropriate fields (e.g. demographic, diagnosis, comments).
The preview image appears when the cursor is over the clipboard image.

Activating the Report (continued)

- Adjust the **Page Change** control to move down the page.

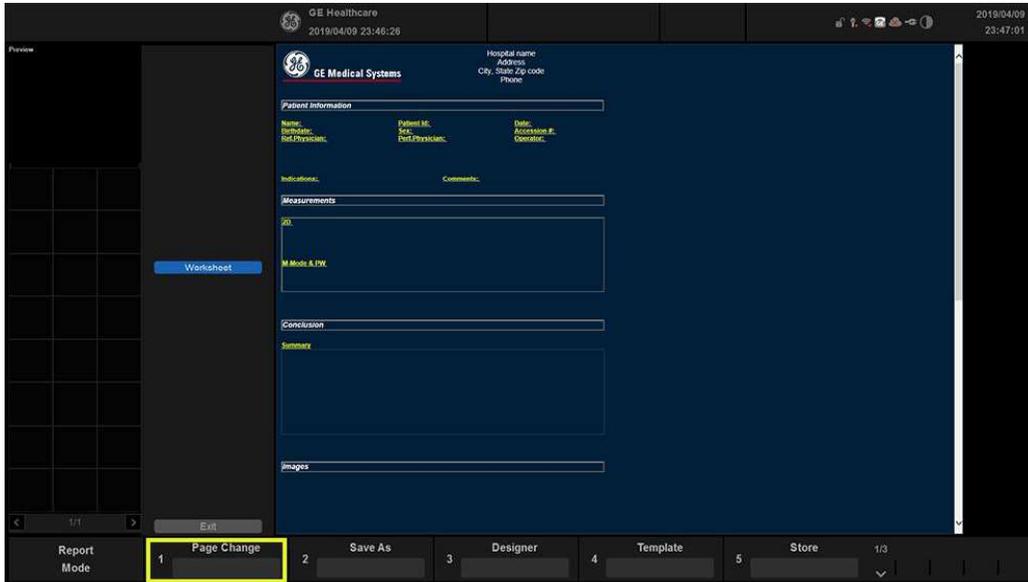


Figure 14-3. Worksheet Page Example

Table 14-1: Report Button Controls

Button	Description
Page Change	Changes to another page of the report.
Save As	Exports the report page to storage media as CHM or PDF format.
Designer	Accesses template editor screen.
Template	Selects templates from the list of selected applications.
Store	Stores the report page into Archive as CHM file.
Retrieve	Retrieves the report page from Archive. Stored Date/Time is appended to the name of stored report.
Print	Prints out the report to the default printer.
Delete	Deletes the report page from Archive.
Worksheet	Accesses Worksheet Page.
Graph	Accesses OB Graph page (applies only to OB).
Anatomical Page	Accesses Anatomical Survey page (applies only to OB).
*CHM is a compressed HTML help file.	

Selecting another template

You can select another template for the current patient:

1. Select **TEMPLATE** on the primary menu at the bottom of the monitor display.
2. A list of available templates and exam categories displays.

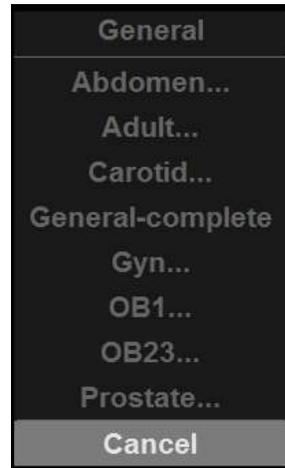


Figure 14-4. Application List Example

Selecting another template (continued)

3. Select the desired template using the **Trackball** and press **Set**.

The selected template displays on the monitor.

NOTE: *If you select another exam category, the template list of the selected category displays. Select the desired template.*

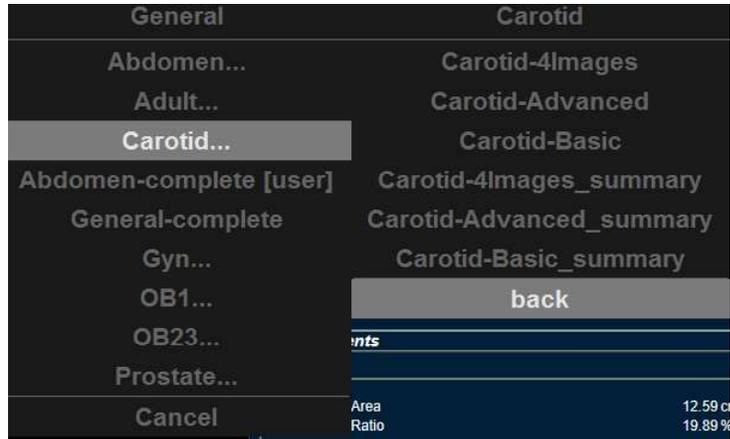


Figure 14-5. Available Template list

4. Select the desired template name and press **Set**.
5. The report changes to the selected template.

Factory Templates

The system has factory templates for each application. You can modify these templates or create user-defined templates. You need to save revised/new templates with unique names.

A template may include one or more of the following:

- Measurements
- Worksheet or Vessel Summary Images
- Anatomical Surveys or Biophysical Profiles
- Anatomical Graphics
- Graphs
- Images areas
- Score Boxes

NOTE: Additional factory templates can be added from the Utility-->Reports menu (OB for multiple gestation, Renal, etc.).

Editing a Report

NOTE: *It is recommended that the user DO NOT use the special characters like !, @, #, \$, %, ^, &, *, (,), |, :, ;, <, >, ?, /, ~, [,], {, }, in the report. When these characters are entered into a report, the characters may be deleted.*

Entering the hospital address

When using a factory template, the area for the hospital information is usually placed in the upper portion of the report.

To make a new area, See 'Fixed Text' on *page 14-52 for more information.*

To modify the factory template:

1. Select **Report** on the control panel.
2. Select **Report Review**.
3. Select **Designer**.
4. Double-click on the area for the hospital information in the template. The Fixed Text dialogue box displays.

Entering the hospital address (continued)

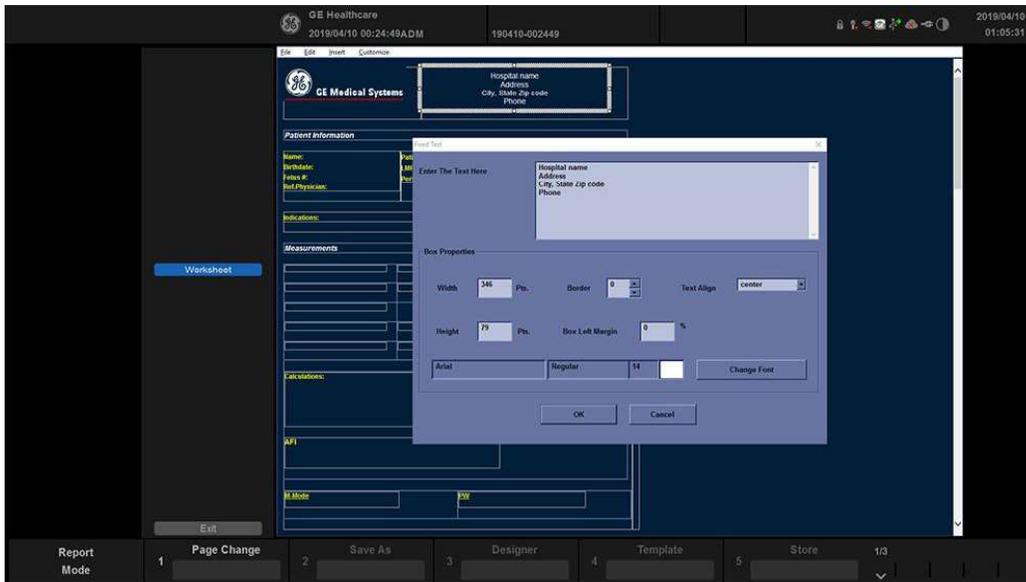


Figure 14-6. Fixed Text Dialogue Box

5. Make changes as necessary.
 - a. Enter the hospital address in the text area.
 - b. Modify Box Properties (box width, box border line width, text align, box height, box left margin, and font).
6. Select **OK**.

Entering the hospital address (continued)

7. Save the template.

To keep the same template name:

- Select Save from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and appends “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select Save As from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and appends “[user]”. For example, NewReport[user].

8. Exit the Report Designer. The report with the hospital address displays.

Inserting the hospital logo

When using a factory template, the area for the logo is usually placed in the upper left portion of the report.

To make a new area, See 'Fixed Text' on page 14-52 for more information.

To modify the factory template:

1. Save the preferred hospital logo in either a jpeg or bmp format on the removable media.

NOTE: *Label the logo with a unique name (e.g. HospitalNameLogo.bmp). If the different logo is printed on the report, rename the logo image you want to use and insert it into the report template again.*

2. Insert the removable media.
3. Select **Report** on the control panel.
4. Select **Designer**.
5. Double-click logo box at the left top so that the frame is highlighted. The logo box displays.

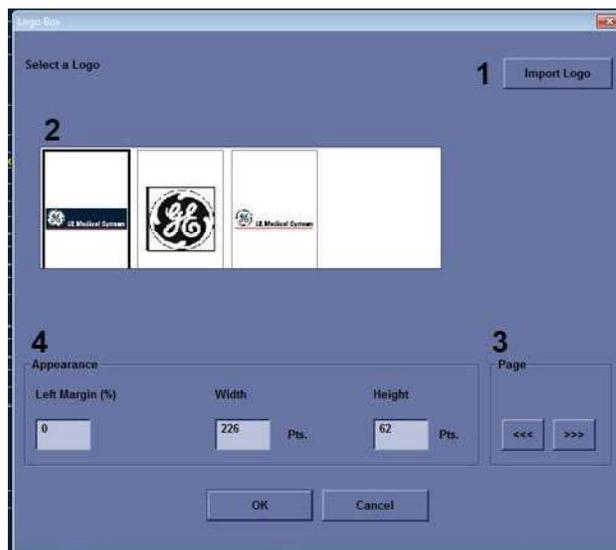


Figure 14-7. Logo Box

Inserting the hospital logo (continued)

6. Select Import Logo (1). Select the removable media first and then the hospital logo.
7. Select **OK**. The hospital logo displays in the logo list (2). Click the logo to select.

NOTE: Scroll the logo list using the left/right arrow key (3).

8. Modify Appearance (4).
9. Select **OK**.
10. Save the template.

To keep the same template name:

- Select Save from the File menu, and press Set. The Save Template dialog box opens.
- Select Yes. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select Save As from the File menu, and press Set. The Save Template As dialog box opens.
- Enter the name of the new template, and press Set. The template receives the new name and adds “[user]”. For example, NewReport[user].

11. Exit the Report Designer. The template with the hospital logo displays.

NOTE: If a different logo prints on the report, rename the logo image which you want on the report and insert it into the report template again.

Changing the Archive Information

When using a factory template, the Archive Information is usually placed below the hospital name and logo.

The contents of the Archive Information is inserted through the related page automatically. If you want to change the description, such as Information or Comments that was entered in the patient menu:

1. Double-click the yellow text to be changed, e.g. Information or Comments.
The area where the description was entered (e.g. Patient menu) displays.
2. Change the existing data as necessary.
3. Select **Report** to return to the report.

Patient Information		
Name:	Patient Id:	Date:
Birthdate:	Sex:	Accession #:
Ref.Physician:	Perf.Physician:	Operator:
Indications:		Comments:

Figure 14-8. Patient Information Area (Example)

Modifying the displayed objects of Archive Information

1. Select **Designer**.
2. Double click on the area for the Archive Information in the template. The Archive Information Box displays.

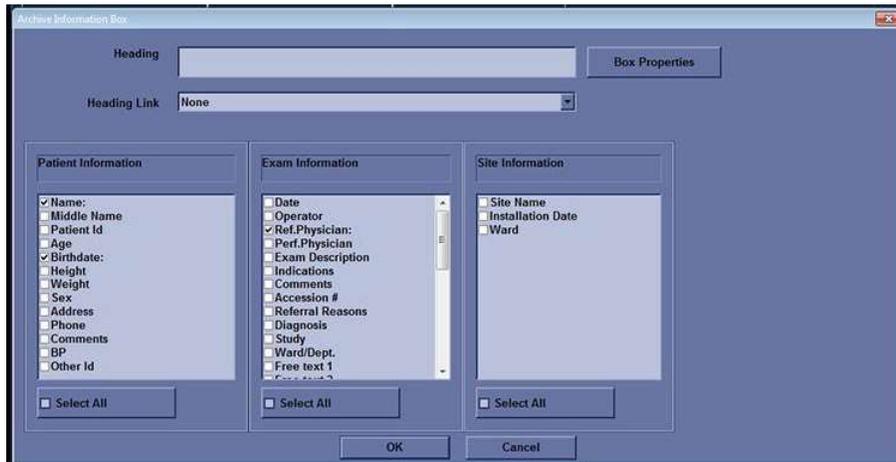


Figure 14-9. Archive Information Box

3. Click the checkboxes to select and deselect the objects. Objects with checkmarks will appear in the report template.
4. Select **Box Properties** to change the font, font size, font color, or box size, and select **OK**.
5. Select **OK** to return to the Report Designer.
6. Save the template.
 - To keep the same template name:
 - Select **Save** from the File menu, and press **Set**. The Save Template dialog box opens.
 - Select **Yes**. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].
 - To save the template with a new name:
 - Select **Save As** from the File menu, and press **Set**. The Save Template As dialog box opens.
 - Enter the name of the new template, and press **Set**. The template receives the new name and adds “[user]”. For example, NewReport[user].
7. Select **File -> Exit** to leave the Report Designer.

Entering free text

You can enter free text to the report using the alphanumeric keyboard.

The factory template terms their text area as “Summary or Comments”.

1. Move the cursor to the text field and press **Set**.

NOTE: You can enter the text only to the field set as free text in the Report Designer.

NOTE: DO NOT enter “%s” in a free text field and then try to edit/save the template in the Report Designer.

2. Type the text.

Inserting Text

1. Select **Designer**.
2. Move the cursor where the text is to be inserted and press **Set**.
3. Select the Text Field from the Insert menu. The Text Field dialog box displays.

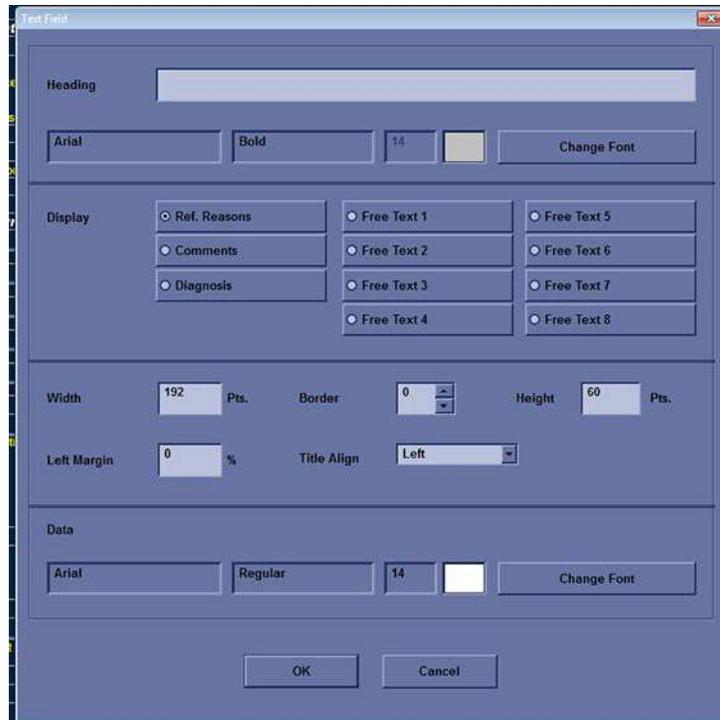


Figure 14-10. Text Field Dialogue Box

4. Select the appropriate display items:
 - Ref. Reasons: Retrieves this information from the Direct Report
 - Comments: Retrieves this information from the Comment field of the patient screen and the Exam Comment field of the worksheet.
 - Diagnosis: Retrieves this information from the Direct Report
 - Free Text 1 - 8

Inserting Text (continued)

5. Type the heading Text.
6. Modify box properties, the heading text and font, and data.
7. Select OK or Cancel.
8. Save the template.

To keep the same template name:

- Select Save from the File menu, and press Set. The Save Template dialog box opens.
- Select Yes. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select Save As from the File menu, and press Set. The Save Template As dialog box opens.
- Enter the name of the new template, and press Set. The template receives the new name and adds “[user]”. For example, NewReport[user].

Inserting an image to the report

Some factory templates include an image area. If you want to insert or modify the image area, See 'Insert Image' on *page 14-43 for more information.*

To insert images from clipboard into the image field of the report:

1. Move the cursor to the desired image on the clipboard.
NOTE: The preview image appears when the cursor is over a clipboard image.
2. Press and hold down the **Set** key and drag the selected image to the report by using the **Trackball** or double click the **Set** key on the desired image.
3. To move images between image areas, press and hold down the **Set** key and using the **Trackball**, drag the selected image to the new location.

To remove an image from the report, press and hold down the **Set** key and using the **Trackball**, drag the select image back to the clipboard.

Measurement result section

Measurement results for the current patient display automatically if you have the measurement section in the report template.

The factory template has an appropriate measurement result area. If you want to insert or modify the measurement area, See 'Measurements' on page 14-49 for more information.

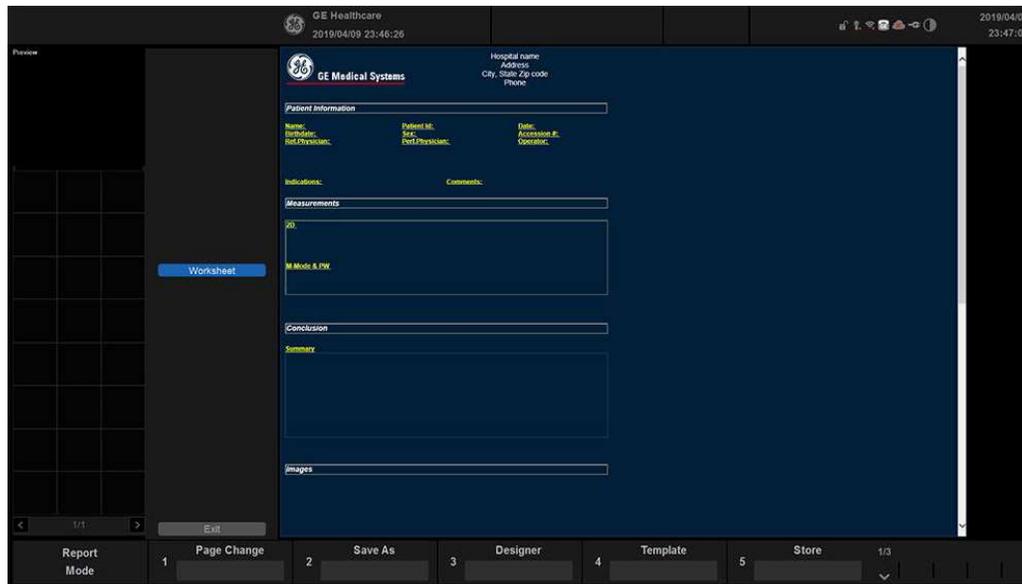


Figure 14-11. Measurement section

Inserting the worksheet

You can insert the worksheet (like you can insert an image) to the image display field. To set an image display field in the report template, See 'Insert Image' on page 14-43 for more information.

1. Display the worksheet on the monitor display.
2. Save the worksheet using the **P1** key.
3. Select **Report Preview**.
4. Drag the worksheet into the report.
 - a. Move the cursor to the desired worksheet on the clipboard.
 - b. Press and hold down the **Set** key. Use the **Trackball** to drag the selected worksheet into the Image Display Field.
 - c. Release **Set**.

NOTE: You can also move the cursor to the desired worksheet on the clipboard, double-click the worksheet, move the cursor to the Image Display Field, and select Set.

5. The worksheet displays on the report.

NOTE: You can double-click the worksheet in the report to change the background color to white to save ink during printing. Double-click the worksheet again to return the worksheet to the original color.

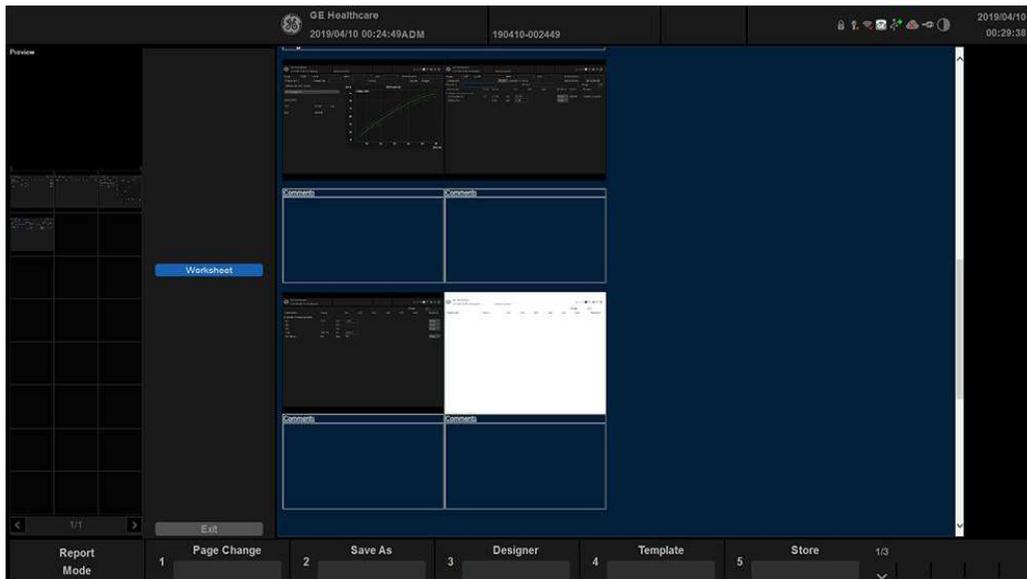


Figure 14-12. Worksheet in Report

Placing objects side-by-side

If you want to place images, the image and comment, anatomical graphic and comment, etc. side-by-side, you must first place a table, which has two (or more) columns, into the report template.

1. Press **Report** on the control panel.
2. Select **Designer** to display the Report Designer.
3. Place the cursor where you want to insert the object.
4. Select Table from the Insert menu. Insert Table box displays.

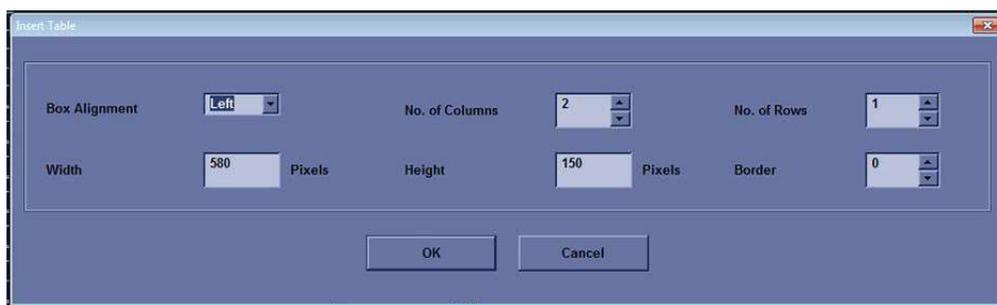


Figure 14-13. Insert Table Box

5. Set the number of columns to 2 (or more, as required) and change the table parameters, if needed. Select OK.
- NOTE:** *If you do not need a table border, set the Border to 0. Add additional rows if required.*
6. Place the cursor in the column and select the desired items from the Insert menu (e.g. logo, image, free text). Specify those items.
 7. Repeat step 6 for each column as required.

Placing objects side-by-side (continued)

8. Save the template.

To keep the same template name:

- Select **Save** from the File menu, and press **Set**. The Save Template dialog box opens.
- Select **Yes**. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select **Save As** from the File menu, and press **Set**. The Save Template As dialog box opens.
- Enter the name of the new template, and press **Set**. The template receives the new name and adds “[user]”. For example, NewReport[user].

You can insert the images in the order preferred, by row or column, on the factory templates. See ‘Inserting the Table’ on *page 14-35 for more information*.

Accessing Worksheet, OB Graph and Anatomical Survey Pages

If the Worksheet, OB Graph, and/or Anatomical Survey pages have been saved for the current patient, you can access these pages from the report page.

NOTE: *OB Graph and Anatomical Survey pages apply only to OB.*

1. Select either **Worksheet**, **Graph** or **Anatomical Page** on the primary menu.
There is also Fixed Text set up as hyper links for these pages. Cursor to the fixed text and press **Set**.
2. The system displays the appropriate page (Worksheet, OB Graph or Anatomical Survey).
3. Select **Report Preview** to return to the Report page.

Retrieving an Archived Report

1. Select **Retrieve**. The Retrieve menu displays.

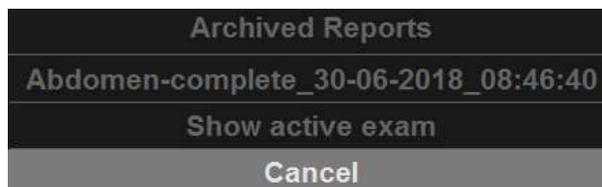


Figure 14-14. Retrieve Menu

2. Select the desired report and press **Set**.

NOTE: *The retrieved report cannot be edited.*

Deleting a Report from Archive

1. Select **Delete**. The delete menu appears on the screen.

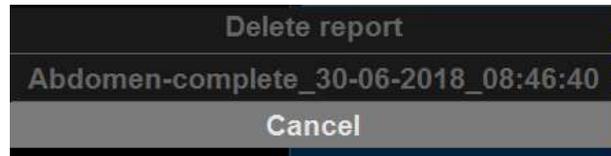


Figure 14-15. Delete Reports Menu

2. Select the report to delete and press **Set**.

Printing the Report

1. Select **P2** to print out the report.

The Report is printed on the default printer.

NOTE: *To preview the Print Layout before printing, See 'Preview the Print Layout' on page 14-32 for more information.*

NOTE: *Double-click the worksheet and/or image in the report to change the background color to white. A white background will save ink during printing. Double-click the worksheet or image again to return to the original color.*

Storing the Report

1. Select **Store**.

The Report is saved as a CHM file to Archive.

NOTE: *The archived report cannot be edited; therefore, it is recommended that the data is carefully reviewed before the report is saved.*

Exporting the Report to Media

Reports can also be saved in a user-defined locations in the following formats:

- Compiled HTML (.CHM) files: readable from any web browser.
- Portable Document Format (.PDF) files: readable with Adobe Acrobat reader.

1. Select File.
2. Select **Save As**.

The Save As dialog box appears on the screen.

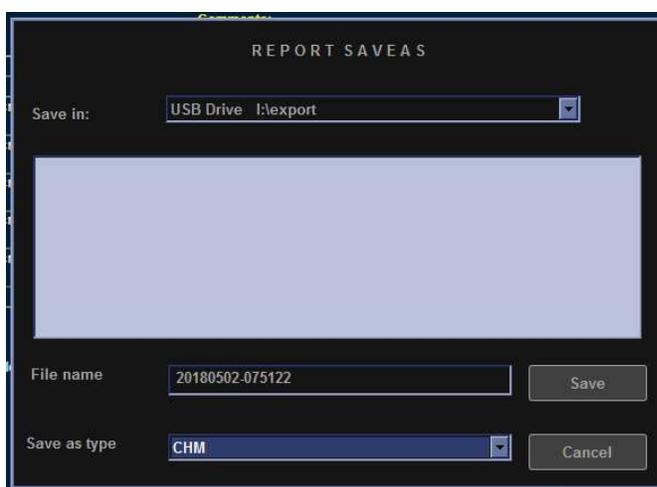


Figure 14-16. Save as dialog box

3. Enter the Report title in the File Name field.
4. Select the media to export the Report. The system supplies a name (numeric DICOM UID, unique identifier).
5. Select PDF or CHM from the Save as type pull down menu.
6. Select **Save**.

Exiting the report

1. Select **Store** to save the report.
- NOTE:** *If the user is working on a report and leaves the report screen for any reason, all information added to the report is automatically saved without loss of data.*
2. Select Exit key to close the report page.

Designing Your Own Template

Template Designer

You can design and create your own customized template from a blank template page, or you can use an existing template (factory or user-defined) and save the changes.

Display the desired template and select **Designer** to open the Template Designer page.

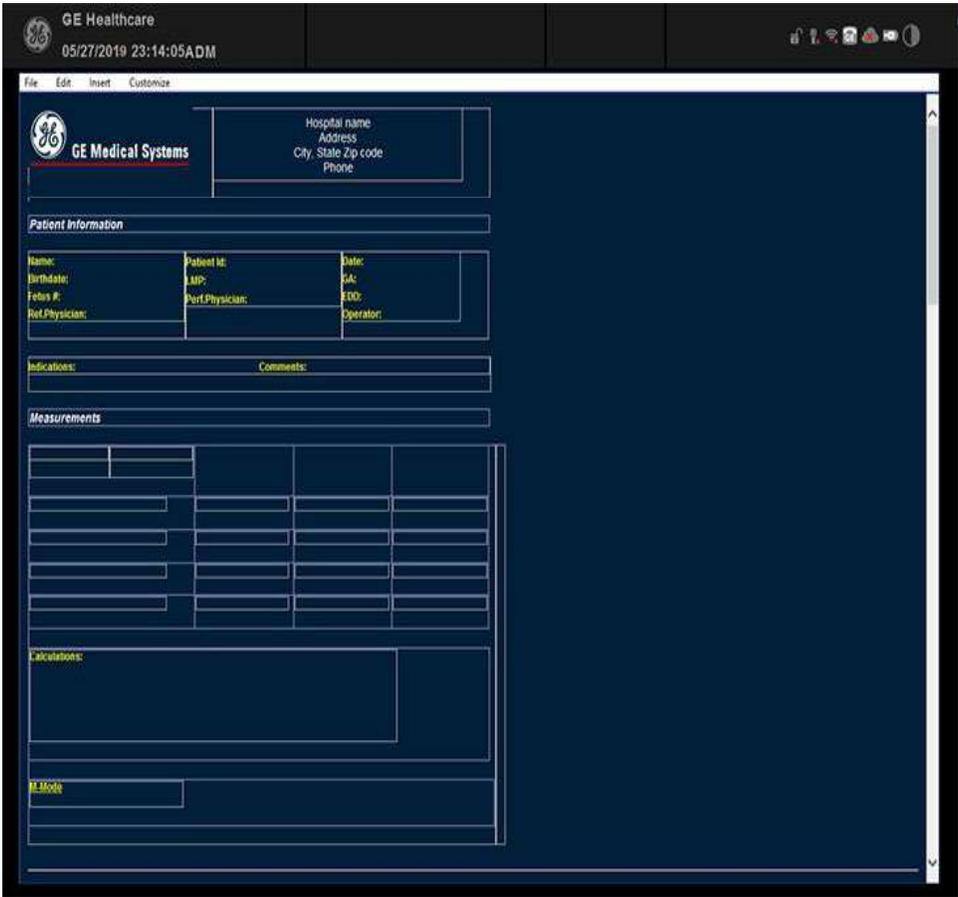


Figure 14-17. Report Designer

File Menu

Enter File Menu:

1. Select a Template.
2. Select Designer.
3. Click on File.

Table 14-2: File Menu

	Description
New	Creates a new template. A blank template appears.
Save	Overwrites the existing template.
Save As	Saves as a new name.
Page Setup	Enters Print Layout screen.
Print Preview	Executes print preview.
Exit	Exits Report Designer page.

Create a new template

To design a new template without using a pre-existing factory template:

1. Select **Designer** to open the Report Designer.
2. Select New from the File menu, and press **Set**.
The blank template displays.
3. Create the report template as needed.
4. Select Save from the File menu, and press **Set**.
The Save Template As dialogue box displays.
5. Enter a template name and click OK.
6. To exit Report Designer, select **Exit** from the File menu, and press **Set**.
 - Yes: Saves changes and exits Report Designer.
 - No: Does not save changes and exits Report Designer.

Create a new template and save as a factory template name

To design a new template by modifying an existing factory template and keeping the same name of the factory template:

1. Select and display the existing factory template.
2. Select **Designer** to open the Report Designer.
3. Modify the report template as needed.
4. To save changes, select **Save** from the File menu, and press **Set**.

The Save Template dialog box displays.

- Yes: Saves changes.
- No: Does not save changes.
- Cancel: Returns to Report Designer.

NOTE: *The template name displays in the template list, retains the same name, and adds “[user]”. For example, “OB23-Basic[user]”. You do not lose the original factory template.*

5. To exit Report Designer, select **Exit** from the File menu, and press **Set**.
 - Yes: Saves changes and exits Report Designer.
 - No: Does not save changes and exits Report Designer.
 - Cancel: Returns to Report Designer.



HINTS

Save changes frequently as you modify your template. Saving often reduces the risk of losing all your changes.

Create a new template and save with a new name

To design a new template by modifying or copying an existing factory template and saving it with a new name:

1. Select and display the existing factory template.
2. Select **Designer** to open the Report Designer.
3. Modify the report template as needed.
4. Select **Save as** from File menu and press **Set**.
The Save Template As dialog box displays.
5. Type the new template name and click OK.
6. Select Exit from the File menu and **Set**.
7. The Report Designer closes and returns to the Report Page.

NOTE: The template receives the new name and adds “[user]”. For example, NewReport[user].

Page Setup

1. Modify the factory template as necessary in **Designer**.
2. Select **Page Setup** from File menu and press **Set**.
3. Change the paper size or orientation to fit the print layout, as necessary.

To define the header and footer for the printed report, type text and enter the required variables listed in the table below. Select "Different for first page" and enter a specific header/footer for that page.

Table 14-3: Variable and Definition

Variable	Definition	Variable	Definition
{pid}	Patient ID	{prt}	Current time (printing time)
{pnm}	Patient name	{cp}	Current page
{pbd}	Patient date of birth	{tp}	Page count
{exd}	Examination date	{c}	Subsequent text is centered
{prd}	Current date (printing date)	{r}	Subsequent text is right aligned.
{inm}	Institution name		

NOTE: *Default is left aligned. Report will appear as black ink on white background.*

4. Select **OK** or **Cancel**.

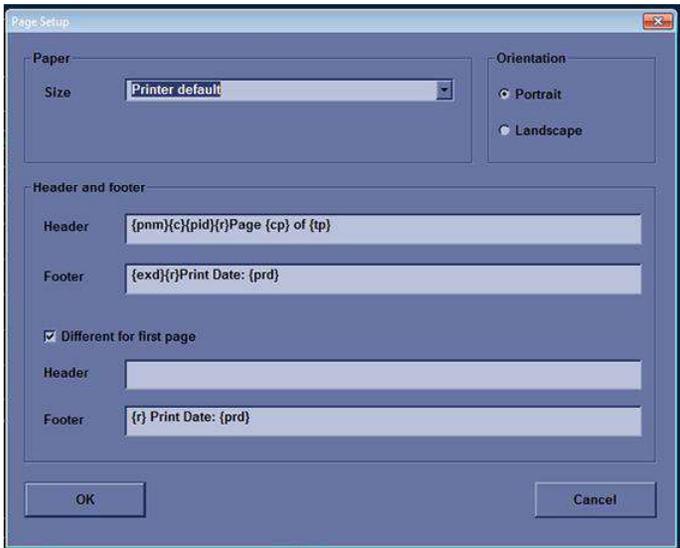


Figure 14-18. Page Setup Dialog

Preview the Print Layout

1. Select **Template** to choose the Report Template.
2. Select **Designer**.
3. Select **Print Preview** from File Menu, and press **Set**.
4. The Print Preview screen displays.

If changes need to be made, select **Close** to exit the Preview page. Modify the template or return to the Report and modify the contents.

Edit Menu

Table 14-4: Edit Menu

	Description
Delete	Deletes the selected object from the report template.
Undo	Restores the previous state(s) of the report template.

Deleting a template object

1. Select the object to be deleted.
2. Select Delete from the Edit menu, and press **Set**. The object is deleted from the template.

Undoing the operation

1. Select Undo from the Edit menu, and press **Set**.
2. Repeat as required.

Insert Menu

Table 14-5: Insert Menu

	Description
Page Break	Inserts a Page Break.
Table	Inserts a Table.
Logo	Inserts a Logo Bitmap File.
Archive Info	Inserts Archive Information.
Anatomical Graphics	Selects anatomical graphics by category to be inserted into a field.
Image	Inserts the image display field to the template.
Wall Motion Analysis	Selects Cut Planes, Bull's Eye, or Score Table Box.
OB/GYN	Selects OB Graph, Bar Graph or Anatomy.
Measurements	Inserts the measurement display field in the template.
Text Field	Edits text field.
Fixed Text	Enters any comments as Fixed Text.
Dropdown Text	Edits dropdown text.

Inserting the Page Break

1. Place the cursor where the Page Break is to be inserted and press **Set**.
2. Select Page Break from the Insert menu and press **Set**. The page break line displays on the template.

Inserting the Table

1. Place the cursor where the table is to be inserted and press **Set**.
2. Select **Table** from the Insert menu and press **Set**. The Insert Table dialog box displays.

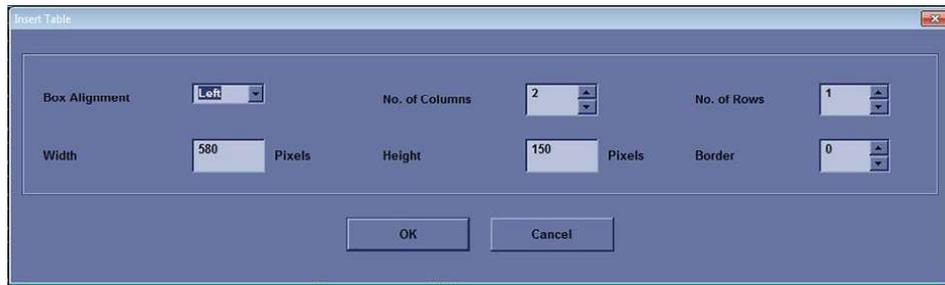


Figure 14-19. Insert Table Dialog

3. Specify each parameter as required.

NOTE: To set the table border as not visible, set "Border" parameter to 0 (zero)

4. Select OK to insert the table or Cancel.

NOTE: To insert/delete a row/column from the table or access table properties, double click the **Set** key in any empty area inside the table. A table menu appears with those options.

Inserting Images in a Table

You can choose the order in which images are inserted into tables: by row (default) or by column.

Image Order by Row

The system default inserts images in the cells of the first row, then to the next row.

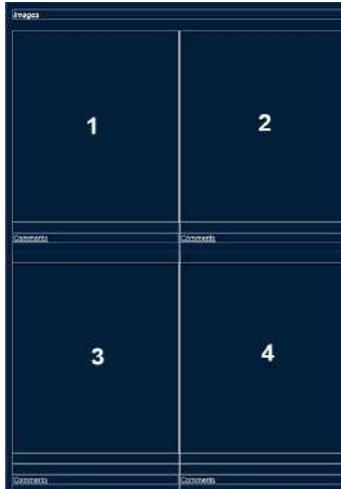


Figure 14-20. Image Order—Row Preference (System Default)

1. Follow the instruction for inserting a table. When specifying parameters, specify:
No. of Columns=2; No. of Rows=2
2. After inserting the table, insert an image box in each cell of the table.
 - a. Move the cursor to the first cell and select Insert -> Image.
 - b. Repeat this step for each cell in the table.

After the template is saved and you are working in the ReportWriter, when you select images to be inserted in the table, they are placed in the default order.

Inserting Images in a Table (continued)

Image Order by Column

If you prefer to have the image placement by column, images are inserted in each cell of the first column, then the next column.



Figure 14-21. Image Order—Column preference

In order to achieve the column preference, you need to create a table with 2 columns and 1 row. In each cell of this table, you need to insert another table.

1. Follow the instructions for inserting a table. When specifying parameters, specify:
No. of Columns=2; No. of Rows=2
2. After inserting the table, create a table inside each of the existing table's cells.
 - a. Move the cursor to the left column's cell and press **Set**.
 - b. Select Table from the Insert menu and press **Set**.
 - c. When specifying parameters, specify:
No. of Columns=1; No. of Rows=2; Width=290 pixels;
Height=500 pixels.
Select **OK**.
 - d. Repeat steps a-c for the right column.
3. Insert an image box to each table cell.
 - a. Move the cursor to the first cell and select Insert -> Image.
 - b. Repeat this step for each cell in the 2 tables.

After the template is saved and you are working in the ReportWriter, when you select images to be inserted in the table, they are placed with your column preference.

Inserting Logos

1. Place the cursor where you want to insert the logo and press **Set**.
2. Select Logo from the Insert menu and press **Set**. The Logo Box displays.
3. Select a logo that you want to insert (1) or import a bmp or jpg file from the removable media (2). Scroll the images using the arrow key (3). Specify the appearance (4).

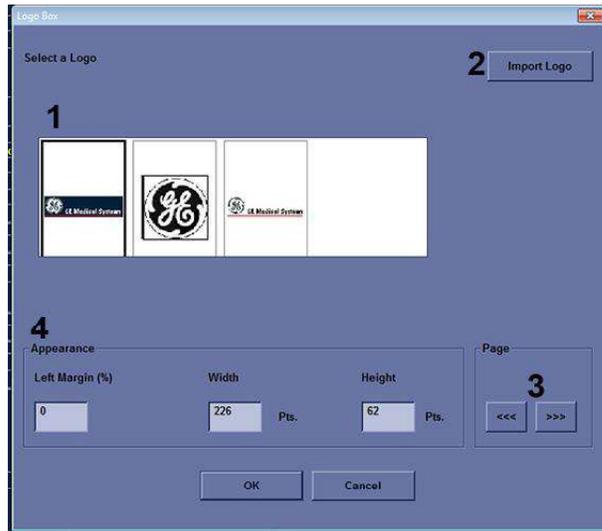


Figure 14-22. Logo box

4. Select **OK** to insert the logo or Cancel.

Changing a logo:

1. Place the cursor on the logo to be changed and press **Set** twice. The Logo Box displays.
2. Select a different logo. If the desired logo is not shown, select Import Logo to import a different logo.
3. Specify the appearance.
4. Select **OK** or Cancel.

Inserting Archive Information

Archive information contains all the objects from the different information menus (Patient, Exam, and Site Information). This box accumulates different information menu selections that can be grouped together and displayed in one table.

1. Place the cursor where you want to enter the archive information and press **Set**.

If you use a factory template, double click on the current archive information area to display the Archive Information Box.

2. Select Archive Info from the Insert menu and press **Set**. The Archive Info Box displays.

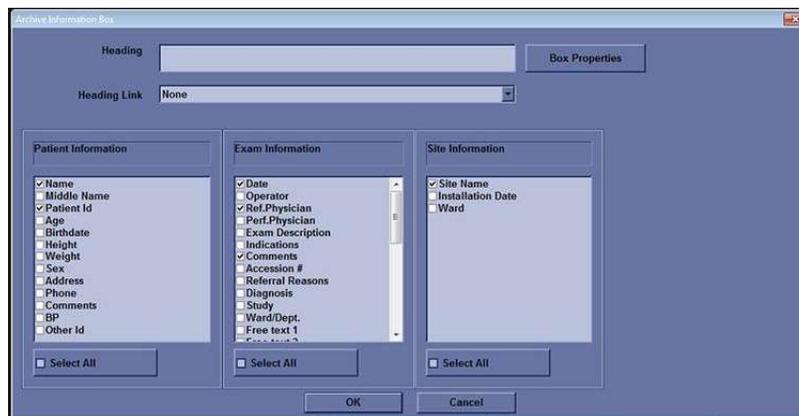


Figure 14-23. Archive Information Box

3. Type the Heading, select a heading link from the pull-down menu, and select the parameters you want to display in the report.

Inserting Archive Information (continued)

4. Select Box Properties to change the Font, Alignment, Appearance, etc.

NOTE: To set the same font to all fields, select *Set All fields*.

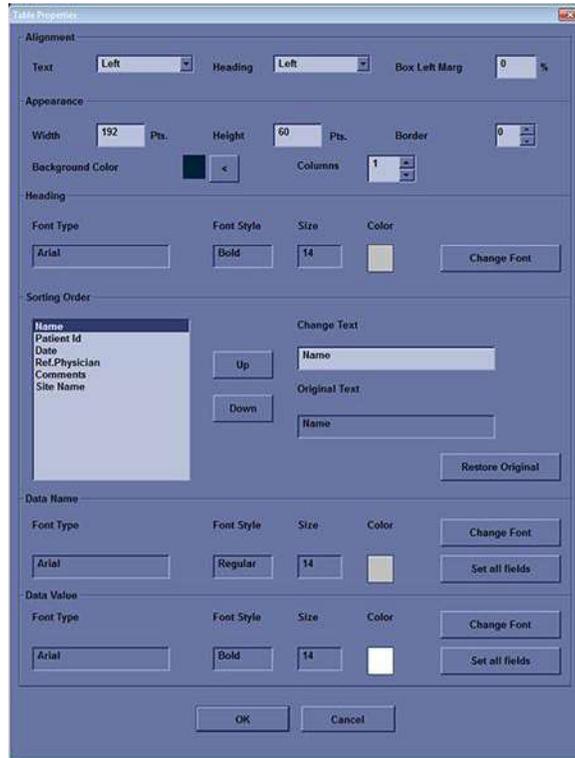


Figure 14-24. Table Properties

5. Select **OK** or Cancel. The contents of the Archive Information is inserted to the related page automatically.

Inserting Archive Information (continued)

Editing displayed Archive Information:

1. Select **Designer**.
2. Move the cursor to Archive Information field to be edited.
3. Press **Set** twice. The Archive Information Box displays.
4. Edit the heading, the Heading Link and Information parameters, as necessary.
5. Select **OK** to save or Cancel.

Anatomical graphics

1. Place the cursor where you want to insert the Anatomical Graphics and press **Set**.
2. Select Anatomical Graphics from the Insert menu.

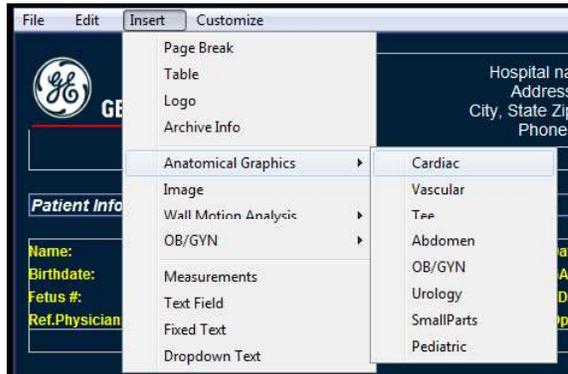


Figure 14-25. Anatomical Graphics Menu Example

3. Select the desired category and press **Set**. The graphic box displays.

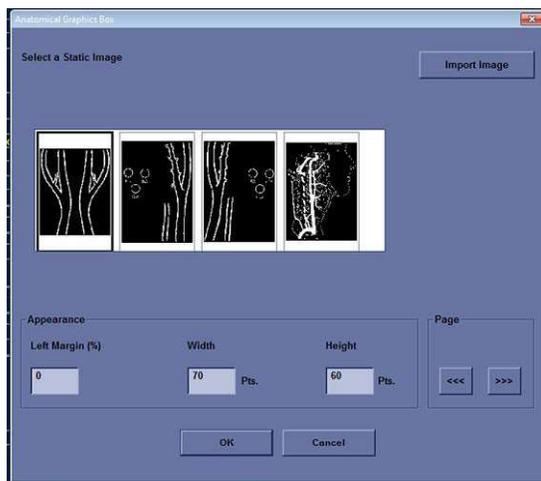


Figure 14-26. Anatomical Graphics Box Example

4. Select the graphic to be inserted to the template or import a bmp or jpg file from the removable media. Scroll the images using the arrow key.
5. Select Appearance.
6. Select **OK** or Cancel.

Insert Image

1. Place the cursor where you want to insert the image.
2. Select a image from the Insert menu and press **Set**. The Ultrasound Image Box displays.

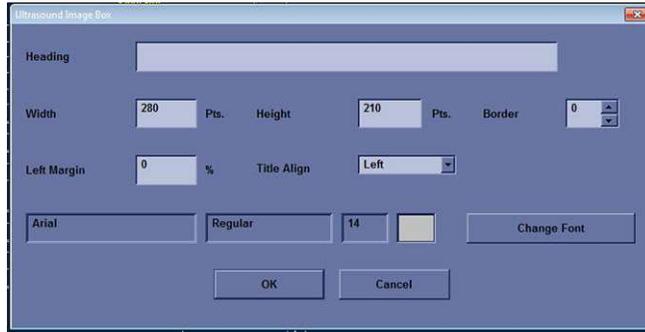


Figure 14-27. Ultrasound Image Box

3. Type the Heading text, modify the box properties, and change the heading text font, as necessary.

NOTE: *For no heading, type a Space in the Heading text.*

To keep the monitor image appearance, the ratio of width to height (W:H) should be 4:3. So, basically 640:480 for large images and 300:225 for two side-by-side images.

4. Select OK or Cancel.

Cardiac Studies Wall Motion Analysis

1. Place the cursor where you want to insert the wall motion analysis and press **Set**.
2. Select Wall Motion Analysis from the Insert menu.
3. Select and set up the desired parameter.
 - Bull's Eye

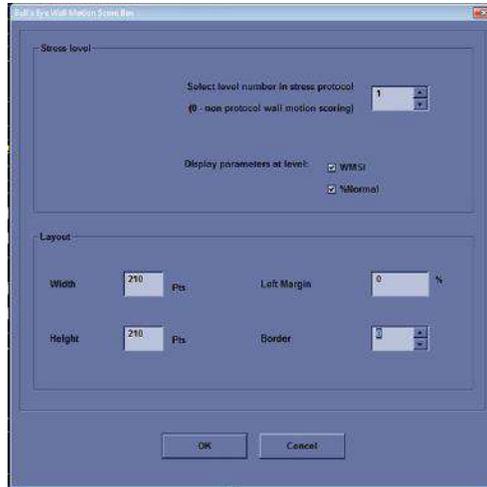


Figure 14-28. Bull's Eye Dialog Box



Figure 14-29. Bull's Eye Report Example

Cardiac Studies Wall Motion Analysis (continued)

- Cut Planes
NOTE: The Cut Planes dialog box parameters are similar to the Bull's Eye Dialog Box shown previously.

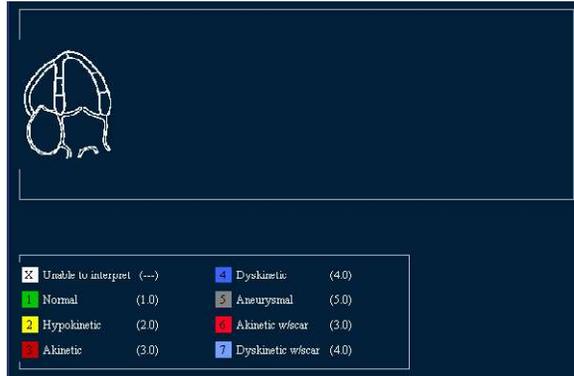


Figure 14-30. Cut Planes Report Example

- Score Table Box

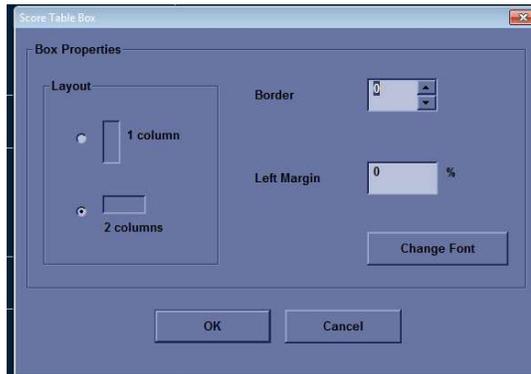


Figure 14-31. Score Table Box Dialog Box

4. After you finish the setup, select OK or Cancel.

OB/GYN (OB and GYN Only)

The OB Graph, Bar Graph and Anatomy can be entered into the Report.

1. Place the cursor where you want to insert the graph or anatomy and press **Set**.
2. From the Insert menu, select OB/GYN. The selection menu displays.

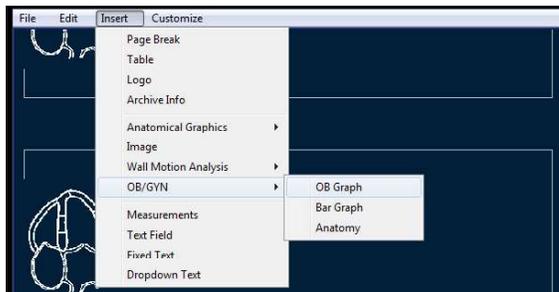


Figure 14-32. Selection Menu

3. Select the appropriate item as necessary. A dialog box displays.
 - OB Graph

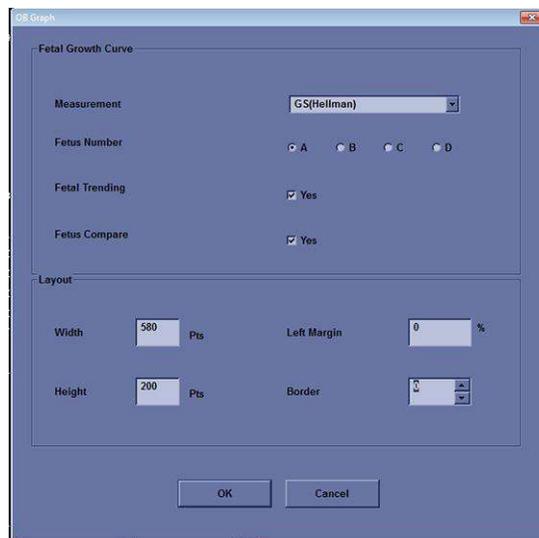


Figure 14-33. OB Graph Dialog Box

OB/GYN (OB and GYN Only) (continued)

- a. Select the Measurement and Fetus Number.
 - b. Check Fetus Trending and Fetus Compare, if appropriate.
 - c. Modify the Layout, if necessary.
 - d. Select OK.
- Bar Graph

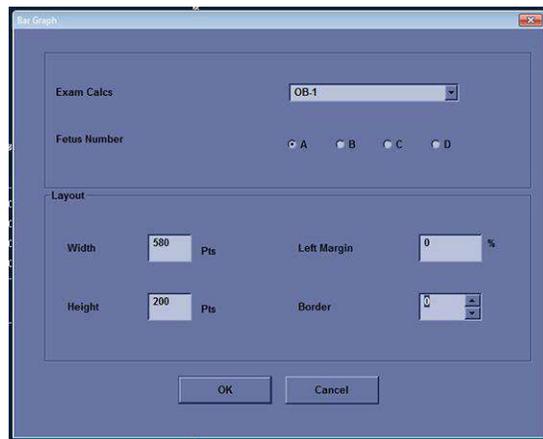


Figure 14-34. Bar Graph Dialog Box

- a. Select the exam and fetus number.
- b. Modify the Layout, if necessary.
- c. Select OK.

NOTE: *The Bar Graph already contains default application measurements.*

OB/GYN (OB and GYN Only) (continued)

- Anatomy

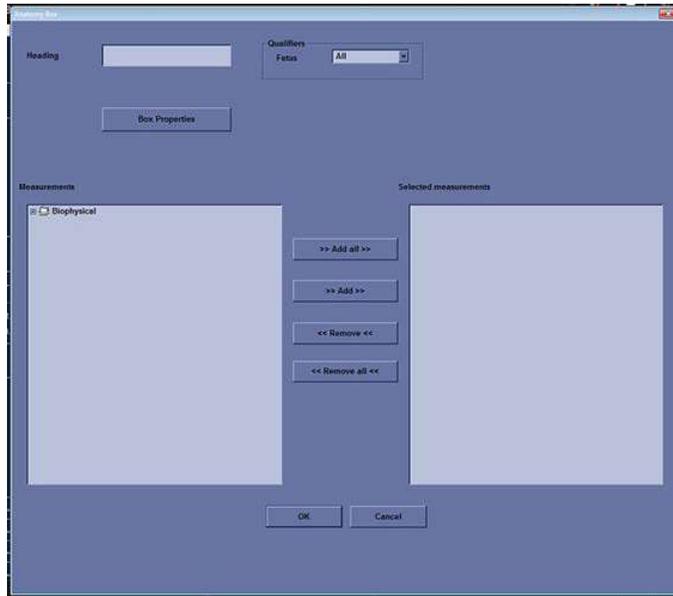


Figure 14-35. Anatomy Dialog Box

- Type the Heading.
- Select qualifiers from the pull-down menu.
- Select "Add all" to copy all measurements to the right column
- Check the box in front of the measurement you need in the left column and select "Add". The select measurements copy to the right column.
- To remove measurements you do not need, check the boxes in front of those measurements in the right column, and select "Remove" or "Remove all".
- If you want to modify the properties, select Box Properties and set required parameters.

Measurements

Insert a field to display the measurements. The measured parameters displayed in the measurement display field are configured.

1. Place the cursor where you want to insert the measurement and press **Set**.
2. Select Measurements from the Insert menu and press **Set**. The Measurements Box displays.

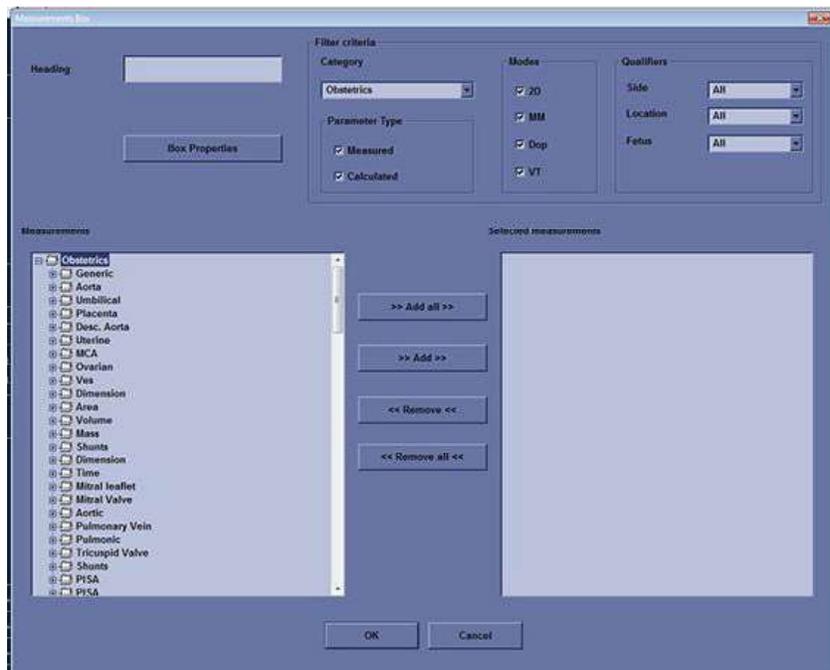


Figure 14-36. Measurement Box

3. Type the Heading text, select the Filter Criteria and measurements from the tree, as necessary.
4. Select OK or Cancel.

Text Fields

1. Place the cursor where you want to insert the text and press **Set**.
2. Select Text Field from the Insert menu and press **Set**. The Text Field dialog box displays.

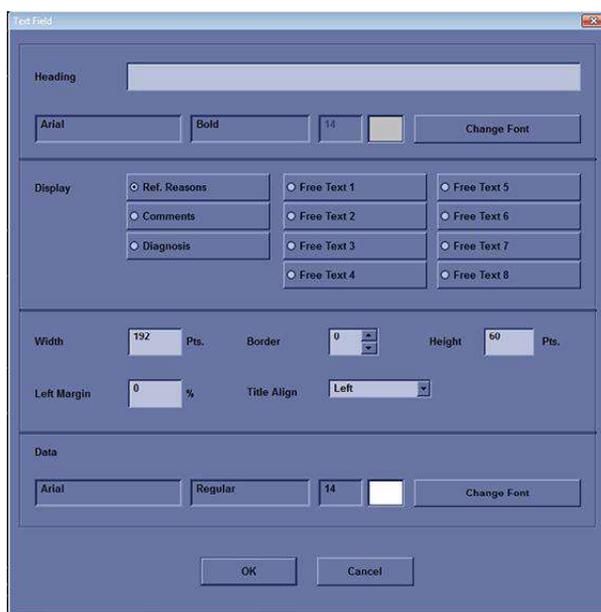


Figure 14-37. Text Field Dialog Box

3. Type the Heading Text. If you do not need the heading, type a space.
4. Select Display item.
 - Ref.Reason: Reason for Referral.
 - Comments: Gets information from the Comment field of the Patient screen and the Exam Comment field of the Worksheet.
 - Diagnosis.
 - Free Text: 1 - 8
5. Specify the border of the Text Field and Font as necessary.
6. Select OK or Cancel.

The text is saved automatically into the corresponding area selected on this dialog box.

Text Fields (continued)

Editing an existing text field:

1. Move the cursor to the Text Field to be edited.
2. Press **Set** twice. The Text Field dialog box displays.
3. Edit the heading, the settings, or font, as necessary.
4. Select OK or Cancel.

Fixed Text

1. Place the cursor where you want to insert the fixed text and press **Set**.
2. Select Fixed Text from the Insert menu and press **Set**. The Fixed Text dialog box displays.

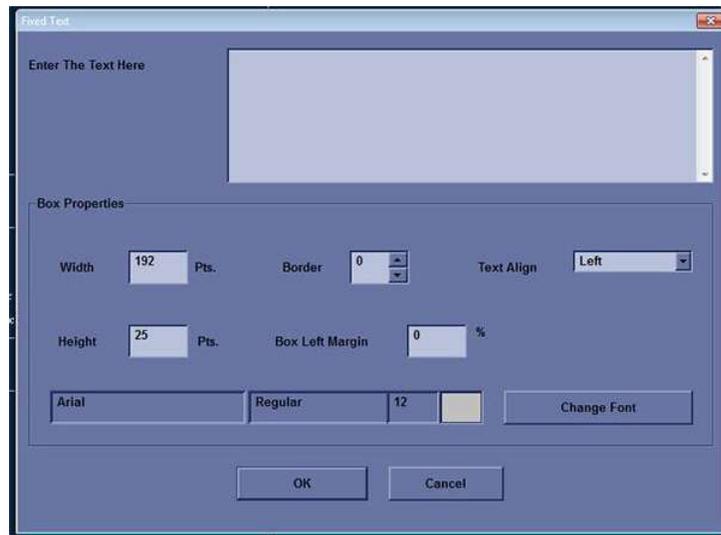


Figure 14-38. Fixed Text Dialog Box

3. Type the text (e.g. hospital information, report title, or table title) and specify the border and font.
4. Select OK or Cancel.

Editing existing Fixed Text:

1. Move the cursor to the Fixed Text to be edited.
2. Press **Set** twice. The Fixed Text dialog box displays.
3. Edit the text, the border or font, as necessary.
4. Select OK or Cancel.

Dropdown Text

1. Place the cursor where you want to insert the dropdown text and press **Set**.
2. Select dropdown Text from the Insert menu and press **Set**. The dropdown Text dialog box displays.

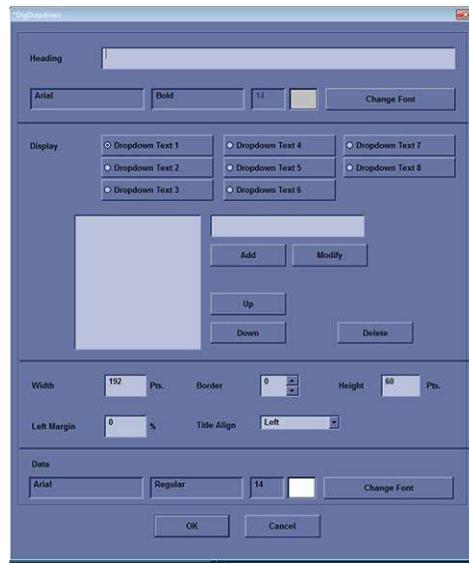


Figure 14-39. Dropdown Text Dialog Box

3. Select the appropriate display items:
 - Dropdown Text 1 - 8
4. Type the heading Text.
5. Modify box properties, the heading text and font, and data.
6. Select OK or Cancel.
7. Save the template.

To keep the same template name:

- Select Save from the File menu, and press Set. The Save Template dialog box opens.
- Select Yes. The template retains the same name and adds “[user]”. For example, OB23-Basic[user].

To save the template with a new name:

- Select Save As from the File menu, and press Set. The Save Template As dialog box opens.
- Enter the name of the new template, and press Set. The template receives the new name and adds “[user]”. For example, NewReport[user].

Customize Menu

Table 14-6: Customize Menu

	Description
Page Color	Changes the template color.
Preference	The Preference menu for Archive Information field displays.

Page Color

1. To change the page color, select Page Color from the Customize Menu and press **Set**. The Color dialog box displays.

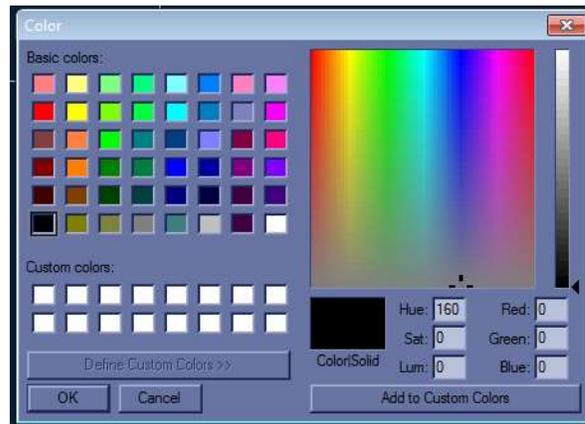


Figure 14-40. Color Dialog

2. Choose the desired color or create a new color.
3. Select OK or Cancel.

Setting Preferences

To set preferences for the Archive Information:

1. Select Preferences from the Customize menu and press **Set**. The Preference Box displays.

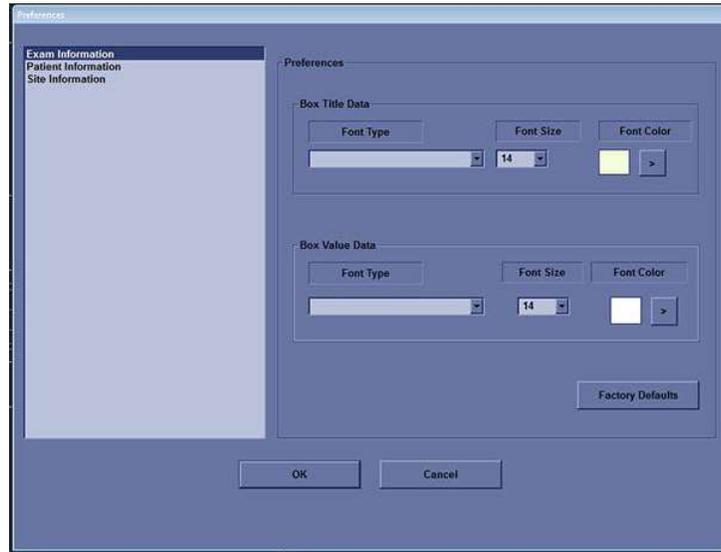


Figure 14-41. Preferences Box

2. Select the information to be modified and set the desired preferences.
3. Select OK or Cancel.
4. Save the template.

Report Presets

Utility Report Page

You can edit the report template and text on the Utility Reports page.

Templates

Left Column: The list of all templates (Factory Default, User defined, etc.)

Right Column: The list of templates displayed on the template list.

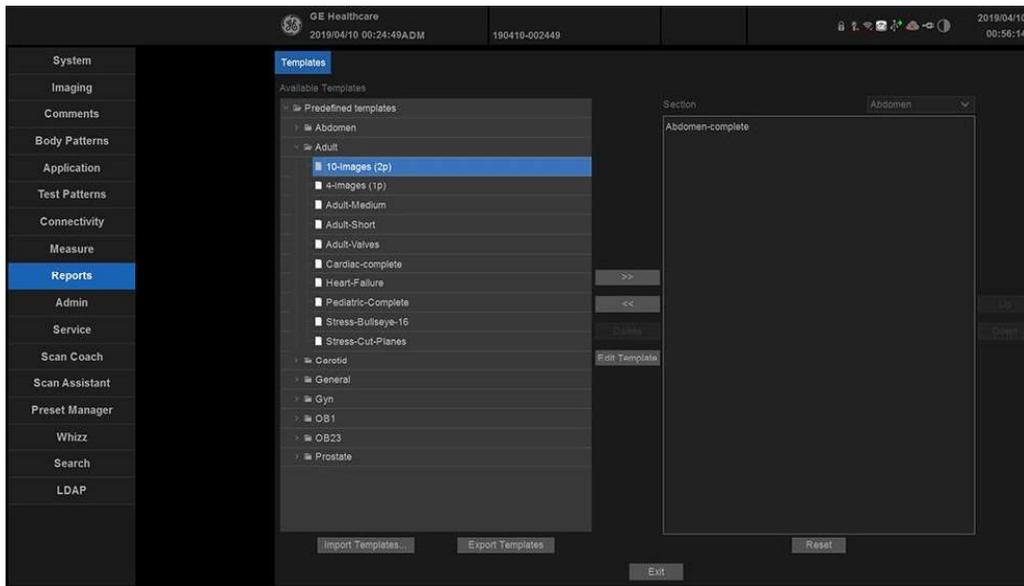


Figure 14-42. Report Template Tab

Templates (continued)

- To insert the template on the template list:
 - a. Select the application which you want to insert into the template from the pull-down menu above the right column.
 - b. Select the category (categories) and/or the template(s) in the left column.
 - c. Select the right arrow to copy the template to the right column.
- To remove the template from the template list but not from the system):
 - a. Select the template in the right column.
 - b. Use the left arrow to remove the template from the right column.
- To edit the template or to make a new template:
 - a. Enter Utility -> Reports -> Templates tab.
 - b. Select the appropriate template in the left column.
 - c. Select **Edit Template**. The Template Designer page displays.
 - d. Edit the template and save or save as with a new name.

If you use Save As with a new name, the new template is added to the left column. See 'Designing Your Own Template' on *page 14-27 for more information*.
- To delete the template:
 - a. Select the template to be deleted.
 - b. Press **Delete**.

NOTE: *The Predefined templates can not be deleted.*

Templates (continued)

- To export the template:



Export templates to removable media (CDs, DVDs, USBs) so, at a later time, you can import those templates to a system. Export only works on templates, not data.

- a. Insert the removable media in the drive.
- b. Move the cursor to “Export Templates” and press **Set**. The available user-defined templates display in the Export Templates window.

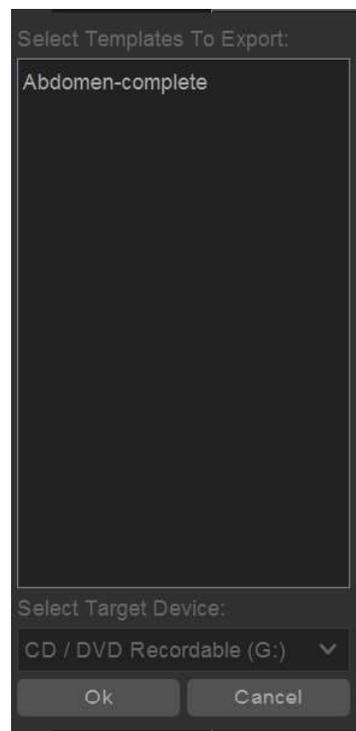


Figure 14-43. Export Templates

- c. Select the template(s) to be exported.
- NOTE:** *To select multiple templates, use the **Ctrl** or **Shift** keys.*
- d. Select the desired removable media under the Select Target Device field.
 - e. Select **OK**.
 - f. Press **F3** to eject the media.

Templates (continued)

- To import the template:

NOTE: *Import only works on templates, not data.*

 - a. Insert the removable media with the report template(s) to be imported.
 - b. Select **Import Templates**. The Import Template window displays.

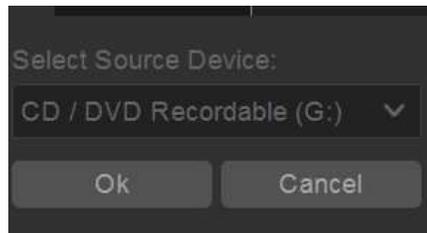


Figure 14-44. Import Templates

- c. Select the Source Device from the pull-down menu. Select **OK**.
 - d. Press **F3** to eject the media.
- NOTE:* *Imported templates are stored in the User defined templates\General directory.*
- To move the template from the left column to the right, or from the right to the left:
 - a. Select the template to be moved.
 - b. Select the Right Arrow or Left Arrow button.
 - To move the template up or down in the right column:
 - a. Select the template to be moved.
 - b. Press the Up Arrow or Down Arrow button.

Chapter 15

Recording Images

Describes how to record images.

Introduction

Overview

A typical workflow for connectivity might be as follows (this setup varies by each user setup):

1. Select the dataflow, worklist for example.
2. Start a new exam. Select the patient.
3. Perform the patient scan.
4. Store images as multi-frame CINE Loops and Raw DICOM data via the assigned print key.
5. Check the DICOM Job Spooler via **F4** to verify delivery.
6. End the exam.
7. Permanently store images via the Patient menu.

Overview (continued)

During an examination, the operator stores data, images and cineloops for immediate purposes. The Versana Active includes an integrated patient archiving system for data and image storage.

The Versana Active enables also storing of data and images to external databases (Network Server, removable media).

Dataflow combines archive, data, DICOM, and onboard records into one coherent workflow. Destination devices are configured and assigned to the print keys. You select the appropriate dataflow (Portable, etc.) according to your requirements. You manage the patient database (local, shared, or via a worklist broker).

- DO NOT use the internal hard drive for long-term image storage. Daily backup is recommended. External storage media is recommended for image archive.

NOTE: *DICOM images are stored to external media storage devices separately from patient data, which also needs to be backed up to a dedicated database-formatted external storage media.*

- If working off-line with a dataflow pointing to a DICOM server, the images stored during the examination may have to be manually resent in the DICOM spooler when reconnecting the unit. Resend all jobs that failed or are on hold.

In addition, stored images and cineloops can be saved to a removable media in the standard formats JPEG, MPEG, AVI and DICOM.

- You need to set up a protocol for locating images stored to external storage media for easy recall.
- GE IS NOT responsible for lost data if you do not follow suggested back-up procedures. GE WILL NOT aid in the recovery of lost data.

Refer to Chapter 16 Customizing your system for instructions on setting up your system's connectivity.

Adding Devices

To add a destination device (printer, worklist server, etc.) to this system, see 'Device' on *page 16-78*.

To verify a DICOM device, see 'Device' on *page 16-78*.

Adding a Dataflow

To add a new dataflow to this system, see 'Dataflow' on *page 16-98*.

Adding Devices to a Print Button

To add devices/dataflows to a print button, see 'Button' on *page 16-99*.

Formatting Removable Media

To format removable media, see 'Formatting removable media' on *page 16-102*.

Storing Images and Cineloops

Overview

Images and cineloops that are stored during a current examination are displayed as thumbnails on the clipboard.

When an image is stored, all the additional information that is displayed is saved with it (i.e. probe and application selected, image setting, annotations or measurements).

See 'Print Control' on *page 16-64* for detailed settings related storing image/Cine.

The image archive is set by the dataflow selected (See 'Dataflow' on *page 16-98 for more information.*)

Storing an image

To store an image,

1. While scanning, press **Freeze**.
2. Scroll through the CINE Loop and select the desired image.
3. Press the Store key.

The selected image is stored (per your preset instructions) and a thumbnail is displayed on the clipboard.

Storing a CINE Loop

A CINE Loop is a sequence of images recorded over a certain time frame. The stored CINE Loops are displayed chronologically on the clipboard.

CINE Loops can be stored at any time during scanning. You can choose to preview the CINE Loop before storage and save the CINE Loop directly, as described below.

Refer to 'Print Control' on *page 16-64* about the setting.

Previewing and Storing a CINE Loop

1. While scanning, press **Freeze**.
2. Determine the best CINE Loop to store.
3. Play the CINE Loop to review it.
4. Press the Store key.

Depending on whether the system has been configured to enable or disable "Preview Loop before store" (see 'Print Control' on *page 16-64*), the following procedures enable the CINE Loop to be stored directly.

Storing a CINE Loop Without Preview

If "Preview clip before store" is disabled,

1. While scanning, press the Store key.
2. The last valid CINE Loop is stored in the archive and a thumbnail is displayed on the clipboard.
3. Scanning resumes immediately.

Storing a CINE Loop With Preview

If "Preview clip before store" is enabled,

1. While scanning, press the Store key.
2. The last valid CINE Loop is previewed.
3. Adjust the CINE Loop, as necessary.
4. Press the Store key.

The movie clip thumbnail is displayed on the clipboard.

Image/Data Management

Reviewing Patient Images

Please refer to 'Retrieving and editing archived information' on *page 4-20* for detailed information on the following:

- Retrieving and editing archived information
 - Searching for a patient
 - Reviewing a patient exam
 - Reviewing an image
 - Deleting a patient, exam, or image

Backup/Restore Images

Please refer to 'Backup and Restore' on *page 16-25* and 'EZBackup and EZMove' on *page 16-29* for detailed information.

Clipboard

The clipboard displays thumbnail images of the acquired data for the current exam. Images from other exams are not displayed on the current patient's clipboard.

All of the images can be viewed in the Active Images screen, available from the display or from the Archive menu.

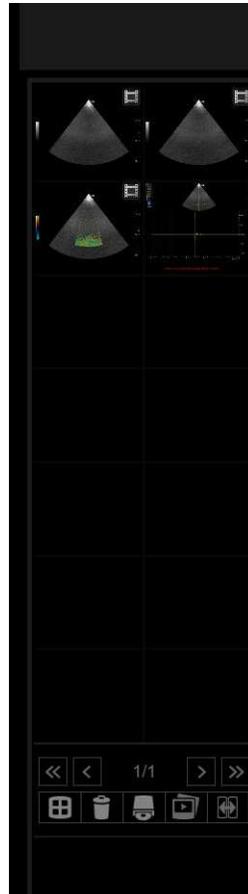


Figure 15-1. Clipboard

Saving the image /cine to the Clipboard

The active image/cine is stored and placed on the clipboard when you press the Store key. The clipboard contains preview images with enough resolution to clearly indicate the contents of the image. CINE Loops are indicated by a movie clip icon.

Previewing Clipboard Images

1. Select the **Cursor** key to obtain a cursor arrow.
2. Move the **Trackball** to position the pointer over the clipboard image you want to recall.
3. An enlarged preview of the image is displayed on the left-hand side of the monitor.

Recalling Images from the Clipboard

To recall images from the clipboard,

1. Select the **Cursor** key to obtain a cursor arrow.
2. Move the **Trackball** to position the pointer over the clipboard image you want to recall.
3. Press **Set** to recall the image.

To delete an image from the clipboard

1. Select the **Cursor** key to obtain a cursor arrow.
2. Place the cursor on the clipboard image you want to delete, then press **Set** to select the image.
3. Place the cursor on the Delete icon and press **Set**.
A warning message is displayed asking the user to confirm the action to perform.
4. Select **Yes**.

Save As

Images and cineloops can be saved to a removable media or Network storage to View on a **Windows PC** in the following standard formats:

- Still images: JPEG, JPEG2000, DICOM and RawDICOM (Raw data + DICOM)
- Cineloops: WMV, AVI, DICOM and RawDICOM (Raw data + DICOM)

Images can also be stored as MPEG format as described on 'MPEGvue' on *page 15-24*

To save images:

1. Insert the media into the drive or connect the USB drive to the system.

NOTE: If you have not formatted the media, the media will be formatted when you select Save As.

2. On the scan screen, press the **Cursor** key. The arrow cursor displays.
3. Place the cursor on the image or CINE Loop in the clipboard to be saved and press **Set**. The image displays on the screen.

Save As (continued)

4. Select save as icon in the lower, right-hand corner of the screen. The SAVE AS menu appears.

NOTE: *If you save the image as an .avi file or .wmv file, run the CINE Loop before you select Menu.*

NOTE: *You can not save 2D cinelooop image as a .jpeg file.*

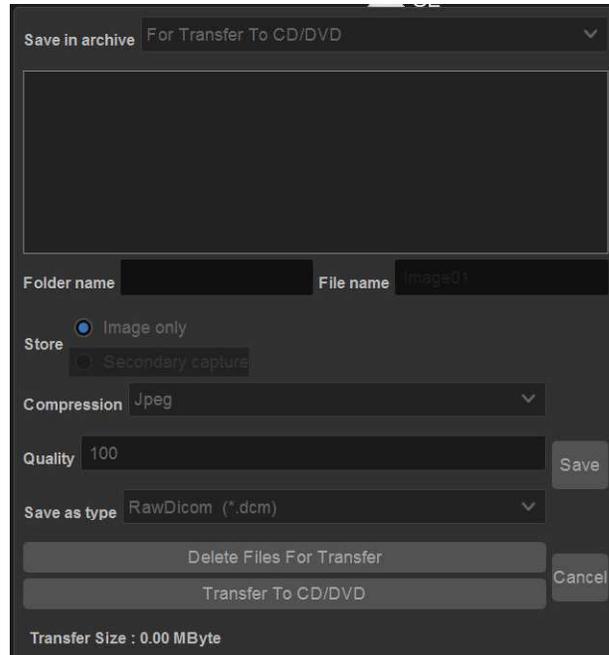


Figure 15-2. Save As Menu

5. Select the media from the Save in archive pull-down menu.
6. Folder name: You can create the folder for the saved file.
 - Default is blank (The folder is not created)

NOTE: *You can not edit the folder name when the folder is opened.*

7. File name: The name of the file is automatically filled in, but you can change the file name in the File name field.

NOTE: *DO NOT use the following special characters when saving images: !, @, #, \$, %, ^, &, *, (,), |, :, ;, <, >, ?, /, ~, [,], {, }.*

Save As (continued)

8. Store: Select Image only or Secondary capture.
- Image only: Saves only the ultrasound image area.
 - Secondary capture: Saves the ultrasound image area, title bar, and scan information area. Not available for DICOM or RawDICOM images.

NOTE: If you select "WMV" for Save as type, Secondary capture is disabled.

9. Compression: Specify Compression.
- None
 - Rle
 - Jpeg
 - Jpeg2000

NOTE: If you select "WMV" for Save as type, Compression is disabled.

10. Quality: Specify image quality (between 10-100). A high quality setting gives a lower compression.

NOTE: If you select "WMV" for Save as type, Quality is disabled.

11. Save as type: Select one of the following.
- RawDICOM: saves the still image or CINE Loop in both GE raw format and DICOM format.
 - DICOM: saves the still image or CINE Loop in pure DICOM format.
 - AVI: Saves the CINE Loop in avi format.

NOTE: Store "Image Only" is available if you select AVI for Type.

- JPEG: Saves the still image in jpeg format.
- WMV: Saves the CINE Loop in wmv format

NOTE: WMV type is only available with CINE loop image.

- JPEG2000: Saves the still image in JPEG2000 format.

If you want to see all data saved onto the SSD, select "AllFiles(*)". All the data names display in the window.

NOTE: The Save button is disabled when you select "AllFiles". Select each Save as type when you want to save data.

Save As (continued)

12. Press **Save**.

The images are saved directly to the USB drives or Network storage whenever you press Save.

If you select "Transfer to CD/DVD", the images are saved to the SSD buffer.

- If free space of the destination is not enough to save all selected images, then warning dialog appears.
- If the same file name is existed in the destination, the warning dialog displays.

OK: Overwrite file and continue to save selected images.

Cancel: Do not save images.

13. Repeat this step for as many images/clips to be saved.

14. After you have added all of the images/loops you want to save and are ready to write to the CD/DVD, transfer all the images at the same time. Press **Save As** --> Transfer To CD/DVD.

A progress bar lets you know that the "Media transfer is in progress."

If total transfer size is bigger than CD/DVD free space size, then only the files that can be copied to CD/DVD are transferred. After the copy is finished, the warning dialog displays. Warning dialog shows total required file size and transferred file size. Press **OK** and you need to change CD/DVD and press **Transfer to CD/DVD** again.

Save As (continued)

15. If you do not want to save the image to CD/DVD, select **“Delete Files for Transfer”** All images are deleted.
16. Press **F3** to eject the media. Select CD/DVD Recordable or USB drive.

NOTE: The Report Save As feature is somewhat different. As soon as you select to save a report, the report is saved. (CD/DVD)

NOTE: If you save 3D image as an AVI file, an annotation text “COMP” appears at the top of the saved image which represents the compressed image.

Table 15-1: Image Format

	.avi format	.wmv format	MPEGvue in Data Transfer
B, B+CF	Multi frames	Multi frames	Multi frames
B+Doppler	Single frame	Multi frames	Single frame
B+M	Single frame	Multi frames	Single frame
3D	Multi frames	N/A	Single frame

NOTE: Verify the saved image works correctly on the Windows PC. If the image does not work, please save it again on the Versana Active.

'SaveAs' Images

You can select the images at one time which you want store by SaveAs in the Active Image screen.

Features are almost same as usual SaveAs. See 'Save As' on page 15-10 for more information.

- NOTE:** We suggest that you save the images page by page with "SaveAs" Images in Active Images. It takes time if you have many images or raw data.
- NOTE:** If the image has a filmstrip icon, this indicates a CINE Loop, which gets saved as a .wmv file; single images are saved as a jpeg file.
- NOTE:** 'SaveAs' Images function doesn't support images which are query/retrieved.
1. In the Active Image screen, place the cursor on the image or CINE Loop to be saved and press **Set**. You can select multi images with multi pages.
 2. Press **'SaveAs' Images** on the monitor display. The SaveAs menu appears.

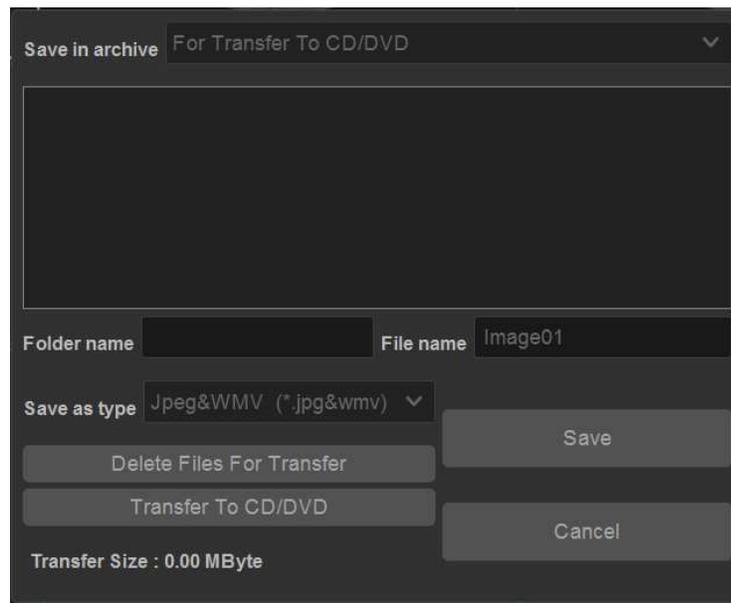


Figure 15-3. 'SaveAs' Images Menu

'SaveAs' Images (continued)

3. Ensure that Jpeg&WMV is selected, then press **Save**.

If you are saving to USB, images are transferred as soon as you press Save; if you are saving via Transfer to CD/DVD, you need to save images to the hard drive, then images are transferred when you select Transfer to CD/DVD. See below.

Storing Images with More Resolution

To store images with more resolution than is available with the JPEG selection, select Save As and select AVI as the Save As Type. You can save single images as .avi files.

Table 15-2: Store Options

Image Type	Store as Image Only	Store as Secondary Capture
CINE Loop	Gives you a loop of just the image (no title bar and scan information).	Gives you a single image of the video area. DO NOT DO THIS BECAUSE YOU DO NOT KNOW WHICH IMAGE FROM THE LOOP THAT YOU ARE GETTING.
Still Image	Gives you a single image (no title bar and scan information).	Gives you a single image of the video area.

Data Transfer

Overview

The user can select and access the Exam Transfer services from the Exam Data Transfer screen.

- Import
- Export
- Worklist
- MPEGvue
- Q/R (Query/Retrieve)

NOTE: *Ensure that all patients are exported or backed up BEFORE deleting them.*

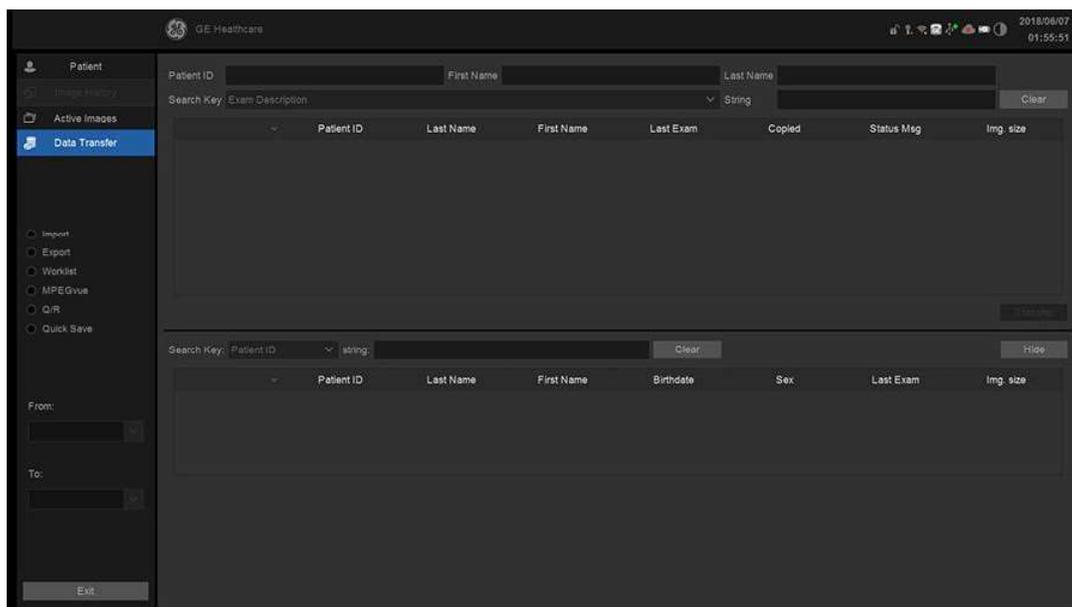


Figure 15-4. Exam Data Transfer Screen

Export/Import

To move exams from one Ultrasound system to another system or to back up/retrieve exam information, you need to export/import exam information.

NOTE: Both database information and images are exported. No data is deleted from the local archive when exporting data.

NOTE: Export/Import patient records may take more than ten (10) minutes. Please allow sufficient time to export/import patients.

NOTE: You MUST verify the media you use BEFORE performing Export/Import. You must do this once each session. If you encounter problems, eject the media and then re-insert the media; then try the Export/Import again.

NOTE: We STRONGLY recommend that you verify files on Eject when using Export.

Exporting Data

To export an exam(s) to a compatible Ultrasound system:

1. Format and label the removable media. Answer Yes/OK to the messages.

NOTE: The system formats the unformatted CD-R/DVD-R automatically when you select Export on the data transfer screen.

2. Press **Active Images** and select **Data Transfer**.
3. The Data Transfer screen is displayed. Select Export.
4. "Local Archive-Int.HD" displays on the Transfer From pull-down menu and the patient list included in the Local Archive displays.

Exporting Data (continued)

5. Select the destination at the Transfer To pull-down menu.
6. Select the patient(s) to export by using the Transfer From search field (the upper field).

You can use Windows commands to select more than one patient.

To select a consecutive list of patients, click the cursor on the first name, move the cursor to the last name, then press and hold down the Shift+Set key to select all the names.

To select a non-consecutive list of patients, click the cursor at the first name, move the cursor to the next name, then press and hold down the Ctrl+Set key, move the cursor to the next name, then press and hold down the Ctrl+Set key again, etc.

You can also search for patients via the Search key and string.

Or, use Select All to select all patient.

NOTE: *You need to use your best judgment when moving patients' images. If there are lots of images or loops, then only move a few patients at a time.*

7. Press **Transfer**. The progress bar displays during the transfer.
8. Once the transfer is complete, press **F3** to eject the media. Specify that you want to finalize the media.

NOTE: *To display exported DICOM or Raw DICOM images on a PC, you need the dedicated viewer.*

Importing Data

To import an exam(s) to another Ultrasound system:

1. At the other Ultrasound system, insert the media.
2. Press **Patient** and select **Data Transfer**.
3. The Data Transfer screen displays. Press Import.
4. Select the media from the Transfer From pull-down menu.
5. The Transfer From search field shows the patients available for import from the removable media you just loaded onto the system.
6. Select the patient(s) or the exam(s) from the list to be imported.
7. Press Transfer. The progress bar displays during the transfer.
8. Please wait for the patient information to be copied to this Ultrasound system. Informational messages appear while the import is taking place.
9. Press **F3** to eject the media.

NOTE: Use Import to restore EZBacked up and/or EZ Moved images.

NOTE: You can retrieve from the media to the Local SSD, playback, or process exam information on the system as Raw Data.

Query/Retrieve (Search and retrieve the data from DICOM device)

NOTE: For Query/Retrieve to find a patient, the patient **MUST** have a Patient ID.

NOTE: Before you retrieve data from the Worklist server, make sure that default IP address is input in the Default Gateway field in Utility -> Connectivity -> TCP/IP.

Query

1. Press **Active Images** and select **Data Transfer**. The Data Transfer screen displays.
2. Select Q/R. The patient/exam list in the Local Archive displays in the Transfer To section.

NOTE: Only "Local Archive - Int.HD" is enabled for Transfer To.

3. Select the Query/Retrieve server from the Transfer From pull-down menu.

NOTE: The server is configured in the Utility screen. Multiple servers are able to be configured.

4. Press **Query** in the Transfer From section. The Query is performed.
5. The server's patient list displays.

NOTE: Press **Query** again to refresh the list.

Retrieve

1. Select the patient(s) or the exam(s) to be retrieved from the patient list.
2. Select **Transfer**. Retrieve the data from the Query/Retrieve Server. The progress bar displays during the transfer.

Worklist (Search and retrieve the Patient/Exam information)

NOTE: *Before you retrieve data from the Worklist server, make sure that default IP address is input in the Default Gateway field in Utility -> Connectivity -> TCP/IP.*

1. Press **Active Images** and select **Data Transfer**. The Data Transfer screen displays.
2. Select Worklist. The patient/exam list in the Local Archive displays in the Transfer To section.

NOTE: *Only "Local Archive - Int.HD" is enabled for Transfer To.*

3. The Worklist used last time is displayed on the monitor display. Press Query to refresh the list or select another Worklist server from the Transfer From pull-down menu.

NOTE: *The worklist server is configured in the Utility screen. Multiple servers are able to be configured.*

NOTE: *You can configure whether the auto-refresh worklist has been enabled/disabled in the Utility screen. The system automatically refreshes the list when the exam data transfer accesses the Worklist server or changes the Worklist server.*

4. Select the patient(s) or the exam(s) from the list.
5. Press Transfer. The progress bar displays during the transfer.

MPEGvue

You can see the exam data on the **Windows PC** by using MPEGvue.



CAUTION

DO NOT transfer more than 50 patients at one time.



CAUTION

DO NOT use lossy compression images, such as JPG or MPEG images, for diagnosis.



CAUTION

MPEGvue function is NOT compatible with other LOGIQ series products. Do NOT share the same USB Drive for MPEGvue between Versana Active and other LOGIQ series products.

NOTE: *If you want to label the removable media, format it before use. The system formats the unformatted CD-R/DVD-R automatically when you select MPEGvue on the data transfer screen.*

1. Insert the removable media.
2. Select **Patient** and select **Data Transfer**. The Data Transfer screen displays.
3. Select MPEGvue. The Patient list, which has images in the Local Archive, displays in the Transfer From section.
Start the media formatting automatically except USB HDD. Label the media with "YYYYMMDD_#".

NOTE: *Only "Local Archive - Int.HD" is enabled for the Transfer From.*

4. Select the media from the Transfer To pull-down menu.

NOTE: *Select Removable CD Archive if you use CD-R or DVD-R.*

MPEGvue (continued)

5. Select the patient(s) or the exam(s) from the list.

NOTE: If you press Clear in the Transfer From and Transfer To section, all the search criteria clears and the list is refreshed accordingly.

NOTE: Trying to save 3D loops using MPEGvue, the 3D loops are saved as still images. Use "Save As" to save 3D loops.

6. Press **Transfer**, then select **OK** to continue. The progress bar displays during the transfer.

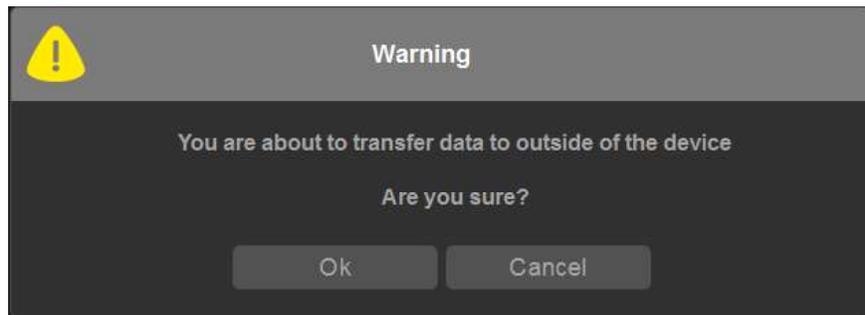


Figure 15-5. Warning message

MPEGvue (continued)

When the transfer complete, the message OK displays in the Status Msg field and Operation completed message displays on the bottom of the screen.

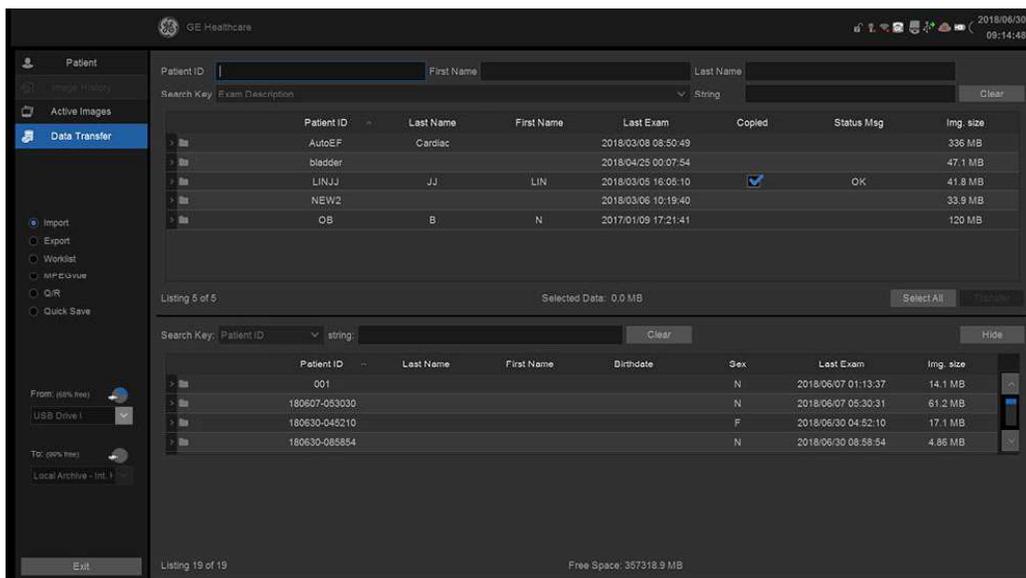


Figure 15-6. Completed patient

When the message “Not enough free space” displays during MPEGvue,

- CD-R/DVD-R: Please change to a new media.
- USB HDD/USB Flash Drive: Backup the current data in the USB device to the other media and clear the USB device.

MPEGvue (continued)

NOTE: *If an error dialogue and message displays during MPEGvue, reduce the number of exams to gain space, and perform MPEGVue once again to a new media (CD-R/ DVD-R) or the USB device.*

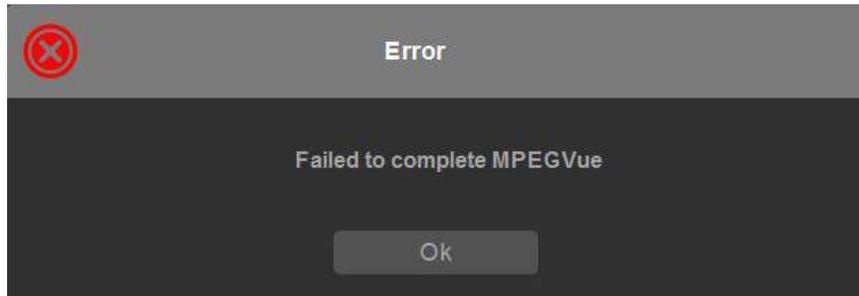


Figure 15-7. Error Dialogue

7. When the transfer is completed, press **Exit** to return to the scan screen and then eject the media.

NOTE: *The capacity of media (number of patients) and the writing time depends on the data size of each patient. If you try to save an image larger than 1GB using MPEGvue, it may take a few hours to save the image.*

NOTE: *Before you read the media on the PC, finalize the media on the Versana Active.*

NOTE: *Measurement graphics from the exam performed on the system are maintained with the MPEG exam.*



CAUTION

DO NOT use “Verify” when ejecting the CD/DVD if you transferred multiple patients to the media using MPEGVue.

Recording Images

MPEGvue (continued)



CAUTION

DO NOT modify the folder name and the folder configuration of MPEGvue which is created in the media.

NOTE: Select “MPEG4 Windows Media Format (*.wmv)” when you save the Cine image from CD/DVD to the SSD while reviewing it on your PC.

NOTE: Measurement graphics from the exam performed on the system are maintained with the MPEG exam.

1. To read MPEG exams stored on a CD-R/DVD-R:
 - Insert the MPEGVue CD-R/DVD-R in the computer DVD drive. The MPEGVue Patient list is displayed.

To read MPEGVue exams stored on other media:

- Insert the media containing the MPEG exams and double-click on the file Start_MPEGvue.bat. The MPEGVue Patient list is displayed.

The screenshot shows the MPEGVue Player application window. The title bar reads 'MPEGVue Player'. The menu bar includes 'File', 'Customize', and 'Help'. Below the menu bar is a toolbar with icons for file operations. The main area of the window displays a table with the following data:

ID	Other ID	Patient Name	Exam Date	Birth Date	Images
170517-091506			2017/5/17	2017/5/17	5

Figure 15-8. Patient list

MPEGvue (continued)

2. Select the desired examination date to display the images.
The MPEGVue screen is displayed.

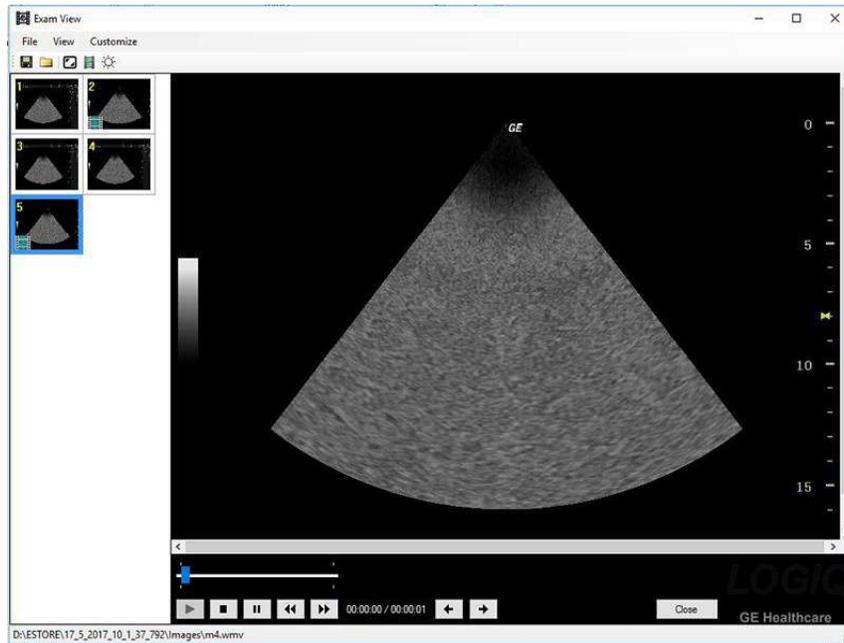


Figure 15-9. MPEGvue screen

1. Freeze/run cineloop
2. Scrolling tool when in Freeze
3. Display full screen
4. Save images as .wmv, .bmp, jpeg or .avi
5. E-mail support
6. Video Setting Adjustment
7. Display previous/next image
8. Display the MPEGVue patient list

MPEGvue (continued)

E-mail support

Sending images or examinations by e-mail.

NOTE: E-mail support and a desktop icon cannot be used on a non-English PC.

The selected image or the entire examination can be sent by e-mail as an attachment, providing the computer has a mail client application (e.g. MS Outlook, MS Outlook Express).

To send an image

1. Select the image to send on the clipboard and select the e-mail button. The e-mail dialogue window displays.
2. Check Send current image. The e-mail address window displays.
3. Select an existing address or enter a new address. Up to 10 addresses can be stored.
4. Select Send.
5. The e-mail with the image is sent and a Confirmation window displays. Select OK.

The person receiving the e-mail can open the image in Windows Media Player.

E-mail support (continued)

To send an examination

Examinations sent by e-mail as attachments are zip-compressed, encrypted and password protected. If the size of the exam is too large to be sent as a single attachment, it is divided into several zip file attachments and sent in several e-mails.

1. Open the examination to send in MPEG viewer and select the e-mail button. The e-mail dialogue window displays.
2. Check Send current exam. The e-mail address window displays.
3. Select an existing address or enter a new address.
4. Select **Send**. The Password window displays.
5. Enter a password and select **OK**. The exam is sent and a confirmation window displays. Select **OK**.

To open an MPEGvue exam from an e-mail

1. In the MPEG viewer press the E-mail button. The E-mail dialogue window is displayed.
2. Check Receive exam. The Password window is displayed.
3. Enter the password and select **OK**. The exam is uncompressed and opened in the viewer and the E-mail(s) containing the MPEG examination is deleted.

Send To (Send the image to the DICOM Device)

“Send To” sends the selected exam for a patient and to interactively Send-To the exam to a destination DICOM device configured on the system. An exam in this case includes its images and any corresponding Structured Report.

1. Search and select the patient and press **Review**. The Exam View screen displays.
2. Select the exam which has the images and press **Send to**.

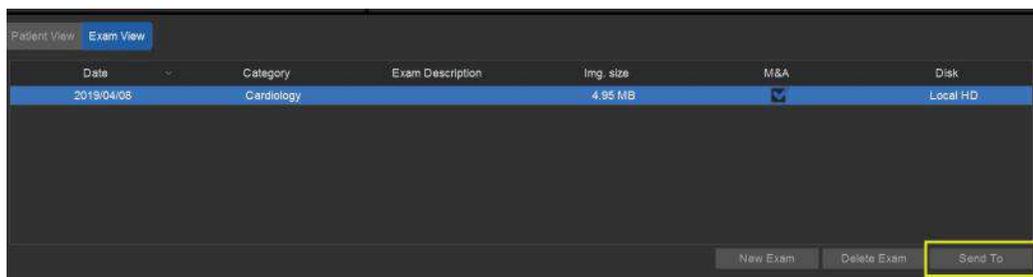


Figure 15-10. Send To

NOTE: You can only select “Local Archive - Int.HD” for Workflow.

3. The “Send To” Dialogue box displays.
Select the destination device and press **OK**.

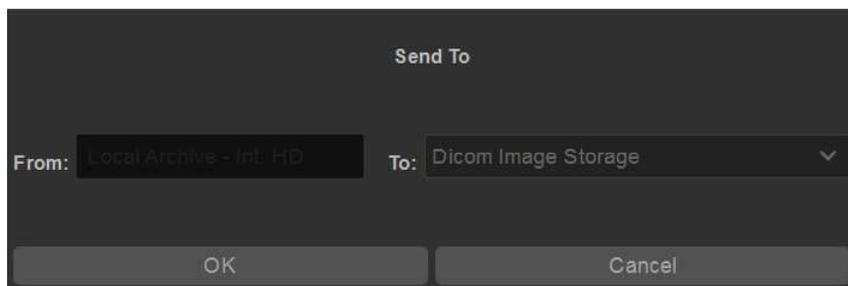


Figure 15-11. Send To Dialogue Box

NOTE: The destination device is configured in the Utility screen. Multiple devices are able to be configured.

The successful/unsuccessful message is displayed at the bottom of the screen.

Selectable Send To

“Selectable Send To” sends the selected images for an exam and to interactively Send-To the exam from Local Archive or DICOM Read to a destination DICOM device configured on the system.

1. Select a patient or an exam in the Archive menu.
2. Go to Active Images.
3. Select an image (images) and press **Send To**. Send To Dialogue displays

NOTE: *If the image is not selected, warning dialog is displayed and no image is sent.*

4. Select a destination from pull-down menu and press **OK**.
“Selected image(s) is (are) send to” message displays on the status bar.

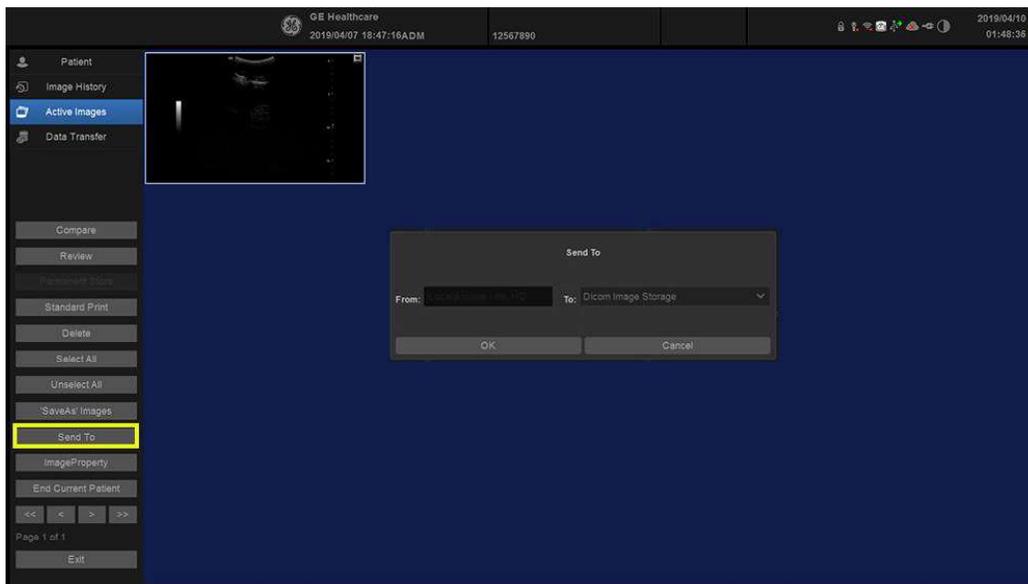


Figure 15-12. Selectable Send To Dialogue Box

Using the DICOM Spooler

To monitor/control DICOM jobs, press **F4**. You can view, resend, redirect, and delete images from the DICOM spooler by selecting a job, then specifying the action to be performed on this job.

NOTE: *If you find a failed job(s) in the Spooler, please remove the failed job(s) from the Spooler.*

Table 15-3: Spooler status description

Status	Description
Hold	Waiting for user activity. Select Resend or Send-To to complete the job.
Pending	Waiting for the previous job(s) to finish (a previous job may be Active or Pending). No user interaction required.
Append	Not completed. Example 1: Direct Storing job. Waiting for more images or the end of the exam (by selecting New Patient or End Current Patient). Example 2: Print job with 3x3 images has only 8 images. Waiting for one more image or the end of the exam (by selecting New Patient or End Current Patient).
Active	Signifies network activity (or connection attempt).
Success	Sent successfully.
Failed	Unsuccessful job attempt. Job stays in spooler. Select Retry or Delete to complete the job.
Done	Finished successfully.

External drives

Removable media

Removable media can be used for the following purposes:

- Long-term image storage: the final destination of the images, after they are moved out of the system hard disk by using the EZBackup/EZMove (see 'EZBackup and EZMove' on *page 16-29*).
- Backup of patient database and system configuration presets (see 'Backup procedure' on *page 16-26*)
- Export to copy a set of patient records to a third party DICOM review station.
- MPEGVue: review exported images on a Windows computer (see 'MPEGvue' on *page 15-24*).
- Copy of system configuration presets between to units using the Backup/Restore feature (see 'Preset synchronization' on *page 16-28*).
- SaveAs: Save images as JPEG, WMV, AVI, DICOM and RawDICOM for review on a standard Windows computer.

About removable media and long-term image storage

If CD/DVD is used, it is recommended to use Archive Grade or Medical Grade CD/DVD.

No matter which media is used, it is always highly recommended to make a backup of the media, which is the responsibility of the customer.



Keeping your media disc in an original media case or caddy all the time will prevent it from becoming dirty or damaged.

DVD Drive

The DVD drive (Standard) is located at the top of the cabinet.

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

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

- CD-R (maximum writing speed: 48x)
- DVD-R (maximum writing speed: 16x)



DO NOT use or attempt to format CD-RW, DVD+R, DVD+RW or DVD-RW on the Versana Active DVD Multi-Drive.



Due to the variety of disk types, we cannot guarantee that every media is available.

Recommendation concerning CD and DVD handling

To avoid data loss, never touch the recordable surface of a disk. Handle the disk only by the outer edge. Do not place it face down on a hard surface. Fingerprints or scratches will make the disk unusable. Before usage, verify that the disk surface has no visible scratches. If there are any scratches, do NOT use the disk.

Insert a media

Insert a media with the eject button on the DVD drive.



When you put a media into the DVD drive, please make sure the media is placed in the right position. If the media is not placed in the right position, the media may be damaged.



Make sure that the Disk tray is securely placed in each device during system operation. Mechanical damage may occur if other objects hit the tray.

Eject a media

1. To eject a media, always press **F3**. **DO NOT** use the eject button on the drive.
2. The Eject device menu is displayed. Select **CD/DVD Recordable**.
3. When ejecting a media, you are prompted if you wish to finalize the disk. If you do not finalize the disk, you can add files to the media at a later time. However, you may not be able to view the files stored on this disk with a standard PC. Finalizing a media, allows you to view these files using most standard PCs.

To verify that the data was successfully transferred to the media, Press **F3**, then select "Finalize" --> "Yes and Verify Files." If there was a corruption to the media during an operation, the message, "An error occurred on the last disk. Please discard it and start over." appears. In this case, please redo the operation with new media.

NOTE: *When you press **F3** with a blank media inside the DVD drive, the finalization menu displays. You can select "Yes" or "Yes and Verify Files", but the system ejects the media without doing anything.*

USB Hard Disk Drive and USB Flash Drive

Cautions and Warnings



WARNING

DO NOT use the USB Hard Disk Drive for patient storage. The USB HDD is not considered a permanent storage device.



WARNING

If you connect the USB HDD to a virus-infected computer, the USB HDD may also be infected with a computer virus.



CAUTION

DO NOT plug in TWO Bus-powered USB Drives at the same time.



CAUTION

When exporting a large quantity of patient data to the USB-HDD, the system may crash. If this occurs, the export is not completed properly. First, delete the data remaining in the USB-HDD, and then try again with a smaller number of patients.



CAUTION

Disconnect the USB HDD when performing EZMove on the system.



CAUTION

DO NOT use “Select All” when you export the patient data to the USB-HDD.

Cautions and Warnings (continued)

NOTE: Do not insert USB Memory devices (hard drives or flash drives) that contain multiple partitions into the scanner. Use single partitioned USB Drives.

NOTE: Some USB memory device manufacturers allow for executable partitions or ship pre-formatted new USB memory devices with multiple partitions pre-configured. BEFORE inserting any memory device into the scanner, insert it into a PC or MAC to verify that there is only a single partition. If multiple partitions exist, contact the USB manufacturer for the steps in reformatting the memory to a single partition.

USB Ports

You can use the USB port next to the control panel for USB flash drives.

Formatting the USB Flash Drive

NOTE: Before using the USB flash drive, format it in Utility -> Connectivity -> Removable media.

To format the USB Flash Drive

1. Insert the USB Flash Drive into the front USB port.
2. Select Utility--> Connectivity--> Removable Media.
3. Select USB Drive from the Removable Media pull-down menu.
4. Type the USB Flash Drive label.
5. Press **Format**.

Eject a USB Flash Drive/USB HDD

1. To eject a removable media, always press **F3**. **DO NOT** use the eject button on the drive.
2. The Eject device menu is displayed. Select the relevant media.
3. Select USB Drive from the pull-down menu to disconnect the USB Drive. Disconnect the USB drive after the success dialogue is displayed.

Remove the USB Drive from the USB port.

NOTE: If the unsuccessful dialogue is displayed, retry after a while.

NOTE: Verify is NOT available on Flash Drives or Hard Disk Drive media.

MPEGvue (Data Transfer)

To transfer a patient/exam to the USB Flash Drive or USB HDD,

1. Insert the USB Drive into the front USB port.
2. On the Active Images menu, select **Data Transfer**, then **MPEGvue**. Specify USB Drive in the transfer To: pull-down menu. Select the patient/exam you want to transfer. Press **Transfer**.
3. When the transfer has been completed, press **Eject (F3)**.



CAUTION

After transferring images to a USB Drive using MPEGVue, verify that the images have actually transferred to the USB drive.

Backup/Restore

To Backup/Restore to/from a USB Flash Drive or USB HDD,

1. Insert the USB Drive into the front USB port.
2. Press Utility -> System -> Backup/Restore. Select the USB Drive as the media.
3. Follow instructions for Backup/Restore. See 'Backup and Restore' on *page 16-25 for more information*.
4. When the Backup has been completed, press **Eject (F3)**.

SaveAs

NOTE: See 'Save As' on page 15-10 for more information.

To save images to the USB Flash Drive or USB HDD,

1. Insert the USB Drive into the front USB port.
2. Select the image(s) to be saved.
3. Select **Save As** menu in the lower, right-hand corner of the screen. Select the USB Drive as the archive media.
4. Specify: Image only or Secondary Capture, type of compression, quality, and image save format (Raw DICOM, DICOM, Avi, Jpeg, or WMV).
5. Press **Save**. When the images have been saved, press **Eject (F3)**.

NOTE: If you perform the SaveAs function to the USB drive (:\\Export) by RawDICOM format and review the data on your PC, the title of the data appears as
“:\\GEMS_IMG\\2006_Oct\\08(date)\\xxxxx(PatientID)”.

Direct SaveAs

You can save the image directly to the USB Drive just by pressing a **Print** key.

NOTE: “Direct SaveAs” doesn't supports WMV type.

1. Insert the USB Drive into the USB port.
2. Select **Save As** from the pull-down menu in Utility -> Connectivity -> Service. Press **Add**.
3. Select **Save As** in the list. Rename it in the Name field if needed.
4. Select USB Drive in the Destination field.
5. Verify the service.
6. Press **Save**.
7. Assign Save As to the appropriate print key in Button tab.
8. Display the image on the monitor and press the print key.

Export/Import

To export/import exams using the USB Flash Drive or USB HDD,

NOTE: *Before you export exams to the USB HDD, check “Export to USB HDD: Create DICOMDIR” in Utility -> Connectivity -> Miscellaneous. If you uncheck this parameter, you must import the data to review.*

1. Insert the USB Drive into the front USB port.
2. On the Patient menu, select Data Transfer, then Export/Import. Specify USB Drive in the transfer To: pull-down menu. Select the patient/exam you want to transfer. Press **Transfer**.
3. When Export/Import has completed, press **F3**.

EZBackup (USB HDD only)

1. Select “USB Drive” on the Utility -> System -> Backup/Restore -> EZBackup/Move -> Media.
2. Follow instructions for EZBackup. See ‘EZBackup and EZMove’ on page 16-29 for more information.
3. When EZBackup has completed, press **F3**.

NOTE: *“Media capacity for estimate (MB)” in Utility -> System -> Backup/Restore -> EZBackup and EZMove are not effective when the Media is “USB HDD”. It only applies to the CD and DVD.*

Network Storage Service

You can save patient data/images to the PC directly with the following functions, if you select Network Storage service.

- Save As
- Export/Import
- MPEGvue
- DICOM Read

NOTE: *DO NOT share the folder used for Export/Import with other ultrasound systems. It causes loss of data if two or more systems access to the same folder. Please create the unique folder for each system.*

NOTE: *Before you export patient data/images using Network Storage, check "Export to Network Storage: Create DICOMDIR" in Utility -> Connectivity -> Miscellaneous. If you uncheck this parameter, you must import the data to review.*



After MPEGVue to Network Storage, the MPEGVue patient may not be listed in the To list. Make sure to confirm on the destination to storage whether the copy of data succeeded.

Potential risk

- Patient/Image data might not be sent at all with inaccurate network configuration.
- Patient/Image data might be lost by disconnecting the network.
- Patient/Image data might be damaged by unstable network/data coupling.
- Patient/Image data might be mixed up by network/data coupling.
- Patient/Image data might be sent to wrong destination if network configuration is not inaccurate.
- The system might be attacked by a virus and vulnerable infection.
- Network is not connected by IP address conflict.

Versana Active Setup

NOTE: Create a Share folder on your PC on the network before continuing with this setup.

1. Select **Utility -> Connectivity -> Device**.
2. Select **Add**.
3. Type the computer name in the Name field and Static IP address in the IP Address field.

NOTE: Only use alphanumeric characters for the name.

NOTE: If you change Static IP Address after export, you cannot import patient data/image. In this case, type previous IP address again before import.

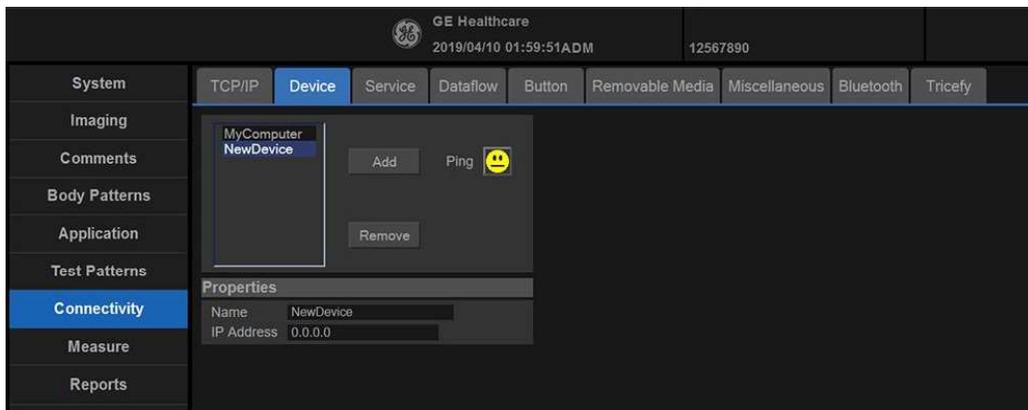


Figure 15-13. Network Storage Service setup - Device

Network Storage Service (continued)

4. Select **Ping** to verify the icon changes (smiley face appears).

5. Select Service.

Select the **Network Storage** from the pull-down menu.
Select **Add**.

Specify the properties for this service.

- Name: Enter unique name that identifies this service.

NOTE:

Do not use the same name for any other Service or device.

- Password: Enter the password used for logging onto the PC.

- User name: Enter the user name used for logging onto the PC.

- Shared Dir: Enter the Share name of the folder.

NOTE:

Only use alphanumeric characters for the Shared Dir.

6. Select **Save** and select **Verify** to verify the icon changes (smiley face appears).

It takes a long time to access Network Storage Service by the condition of the network.

Setup on your PC

Check with your network administrator about the LAN connection and setting method of the shared folder.

Printing Options

Setting up Digital Peripherals

You set up digital peripherals from the Utility --> System --> Peripherals menu.

NOTE: *Printing using a standard printing service overrides the orientation and N-up feature of the printer preferences. Printer preferences are set up in the printer folder (via Utility-->System -->Peripherals. Select Properties under Standard Printer Properties).*

Digital Printer Setup

There are two steps to do when setting up a digital printer:
1) follow the procedure below for each printer, then 2) set up specific properties for each printer if you need.

Follow this procedure for each printer:

1. Select Utility--> Connectivity--> Service. Add the Standard Print. Highlight Standard Print in the Service list. Select the printer from the Printer pull-down Properties menu. For the UP-D898 printer, select "Portrait" as orientation.
2. Type the printer name in the Name field. This name is used on the Button screen. After you select the printer from the Printer pull-down Properties menu again, it turns white. Press **Save**.
3. Select **Button**. Select the appropriate print key (Print1, Print2, Print3) from the Physical Print Buttons section as shown in the figure below. Select the printer from the MyComputer column and press >> to move it to the Printflow View column. Press **Save**.

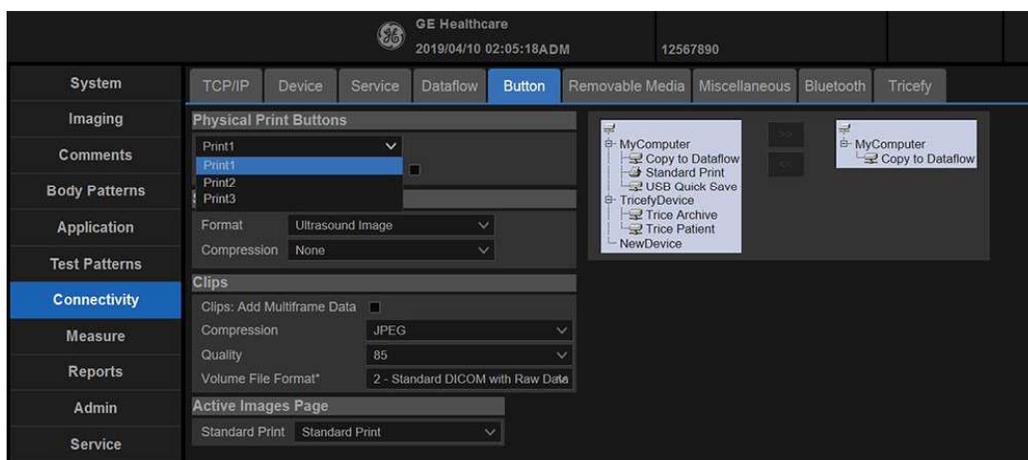


Figure 15-14. Print buttons

Sony UP-D898 Instructions

Follow these steps to set up the paper size of Sony UP-D898 printer.

1. Press Utility-->System-->Peripherals. Select the UP-D898 from the pull-down menu under Standard Printer Properties. Click **Properties**.

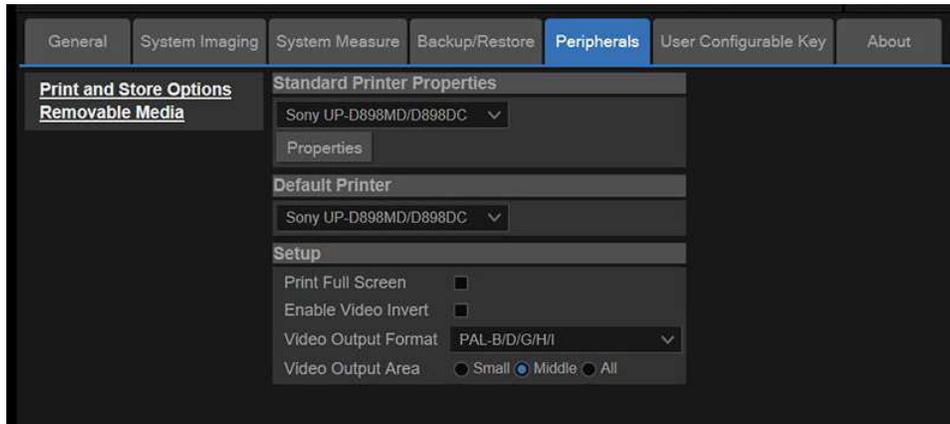


Figure 15-15. Properties

2. Click Print -> Printing Preferences at the menu of Properties Window.



Figure 15-16. Properties

Sony UP-D898 Instructions (continued)

3. Select Paper Size. Press **Apply**. Press **OK**.

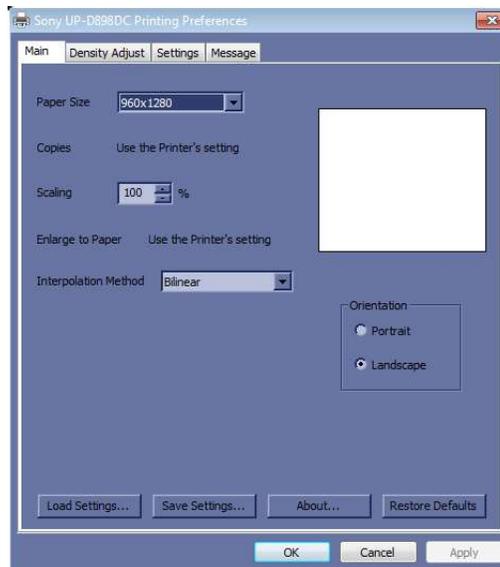


Figure 15-17. Printing Preferences

4. Press **Save**, then **Exit**.

Setting up the Off-Line Paper Printer

You can connect an off-line paper printer via the USB connection.



When using external commercial printers, the PUI (Printer USB Isolator) shall be used to provide safety protection.



ONLY plug in devices to the USB ports located at the side of the system WHILE the Versana Active is NOT powered up. If you plug in a device while the Versana Active is powered on, your system may become unusable.



DO NOT place an off-line paper printer inside the patient environment. This assures compliance to leakage current.

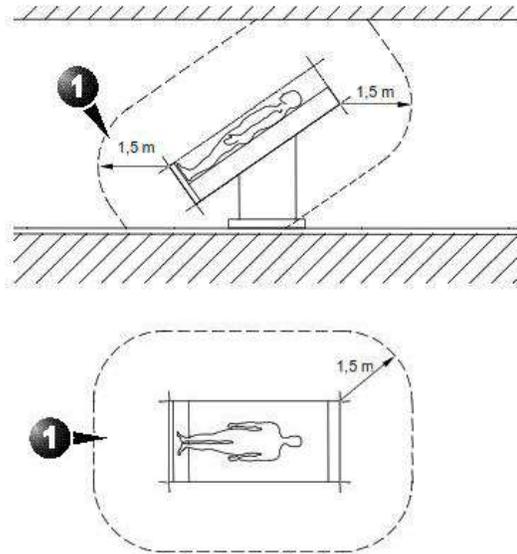


Figure 15-18. Patient Environment

Setting up the off-line paper printer

NOTE: The printer driver is customized for the Versana Active at the factory; you do not need to change the settings.

1. Connect the printer to the USB port.
2. Select **Utility--> Connectivity--> Service**. Add the **Standard Print** service.



Figure 15-19. Connectivity -> Service Screen

3. Select the printer from the Printer pull-down Properties menu.

NOTE: After selecting the printer, the field turns white.

4. Set the following parameters in Properties:
 - Rows=3
 - Columns=2
 - Orientation=Portrait
 - Right Margin (mm)=10
5. Type the printer name in the Name field.

NOTE: This name is used on the Button screen.

Setting up the off-line paper printer (continued)

6. Press **Save**, then select the Button tab.
7. Select the Print key from the control panel.
8. Select the printer from the MyComputer column and press “>>” to move it to the Printflow View column.

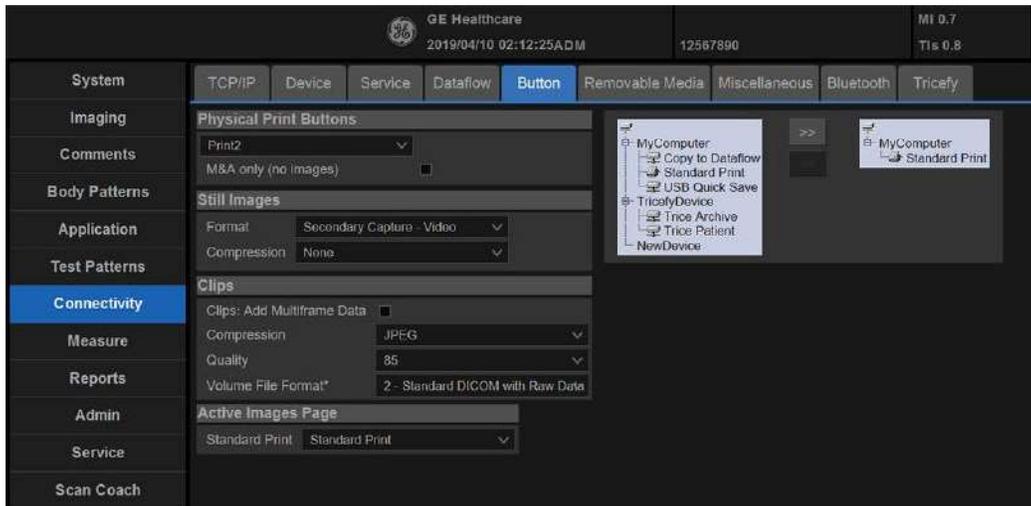


Figure 15-20. Connectivity -> Button Screen

9. If you want to assign this printer to the Standard Print Button on the Active Image Screen, select this printer at the Active Image Printer section.
10. Press **Save**.

NOTE: *If you want settings other than 1 image per sheet, or 2x3 sheet, or to improve the image quality, refer to the manual that came with the printer.*

Setting up the Printer to Print Reports

To set up the Off-Line Printer to print reports,

1. Enter **Utility--> System--> Peripherals**.
2. Select the printer from Default Printer pull-down menu.

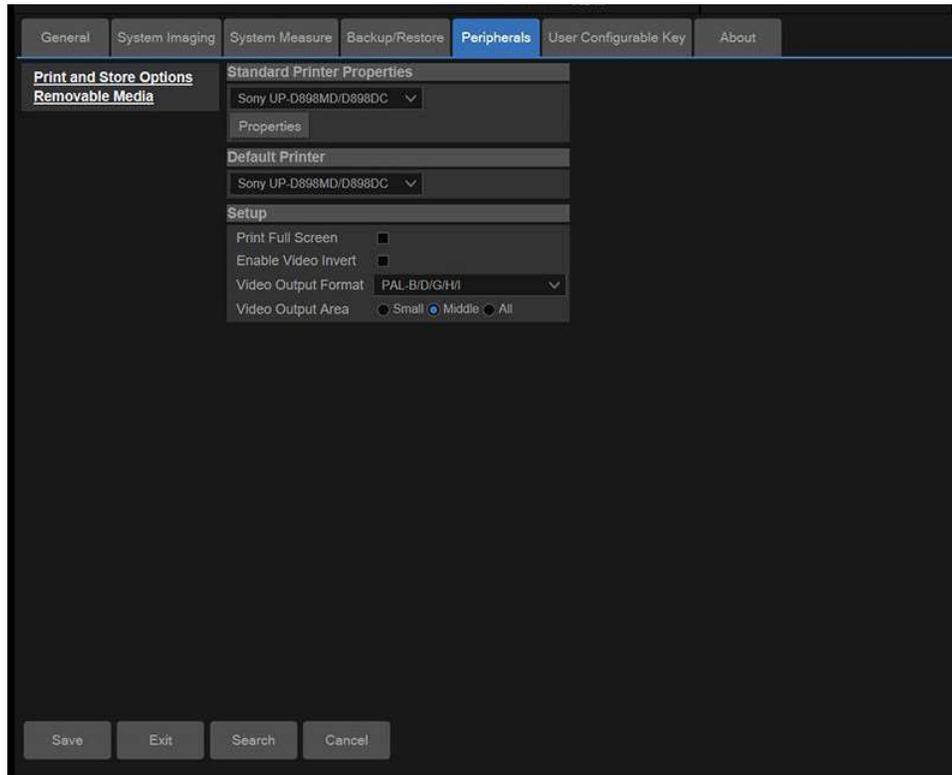


Figure 15-21. Report Printer Setup

3. Press **Save**.
4. Press **Print** on the Report screen to print the report.

Chapter 16

Customizing Your System

Describes how to create system, user, and exam presets.

Overview

Preset Menu provides the following functionality:

- **System presets.** View and update general system configuration settings, measurement settings, backup and restore data and configuration files.
- **Imaging presets.** View and update exam and imaging parameters.
- **Comments presets.** Set up comment libraries by application.
- **Body Patterns presets.** Set up body pattern libraries by application.
- **Application presets.** Configure application- and user-specific settings.
- **Test Patterns presets.** Helps configure system settings.
- **Connectivity Setup.** Define connection and communication setup, including exam dataflow information.
- **Measure presets.** Customize exam studies, create measurements, set up manual sequencing, and create OB Tables.
- **Reports presets.** Allows you to edit report template, diagnosis codes, and report comments. Please refer to Chapter 14 for more information.
- **Admin presets.** Perform system administrator activities such as setting up user IDs and logon formats.
- **Service.** Activates the Service Browser.
- **Scan Coach.** Create, import/export, and manage Scan Coach programs.
- **Scan Assistant.** Create, import/export, and manage Scan Assistant programs.
- **Preset Manager.** Activates the imaging preset to create, edit, import and export user imaging presets.
- **Search.** You can search for a parameter on the Utility pages (Measure, Reports, and Service pages cannot be searched.)

To access these functions, select the **Utility** on the keyboard, then select the appropriate menu key.

System Presets

Overview

System presets allows you to view or change the following parameters:

- **General** – Location, Date/Time, General User Interface, Ttile bar, Trackball, Key Usage, Utility, Scan Coach and Audio configuration
- **System Imaging** – Biopsy Guides, Automatic Wide Screen, QAnalysis Statistics Value Display, Image Control and Display configuration
- **System Measure** – Measurement, Cursor and Results Window configuration, SonoBiometry (AFB)
- **Backup/Restore** – Backup, Media, EZBackup/EZMove, Restore, Detailed Restore of User Defined.
- **Peripherals** – Print and Store Options, Standard Printer properties, Default Printer and Setup configuration
- **User Configurable Key** – User Defined keys, Keyboard key.
- **About** – System software, patent, and image information

Changing system parameters

To change system parameters:

1. Select **Utility** on the keyboard.
2. Then select **System**.
The System screen is displayed.
3. On the monitor display, move the **Trackball** to select the tab that has the information you want to change.
4. Select values for the parameters you want to change.
5. To save the changes, select the **Save** button. Select **Exit** to return to scanning. In some cases, you may need to reboot the system for the change to take effect.

System/General Preset Menu

The System/General screen allows you to specify hospital name and system date and time.

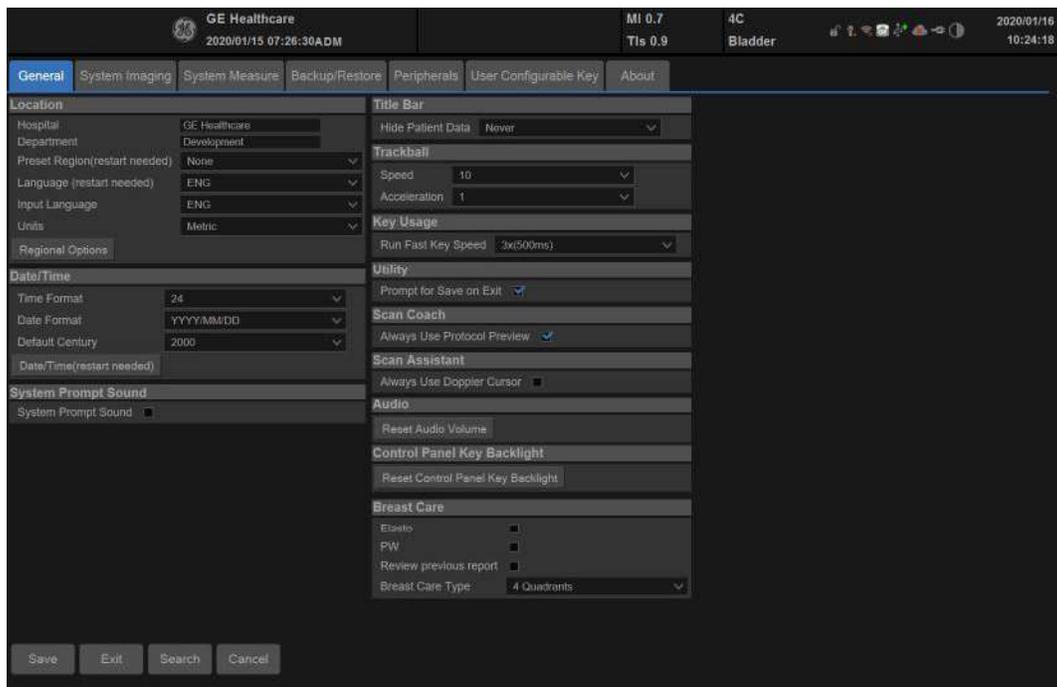


Figure 16-1. System/General Preset Menu

System/General Preset Menu (continued)

Table 16-1: Location

Preset Parameter	Description
Hospital	Type the <i>institution's</i> name.
Department	Type the institution's department name.
Preset Region (restart needed)	Select region (None, Asia, EU, China, India, USA_LA, EAGM).
Language (restart needed)	Select the appropriate language from the drop-down list.
Units	Select metric or US units of measurement.
Regional Options	Select to set up the keyboard.

Table 16-2: Date and Time

Preset Parameter	Description
Time Format	Select the time format: 12 Hr. AM/PM or 24 Hr.
Date Format	Select the date format: dd/mm/yyyy, mm/dd/yyyy, or yyyy/mm/dd.
Default Century	Select the default century for the system to use.
Date/Time	Select to display the Date/Time Properties window, to specify the system date, time, time zone, and to auto adjust for daylight savings time.

Table 16-3: System Prompt Sound

Preset Parameter	Description
System Prompt Sound	Check box to initiate system operation prompt sound.

Table 16-4: Title Bar

Preset Parameter	Description
Hide Patient Data	When set to Always, patient information is removed from the scanning screen Title bar and when storing images; or you can set this to remove patient information only when storing the image (On Store); or Never. Note: Upon recall of images with measurements, Dual image, the DICOM image is recalled. In this case, there is no patient data burned into the DICOM image. If you DO NOT want this to occur, set this to Never.

System/General Preset Menu (continued)

Table 16-5: Trackball

Preset Parameter	Description
Speed	Set how fast you want the Trackball to move while performing actions such as tracing the anatomy. 0=Slow; 20=Very Fast
Acceleration	Set how fast you want to trackball to move across the display. 0, 1, and 2 with 0 being the slowest acceleration.

Table 16-6: Key Usage

Preset Parameter	Description
Run Fast Key speed	Select the maximum value of the key interval when running Fast Key.

Table 16-7: Utility

Preset Parameter	Description
Prompt for Save on Exit	If selected, the system prompts you to save data when you select exit without saving.

Table 16-8: Scan Coach

Preset Parameter	Description
Always Use Protocol Preview	Show the protocol preview before the Scan Coach starts.

Table 16-9: Scan Assistant

Preset Parameter	Description
Always Use Doppler Cursor	Use the Doppler Cursor when you activate Scan Assistant.

Table 16-10: Audio

Preset Parameter	Description
Reset Audio Volume	Reset audio volume to default configuration.

Table 16-11: Control Panel Key Backlight

Preset Parameter	Description
Reset Control Panel Key Backlight	Reset control panel key backlight to default configuration.

Language Keyboard Setup

NOTE: You must apply the changes on each setup page before moving to the next page.

1. In **Utility -> System -> General**, select Regional Options.

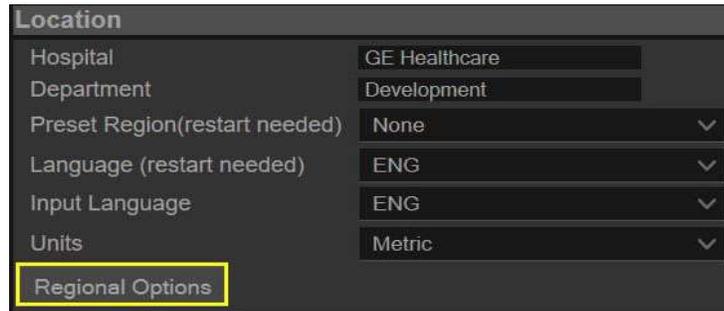


Figure 16-2. Region Option

2. Under Formats select desired language.

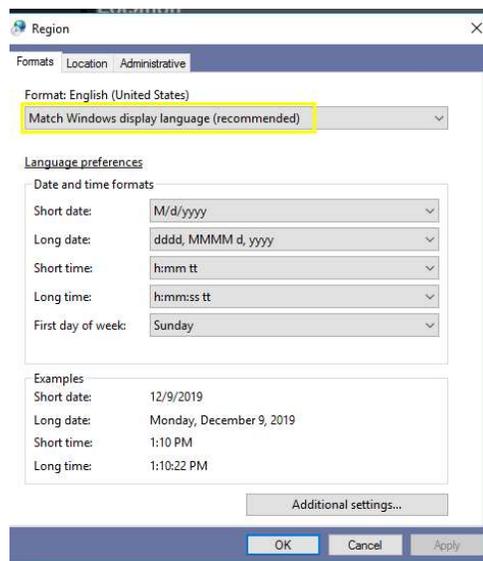


Figure 16-3. Formats selection

Language Keyboard Setup (continued)

3. Under Location select desired location.

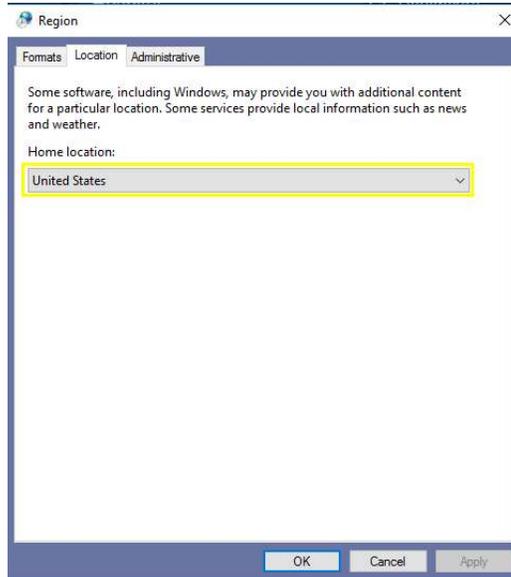


Figure 16-4. Regional Options

4. Under **Administrative**, select **Change system locale...**

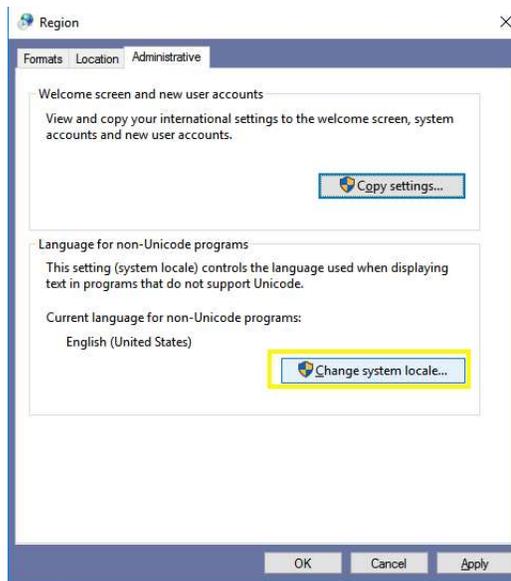


Figure 16-5. Administrative

Language Keyboard Setup (continued)

5. Select **Apply** when below message displays.



Figure 16-6. Change Regional Options

6. Select the language under **Current system locale**, then select **OK**.

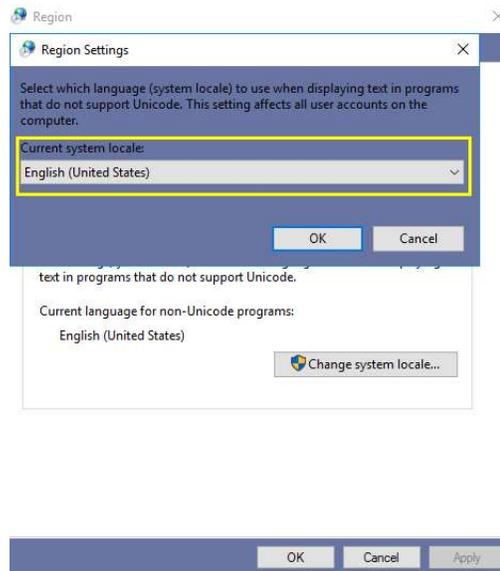


Figure 16-7. Set Language

Language Keyboard Setup (continued)

7. Select **Cancel** not to restart the system.

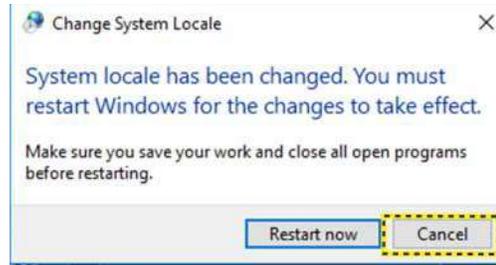


Figure 16-8. Restart Request

8. Select Close to close the window.

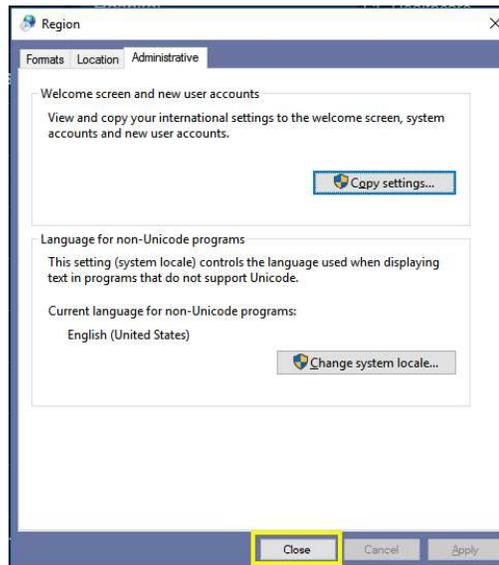


Figure 16-9. Close Window

Language Keyboard Setup (continued)

- 9. Select **Cancel** to return to the system setting.

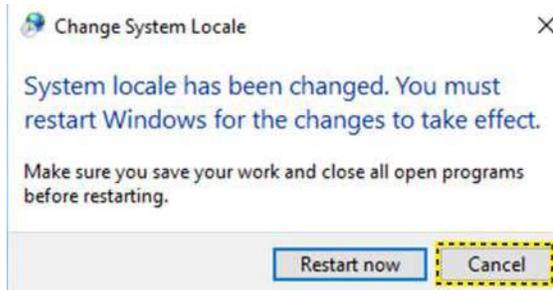


Figure 16-10. Restart Request

- 10. In **Utility** -> **System** -> **General**, select the language as desired, and then select **Save**.

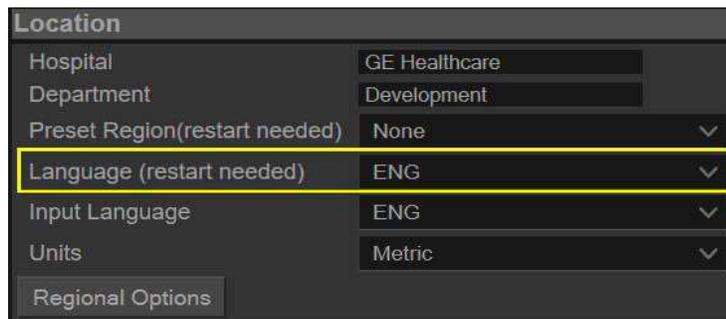


Figure 16-11. Change the System Language

NOTE: *Input language must match with system language to avoid corrupted words.*

- 11. Click **Restart now** to restart the system.

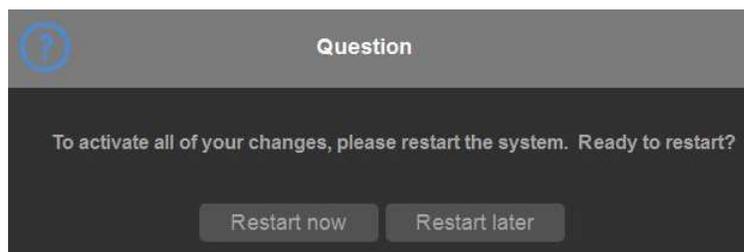


Figure 16-12. Restart Request

- 12. When the system boots up, the system appears in the selected language.

NOTE: *To have the settings take effect, you **MUST** restart the system.*

NOTE: *Press **Alt+Shift** to change the input language.*

System/System Imaging Preset Menu

The System/System Imaging screen allows you to specify parameters for biopsy guides, automatic wide screen, QAnalysis statistic value display and image control and display.

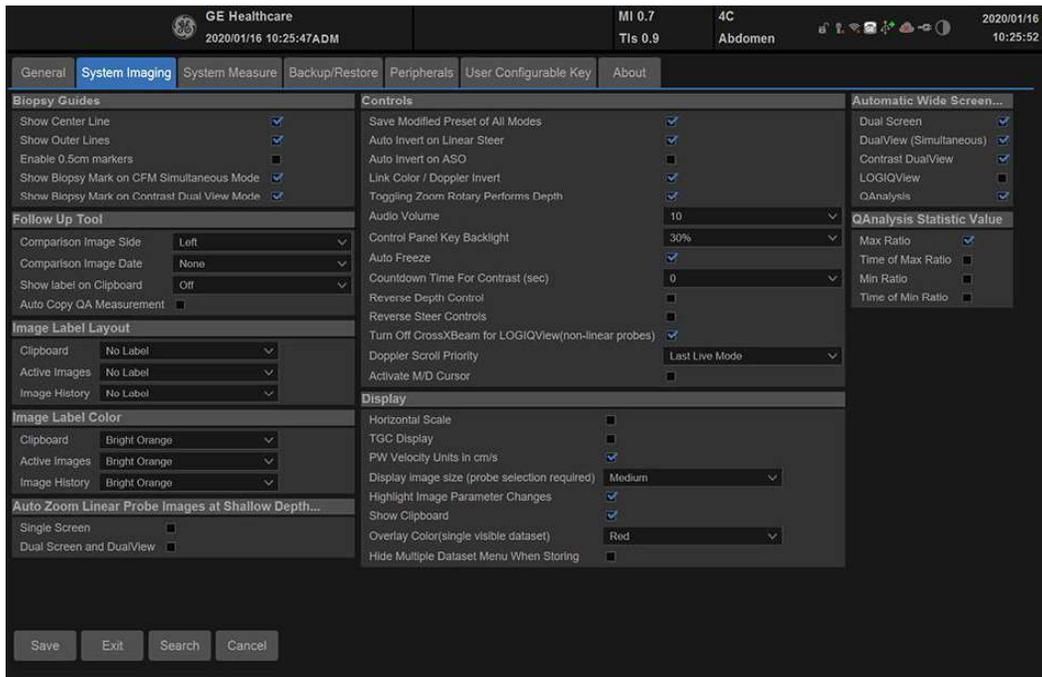


Figure 16-13. System/System Imaging Preset Menu

Table 16-12: Biopsy Guides

Preset Parameter	Description
Show Center Line	Displays center biopsy guideline.
Show Outer Lines	Displays outer biopsy guidelines.
Enable 0.5cm markers	Activates biopsy depth markers every 0.5cm.
Show Biopsy Mark on CFM Simultaneous Mode	Displays the Biopsy Guideline on the image while in Simultaneous Mode.
Show Biopsy Mark on Contrast Dual View Mode	Displays the Biopsy Guideline on the image while in Contrast Dual View Mode.

System/System Imaging Preset Menu (continued)

Table 16-13: Automatic Wide Screen...

Preset Parameter	Description
Dual Screen	Automatically switch to Wide Screen when in Dual Screen.
DualView (Simultaneous)	Automatically switch to Wide Screen when in Simultaneous DualView Screen.
Contrast DualView	Automatically switch to Wide Screen when in Contrast DualView Screen.
LOGIQ View	Automatically switch to Wide Screen when in LOGIQ View.
QAnalysis	Automatically switch to Wide Screen when in QAnalysis.

Table 16-14: QAnalysis Statistic Value Display

Preset Parameter	Description
Max Ratio	When selected, the system displays the maximum Ratio of Color (Power) Doppler pixels in each ROI in Statistics result.
Time of Max Ratio	When selected, the system displays in which frame the maximum Ratio of Color (Power) Doppler pixels occurs in Statistics result.
Min Ratio	When selected, the system displays the minimum Ratio of Color (Power) Doppler pixels in each ROI in Statistics result.
Time of Min Ratio	When selected, the system displays in which frame the minimum Ratio of Color (Power) Doppler pixels occurs in Statistics result.

Table 16-15: Controls

Preset Parameter	Description
Save Modified Preset of All Modes	Save all modes preset after modified
Auto Invert on Linear Steer	When selected, for auto calcs, automatically inverts the timeline if needed when using ASO.
Auto Invert on ASO	Automatically inverts the spectrum with ASO.
Link Color/Doppler Invert	When selected, the Doppler timeline scale inverts along with the color ROI.
Toggling Zoom Rotary Performs Depth	When selected, you can adjust the Depth by moving the toggle Zoom rotary.
Audio Volume	Adjust the Audio Volume.
Control Panel Key Backlight	Adjust the control panel key backlight brightness.
Auto Freeze	Automatically freezes the system after 120 seconds of inactivity.
Countdown Time For Contrast (sec)	When selected, you can configure the system to perform a countdown for the contrast injection.

Table 16-15: Controls (Continued)

Preset Parameter	Description
Reverse Depth Control	Select to change key direction for the Depth control.
Reverse Steer Controls	Select to change key direction for the Steer controls.
Turn Off CrossXBeam for LOGIQView (non-linear probe)	Deactivates CrossXBeam when you activate LOGIQView.
Doppler Scroll Priority	Set to 2D, Doppler, or Last Live Mode.
Activate M/D Cursor	Select to activate M/D cursor.

Table 16-16: Display

Preset Parameter	Description
Horizontal Scale	Select to display width markers.
TGC Display	Select to display TGC curve.
PW Velocity Units in cm/s	Select to change scale on timeline from meters per second to centimeters per second.
Display image size (probe selection required)	Select Default or Large.
Highlight Image Parameter Changes	Select if you want the display to indicate which controls you adjusted by highlighting the new value on the display.
Show Clipboard	Deselect to hide the clipboard.
Overlay Color (single visible dataset)	Select Red, Green, Blue or BW.
Hide Multiple Dataset Menu When Storing	Select to hide the Multiple Dataset Menu when storing.

Table 16-17: Auto Zoom Linear Probe Images at Shallow Depth...

Preset Parameter	Description
Single Screen	Automatically zoom linear probe images at a shallow depth on a single screen.
Dual Screen and DualView	Automatically zoom linear probe images at a shallow depth on the dual and DualView screen.

System/System Measure Preset Menu

The System/System Measure screen allows you to specify measurement parameters such as the type of default OB measurements and calculations. You can also define cursor and Results Window default functionality.

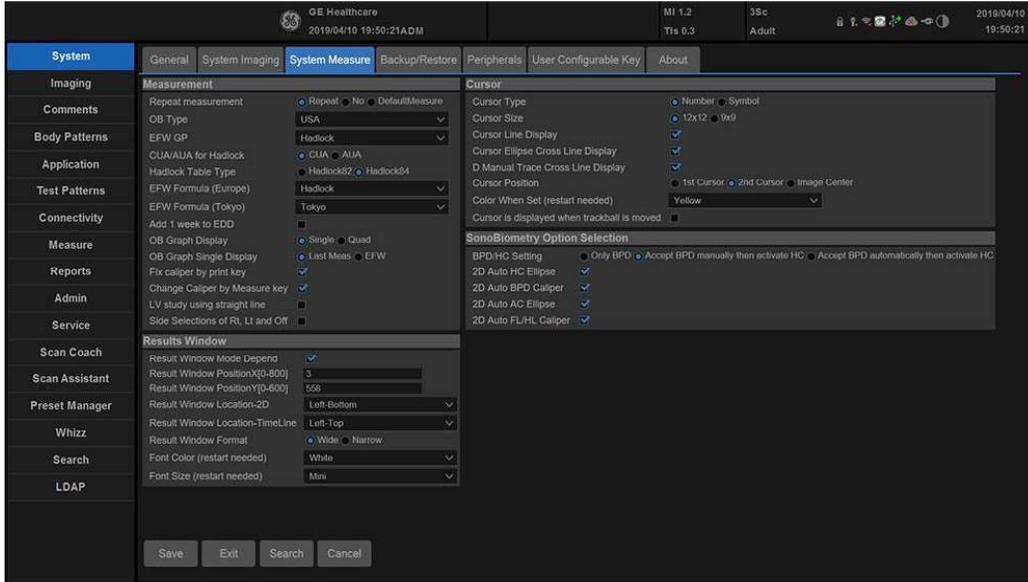


Figure 16-14. System/System Measure Preset Menu

System/System Measure Preset Menu (continued)

Table 16-18: Measurement

Preset Parameter	Description
Repeat Measurement	Select No, Repeat, DefaultMeasure
OB Type	Select which OB measurements and calculations studies to use: USA, Europe, Tokyo, Osaka, or ASUM.
EFW GP	Select the source used to calculate EFW-GP (Estimated Fetal Weight-Growth Percentile)
CUA/AUA for Hadlock	Select to use CUA (Composite Ultrasound Age) or AUA (Average Ultrasound Age) as the default
Hadlock Table Type	Select Hadlock 82 or Hadlock 84 tables
EFW Formula (Europe)	Select the source used to calculate EFW (Europe) (Estimated Fetal Weight)
EFW Formula (Tokyo)	Select the source used to calculate EFW (Tokyo) (Estimated Fetal Weight)
Add 1 week to EDD	Select to add additional week to estimated date of delivery
OB Graph Display	Select Single or Quad for displaying OB Graphs.
OB Graph Single Display	Select Last Meas or EFW Single OB Graph displayed by default.
Fix Caliper by Print key	Select to use the Print key like the Set key. <i>NOTE: If you select this during a generic volume measurement, the print key does not function like the Set key, but instead ends the measurement sequence and initiates the volume calculation based on the number of measurements taken so far.</i>
Change Caliper by Measure key	Check box to change Caliper by Measure key.
LV Study using straight line	Sets straight line as the default for 2D LV studies.
Side selections of Rt, Lt and Off	Select to use "Rt, Lt and Off" for Side Selection. When not selected, displays only "Rt and Lt".

System/System Measure Preset Menu (continued)

Table 16-19: SonoBiometry Option Selection

Preset Parameter	Description
BPD/HC Setting	Select Only BPD, Accept BPD manually then activate HC, or Accept Setting BPD automatically then activate HC.
2D Auto HC Ellipse	Select checkboxes to choose SonoBiometry options.
2D Auto BPD Caliper	
2D Auto AC Ellipse	
2D Auto FL/HL Caliper	

Table 16-20: Cursor

Preset Parameter	Description
Cursor Type	Select whether to mark measurements with numbers or symbols.
Cursor Size	Specify 12x12 or 9x9.
Cursor Line Display	If selected, after you press Set to complete a measurement, the cursor line is displayed. If not selected, after you press Set to complete a measurement, only the cursor number or symbol is displayed.
Cursor Ellipse Cross Line Display	Check box to display the cross line in Ellipse.
D Manual Trace Cross Line Display	Check box to display the cross line with the caliper.
Cursor Position	Select 1st Cursor, 2nd Cursor, or Image Center.
Color When Set (restart needed)	Select white, yellow, bright red, or orange.
Color is displayed when trackball is moved	Is selected, color is displayed when trackball is moved.

System/System Measure Preset Menu (continued)

Table 16-21: Results Window

Preset Parameter	Description
Result Window Mode Depend	Select this if you want the measurement result window to be repositioned, depending on the mode.
Result Window Position X[0-800]	You can set the coordinates for the measurement result window when you do not have the result window set to be mode dependent. This is the X coordinate (left/right)
Result Window Position Y[0-600]	You can set the coordinates for the measurement result window when you do not have the result window set to be mode dependent. This is the Y coordinate (up/down)
Result Window Location-2D	Select the Result Window location on the Monitor Display.
Result Window Location-Timeline	Select the Result Window location.
Result Window Format	Select Wide or Narrow.
Font Color (restart needed)	Select White, Off White, Yellow, Bright Red or Orange (reboots the system).
Font Size (restart needed)	Select Mini, Small, Medium, Large or Extra Large (reboots the system).

System/Backup and Restore Preset Menu

The backup and restore procedures described in this section are divided into two parts. The first part describes procedures to backup and restore patient data. The second part describes procedures to backup and restore system and user-defined configurations.

The Backup/Restore function enables the user to:

- Copy/Restore the patient archive.
- Copy/Restore the system configuration. The Copy/Restore system configuration feature enables the user to configure several units with identical presets, providing that the units have the same software version.

Depending on the system, you can use either a CD-R, DVD-R, USB Flash Drive, or USB Hard Disk for system backup/restore. For the sake of simplicity, we have used the CD-R in the following examples.

NOTE: *The system ONLY supports CD-R / DVD-R and DOES NOT support CD-RW / DVD+R.*



WARNING

GE is not responsible for lost data if the suggested backup procedures are not followed and will not aid in the recovery of lost data.



WARNING

The Versana Active is not intended to be used as a storage device; backup of the Patient and Image Database is your institution's responsibility. GE is NOT responsible for any lost patient information or for lost images.



WARNING

The system crash can cause the SSD corruption. The SSD is not considered a permanent storage device. Backup data on a regular basis.

System/Backup and Restore Preset Menu (continued)



CAUTION

To minimize accidental loss of data, perform EZBackup and Backup on a regular basis.

1. First, perform EZBackup to save the images.
2. Next, perform Backup at **Utility -> System -> Backup/Restore**. Enable the following checkboxes under Backup:
 - Patient Archive
 - User defined configuration
 - Service



CAUTION

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



CAUTION

Make sure to verify the media after writing of data, such as EZBackup, SaveAs or Export.

Verifying media requires additional time, which varies depending on the amount of data backed up or exported.



CAUTION

Before deleting a patient or image from the patient screen, make sure you have saved the data by EZBackup/Backup or Export and verify that the media transfer of data was successful.

System/Backup and Restore Preset Menu (continued)

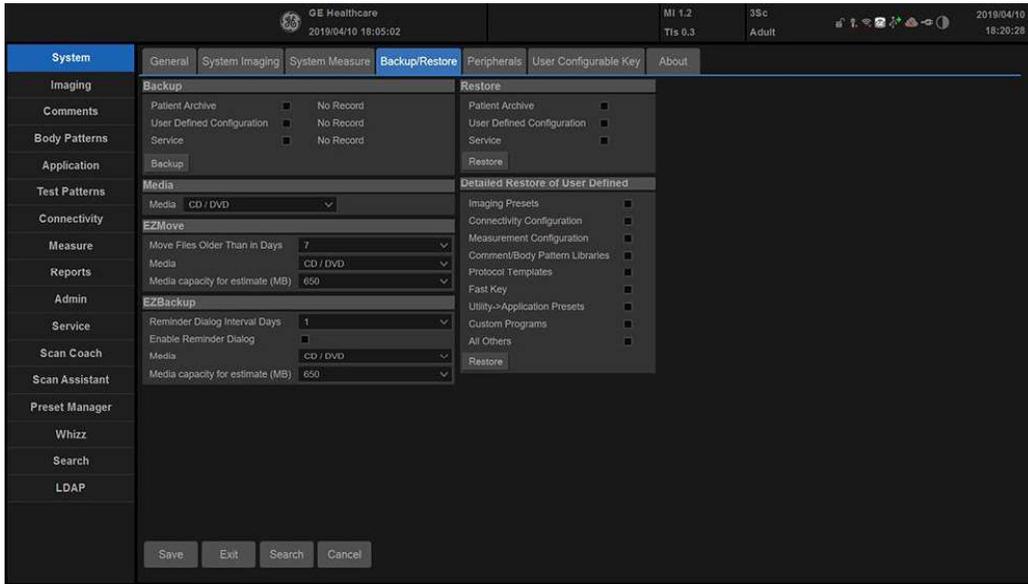


Figure 16-15. System/Backup/Restore Preset Menu

Table 16-22: Backup

Preset Parameter	Description
Patient Archive	Select to back up patient data.
User Defined Configuration	Select to back up the user-defined configuration settings.
Service	Select to back up Service settings.
Backup	Select to begin the backup.

Table 16-23: Media

Preset Parameter	Description
Media	Select media type to use for backup and restore.

System/Backup and Restore Preset Menu (continued)

Table 16-24: EZMove

Preset Parameter	Description
Move Files Older Than in Days	The system will move images older than the number of days specified here. If you enter a zero (0), then all of the images from today on will be moved.
Media	Select media type.
Media capacity for estimate (MB)	Specify the capacity of the backup media.

Table 16-25: EZBackup

Preset Parameter	Description
Reminder Dialog Interval days	Specify the number of days after the last backup that you want the system to prompt you to perform an EZBackup/EZMove procedure (only for moving images).
Enable Reminder Dialog	Select to activate the EZBackup/EZMove reminder pop-up dialog.
Media	Select media type.
Media capacity for estimate (MB)	Specify the capacity of the backup media.

Table 16-26: Restore

Preset Parameter	Description
Patient Archive	Select to restore patient data.
User Defined Configuration	Select to restore the user-defined configuration settings.
Service	Select to restore service iLinq and Network settings. CAUTION: DO NOT restore service presets on to a different Versana Active system. Only restore service presets to the same system.
Restore	Select to begin the restore process for the selected configuration files.

System/Backup and Restore Preset Menu (continued)

The detailed section of this menu allows you to restore one area at a time from the user defined configuration. This allows you to selectively restore what you want to restore across multiple machines. Check the box(es) you want to restore, insert the appropriate media, and press Restore.

NOTE: *When you restore backup data from the Utility menu, the Versana Active application usually restarts automatically when the restoring is complete.*

Table 16-27: Detailed Restore

Preset Parameter	Description
Imaging Presets	Select to restore imaging presets.
Connectivity Configuration	Select to restore connectivity configurations.
Measurement Configuration	Select to restore measurement configurations.
Comment/Body Pattern Libraries	Select to restore comment and body pattern configurations.
Protocol Templates	Select to restore Protocol Templates.
Fast Key	Select to restore Fast Key.
Utility-->Application Presets	Select to restore Utility--> Application presets.
Custom Programs	Select to restore Scan Coach/Assistant programs.
All Others	Select to restore all other configurations not listed in the Detailed Restore section. This includes parameters defined on the System preset menus.
Restore	Select to begin the restore process for the selected configuration files.

Backup and Restore

To minimize accidental loss of data, perform backup of the patient archives stored on the local hard drive **DAILY** as described in this section. Use a formatted Backup/Restore disk to back up patient archives from the hard drive, using the backup procedure described in this section. Data from the Backup/Restore disk may be restored to the local hard drive using the restore procedure.

NOTE: Backup/Restore Patient Archive/User Defined Configuration/Service are not allowed to transfer between R1.1.x and R1.2.x, as these data are incompatible.

Backup procedure

Back up patient data AFTER you've archived (via EZBackup/EZMove) images so that the pointers to the patient's images reflect that the images have been moved to removable media and are no longer on the hard drive.

NOTE: 1. Insert a media into the drive or USB device into a USB port.
About formatting media, See 'Formatting removable media' on page 16-102 for more information..

2. In the archive screen, select the dataflow Local Archive - Int. HD.

3. Enter **Utility-> System-> Backup/Restore**.

The Backup/Restore screen is displayed.

4. In the Backup list,

- Select **Patient Archive** to backup the patient records.
- Select **User Defined Configuration** to copy system settings and user presets.
- Select **Service** to backup service presets.

NOTE: *The detailed section of this menu decouples the user defined configuration above. This allows you to selectively restore what you want to restore across multiple machines.*

5. Specify where to save data in the media field.

6. Select **Backup**.

The system performs the backup. As it proceeds, status information is displayed on the Backup/Restore screen.

7. At the end of the process, the Backup completed message is displayed on the monitor.

Press **Eject (F3)** for eject media/disconnect USB.

8. Make sure to physically label the media. An identification of the system should also be noted on the media and a backup log should be kept.

File the media in a safe place.

Restore procedure



CAUTION

The restore procedure overwrites the existing database on the local hard drive. Make sure to insert the correct media.

You cannot restore the data between systems with different software versions.



CAUTION

To avoid the risk of overwriting the local patient and report archives, **DO NOT** check Patient Archive when restoring user-defined configurations.

1. Enter **Utility-> System-> Backup/Restore**.
The Backup/Restore screen is displayed.
2. In the Restore list,
 - Select **Patient Archive** to restore the patient archive.
 - Select **User Defined Configuration** to restore all system settings and user presets.or
One or several system configuration items to restore parts of the Detailed Restore of User Defined.
 - Select **Service** to backup service presets.
3. In the Media field, select the appropriate Source device.
4. Select **Restore**.
The system performs the restore. As it proceeds, status information is displayed on the Backup/Restore screen.
5. The Versana Active restarts automatically when Restore is done.

Backup and restore strategy: user-defined configurations

In addition to generating a safety copy, the backup/restore function of the user-defined configuration (presets) can be used to configure several Versana Active systems with identical presets (preset synchronization).

Preset synchronization

The procedure for preset synchronization of several scanners is as follow:

1. Make a backup of the user-defined configurations on a removable media from a fully configured Versana Active system.
2. Restore user-defined configurations from the removable media to another Versana Active system (you can restore all the user-defined presets or select specific presets to restore via Detailed Restore).

EZBackup and EZMove

EZBackup or EZMove allows you to manage hard disk space (move images off the hard drive) while maintaining the patient database on the scanner, as well as to back up the patient database and images.

- **EZBackup:** Copy the data from the local SSD to the removable media.
- **EZMove:** Copy the data from the local SSD to the removable media. After copying the image file to the media, EZMove deletes the image file from the Local SSD.



HINTS

PLEASE READ THIS

Ensure that you have established a data management protocol for your office/institution. You **MUST** manage the backup media by keeping a log and by creating a media filing system.

For example, if you need to back up 500 MB/day, or 2.5 GB/week, then you need to back up 5 CDs/s/week, or ~250CDs/year.

Generally speaking, you should back up the system when you have 10 GB of images to back up.

You should assign the person who is in charge of performing the backups. Backups will vary by the volume of your work. You need to track how long it takes your office/institution to get to 10 GB, and set the back-up parameters accordingly.

Your office/institution needs to determine your backup strategy, for instance, backup weekly and move monthly. It should be an easy strategy to perform and to remember. And follow this same strategy/schedule consistently.

It's also useful to keep your more recent information on the hard drive since it's easier to recall that way.

EZBackup and EZMove (continued)



CAUTION

You can still do a backup/move daily; but ALWAYS do a patient archive backup after each move.



CAUTION

Only cancel the backup/move in case of an emergency. The system completes backing up the current media and then cancels the operation.



CAUTION

When EZBackup requires more than one disk (CD-R or DVD-R) for backup, a message appears when the first disk is full. If you select "Cancel" to stop the backup procedure and later try EZBackup again, all the data may not be backed up.

Select "Full Backup" on the first EZBackup wizard screen if the last time you were performing EZBackup you selected "Cancel".



CAUTION

If you use EZBackup or EZMove as a "true" patient archive, you must maintain a separate backup of the patient database (Patient Archive and Report Archive). If for any reason the Local Archive - Int HD gets corrupted or the base system software has to be reloaded, then the patient archive is the ONLY way to rebuild the EZBackup and EZMove patient archive.



CAUTION

DO NOT turn off the power while EZBackup is running. The data may be lost. It may take several hours for EZBackup to finish, depending on the amount of data being backed up.

The following may give the impression of a lockup, but EZBackup is continuing in the background.

- The progress bar does not move.
- The screen may become white.
- The hourglass icon keep turning.

EZBackup and EZMove (continued)



CAUTION

NEVER restore the patient archive from media made previous to the last move.

NOTE: Export/Import Patient data are not allowed to transfer between R1.1.x and R1.2.x, as these data are incompatible.

NOTE: EZBackup/EZMove are saved data as RAW data. If you import data to the system, you can modify the image data.

NOTE: To display exported Raw DICOM images on a PC, you need the dedicated viewer.

NOTE: When backing up or moving reports using EZBackup and EZMove, use the USB HDD. DVDs and CDs are not supported for backing up or moving reports using EZBackup and EZMove.

NOTE: "Archived" information is saved to each exam during EZBackup. When you perform EZBackup, the system backs up the exams except for the archived exam.

NOTE: EZBackup/EZMove cannot span a single image across two (2) or more media. Therefore, if EZBackup/EZMove encounters an image that is greater than the capacity of the media, it skips the oversized image.

NOTE: EZBackup/EZMove does not store images to media in sequential order. Instead it maximizes the most amount of images per media.

NOTE: If the system locks up during the media auto format process, shutdown the system by holding down the power button and boot it up again. After the system is up, replace the media to a new one and execute EZBackup or EZMove again. To avoid a trouble such as data loss, do not reuse the failed media for any other function.

NOTE: If you try exporting a previously backed-up exam, the message "Can't Find Source file" displays. The image data had already been removed from the hard disk drive with EZBackup/EZMove.

EZBackup and EZMove (continued)

Basically, when you perform the EZBackup or EZMove procedure, you insert the media (or connect USB HDD if applicable), the system backs up/moves the images, and creates a reference between the patient database and the media's volume.

EZBackup/EZMove can take up to 20 minutes (or longer, depending on the size of the backup). Make sure to schedule this at the same time daily, when no patients are scheduled.

1. Prepare unformatted media or the USB HDD before starting EZBackup/EZMove.
2. Specify the EZBackup/EZMove setup on the **Utility --> System --> Backup/Restore** page.

EZBackup and EZMove (continued)

- To start the EZBackup/EZMove procedure, go to the Patient menu and select EZBackup/EZMove. The EZBackup/EZMove Wizard starts.

NOTE: *If you use the USB HDD, some wizards and the pop-up messages DO NOT appear.*

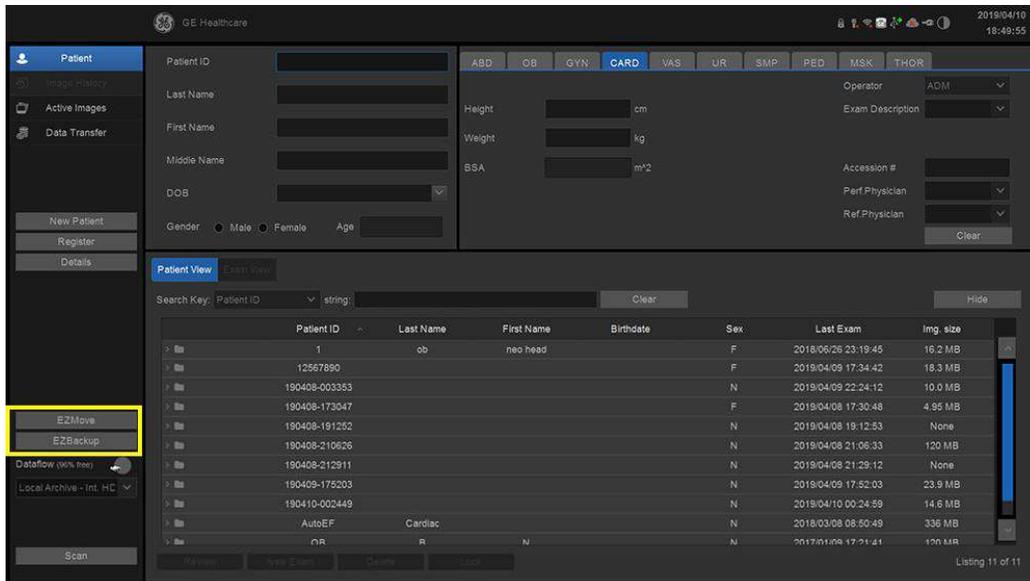


Figure 16-16. Archive Screen

EZBackup and EZMove (continued)

4. Verify the information on the first page of the EZBackup/EZMove Wizard, then press *Next*.

Full backup options display on the first page of the EZBackup wizard. If you want to backup all of the exams in the range (even if the exam was previously backed up, check this option). If you uncheck this option, the system only backs up exams which have not yet been backed up.

EZBackup does not back up the exams which were previously backed up once by EZBackup or Export.

NOTE: *You can set the range in Utility --> System --> Backup/Restore --> Move files older than in days for EZMove.*

NOTE: *If you update an exam which is already backed up, the exam is also backed up.*

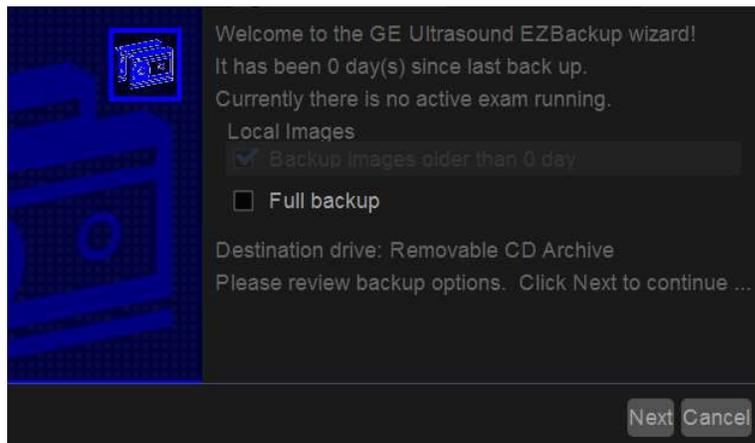


Figure 16-17. EZBackup Wizard, Page 1

EZBackup and EZMove (continued)

5. Verify the information on the EZBackup/EZMove Wizard, Page 2. The backup may span multiple media. This page tells you how many media you need to do this backup. After you have gathered the media (allow for one extra media, just in case), you are ready to begin the backup. Press *Next*. If the storage capacity of the USB HD is insufficient, you will see the message, "Selected Location does not have enough free space."

NOTE: *The calculation for the number of backup CD is only an estimate. Allow for one additional CD when performing an EZBackup/EZMove.*

NOTE: *This message appears if you press Next without inserting the backup media: "Please insert a blank media...". Insert the media and continue.*

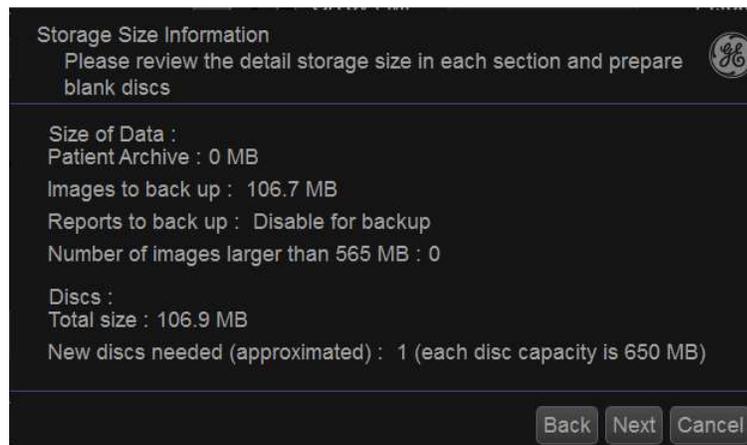


Figure 16-18. EZBackup/EZMove Wizard, Page 2

EZBackup and EZMove (continued)

6. A pop-up message appears that provides you with the media label. Label the media, then insert the media. Press **OK**.

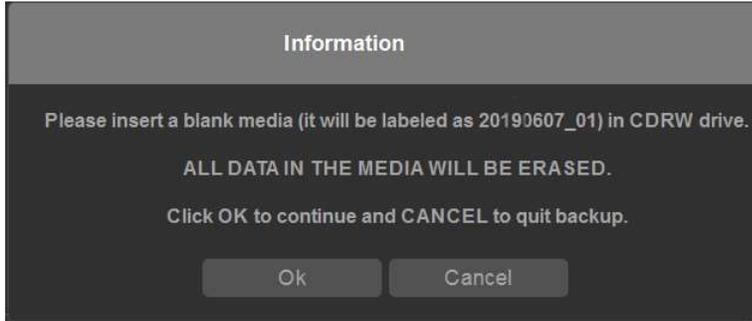


Figure 16-19. Insert Media Message

- a. Ensure that you label the media with not only the volume name indicated on the Insert Media Message, but with the name of the Versana Active system where this backup/move procedure was done.
- b. Update the EZBackup/EZMove log with this information the volume information and the location of the media.
- c. After the backup/move has been completed, file the media.

Table 16-28: Typical EZBackup/EZMove Log

Date	Scanner ID Name	Backup Images Y/N	Older than ___ Days	Move Images Y/N	Media Label (and Scanner ID)

EZBackup and EZMove (continued)

7. A pop-up window shows the system is checking whether the media is inside the drive.

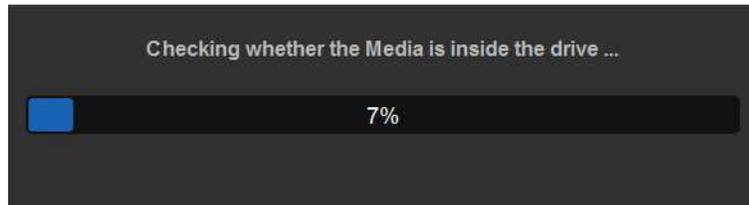


Figure 16-20. Check Media

- If the media is in the drive, the window automatically disappears when the checking is completed. The EZBackup progress then begins.
- If the media is not in the drive, a pop-up message appears notifying that there is no media in the drive. Press OK.

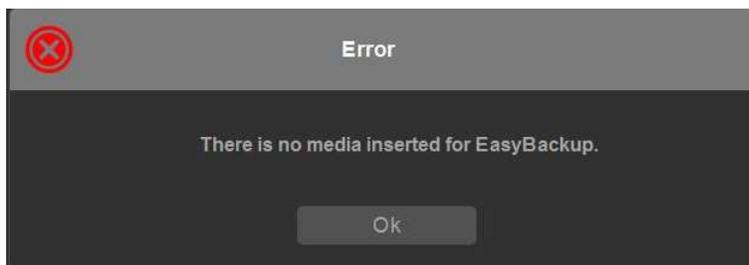


Figure 16-21. Insert Disc Error

A pop-up message appears that provides you with the media label. Label the media, then insert the media. Press *OK*.

EZBackup and EZMove (continued)

8. The status menu appears. When the backup/move has been completed, press **Next**.

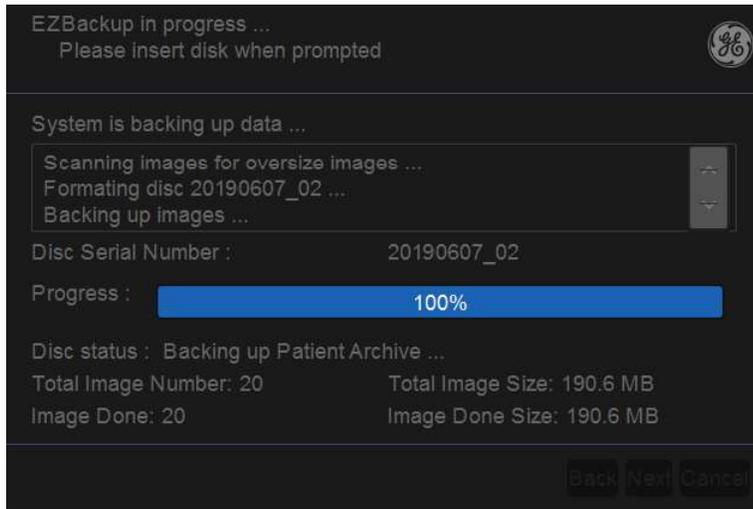


Figure 16-22. EZBackup Wizard Page 3

NOTE: *When/if you need to insert the next media, a message appears providing you with the media label. Label the media, then insert the next media and press OK.*

EZBackup and EZMove (continued)

9. When the backup is complete, the completed wizard page appears. Press **Finish**.

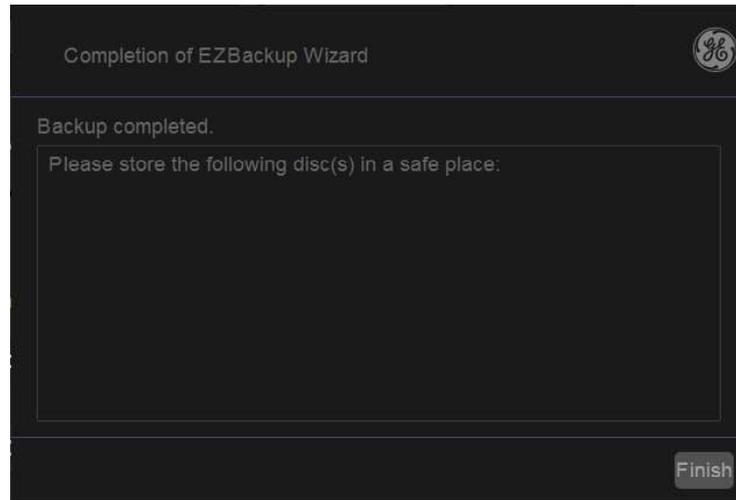


Figure 16-23. EZBackup/EZMove Wizard, Page 4

10. Do a patient archive after each EZBackup/EZMove (move).
We recommend attaching the patient list to the EZBackup/EZMove media. Insert the media and select DICOM CD Read for dataflow (if you use a USB drive, select DICOM USB Drive Read). Select any patient and press the Set key to print the patient list on the digital printer.

NOTE: Use *Import* to restore EZBackup images.

To Review EZBackup/EZMove and Export Images

You can review backed up media via the Archive Menu, Import, and the DICOM Read dataflow.

If you review EZMoved image,

1. Select the patient on the Patient Menu (on the same system where the EZMove was performed).
2. Insert the media volume indicated on the Patient Menu.
3. View the exam from the media.

NOTE: *You may need to insert a media volume prior to or after the recommended media.*

NOTE: *If the patient is split over multiple media, images on the previous or next media are displayed as triangles.*

NOTE: *To view the whole patient on the system, use Import, from as many media as you have for that patient. However, take care not to import studies over existing studies; duplicate or missing images may result. Delete the existing exam first.*

System/Peripherals Menu

The System/Peripherals screen allows you to specify parameters for the printers.



Figure 16-24. System/Peripherals Preset Menu

Print and Store Options. Press Print and Store Options to go to the Utility --> Connectivity --> Miscellaneous setup page.

Removable Media. Press Removable Media to go to the Utility --> Connectivity --> Removable Media page.

Table 16-29: Setup

Preset Parameter	Description
Standard Printer Properties: [Printer] and Properties, and Default Printer	Select to add an additional standard printer via the USB serial port and to configure digital printers. This activates the Windows Add Printer wizard. NOTE: Most printer drivers are available via Windows; however, newer printers may require you to load the manufacturer-supplied print driver (must be on CD-ROM). Refer to the Basic Service Manual for more information.
Print Full Screen	Select for the standard printer to print the full screen.
Enable Video Invert	Select for the standard printer to print black on white rather than white on black.

System/User Configurable Key

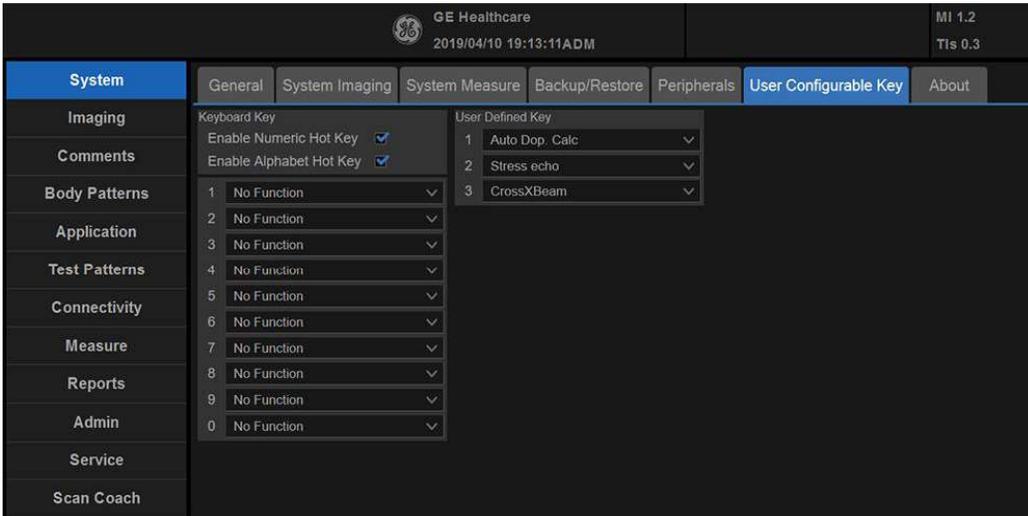


Figure 16-25. User Configurable Key Preset Menu

Table 16-30: Key Configurations

Parameter	Description
0-9	The keys are configurable.

Table 16-31: Enable Hot Key

Parameter	Description
Enable Numeric Hot Key	Select to activate numeric hot key control.
Enable Alphabet Hot Key	Select to activate alphabet hot key control.

User Defined and Keyboard keys

User Defined Keys can be programmed as one of the following functions:

NOTE: *Keyboard Keys can be programmed as one of the following functions, but some features are not supported.*

Table 16-32: User Defined and Keyboard Keys

Parameter	Description
No Function	No function.
Active Images	Go to Active Images Screen.
Auto Dop. Calcs	Turn on/off Auto Calcs in Doppler mode.
Biopsy Guideline	Biopsy Guideline Display/change biopsy guide line.
Bluetooth Save	Turn on/off bluetooth to save images.
CHI	Turn on/off CHI mode.
Clear Saved Measurements	Clear all measurements in the selected measurement category. Display the Confirmation dialogue before delete data.
CrossXBeam	Turn on/off CrossXBeam.
ECG On/Off	Turn on/off ECG.
FollowUp	Compare scan result with last scan.
FollowUp Fusion	Turn on/off FollowUp Fusion.
My Trainer	Turn on/off My Trainer.
OB Graph Display	Go to OB Graphy page.
Print3	Behave the function assigned to Print3 via Connectivity-> Button.
Removable Media	Go to Media format menu in Utility.
SRI HD	Turn on/off SRI HD.
Save as	Display SAVE AS menu to save image.
Scan Assistant	Turn on/off Scan Assistant.
BFlow	Turn on/off BFlow Mode.
Breast Care	Turn on/off Breast Care.
Contrast	Turn on/off Contrast.
Contrast Triggle	Adjust Contrast Triggle.
Elasto	Turn on/off Elasto.
LOGIQView	Turn on/off LOGIQ View.

Table 16-32: User Defined and Keyboard Keys

Parameter	Description
Needle	Turn on/off Needle.
Stress echo	Turn on/off Stress echo.
TVI	Turn on/off TVI mode.
3D/4D	Turn on/off 3D/4D.
CW	Turn on/off CW Mode.
PDI	Turn on/off PDI.

System/About Preset Menu

The System/About screen lists information about the system software.

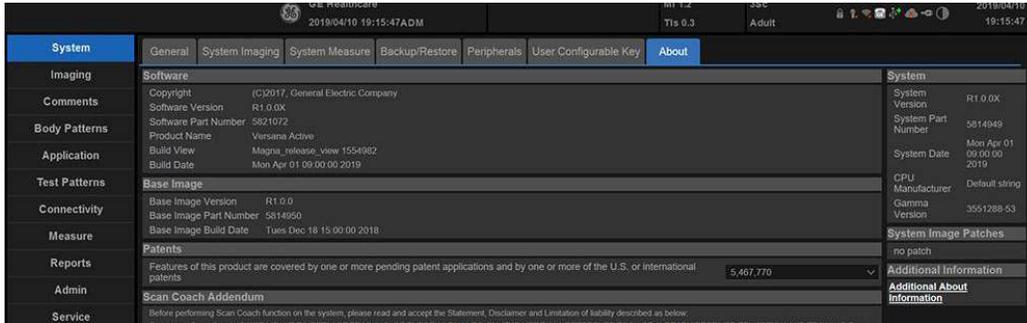


Figure 16-26. System About Menu

Table 16-33: Software

Preset Parameter	Description
Software Version	The current software version on this system.
Software Part Number	The software part number.
Build View	The software build view.
Build Date	The software build date.

Table 16-34: Patents

Preset Parameter	Description
Patents	Lists system patents.

Table 16-35: System

Preset Parameter	Description
System Part Number	The system part number.
System Date	The system date.
CPU Manufacturer	Indicate the CPU Manufacturer.
Gamma Version	Indicate the Gamma Version.

Table 16-36: Additional Information

Preset Parameter	Description
Additional About Information	Select to open Additional About Information for hardware information: Module Name, Revision and Part Number.

Imaging Presets

Overview

Imaging screens allow you to specify parameters for the following:

- B-Mode (B)
- Color Flow Mode (CF)
- Power Doppler Imaging (PDI)
- M-Mode (M)
- Anatomical M-Mode (AMM)
- Pulse Wave Mode (PW)
- Continuous Wave Mode (CW)
- Harmonics (HAR)
- Tissue Velocity Imaging (TVI)
- Tissue Velocity Doppler (TVD)
- General

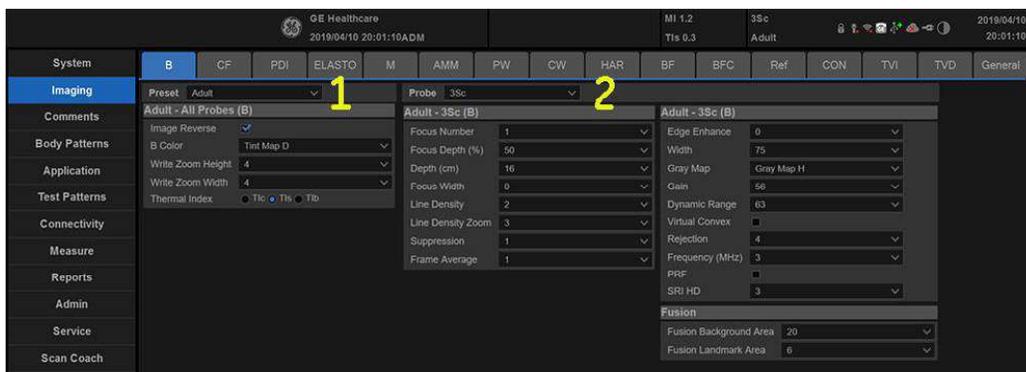


Figure 16-27. Imaging - Example

1. Model/application dependent setup parameters
2. Probe dependent setup parameters

Changing imaging presets

To change imaging presets:

1. Select **Utility** on the keyboard.
2. On the Top/Sub menu, select **Imaging**.
The system displays the Imaging screens.

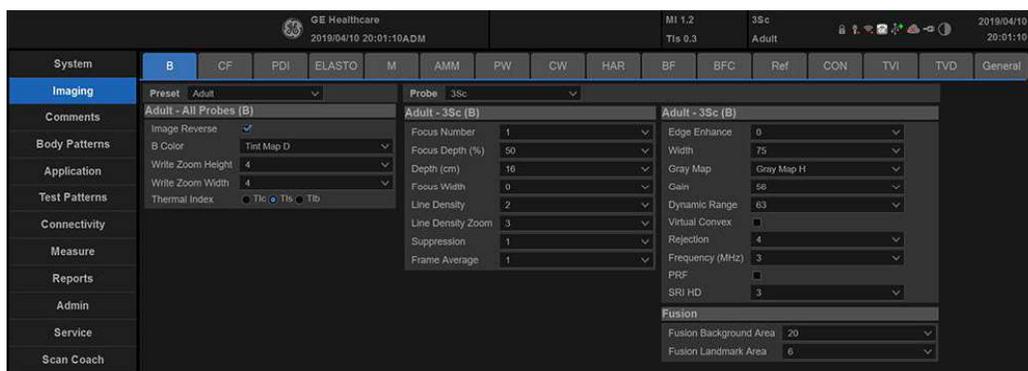


Figure 16-28. Example: B-Mode Preset

3. In the row across the top of the screen, select the mode.
The system displays two sets of parameters and settings. The left column lists all settings for the exam (for example, Abd). The right column lists settings that apply only to the exam and probe combination.
4. In the Preset list, select the exam.
5. In the Probe list, select the probe.
6. To change a parameter, do one of the following:
 - Select the value from a list.
 - Select one value from a choice of two or more buttons.
 - Select or clear a check box.
7. After changing the parameters, to save the changes, select the **Save** button.

NOTE: *When you Save changes to imaging parameters, the system saves changes to all modes, not just the mode currently displayed.*

Changing imaging presets (continued)

NOTE: If you have problems with imaging, you can return parameters back to the original settings. Select the exam, probe, and mode, and then select Reload Factory Defaults. The system returns the selected parameters to the original settings.

For information about the specific parameters, refer to Chapter 5 Optimizing the Image.

General

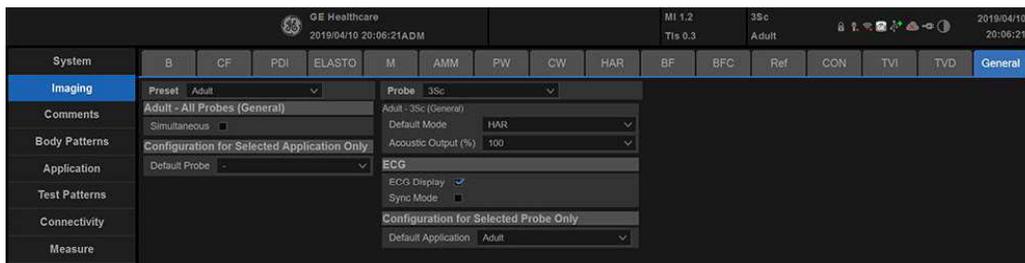


Figure 16-29. General Presets

You can specify a default probe per application and a default application per probe.

Default probe per application

1. To specify a default probe per application, select Utility --> Imaging --> General.
2. Select the default probe from the pull-down menu.

Default mode and application per probe

1. To specify a default application per probe, select Utility --> Imaging --> General.
2. Under Probe, specify the desired application from the pull-down menu.

Other setting

Checkmark the following field when you want the system to activate a certain display:

- Simultaneous
- ECG
 - ECG Display
 - Sync Mode

If your system has the following options, you must assign the option to the button per application and probe.

- B or HAR(Harmonics)
- Acoustic Output (%)

NOTE: *If you use the user-defined preset as default preset, re-select the preset in Utility whenever you overwrite the user-defined preset.*

Comments Libraries Presets

Overview

Comment screens allow you to specify comment text and pointer options, to define comment libraries, and assign comment libraries to applications.

Comments Libraries/Libraries Preset Menu

1. On the comments *Libraries* tab, you can change and create comment libraries. A comment library is a list of comments that are associated with a specific application. The comments are listed in the library in the order in which they display on the Comment Menu on the screen. For each library, you can define two columns of comments for both left and right sides, with 13 rows available for each column.

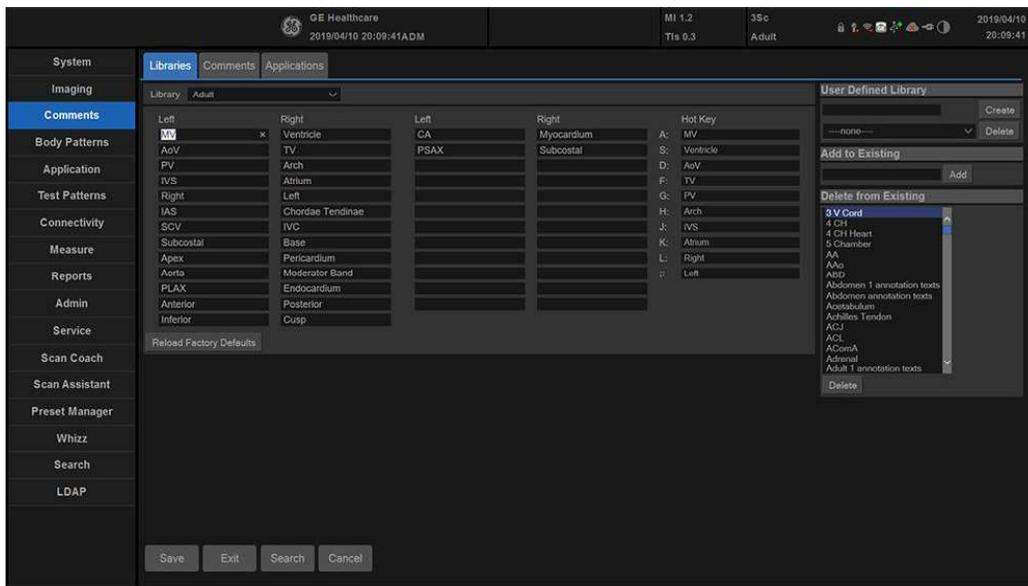


Figure 16-30. Comment Libraries Preset Menu

Comments Libraries/Libraries Preset Menu (continued)

Table 16-37: Libraries

Preset Parameter	Description
Library	The name of the comment library.
Left and Right Columns	The list of comments for the selected library seperated by side.
User Defined Library	The name of a new comment library that you want to create/delete.
Add to Existing	You can add to the selection of comments.
Delete from Existing	You can delete from the existing selection of comments.

Defining Comments

1. In the *Library* field, select the library you want.
The system displays all comments for the library. The comments are listed in the order that they are shown when you use comments.
2. To change or add an comment, select the comment or blank location and press **Set**, then do one of the following:
 - Type the comment.
3. To save the changes, select the **Save** button.

Creating a new comments library

1. In the *User Defined Library* field, type a name for the library, then select **Create**.
The system creates a new library.
2. Enter comments as described in step 2 above.
3. To save the changes, select the **Save** button.

Deleting a user defined library

1. Select the library name which you want to delete from the pull-down menu.
2. Press **Delete**.
3. Press **Save** to save the changes.

Comments Libraries/Comments Preset Menu

On the Comments tab, you specify text and pointer options.

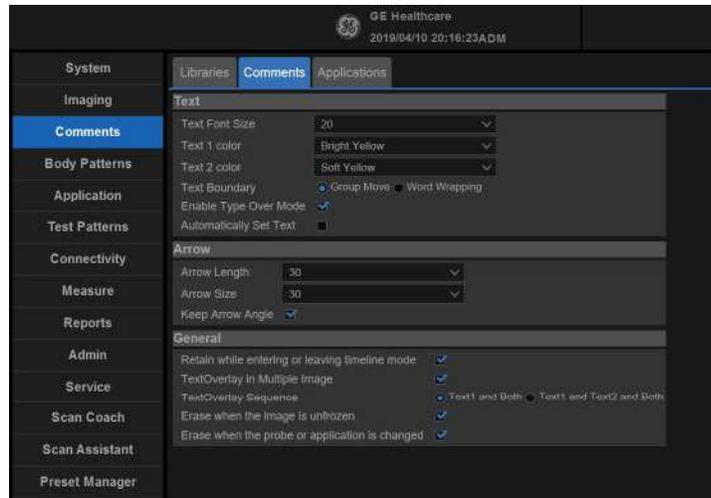


Figure 16-31. Comment/Comments Preset Menu

Table 16-38: Text

Preset Parameter	Description
Text Font Size	Specify the font size. The font size increases as the number increases.
Text color (Text1 and Text2)	Select the color for comment Text1 and Text2.
Text Boundary	Select Group Move or Word Wrapping.
Enable Type Over Mode	Select to type over existing comments. Position the cursor over the text to be changed, then start typing.
Automatically Set Text	If selected, the system sets the comment at the cursor position automatically when text entry is complete.

Comments Libraries/Comments Preset Menu (continued)

Table 16-39: Arrow

Preset Parameter	Description
Arrow Length	Select the default pointer length.
Arrow Size	Select the default pointer size.
Keep Arrow Angle	Keep the angle of arrow pointer head until next change.

Table 16-40: General

Preset Parameter	Description
Retain while entering or leaving timeline mode	If selected, the system keeps the comment(s) on the monitor display when you enter or leave timeline mode.
TextOverlay in Multiple Image	When selected, and you select the F8 key to hide or show comments, if you are in multiple image, the system hides the text in both images. When cleared, the system only hides the text for the active image.
TextOverlay sequence	You can specify to display Text1, Text2, or both. This allows you to have some comments that do not change during the exam while allowing you to change other comments. Toggle the F8 key to cycle through the 3 Text1/ Text2 states.
Erase When the image is unfrozen	Deletes comments when you unfreeze the image. If you check this parameter, Text2 automatically erase when you unfreeze the image.
Erase When the probe or application is changed	Deletes annotations when you change the application or probe.

After you change comment options, select *Save* to save the changes.

NOTE: *Only use letters, numbers or underscore “_” when naming the user defined annotation libraries. The name MUST start with either a letter or underscore.*

Comments Libraries/Applications Preset Menu

The Comments Libraries/Applications tab is a link to the Applications preset menu. The Applications preset screen allows you to specify which libraries belong to an application. You also specify which is the default library that displays when you use comments.

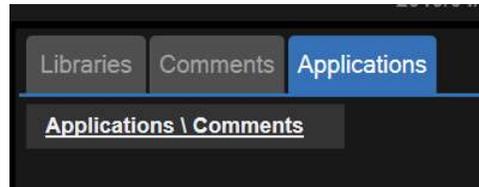


Figure 16-32. Applications/Comments Link

The Applications/Comments screen can be accessed through either the Comments Libraries or Applications key.

Specifying which libraries belong to an application

1. On the Comments tab, in the Preset field, select the application.
2. In the Library Group Tabs fields, select the libraries for this application.

NOTE: *When you use comments, the default library is displayed. To use other libraries for the application, press the tab for the library.*

3. To save the changes, select the **Save** button.

Table 16-41: Applications

Preset Parameter	Description
Preset	The name of the application preset.
Tabs	A list of libraries for the application.

Using comments from a library

To use comments, press the **Comment** key on the Control Panel. Comments are then displayed on the screen.

Body Patterns Presets

Overview

Body patterns screens allow you to specify body pattern options, to define body pattern libraries, and assign body pattern libraries.

Body Pattern Libraries/Libraries Preset Menu

On the Body Patterns Libraries tab, you can change and create body pattern libraries. A body pattern library is a list of body patterns that are associated with a specific application. The body patterns are listed in the library in the order in which they display on the control panel. For each library, you can define three columns of body patterns, with 8 rows in each column.

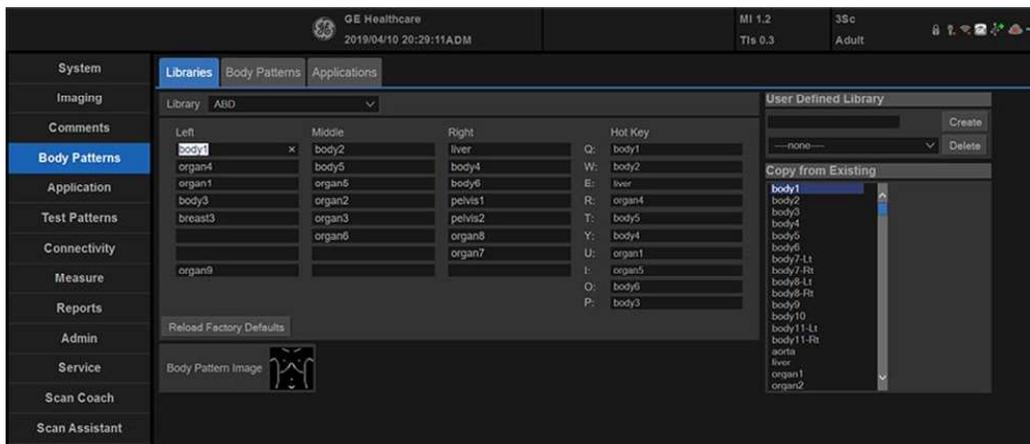


Figure 16-33. Body Patterns Libraries Preset Menu

Body Pattern Libraries/Libraries Preset Menu (continued)

Table 16-42: Body Patterns Libraries

Preset Parameter	Description
Library	The name of the body pattern application library.
Left, Middle and Right Columns	The list of body patterns for the selected library.
Body Pattern Image	Displays the image of the currently selected body pattern.
User Defined Libraries-Create	The name of a new body pattern application library that you want to create.
User Defined Libraries-Delete	Allows the selection of the user defined library to be deleted.
Copy from Existing	A list of body patterns you can use to create an application library.
Hot Key	The list of body patterns for the selected library can be assigned to 10 designated alphanumeric keys as hot keys.

Defining body patterns

1. In the *Library* field, select the application library you want.
The system displays all body patterns for the library. The body patterns are listed in the order that they are shown on the menu.
2. To change or add a body pattern, select the body pattern or blank location and press **Set**, then do one of the following:
 - Type the body pattern name.
 - Select the body pattern in the *Copy from Existing* list, and press **Set**.

NOTE: When you select a body pattern name on the menu or in the *Copy from Existing* list, the system displays the pattern in the lower left corner of the screen.

3. To save the changes, select the **Save** button.

Creating a new body pattern library

1. In the *User Defined Libraries* field, type a name for the library, then select **Create**.
The system creates a new library.
2. Enter body patterns as described in step 2 above.
3. To save the changes, select the **Save** button.

Body Pattern Libraries/Body Patterns Preset Menu

On the Body Patterns tab, you specify body pattern options.

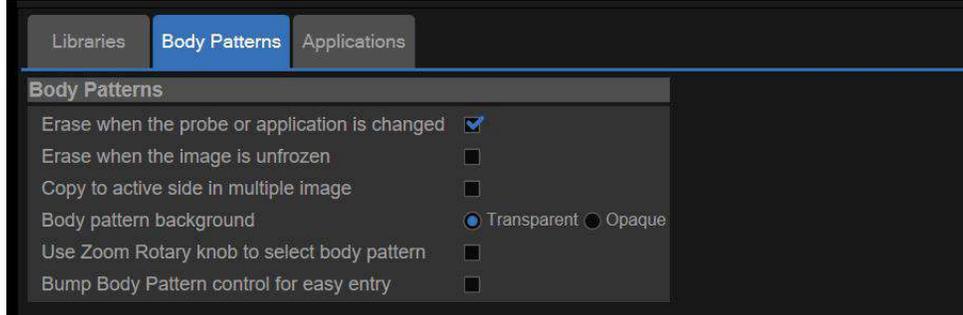


Figure 16-34. Body Patterns General Preset Menu

Table 16-43: Body Patterns

Preset Parameter	Description
Erase When the probe or application is changed	If checked, when you change probes or applications, the system erases the body pattern.
Erase When the image is unfrozen	If checked, when you unfreeze the image, the system erases the body pattern.
Copy to active side in multiple image	If checked, when you use dual B-Mode, the system copies the body pattern to the active side of the dual image.
Body pattern background	Select whether you want the body pattern background to be Transparent or Opaque.
Use Zoom Rotary key to select Body pattern	If selected, you can scroll through the body patterns with the Zoom control.
Bump Body Pattern Control for easy entry	If checked, allows you to quickly add a body pattern by nudging the control.

After you change body pattern options, select Save to save the changes.

Body Pattern Libraries/Applications Preset Menu

The Body Patterns Library/Applications tab is a link to the Applications preset menu. The Body Patterns Applications tab allows you to select body pattern application libraries. You also specify which is the default library that displays when you use body patterns.

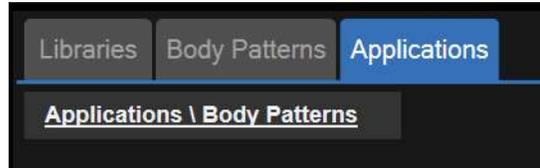


Figure 16-35. Applications/Body Patterns Link

The Applications/Body Patterns screen can be accessed through either the Body Pattern Libraries or Applications keys.

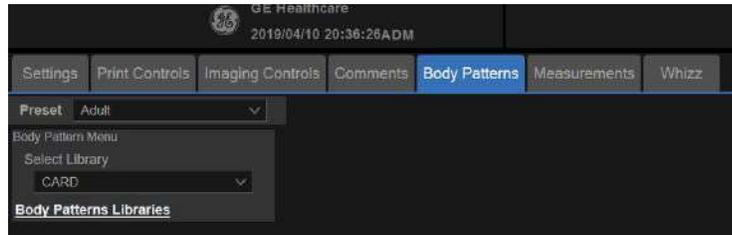


Figure 16-36. Body Patterns Applications Preset Menu

Table 16-44: Applications

Preset Parameter	Description
Preset	Defines the Body Pattern option.
Select Library	A list of body pattern applications.

Selecting body pattern application libraries

1. On the Body Patterns tab, in the Preset field, select the body pattern.
2. In the Library Group Tabs fields, select the application libraries for Body Patterns.
3. To save the changes, select the **Save** button.

NOTE: When you use body patterns, the default library is displayed. To use other application libraries, press the tab for the library.

Using body pattern application libraries

See the following Body Patterns Small Parts.

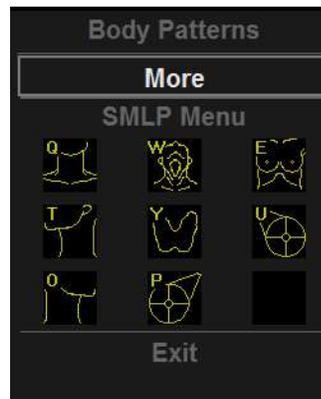


Figure 16-37. Body Patterns Small Parts

To select a body pattern library, select the tabs (for example, ABD or OB).

To select body patterns, use the **Body Pattern** control on the Control Panel.

Application Presets

Overview

Application Settings presets allow you to configure the application-specific settings (presets).

Settings

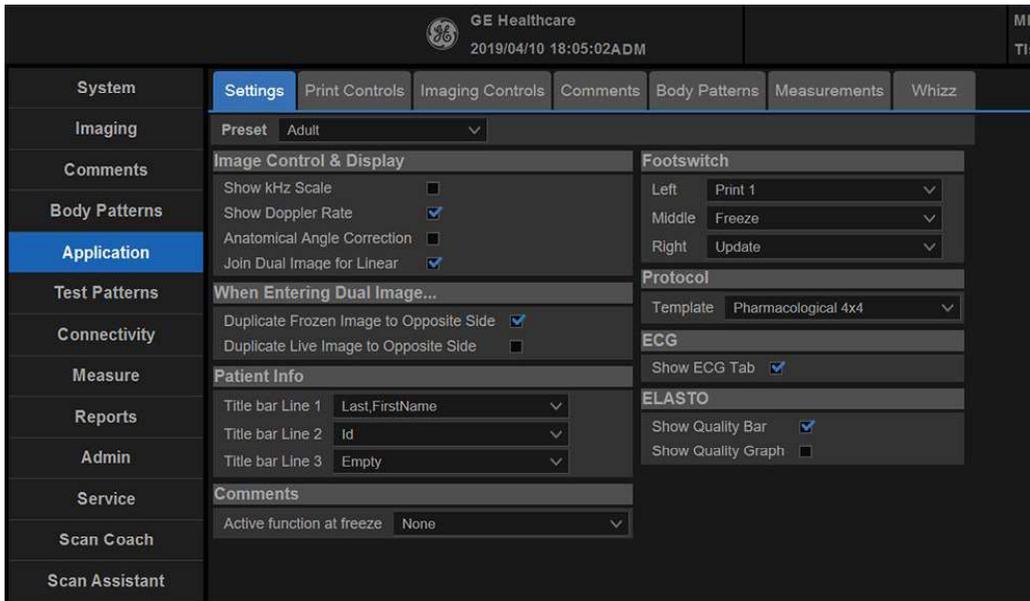


Figure 16-38. Application Settings Preset Menu

Table 16-45: Preset

Preset Parameter	Description
Preset	Select the application that you want to specify the presets.

Table 16-46: Image Control and Display

Preset Parameter	Description
Show kHz scale	When selected, displays the kHz scale on the left side of the Doppler spectrum.

Table 16-46: Image Control and Display

Preset Parameter	Description
Show Doppler Rate	When selected, displays the Doppler rate (mm/s) below the Doppler spectrum.
Anatomical Angle Correction	Select to keep the angle constant with regard to the anatomy.
Join Dual Image for Linear	Select to place linear probe dual images directly next to each other.

Table 16-47: When Entering Dual Image...

Preset Parameter	Description
Duplicate Frozen Image to Opposite Side	When entering Dual Image, duplicate the frozen image to the opposite side.
Duplicate Live Image to Opposite Side	When entering Dual Image, duplicate the live image to the opposite side.

Table 16-48: Patient Info

Preset Parameter	Description
Titlebar Line 1	Select the patient information to display on the scanning screen Title bar.
Titlebar Line 2	Select the patient information to display on the scanning screen Title bar.
Titlebar Line 3	Select the patient information to display on the scanning screen Title bar.

Table 16-49: Comments

Preset Parameter	Description
Active function at Freeze	Select None, Body Pattern, or Comments. If Body Pattern or Comment is selected, the Body Pattern or Comment is activated automatically when freezing the system.

Table 16-50: Footswitch

Function	Description
Left, Middle, Right	Specify from the following for each footswitch pedal: No Function, Freeze, Next Heartcycle, Previous Heartcycle, Print 1,2, Update, Next Step (Scan Coach/ Assistant), Previous Step (Scan Coach/Assistant), or Scan Assistant Pause/Resume.

Table 16-51: Preset

Preset Parameter	Description
Show ECG Tab	Check to the ECG Tab on the Screen.

Print Control

You have to set parameters with each application.

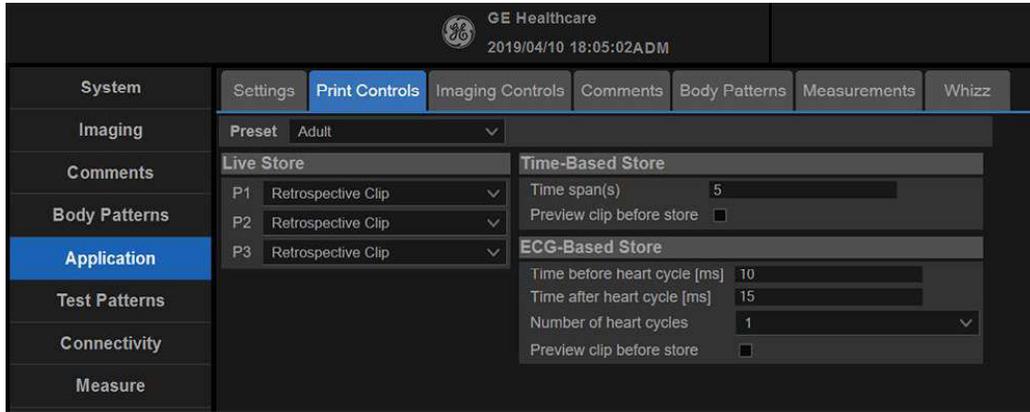


Figure 16-39. Print Control

Table 16-52: Preset

Preset Parameter	Description
Preset	Select Application from pull-down menu. You can set Time span for each application.

Table 16-53: Live Store

Preset Parameter	Description
P1/P2/P3	Select the behavior of Print key during live scan from Retrospective Clip, Single image only or None for each print key. None: Store a still image when you press P-key during Freeze. Retrospective clip: The system stores cine predetermined time before you press the Print button, based on the Time Span setting. Single image only: Store a still image during live scan each time you press P-Key.

Table 16-54: Time-Based Store

Preset Parameter	Description
Time span [s]	Select the number of seconds of CINE Loop storage. The default is 3 seconds.
Preview clip before store	When selected, allows you to review cine loops before storage.

Table 16-55: ECG Based-Store

Preset Parameter	Description
Time before heart cycle [ms]	Sets the storage time span before R-wave of the first heart cycle.
Time after heart cycle [ms]	Sets the storage time span after R-wave of the last heart cycle.
Number of heart cycles	Select the number of heart cycles to store. (Must be de-selected for single frame.)
Preview loop before store	When selected, allows you to review cine loops before storage.

Imaging Controls

For B, M, CF, PDI, PW, CW, CM and Cine mode, you can select which controls you want to be available on the primary menu for the selected application.

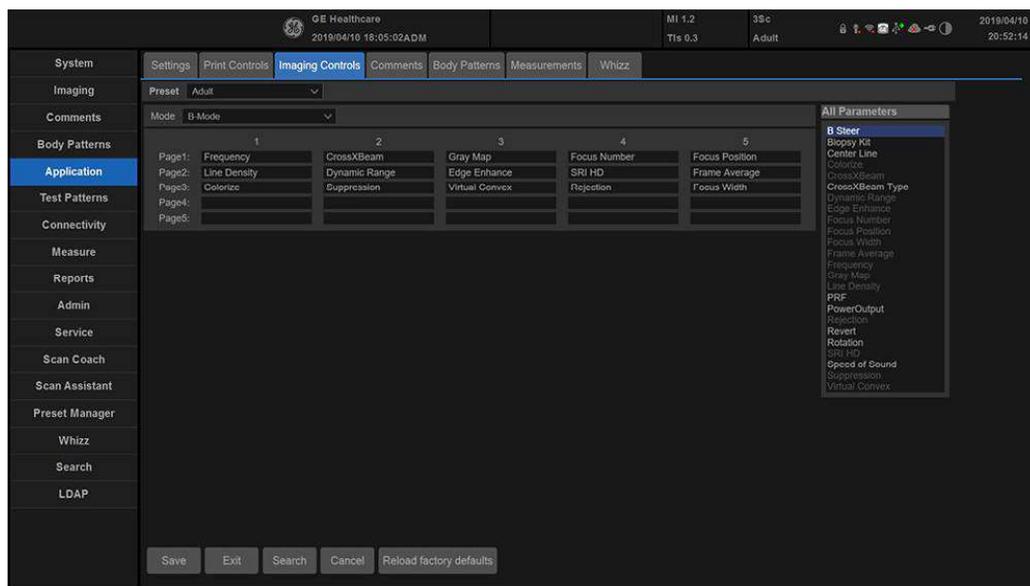


Figure 16-40. Imaging Controls

Comments and Body Patterns

Comments and Body Patterns were described earlier in this chapter.

Measurements

You can set the exam category measurement and calculation package you want to appear when you select the exam category Preset.

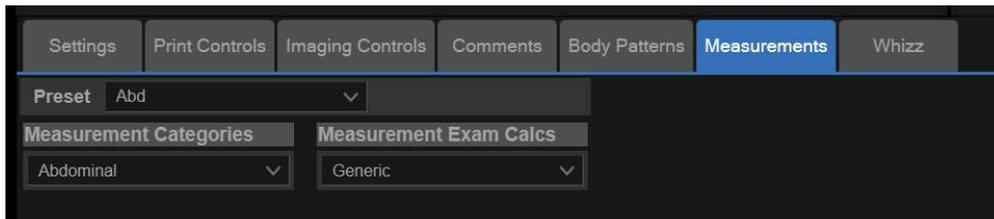


Figure 16-41. Application Measurements Menu

Test Patterns

Overview

There are different test patterns available: Gray Bars, Color Bars, Resolution, Text, Brightness Calibration, White, Gray, Red, Green and Blue.

Configuring Connectivity

Overview

You use Connectivity functionality to set up the connection and communication protocols for the ultrasound system. This section gives an overview of each of the Connectivity functions. Each function is described in detail in the following pages.

Structured Reporting

DICOM Structured Reporting provides the results of a procedure as structured data elements (well-defined fields) as opposed to unstructured data (large amounts of text undifferentiated by individual fields). This greatly improves query capability. DICOM Structured Reporting creates coded clinical data that can be used for clinical research, outcomes analysis, and disease management.

Supported parameters

The DICOM supported parameters are listed in the DICOM Conformance Statement at the following web site under DICOM - Ultrasound:

<http://www.gehealthcare.com/usen/interoperability/dicom/>

Connectivity Functions

To set up your institution's connectivity, you must login with administrator privileges.

1. **TCPIP:** allows you to configure the Internet Protocol.
2. **Device:** allows you to set up devices.
3. **Service:** allows you to configure a service (for example, DICOM services such as printers, worklist, and other services such as standard print) from the list of supported services. This means that the user can configure a device with the DICOM service(s) that particular device supports.
4. **Dataflow:** allows you to adjust the settings of the selected dataflow and associated services. Selecting a dataflow customizes the ultrasound system to work according to the services associated with the selected dataflow.
5. **Button:** allows you to assign a pre-configured output service (or a set of output services) to the Print keys on the control panel.
6. **Removable Media:** enables formatting (DICOM, database, or blank formatting) and DICOM verification of removable media.
7. **Miscellaneous:** allows you to set up the patient exam menu options, print and store options, and the order of the columns in the examination list on the Patient menu.
8. **Bluetooth:** allows you to set up bluetooth device connection.
9. **Tricefy:** allows you to set up tricefy connection.

Configure these screens from left to right, starting with the Tcpiip tab first.

NOTE: *The ultrasound system is pre-configured for many services, with default settings selected. You can change these services and settings as needed.*



You must restart the Versana Active (shutdown) after making any changes to connectivity settings in the Utility menus. This includes any changes on the TCPIP or dataflow setup screens.

TCPIP

This configuration category enables users with administrative rights to set the TCPIP for the system and connected remote archive.

1. Type the name of the Ultrasound system in the Computer Name field.
2. In the IP settings section, identify the ultrasound system to the rest of the network by one of the following:
 - Dynamic Host Configuration Protocol (DHCP) can be used provided your network supports the DHCP protocol..
 - Type the IP-Address. In this case, uncheck the “Enable DHCP” box and enter the IP address, Subnet Mask and default Gateway. Contact your network administrator if you are unsure what values to enter.

NOTE: *Do not set up the system with DHCP. The IP address MUST BE static for the diagnostic and DICOM to function correctly.*

3. Select the Network Speed.
4. Select Save settings.
5. Restart the ultrasound system.

NOTE: *TCPIP settings do not get restored when restoring backups. This is per system design. The Versana Active IP address MUST BE unique.*

TCPIP (continued)



Figure 16-42. Connectivity TCPIP Preset Menu

Table 16-56: Computer Name

Preset Parameter	Description
Computer Name	Type the unique name for the Ultrasound system (no spaces in name).

Table 16-57: IP settings

Preset Parameter	Description
Enable DHCP	DO NOT select this box to enable dynamic IP Address selection. NOTE: The system shall disable IP-Address, Subnet Mask, and Default Gateway when the user chooses to use DHCP.
IP-Address	Type the IP Address of the Ultrasound system. NOTE: IP stands for Internet Protocol. Every device on the network has a unique IP address.
Subnet Mask	Type the subnet mask address. NOTE: The Subnet Mask is an IP address filter that eliminates communication/messages from network devices of no interest to your system.
Default Gateway	Type the default gateway address.
Network Speed	Select the network speed (Auto Detect, 10Mbps/Half/Full Duplex, 100Mbps/Half/Full Duplex, or 1000Mbps/Auto-negotiate).

Table 16-58: Wireless Network

Preset Parameter	Description
Configuration	Press this button to set up wireless network.
IP-Address	Wireless Network IP Address of the Ultrasound system.
Subnet Mask	Wireless Network subnet mask address.
Default Gateway	Wireless Network default gateway address.

NOTE: Restart the system to activate any changes saved from this page.

Wireless Network Configuration

A wireless network is available on the Versana Active. When the WLAN is active, an icon appears in the status bar to indicate whether the WLAN is connected or disconnected.

Connecting to the WLAN

To connect the Versana Active to the WLAN:

1. Enter **Utility** -> **Connectivity** -> **TCP/IP**, and select **Configuration** under Wireless Network.

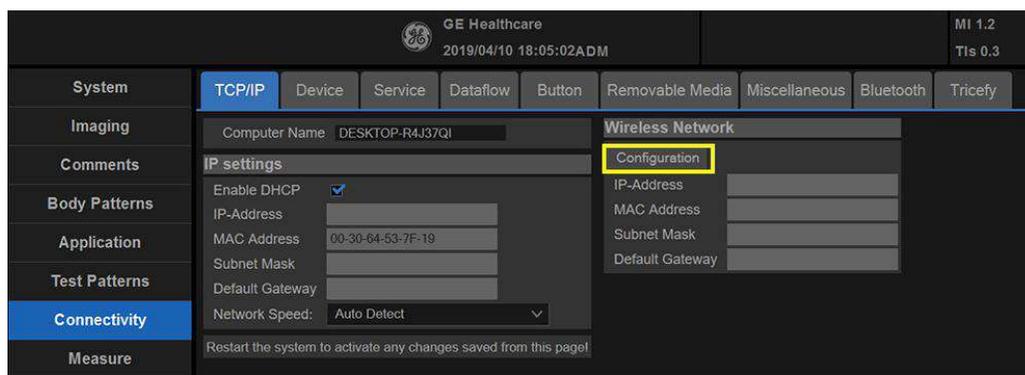


Figure 16-43. WLAN setting on TCP/IP

Customizing Your System

Connecting to the WLAN (continued)

2. The Wireless Network Configuration tool appears. The wireless networks broadcasting in your area appear in the list.

Highlight the wireless network you want to connect, and then select **Connect** from the bottom of the configuration page.

NOTE: Check “Enable Wireless Connection” if necessary.

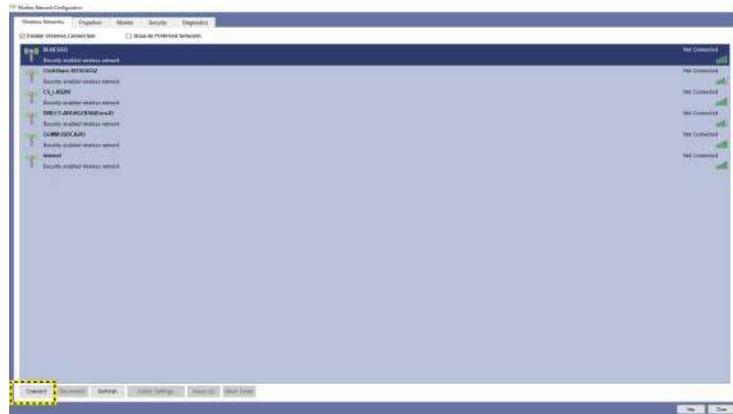


Figure 16-44. Available Wireless Networks

3. A pop-up window appears. Select **OK** to continue.



Figure 16-45. Pop-up Window

Connecting to the WLAN (continued)

4. Choose the **Security** tab, select the Security type and Encryption type, and then input the network security key to connect the wireless network.



Figure 16-46. Network Properties Tab

5. A process bar is displayed while the system is attempting to connect the wireless network.

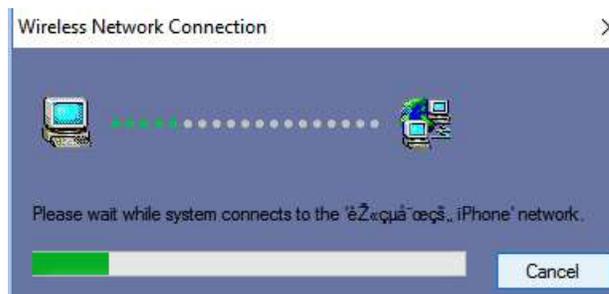


Figure 16-47. Process Bar

Connecting to the WLAN (continued)

- The wireless network is connected successfully.

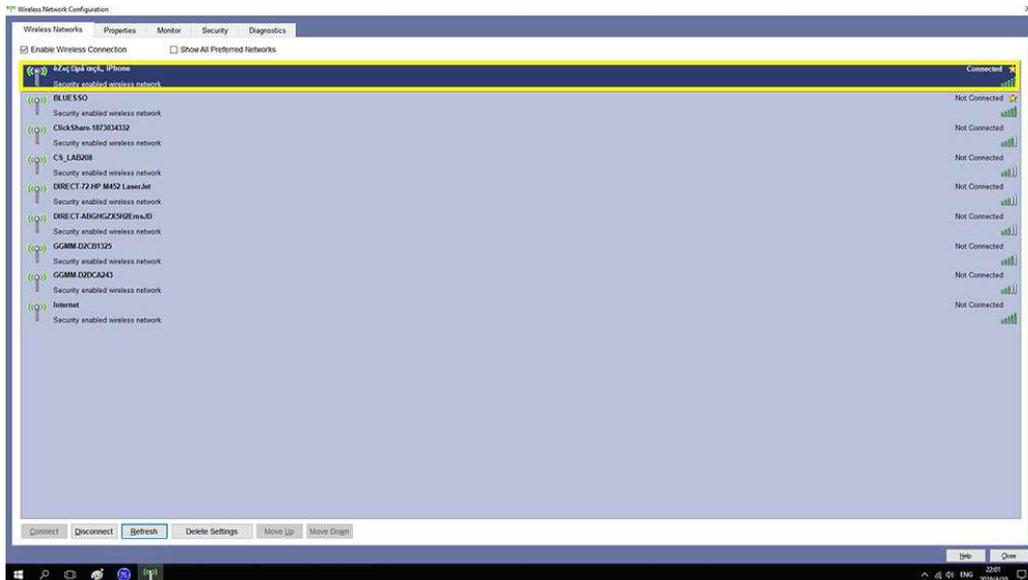


Figure 16-48. Network Configuration

Adding a Wireless Network

To add a WLAN profile (even for a network which is not yet available),

- Enter **Utility** -> **Connectivity** -> **TCP/IP**, and select **Configuration** under Wireless Network.
The Wireless Network Configuration tool appears. Available Wireless Networks appear.
- Select the **Security** tab.
- Select **Add...**
- Add the following information to the Wireless Network Properties page:
 - Network Name (SSID)
 - Network Authentication (Open, Shared Key, WPA, WPA PSK, WPA2, or WPA2 PSK).
 - Data Encryption
 - Network Key
 - Key Index
- After you have filled in all the required information, press **OK**. To cancel adding this profile, press **Cancel**.

Removing a WLAN

To remove a WLAN profile (even for a network which is not available),

1. Enter **Utility** -> **Connectivity** -> **TCP/IP**, and select **Configuration** under Wireless Network.
The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the **Security** tab.
3. Select **Remove**.

Customizing Wireless Network Settings

To customize an existing WLAN profile,

1. Enter **Utility** -> **Connectivity** -> **TCP/IP**, and select **Configuration** under Wireless Network.
The Wireless Network Configuration tool appears. Available Wireless Networks appear.
2. Select the **Security** tab.
3. Select **Customize...**
4. Add the following information:
 - a. Network Name (SSID)
 - b. Network Authentication (Open, Shared Key, WPA PSK, or WPA2 PSK).
 - c. Data Encryption
 - d. Network Key
 - e. Key Index
5. After you have filled in all the required information, press **OK**. To cancel adding this profile, press **Cancel**.

Device

To add a new device,

1. Press **Add**.
2. Type the device name in the Name field.
3. Type the device's IP address in the IP Address field.

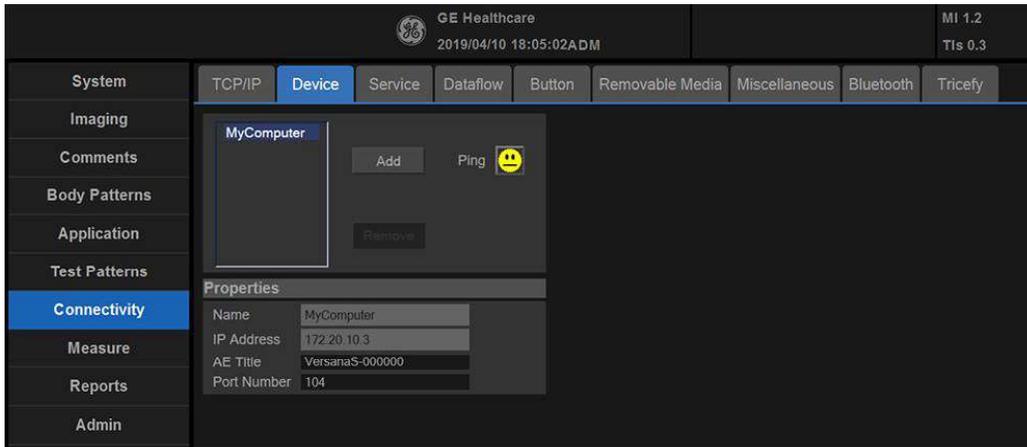


Figure 16-49. Connectivity Device Preset Menu

Table 16-59: Device

Preset Parameter	Description
Add/Remove	Press Add to add a new device; press Remove to delete a device.
Ping	Press Ping to confirm that a device is connected.
Properties: Name	Type the name of the device.
Properties: IP Address	Type the device's IP address.
Properties: AE Title	AE Title of the Versana Active. NOTE: Only available for MyComputer.
Properties: Port Number	IP Port Number Used for DICOM, set by default to 104. NOTE: Only available for MyComputer.

To ping a device,

1. Select the device.
2. Press **Ping**. If the smiley face smiles, then the connection has been confirmed. If the smiley face frowns, then the connection has not been made. Check the device name and IP address.

Service

For each Device that you added to the system, you need to set up the service(s) that device supports (you must be an administrator to update these screens).

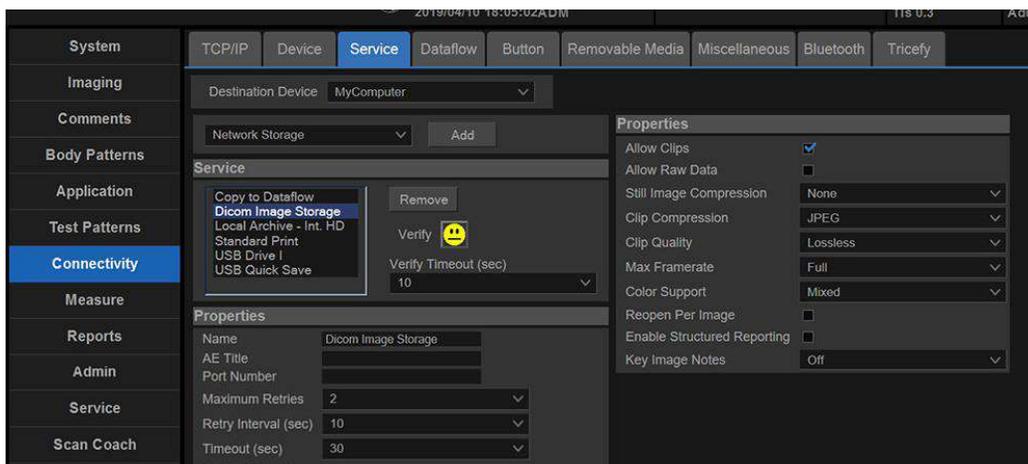


Figure 16-50. Connectivity Services Preset Menu

The Services screen has the following sections of information:

1. **Destination Device** - lists information about destination devices. You can select from a list of currently existing devices.
2. **Service Type to Add** - lists information about services for the destination device. You can add services, select from a list of currently existing services, and remove services.
3. **Service Properties** - lists parameters for the service currently selected in the Services section. The name and parameters in this section change, depending on what service is currently selected.

Adding a service to a destination device

1. Select the service from the pull-down menu. Press **Add**.
2. Specify the properties for this service. Press **Save**.
3. Verify the service.

Removing a service

1. Select the service. Press **Remove**.
2. Press **Save**.

Changing parameters for a service

There are certain parameters that may need to be set up for each service:

Table 16-60: Service Parameters: Common Service Parameters

Preset Parameter	Description
Name	Free text: give a descriptive name to the device.
AE Title	The Application Entity Title for the service.
Port Number	The port number of the service.
Maximum Retries	Max # – the maximum number of times to try establishing a connection to the service.
Retry Interval (sec)	Specify how often (in seconds) the system should try to establish a connection to the service.
Timeout	The amount of time after which the system will stop trying to establish a connection to the service.

Table 16-60: Service Parameters: Common Service Parameters

Preset Parameter	Description
Enable Encryption	<p>Select to enable encryption on the data during data transfer when the DICOM server requires encryption.</p> <p>The system supports Secure Sockets Layer 3.0 client protocol and Transport Layer Security 1.0 client protocol. Peer authentication is not supported.</p> <p>The following are supported cipher suites:</p> <ul style="list-style-type: none"> • TLS_RSA_WITH_RC4_128_MD5 • TLS_RSA_WITH_RC4_128_SHA • TLS_RSA_WITH_3DES_EDE_CBC_SHA • TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA • TLS_RSA_WITH_DES_CBC_SHA • TLS_DHE_DSS_WITH_DES_CBC_SHA • TLS_RSA_EXPORT1024_WITH_RC4_56_SHA • TLS_RSA_EXPORT1024_WITH_DES_CBC_SHA • TLS_DHE_DSS_EXPORT1024_WITH_DES_CBC_SHA • TLS_RSA_EXPORT_WITH_RC4_40_MD5 • TLS_RSA_EXPORT_WITH_RC2_CBC_40_MD5 • TLS_RSA_WITH_NULL_MD5 • TLS_RSA_WITH_NULL_SHA <p>NOTE: Enable Encryption is only available with DICOM Image Storage and DICOM Worklist.</p>

Many service parameters are specific to each type of service. The parameters are described on the following pages:

- DICOM Image Storage
- DICOM Performed Procedure
- DICOM Print
- DICOM Query/Retrieve
- DICOM Storage Commitment
- DICOM Worklist
- Standard Print
- USB Quick Save
- Save As
- Network storage

DICOM Image Storage

DICOM Image Storage allows the system to send or receive ultrasound images in a format that can be interpreted by PACS.



GE does not warrant the operation if the DICOM format of send image (US, USMF, SC) does not correspond with the DICOM Server.

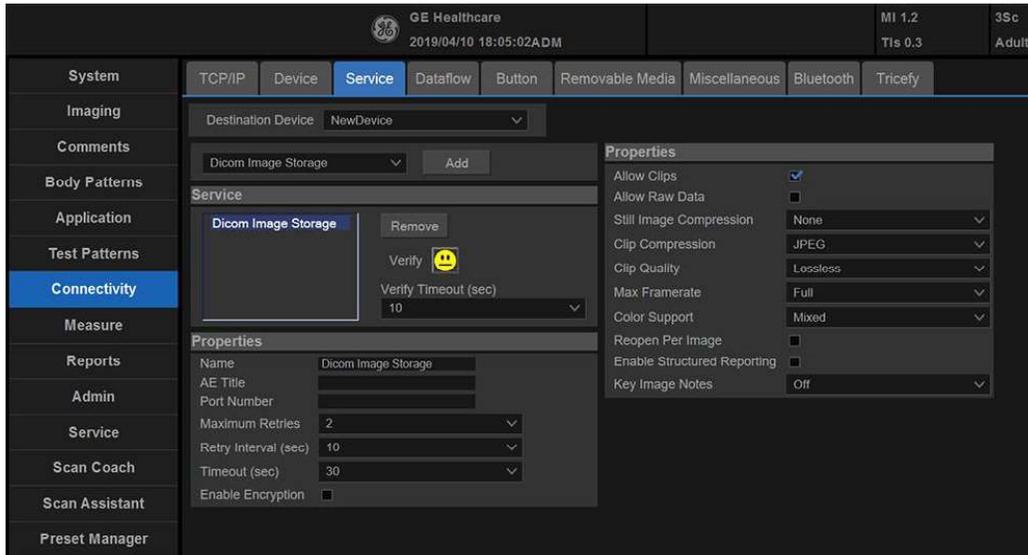


Figure 16-51. DICOM Image Storage Service

Table 16-61: DICOM Image Storage

Preset Parameter	Description
Allow Clips	Select to allow cine loop storage.
Allow raw data	Select to save data in both TruAccess (raw data) and DICOM format. Clear to save in DICOM format only.
Compression	Select the compression type: None, Rle, or Jpeg.
Max Framerate	Select the maximum frame rate: Full, 25, or 30.
Color Support	Select: Mixed, Gray or Color
Reopen per image	Reopen per image
Enable Structured Reporting	Select for Structured Reporting.

Table 16-61: DICOM Image Storage (Continued)

Preset Parameter	Description
Key Image Notes	Image deletion notification. ONLY available for the Direct Store Workflow and ONLY generated when there are images deleted during the exam. Selecting this lets the reader at the PACS system know which images have been deleted. An indicator is placed on deleted images with a reason, "Rejected for Quality Reasons," for example.

DICOM Performed Procedure

DICOM Performed Procedure provides an acknowledgement that a study has been performed.

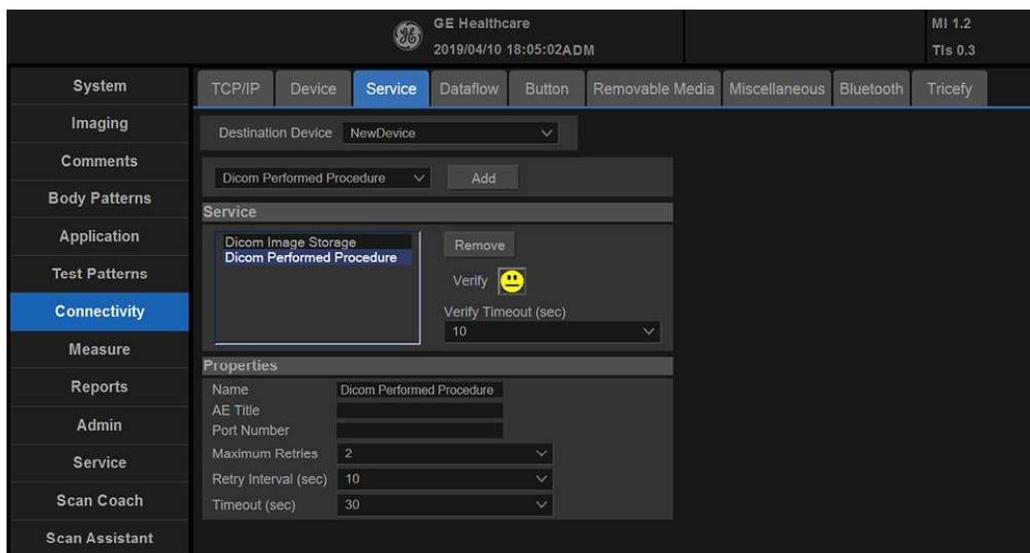


Figure 16-52. DICOM Performed Procedure Service

DICOM Print

DICOM Print provides the ability to send or receive ultrasound image data to DICOM printers.

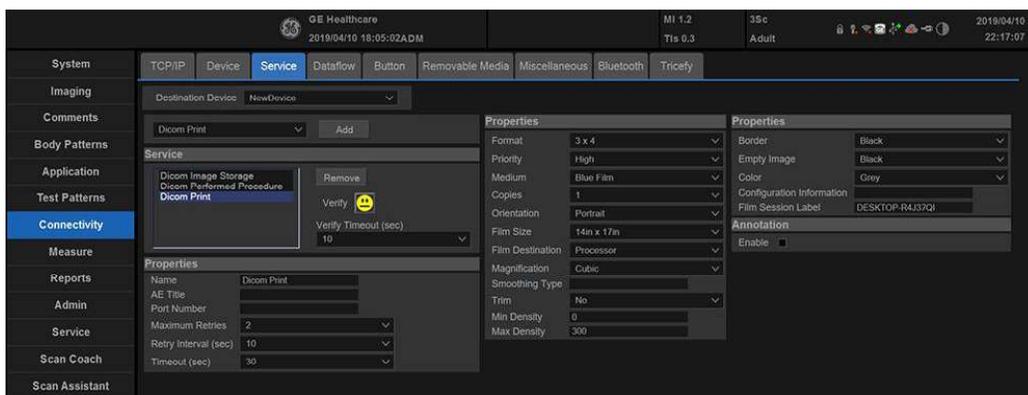


Figure 16-53. DICOM Print Service

Table 16-62: Properties

Preset Parameter	Description
Format	Indicates how many prints to print per page, for example, 1,1, 1,2, 1,3, up to 7,5. Partial prints are displayed as one print job.
Priority	Specify the print job priority: High, Medium, or Low.
Medium	Select the print medium: Clear Film, Paper, or Blue Film.
Copies	Enter the number of copies.
Orientation	Specify whether to print the image Portrait (vertically) or Landscape (horizontally).
Film Size	Specify the dimensions of the film size.
Film Destination	Specify the film destination for the exposed filmMagazine – Store in a film magazineProcessor – Develop in a film processor
Magnification	Specify how the printer magnifies the image to fit it onto the film.Replicate – Interpolated pixel are copies of the adjacent pixelsBilinear – Interpolated pixels are created by bilinear interpolations between the adjacent pixelsCubic – Interpolated pixels are created by cubic interpolations between the adjacent pixelsNone – No interpolation
Smoothing Type	Specify the printer's magnification interpolation for the output.
Trim	Specify whether you want a trim box to be printed around each image on the film: Yes or No.
Min Density	Enter a number indicating the minimum density level of the film.
Max Density	Enter a number indicating the maximum density level of the film.

Table 16-62: Properties (Continued)

Preset Parameter	Description
Border	Select to have the border area surrounding and between the images of the film: Black or White.
Empty Image	Select to have a Black or White empty image.
Color	Select whether to have the image Color or Grey.
Configuration Information	Enter vendor-specific image quality settings.
Film Session Label	Type a name for the group of film labels associated with the print job.

Table 16-63: Annotation

Preset Parameter	Description
Enable	Lets you annotate the image.

DICOM Query/Retrieve

DICOM Query/Retrieve provides a list of patients sorted by query parameters.

NOTE: Some PACS vendors only offer Query/Retrieve as an option. Please confirm that this service is available.

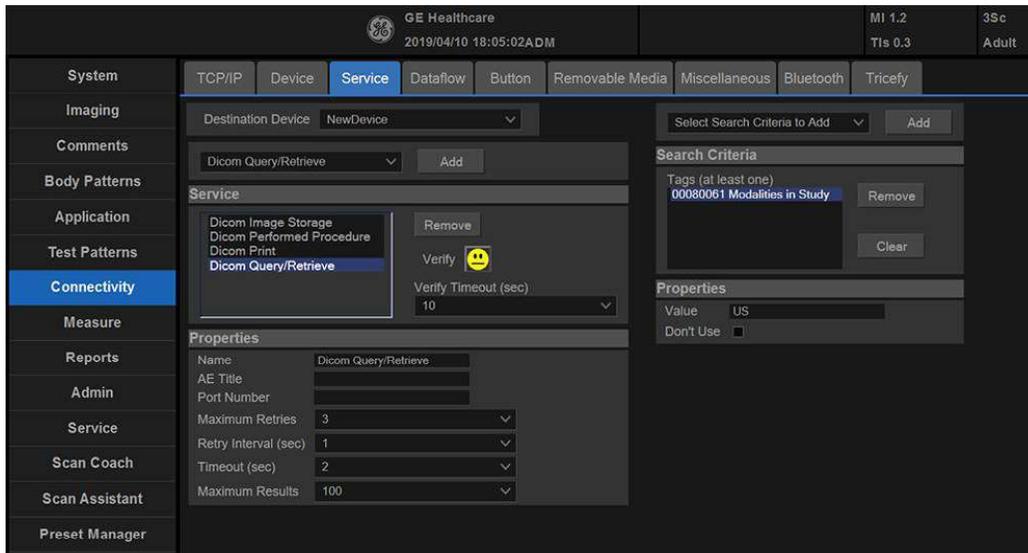


Figure 16-54. DICOM Query/Retrieve Service

Table 16-64: DICOM Query/Retrieve

Preset Parameter	Description
Maximum Result	Specify the maximum number of patient records you want the system to retrieve when searching the patient database.
Search Criteria	Displays the Search Criteria window, where you can enter search parameters for the system to use when searching the patient database.

NOTE: If you are experiencing problems with slow responses from DICOM servers, increase the time-out in the DICOM server properties dialog. (Utility -> Connectivity -> Service -> Properties -> Maximum Retries and Timeout). Problems with slow responses may result in images being re-sent automatically and low transfer rates. The retry settings can be used to make jobs retry on bad networks. When portable (off-line), use minimum time-out and no retries or it will affect shutdown speed.

DICOM Query/Retrieve (continued)

Table 16-65: DICOM Query/Retrieve Search Criteria

Preset Parameter	Description
Select Search Criteria to Add	Select the type of information that you want to define for search parameters. The following searches are allowed: Patient Name, Patient ID, Modality, Scheduled Procedure Start Date, Start Time, and End Time.
Tags (at least one)	The name of a tag selected to use for search criteria.
Properties: Value	Type the value of the Selected Tag item. For example, if you select Referring Physician's Name in the Select Tag field, you can enter the name of the physician in the Value field.
Properties: Don't Use	Select to turn off the selected search criteria. To exclude a tag from the worklist query, select Don't Use and then select Add to List.
Add	Select to add the tag and value to the list of search criteria.
Remove	Select to remove the tag and value from the list of search criteria.
Clear	Clears all tags.

Query/Retrieve Per Series

You can now display/retrieve multiple series by patient on the Patient--> Data Transfer--> Q/R page.

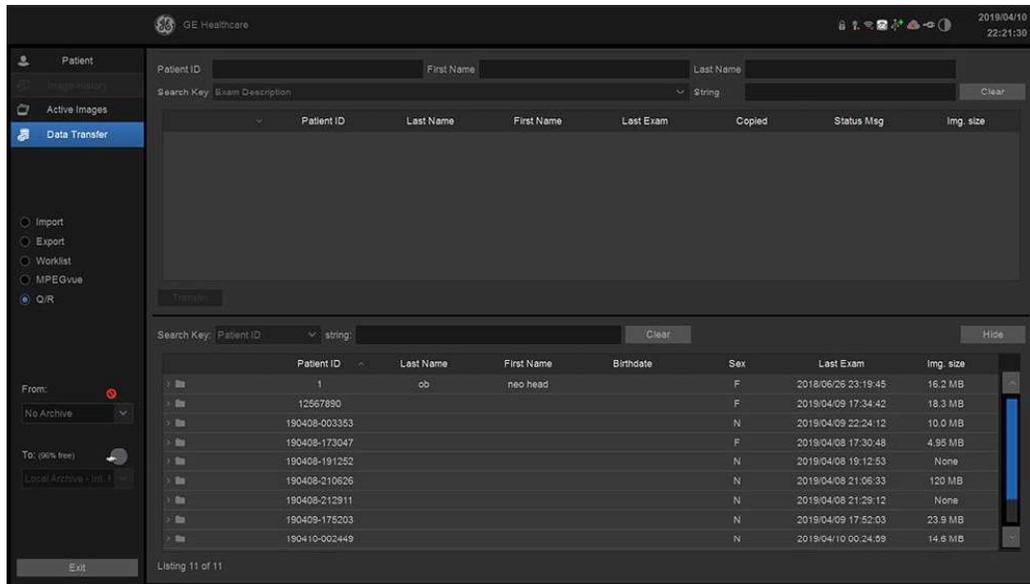


Figure 16-55. Q/R Per Series Example

DICOM Storage Commitment

DICOM Storage Commitment provides acknowledgement from PACS that the study has been accepted into archive.

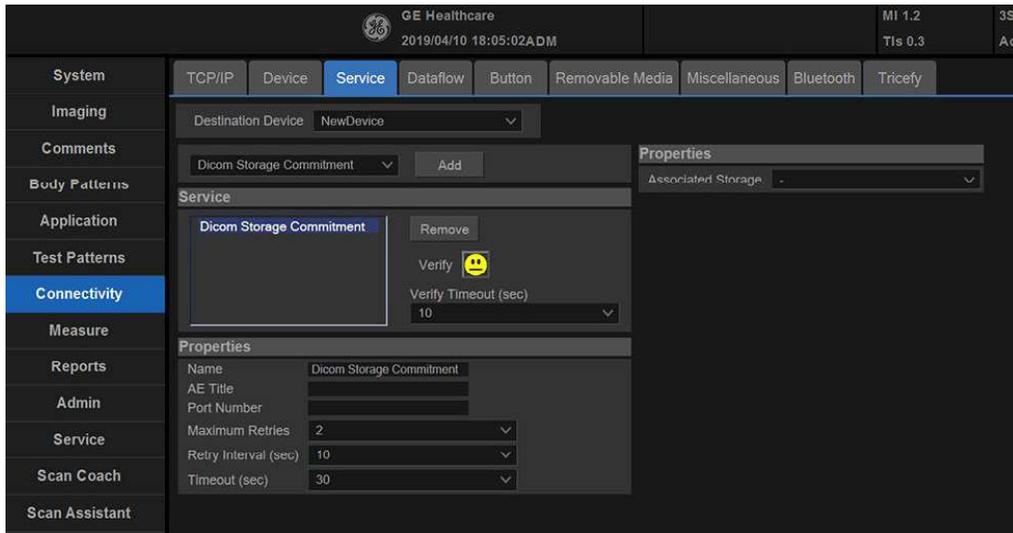


Figure 16-56. DICOM Storage Commitment Service

Table 16-66: DICOM Storage Commitment

Preset Parameter	Description
Associated Storage	This selection is based on the services entered by the user.

DICOM Worklist

DICOM Worklist provides a list of patients sorted by query parameters.

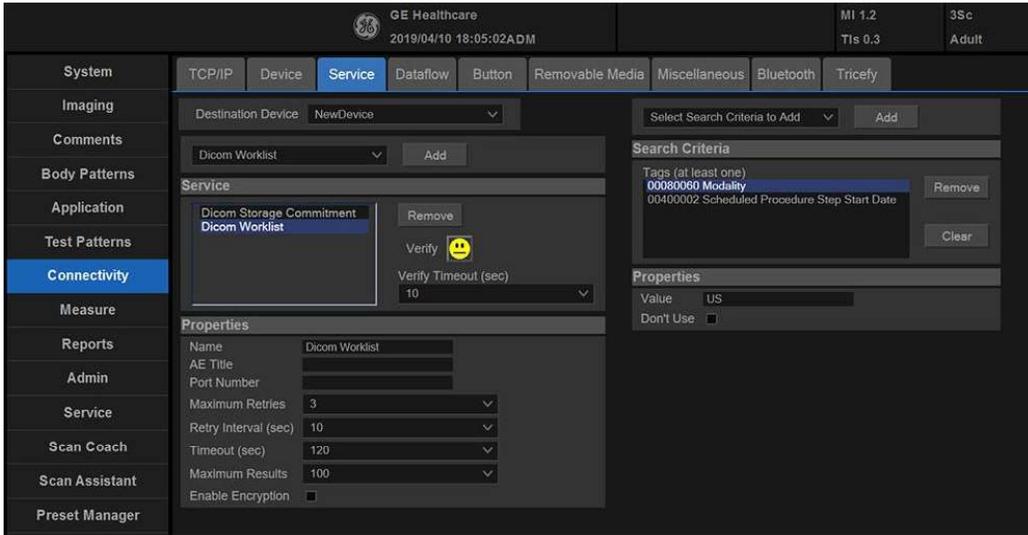


Figure 16-57. DICOM Worklist Service

Table 16-67: DICOM Worklist

Preset Parameter	Description
Maximum Result	Specify the maximum number of patient records you want the system to retrieve when searching the patient database.
Search Criteria	Displays the Search Criteria window, where you can enter search parameters for the system to use when searching the patient database.

DICOM Worklist (continued)

Table 16-68: DICOM Worklist Search Criteria

Preset Parameter	Description
Select Search Criteria to Add	Select the type of information that you want to define for search parameters. The following searches are allowed: Patient Name, Patient ID, Modality, Scheduled Procedure Start Date, Start Time, and End Time.
Tags (at least one)	The name of a tag selected to use for search criteria.
Properties: Value	Type the value of the Selected Tag item. For example, if you select Referring Physician's Name in the Select Tag field, you can enter the name of the physician in the Value field.
Properties: Don't Use	Select to turn off the selected search criteria. To exclude a tag from the worklist query, select Don't Use and then select Add to List.
Add	Select to add the tag and value to the list of search criteria.
Remove	Select to remove the tag and value from the list of search criteria.
Clear	Clears all tags.

Standard Print



Figure 16-58. Standard Print Service

Table 16-69: Standard Print

Preset Parameter	Description
Printer	Select the printer.
Rows	Specify 1-5.
Columns	Specify 1-5.
Orientation	Specify Landscape/Portrait
Top Margin (mm)	Specify the top margin (0-51mm)
Bottom Margin (mm)	Specify the bottom margin (0-51mm)
Left Margin	Specify the left margin (0-51mm)
Right Margin	Specify the right margin (0-51mm)

Save As

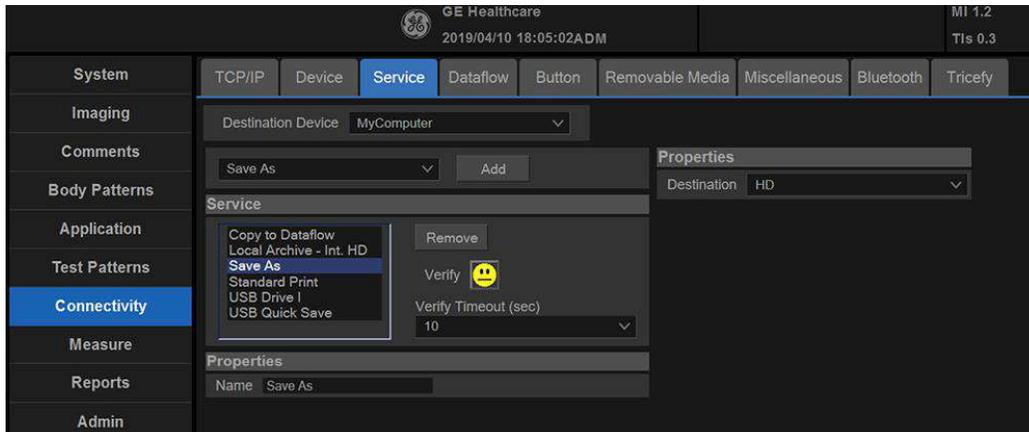


Figure 16-59. Save As

Table 16-70: Save As

Preset Parameter	Description
Destination	Specify destination device, Hard Drive, USB Flash Drive.

USB Quick Save

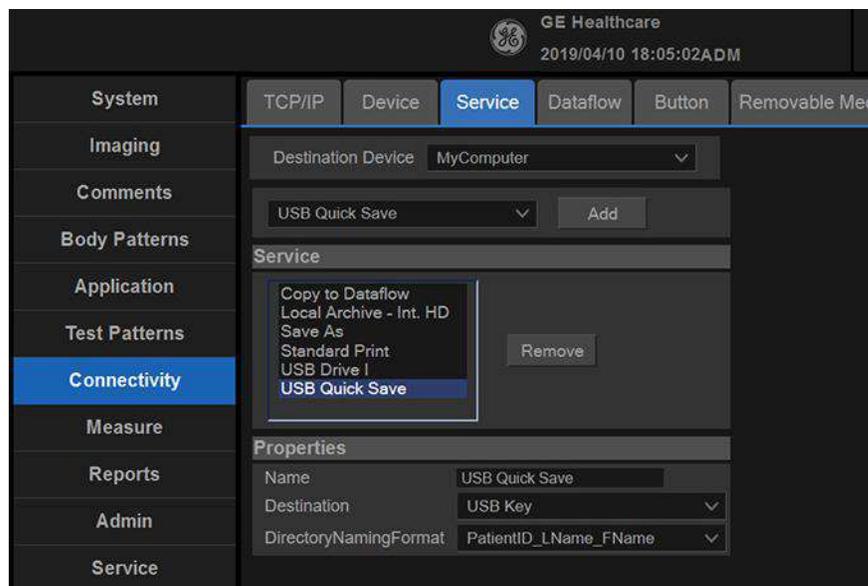


Figure 16-60. USB Quick Save

Table 16-71: USB Quick Save

Preset Parameter	Description
Name	Type the name.
Destination	Specify destination device: USB key or NetworkStorage.
DirectoryNamingFormat	Specify the directory naming format.

Setting up a Printer

Use Standard Print for digital peripherals. These are printers with either a USB interface or Ethernet interface (Sony UP-D898MD, for example).

On the Utility --> Connectivity --> Button page, select the Print key in the upper, left-hand corner of the display. In the middle portion of the page, under Available Input/Outputs, select the printer you want to configure. Next, press the two right arrows (>>) in the upper, right-hand corner of the page to move this printer into the Printflow View.

You can also configure the Standard Print button that appears on the Active Images screen.

Example: For instance a report printer, on the Utility --> Connectivity --> Service page, in the Service Type to Add box, and press **Add**. In the properties box on the upper, right-hand side, select the type of device and in the Properties box in the lower, left-hand side, type in a unique descriptive name for this device.

Network Storage

The Network Storage service provides the following:

- MPEGvue patient data to a Windows compatible file share.
- Send images (JPEG), video (AVI) and reports (PDF) to a Windows compatible file share with the USB Quick Save service.
- Exporting is allowed to a network storage location.

NOTE: *Before setting up the ultrasound system, a Windows compatible file share must be setup on the network to connect to. The user that is connecting to the share must have Full Control rights and permissions to the shared folder. For additional help creating users or configuring file shares, please consult your operating system documentation.*

NOTE: *Do not connect multiple ultrasound systems to the same share.*

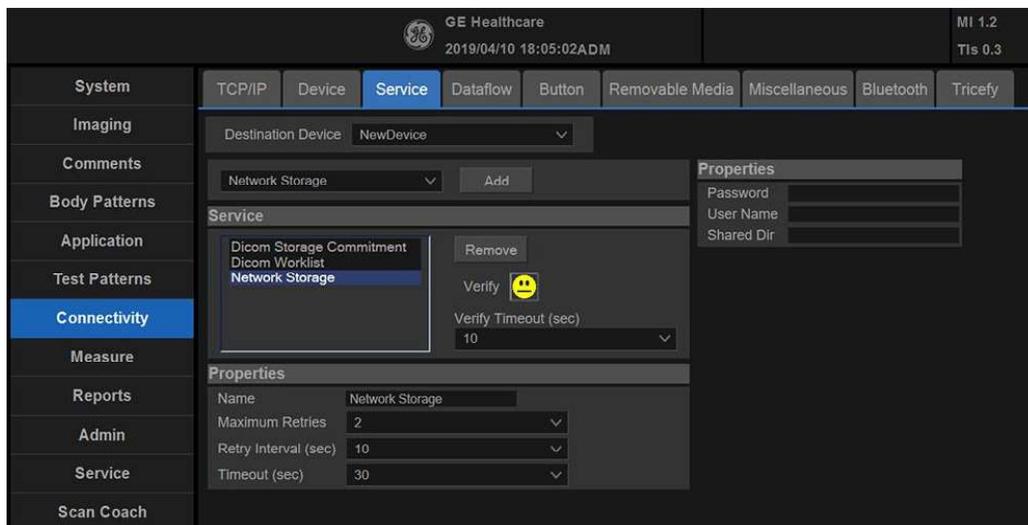


Figure 16-61. Network Storage Service

NOTE: *The password used to connect to the shared folder must only contain numbers and letters.*

NOTE: *The account used to connect to the shared folder must be local to the device hosting the shared folder.*

NOTE: *If the shared folder exists on a Domain Controller, an active directory account is acceptable to use.*

Network Storage (continued)

NOTE: If the device hosting the shared folder is running Windows Server 2008 R2 or later, you will have to enable NTLM in the local security policy on the server.

Table 16-72: Network Storage Service

Preset Parameter	Description
Name	Enter unique name that identifies this service. <i>NOTE: Do not use the same name for any other Service or device.</i>
Password	Enter the password used for logging onto the PC.
User Name	Enter the user name used for logging onto the PC.
Shared Dir	Enter the Share name of the folder, not the entire UNC path. For example if the UNC path to the share is \\server\images, you would enter images as the name in the Shared Dir field. <i>NOTE: Only use alphanumeric characters for the Shared Dir.</i>

Dataflow



CAUTION

DO NOT rename the factory default dataflow.

A dataflow is a set of pre-configured services. When you select a dataflow, the ultrasound system automatically works according to the services associated with the dataflow. The Dataflow tab allows you to select and review information about dataflows. You can also create, change, and remove dataflows.

Set up dataflows for the services.

NOTE: You must be logged on as Administrator to use the Dataflow tab.

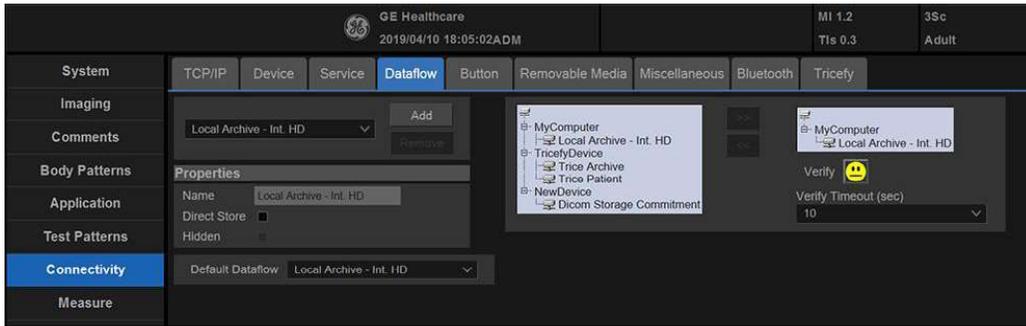


Figure 16-62. Dataflow Preset Menu

Table 16-73: Dataflow

Preset Parameter	Description
Name	Select the dataflow from the list.
Direct Store	Select to store data directly to archive (no buffer storage).
Hidden	Select so that this dataflow does not appear as a Dataflow on the Patient menu.
Default Dataflow	Select to use this dataflow as the default dataflow when you start the system.

Button

You can assign print buttons via the Utility --> Connectivity --> Button page.

Assigning print buttons. First select the print button to configure on the upper, left corner of the page. Then select the device you want to add in the middle part of the page, under Available Input/Outputs. Then click on the right arrow in the top right corner of the page.

- NOTE:** You can configure each print key to multiple output devices/ dataflows.
- NOTE:** Only attach one DICOM service per print key (e.g., PACS and DICOM printer). Multiple DICOM devices should be configured via a dataflow.
- NOTE:** When using a print key to send an image directly to a DICOM device, this causes a single DICOM association per image. Most devices (all known printers) work fine with this. However, some storage devices, such as ALI, Kodak Access, and Cemax, assume that the end of each association is the end of the exam and can result in a new folder for each image. In the Utility menu, select a single association or open PR for the desired DICOM storage device.

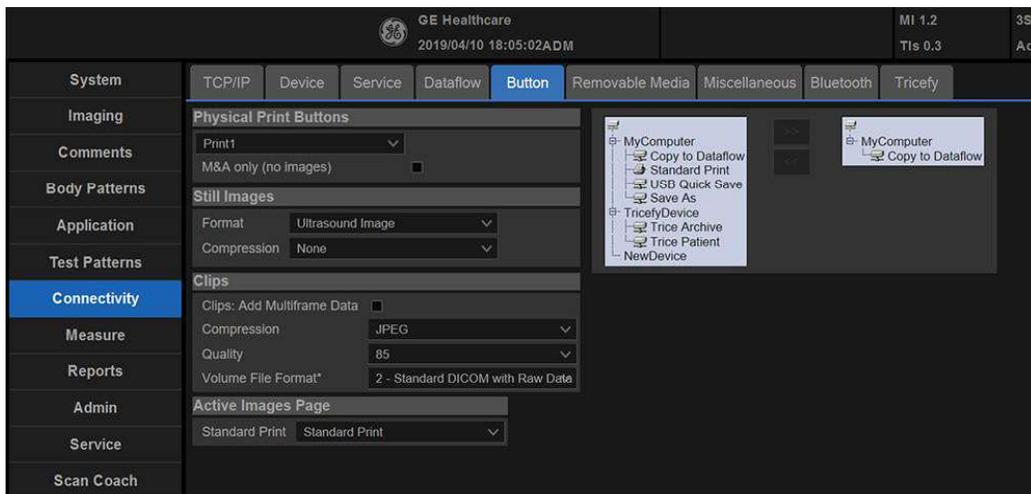


Figure 16-63. Button Preset Menu

Table 16-74: Physical Print Buttons

Preset Parameter	Description
M&A only (no images)	Configures the system to send a DICOM structured report only; no image is generated or sent.

Table 16-75: Still Images

Preset Parameter	Description
Format	RawDICOM, DICOM, or M&A.
Compression	Always set to None.

Table 16-76: Clips/Volumes

Preset Parameter	Description
Clips: Add Multiframe Data	Checkbox
Compression	None, Rle, Jpeg, Jpeg2000
Quality	Lossless, 99, 98, 97, ... 50 Note: The default Compression for Clips is JPEG85. It is strongly recommended to keep the Compression set to JPEG85.

Table 16-77: Active Images Page

Preset Parameter	Description
Standard Print	Lets you send to a Windows-based printer.

Removable Media

The Removable Media tab allows you to:

- Verify the DICOM directory on removable media.
- Verify the free space of the media.
- Verify that the media is finalized or unfinalized.
- Verify that the media is formatted or unformatted.
- Format removable media (rewritable CD/DVD or USB device).

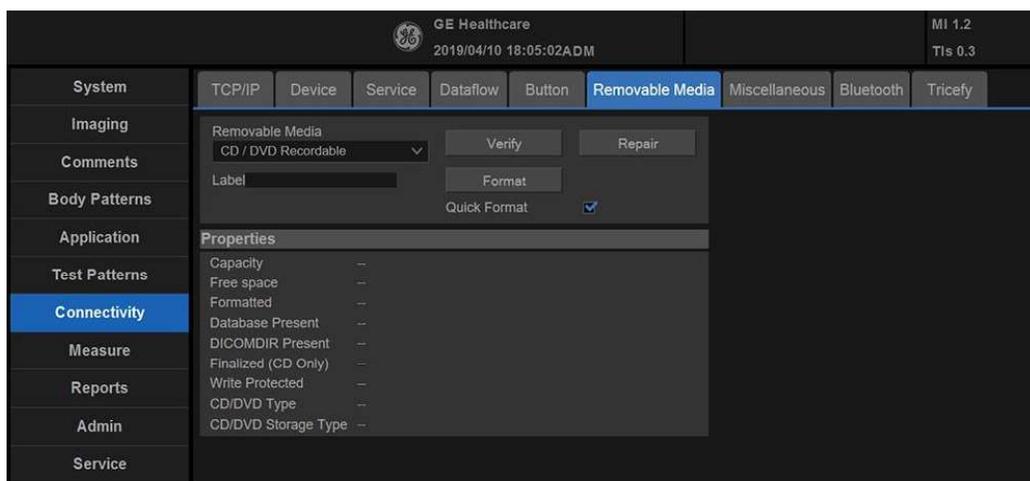


Figure 16-64. Removable Media Preset Menu

Table 16-78: Tools

Preset Parameter	Description
Removable Media	Select the removable media to format or verify.
Label	Type a label for a new removable media (free text).
Verify	<ul style="list-style-type: none"> • Select to verify DICOM directory on removable DICOM disk. • Verify the free space of the media. • Verify that the media is finalized or unfinalized. • Verify that the media is formatted or unformatted.
Format	Select to format removable media.
Quick Format	To format the media quickly, check this box. If you uncheck this box, the media is formatted with a full format. New media should always be formatted with a full format.

The bottom of the screen lists properties of the selected media.

Removable Media (continued)

Formatting removable media

1. Select the removable media from the Media list.
2. Type a name for the removable media in the Label field.

NOTE: Do not use the following characters for labelling:

*\ / : ; . , * < > | + = []*

3. Select **Format**. Confirm **OK** or **Cancel**.
4. An information window confirms when the format has been completed. Select **OK** to exit.

Verifying removable media

1. Select the removable media from the Media list.
2. Select **Verify**.

Miscellaneous

The Miscellaneous tab allows you to configure tools related to patient management and print and store options. You can specify default system functionality, such as whether patient ID is required when you archive data, or if you want the system to automatically search the archive for a patient when you enter patient data.

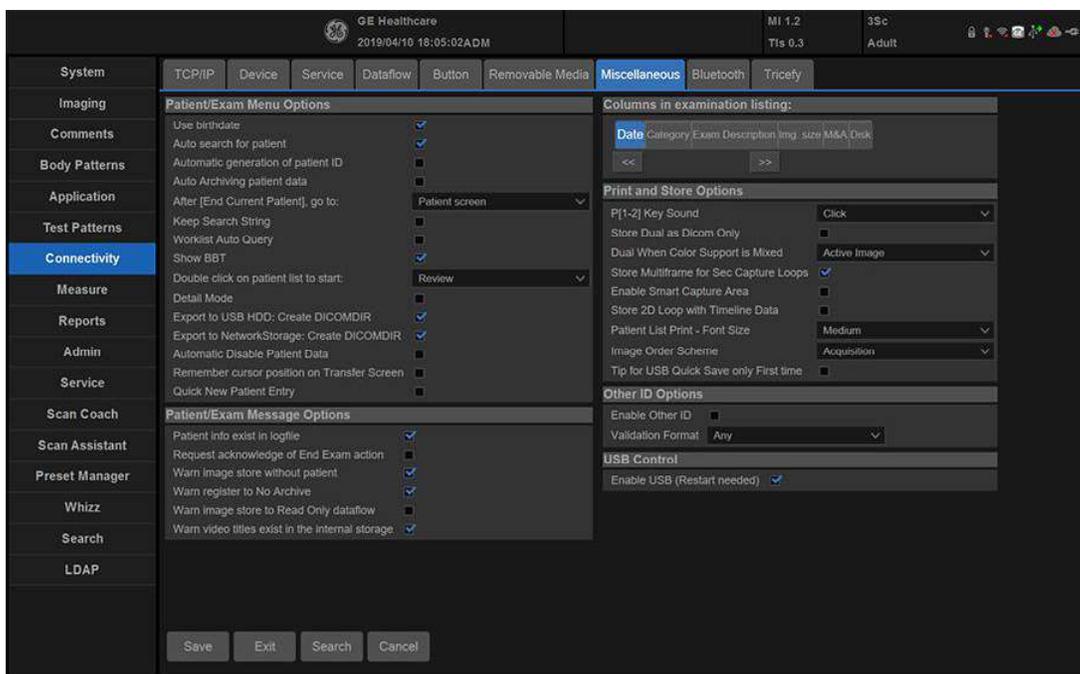


Figure 16-65. Miscellaneous Preset Menu

Table 16-79: Patient/Exam Menu Options

Preset Parameter	Description
Use birthdate	In the Patient information window, enter either the patient age or the birthdate:When selected, enter birth date, then the age is calculated.When cleared, enter age (birth date field not available).
Auto search for patient	In the Search/Create Patient window: When selected, the system automatically searches through the selected patient archive, while the user enters patient information.When cleared, the automatic search tool is turned off. If you are trying to keep the past patient data confidential, DO NOT use this feature.
Automatic generation of patient ID	In the Search/Create Patient window: When selected, the Patient ID is not required when entering a new patient in the archive. The system automatically generates an ID number. When cleared, the Patient ID is required when entering a new patient in the archive.

Table 16-79: Patient/Exam Menu Options (Continued)

Preset Parameter	Description
Auto Archiving patient data	Archives patient data automatically.
After [End Current Patient], go to	Select go to Worklist screen or Patient screen when ending the current patient.
Keep Search String	Search string is kept rather than cleared.
Worklist Auto Query	Automatically queries the worklist server.
Show BBT	Show BBT field on the OB patient screen to input the basal body temperature.
Double click on patient list to start	Select Review or New Exam to display each time you double click on the patient name in the patient list on the Patient menu.
Detail Mode	Select to display Detail Mode, rather than Exam View, when you select the patient name in the patient list on the Patient menu. You can also type comments while in Detail Mode.
Export to USB HDD: Create DICOMDIR	Create DICOMDIR is a DICOM file format which contains how the directory and DICOM files structured for diagnostic portable media behave. It is important for portability between the Versana Active to PACS. If you want to save exams to the USB Hard drive and look at it on the PACS, the DICOMDIR is a must.
Export to Network storage: Create DICOMDIR	
Automatic Disable Patient Data	Select to automatically disable patient data. If selected, locks the patient name, date of birth and gender (like Patient ID). The Factory Default for this preset is unchecked.
Remember Cursor Position on the Transfer Screen	To set a default cursor location on the Data Transfer screen: <ol style="list-style-type: none"> 1. Select the "Remember cursor position in the Transfer screen" preset and press Save. 2. On the Data Transfer screen, move the cursor to the desired field. 3. Exit out of the Data Transfer screen. When returning to the Data Transfer screen, the cursor location is in the position your selected.
Quick New Patient Entry	Select to store new patient automatically by pressing the Patient key.

Table 16-80: Patient/Exam Message Options

Preset Parameter	Description
Patient info exist in logfile	Check box to select.
Request acknowledge of End Exam action	When selected, the user is asked to confirm action when ending an examination.
Warn Image Store without Patient	Select to receive a warning when you press the Print key without an active patient.
Warn Register to No Archive	Select to receive a warning when you register a patient to the "No Archive" data flow. Select a different data flow for permanent storage of patient data.
Warn image store to Read Only dataflow	The system posts a warning message if you attempt to store images to a read-only Dataflow.

Table 16-80: Patient/Exam Message Options

Preset Parameter	Description
Warn video titles exist in the internal storage	The system posts a warning if the video titles exist on the internal DVR flash memory.

Table 16-81: Print and Store Options

Preset Parameter	Description
P[1-3] Key Sound	Select None, Click, Chimes, Ding, Ding-Dong, or Whoosh.
Store Dual as Dicom Only	Select to always store dual images as a DICOM (secondary capture) store, rather than Raw DICOM.
Dual When Color Support is Mixed	Dataflow Mixed is not available. While transferring dual images to the PACS, send black and white images as gray; send color images as color. Set up 2 services (one gray and one color), set up 2 dataflows, and set up 2 buttons. Each button needs to be tied to a different service. Select if you want to keep the user preset for Color Photometric Interpretation while in Dual mode.
Store Multiframe for Sec Capture Loops	Select if you want the CINE loop stored as secondary capture.
Enable Whizz Capture Area	Check box to select.
Store 2D Loop with Timeline Data	Check box to select.
Patient List Print-Font Size	Select font size.
Image Order Scheme	Select to Direct Store images in Acquisition Order, Scan Coach/Assistant Order, or Off. <ul style="list-style-type: none"> • Off. The clipboard on the Ultrasound system shows the image in the order it was acquired. Therefore, re-stored images appear where you'd expect. However, on the PACS system, images appear in arrival order or in image number order. • Acquisition Order. From the Ultrasound system perspective, the same as "Off." But on the PACS system (if based on image number order), images are displayed consistently with the way they are stored on the Ultrasound system. • Scan Coach/Assistant Order. You can define the storage order (reading order) via Scan Coach/Assistant Creator. Therefore, based on the order defined in Scan Coach/Assistant, images are re-ordered and displayed in this manner both on the Clipboard and on the PACS system.

Table 16-82: Other ID Options

Preset Parameter	Description
Enable Other ID	Not selected is the Default. If selected, allow entering Other ID, such as Citizen Service Number, Burger Service Number (BSN), National Health System (NHS) number, along with patient ID information on the Patient Screen.

Table 16-82: Other ID Options (Continued)

Preset Parameter	Description
Validation Format	If the Enable Other ID preset is selected, the system validates the format of "Other ID" when an ID is entered. Choose: NHS Number *** ** ***, Letters and Numbers, Numbers, or Any (no restriction)

Bluetooth

To add a new bluetooth device,

1. Press **Add New Device**.
2. Type the device name in the Name field.

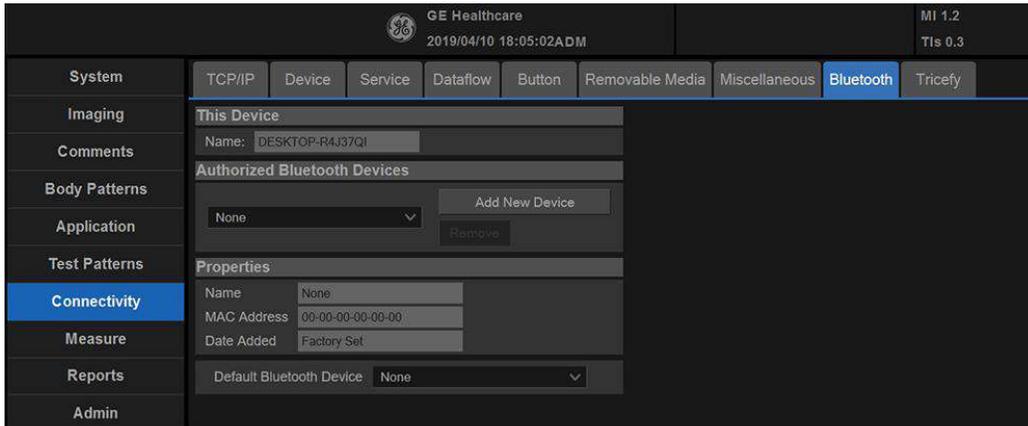


Figure 16-66. Connectivity Bluetooth Preset Menu

Table 16-83: Device

Preset Parameter	Description
Add New Device/Remove	Press Add new device to add a new device; press Remove to delete a device.
Properties: Name	Type the name of the device.
Properties: MAC Address	Unique network card address. NOTE: Only available for MyComputer.
Properties: Enabled	Select to enable bluetooth device.
Properties: Image Transfer Support	Select to enable image transfer.
Properties: Date Added	Display the new device added date.

Tricefy Uplink

New GE Versana ultrasound systems have Tricefy Uplink pre-installed. Additional software is not necessary for using Tricefy Uplink; simply activate your account using the following steps.

1. Press **Utility -> Connectivity -> Tricefy**.

NOTE: *The Tricefy tab is only available on machines that have Tricefy Uplink option.*



Figure 16-67. Tricefy Menu

2. Enable Tricefy checkbox, and enter the email address to authorize the account. Press “**Activate account**” to activate your account, this process may take up to 30 seconds, and a dialog will pop up if succeeded. And you will receive a notification email, click the link to complete the whole activating process.

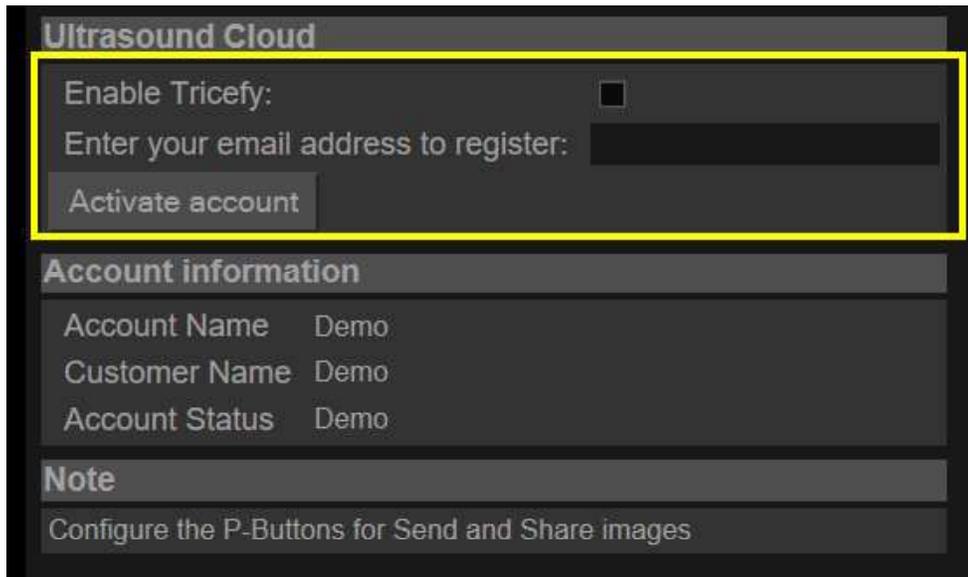


Figure 16-68. Activate Tricefy Account

Tricefy Uplink (continued)

3. Add Tricefy Uplink to Print workflow.
 - Click **Button** to configure the P- Buttons for sending and sharing images.

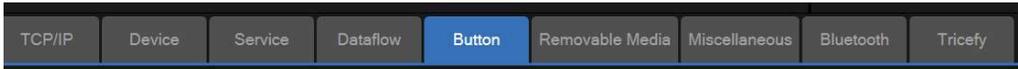


Figure 16-69. Button Menu

- Select **Print1** (or **Print2**, **Print3**) which you would like to use. Then Select **Trice Archive** and press >> button to add it to **Printflow View**, press **Save**. Now when you press the **P1** button, the image will be sent to your Tricefy cloud.

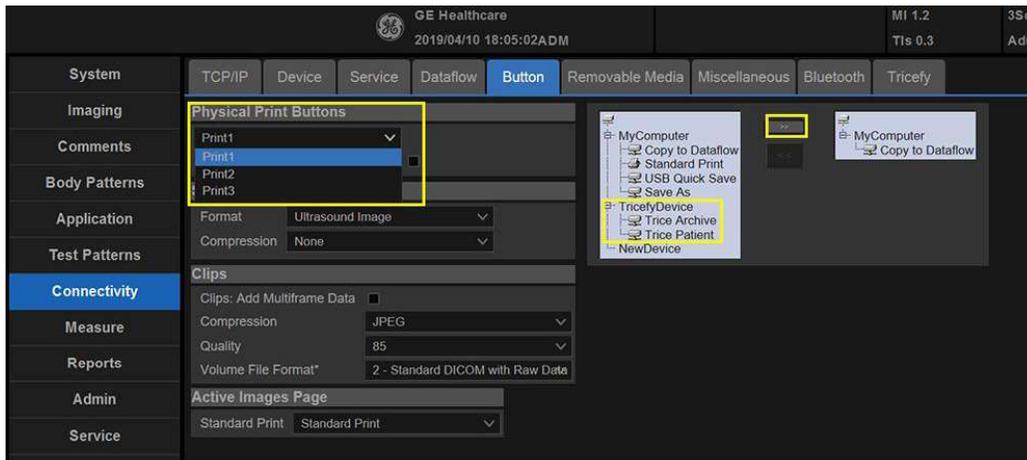


Figure 16-70. Configure the P-Button for Tricefy Uplink

Tricefy Uplink (continued)

4. If you want to share the images to patient, please add **Trice Patient to Printflow View**. And also remember input the patient's Phone number or email address.

The screenshot shows the GE Healthcare interface for patient details. On the left is a navigation menu with options: Patient (selected), Image History, Active Images, Data Transfer, New Patient, Register, Details (highlighted in blue), EZMove, EZBackup, Dataflow (99% free), Local Archive - Int. HC, and Scan. The main form area contains the following fields: Patient ID, Last Name, First Name, Middle Name, DOR (dropdown), Gender (radio buttons for Male and Female), Age, Address, Comments, Patient Phone #, and Email. The Patient Phone # and Email fields are highlighted with a yellow border.

Figure 16-71. Share Images to Patient

NOTE: If you have any problem with Tricefy Uplink settings, please contact your GE service/sales representative.

Tricefy Uplink (continued)

For using Q&R function on Tricefy Uplink, please follow the settings:

- Login to Tricefy.
- Choose Accounts from the top-right dropdown menu (the person icon, see image below).
- If you have multiple account memberships you now select which account to view settings for.
- In the account settings, choose “Uplinks” from the left-hand menu.
- Each Uplink is listed here and there is a checkbox to enable/disable Q/R.

NOTE: The changes take 10-60s to propagate.

Measure

Please refer to Chapter 7, General Measurements and Calculations for more information on setting up Measurement and Analysis Presets.

Reports

Refer to Chapter 14 for more information.

System Admin

Overview

The Admin screen has the following three sections:

- **System Administration** – lists all the options implemented in the system.
- **Users** – allows you to define user IDs, specify operator's registration, operator's rights, and registration of staff related to an examination (for example, referral doctors and sonographers).
- **Logon** – defines logon procedures.
- **User policies** – defines user name policy and password policy.

System Admin

The System Admin screen has information about any options implemented for the system.

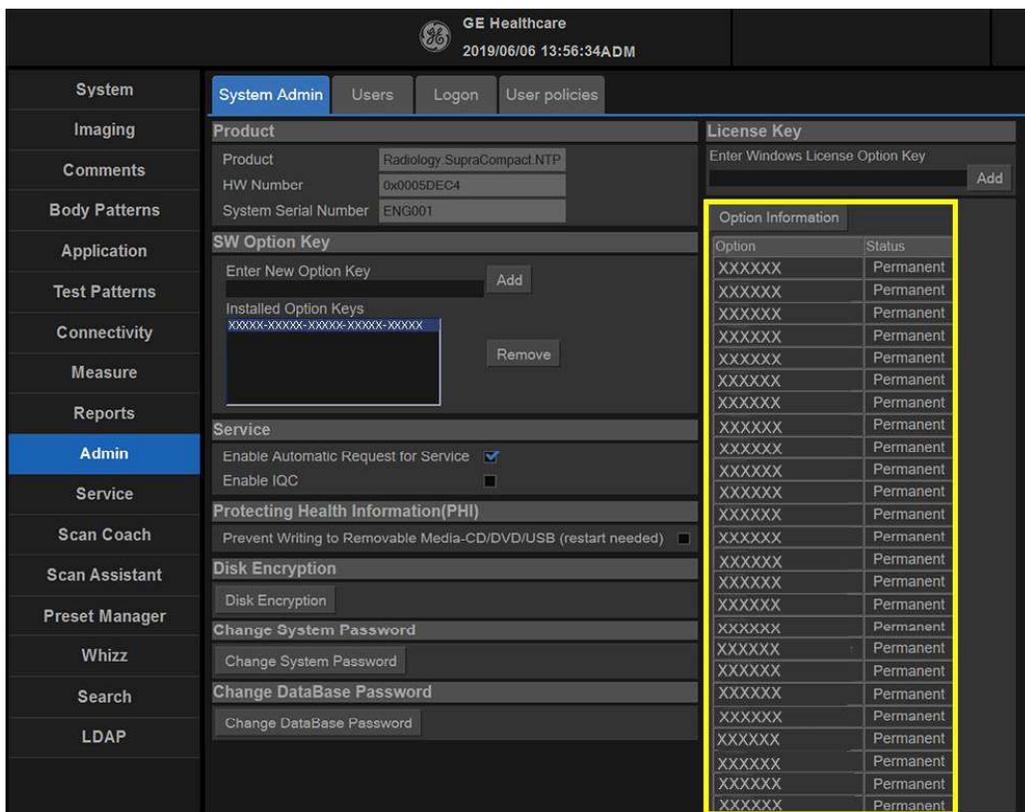


Figure 16-72. System Admin Preset Menu

Table 16-84: System Administration

Preset Parameter	Description
Product	The name of the product.
HW Number	The hardware number of the product.
System Serial Number	The serial number of the product.
SW Option Key	The software option key section.
Enter New Option Key	Type the key for the option you wish to add and press Add.
Installed Option Keys	Lists the key for the installed options.
Remove	To remove a software option key, select the key in the SW Option Key list, and then select Remove.

Customizing Your System

Table 16-84: System Administration

Preset Parameter	Description
Options	A list of the option name and status.
Status	Lists each option's effectivity.

Table 16-85: Service

Preset Parameter	Description
Enable Automatic Request for Service	Check this box to enable the system to send system-generated requests for service, without your intervention.
Enable IQC	Check this box to enable the Image Quality Check function.

Table 16-86: Protecting Health Information (PHI)

Preset Parameter	Description
Prevent Writing to Removable Media-CD/DVD/USB (requires reboot)	Prevent from copying data including Patient Information to external storage device. Media: USB Memory / USB HDD / CD-R / DVD-R Function: Export / MPEGVue / EzBackup / EzMove / Save As / Save As Images / Report Save As / Backup Patient Archive and Report Archive from Utility

Table 16-87: Disk Encryption

Preset Parameter	Description
Disk Encryption	Select to encrypt the local patient data drive or removable media.

Table 16-88: Change System Password

Preset Parameter	Description
Change System Password	Select to configure system password.

Table 16-89: Change DataBase Password

Preset Parameter	Description
Change DataBase Password	Select to configure database password. Note: Do not use special characters when changing the database password.

Disk Encryption

Disk Encryption is a function to protect the patient information on the device and prevent unauthorized access to PI/PHI, especially when the device is stolen. The encryption AES is 256 bit.

NOTE: Disk Encryption can also protect the user data stored on removable device.

NOTE: The steps for Removable Media Encryption and Local Patient Data Drive Encryption are the same.



CAUTION

The user must make backups and take care of the encryption password/passphrase and recovery key. It is the customer's responsibility for storing the data. GE will have no back door or any responsibility or possibility of recovering the data.

Disk Encryption (continued)

NOTE: Encryption is set as “ON” for Local patient data drive after software installation. User can not turn off the Disk Encryption. But user can turn on and off the Disk Encryption for Removable Media.



Figure 16-73. Encryption ON

You could change password as you wish.

- Select Change Password and you will be prompted to enter old password/passphrase which you previously set up in EZ Configuration Wizard, refer to step 3 of 'EZ configuration Wizard' on page 6-39.

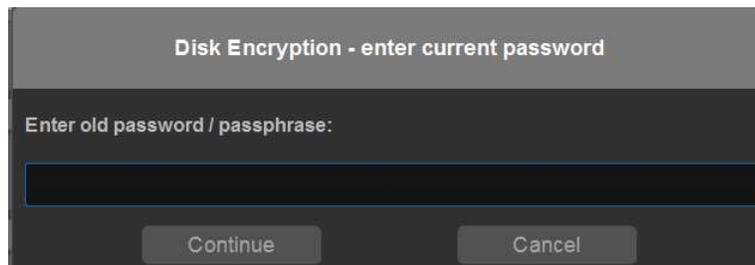


Figure 16-74. Enter Current Password

Disk Encryption (continued)

- Enter new password/passphrase, and re-enter it to confirm.

Disk encryption - select password or passphrase

The password / passphrase will protect the patient data on the device.

Enter password / passphrase:

Re-enter password / passphrase:

Minimum password length: 10
Maximum password length: 256
Minimum number of character sets required in the password: 4

- Minimum number of upper case characters: 1
- Minimum number of lower case characters: 1
- Minimum number of digits (0-9): 1
- Minimum number of non-alphanumeric characters(e.g. !\$,%): 1

Continue Cancel

Figure 16-75. Change Password 1

- Press **OK**.

Information

Password has been changed successfully.

Ok

Figure 16-76. Change Password 2

Disk Encryption (continued)

Turn on Disk Encryption of Removable Media on R1.1.x and R1.2.x.

1. Login as administrator. Press **Utility -> Admin -> System Admin -> Disk Encryption**.

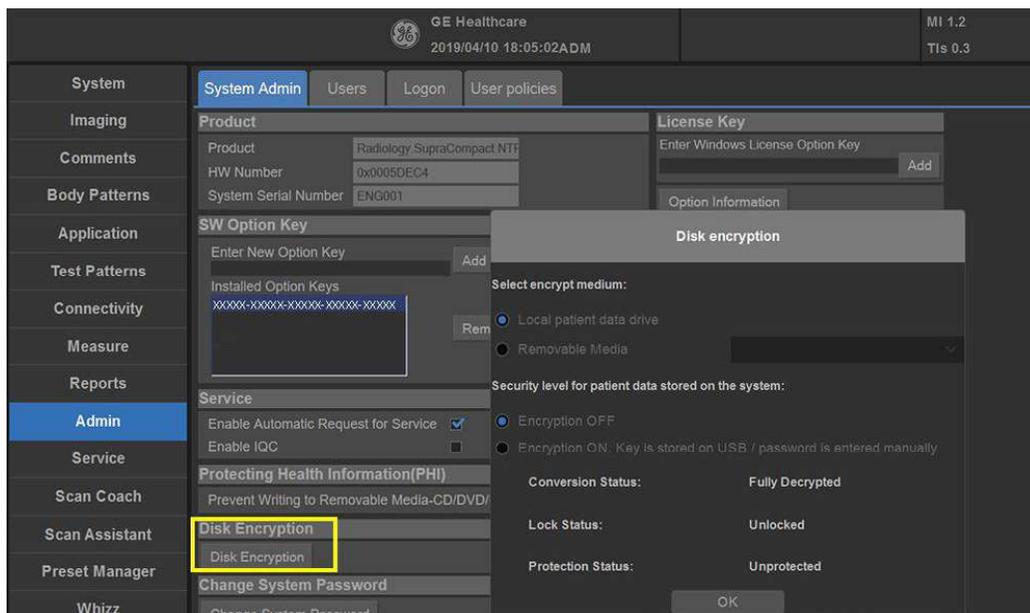


Figure 16-77. Disk Encryption 1

Disk Encryption (continued)

2. Select **Encryption ON**. A confirmation message pops up, press **Continue** to continue the encryption process.



Figure 16-78. Disk Encryption 2

3. Enter a password or a passphrase and re-enter to confirm. Press **Continue**.

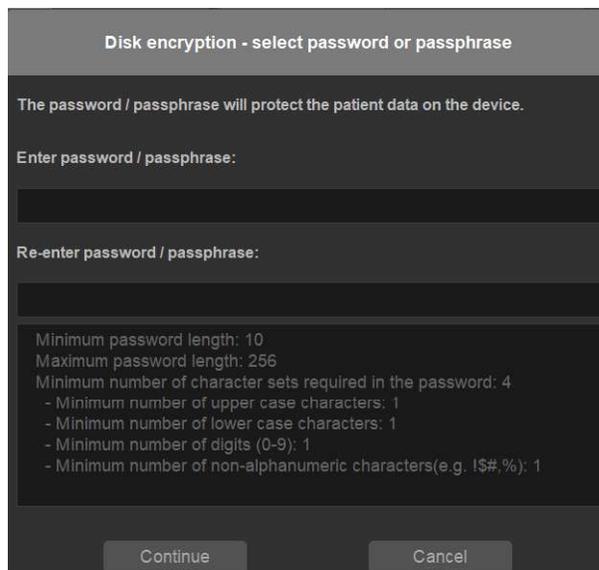


Figure 16-79. Disk Encryption 3

Disk Encryption (continued)

4. Insert a USB and select it to record the recovery key. You can also press **Print recovery key** to print the recovery key, or you can press **Hide recovery key** to hide the recovery key.

Press **Continue**.



Figure 16-80. Disk Encryption 4

5. When the recording process is completed, a confirmation dialog pops up, press **OK**.

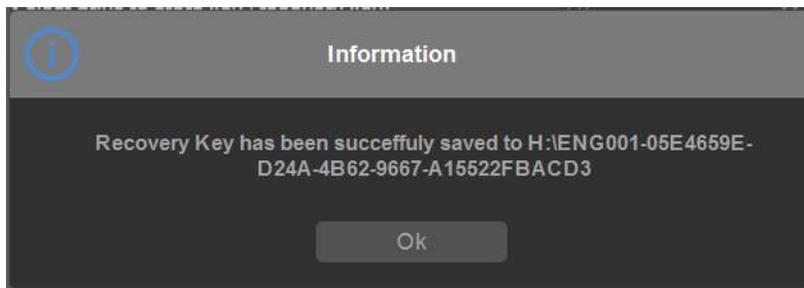


Figure 16-81. Disk Encryption 5

Disk Encryption (continued)

6. Encryption process begins.
You can press **Pause** to pause the encryption process.



Figure 16-82. Disk Encryption 6

7. When the encryption process completes, press **Finish**.

NOTE: *The encryption process for patient data drive may take thirty minutes or more.*



Make sure to keep the password/passphrase, recovery key and any back up of these in secure place, not accessible for unintended audience.

Pause Encryption

1. During encryption process, you can press Pause to stop the encryption process.

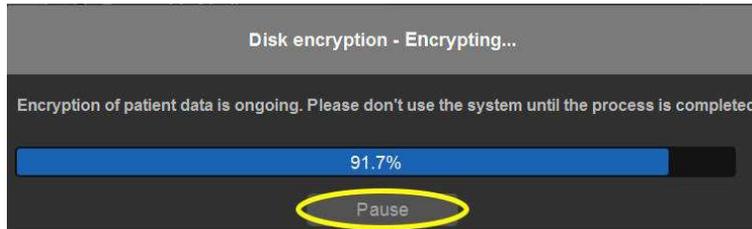


Figure 16-83. Encryption Pause 1

2. A confirmation dialog pops up, press **Yes** to continue or **No** to cancel.

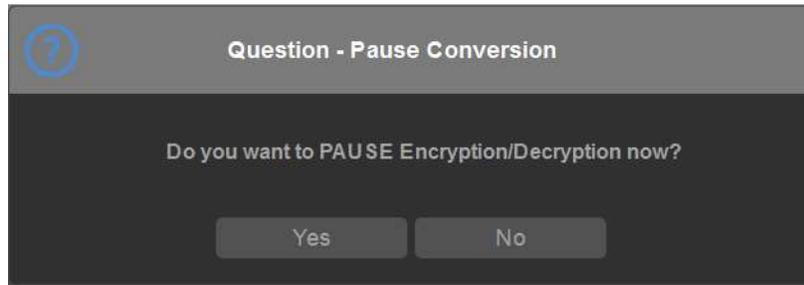


Figure 16-84. Encryption Pause 2

Resume Encryption

1. Press **Utility** -> **Admin** -> **System Admin** -> **Disk Encryption**. Press **Resume**.

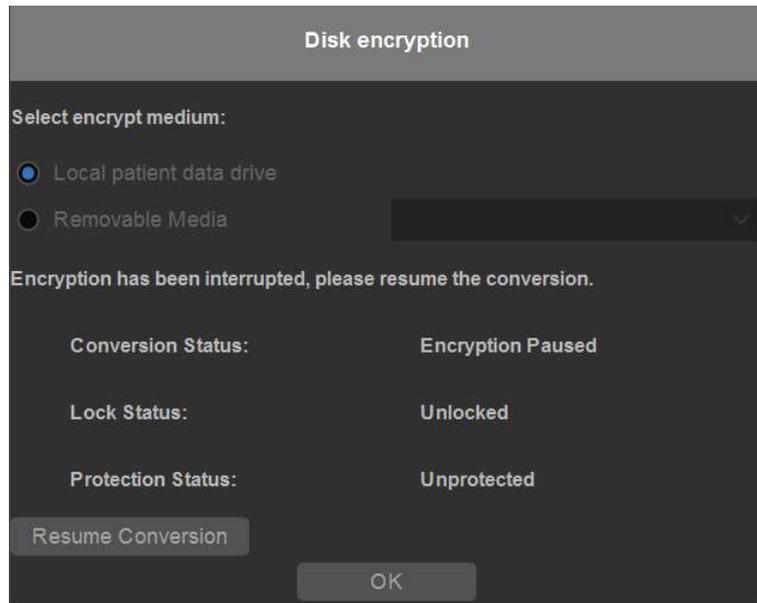


Figure 16-85. Encryption Resume 1

2. A confirmation dialog pops up, press **Yes** to resume conversion or press **No** to cancel.



Figure 16-86. Encryption Resume 2

Resume Encryption (continued)

3. Encryption of patient data is ongoing. Please do not use the system until the process is completed.



Figure 16-87. Encryption Resume 3

Change Password

After the encryption process is completed, you can change the password as you wish (for Disk Encryption of Removable Media on R1.1.x).

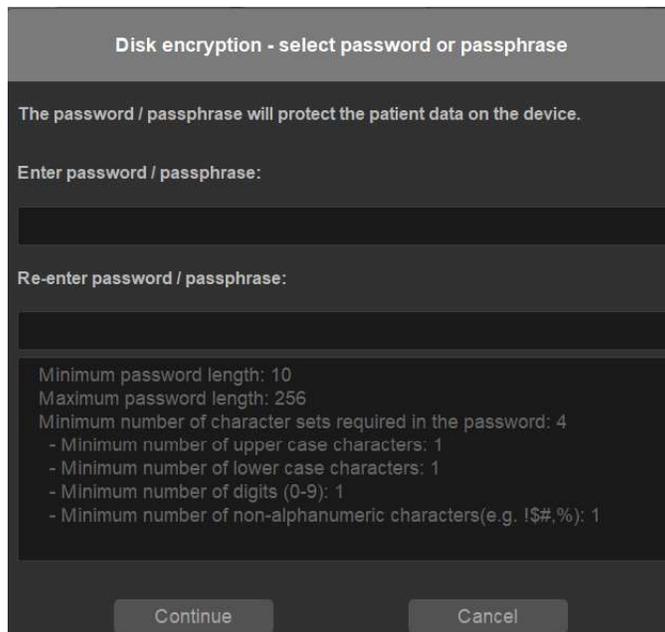
1. Press **Utility -> Admin -> System Admin -> Disk Encryption**. Press **Change Password**.



Figure 16-88. Change Password 1

Change Password (continued)

2. Enter new password/passphrase, and re-enter it to confirm.



Disk encryption - select password or passphrase

The password / passphrase will protect the patient data on the device.

Enter password / passphrase:

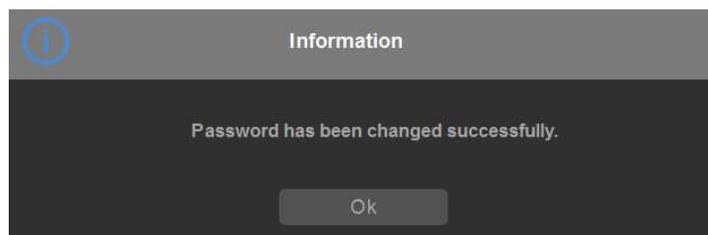
Re-enter password / passphrase:

Minimum password length: 10
Maximum password length: 256
Minimum number of character sets required in the password: 4
- Minimum number of upper case characters: 1
- Minimum number of lower case characters: 1
- Minimum number of digits (0-9): 1
- Minimum number of non-alphanumeric characters(e.g. !\$#,%): 1

Continue Cancel

Figure 16-89. Change Password 2

3. Press **OK**.



Information

Password has been changed successfully.

Ok

Figure 16-90. Change Password 3

Change Recovery Key

After the encryption process is completed, you can change the recovery key as you wish (for Disk Encryption of Removable Media on R1.1.x and R1.2.x).

1. Press **Utility -> Admin -> System Admin -> Disk Encryption**. Press **Save/Change Recovery Key**.



Figure 16-91. Change Recovery Key 1

2. Insert a USB to store the new recovery key.



Figure 16-92. Change Recovery Key 2

Change Recovery Key (continued)

3. Press **OK**.

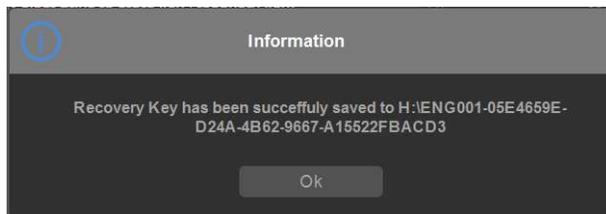


Figure 16-93. Change Recovery Key 3

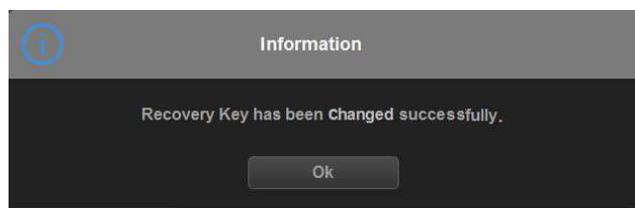


Figure 16-94. Change Recovery Key 4

Unlock with user entered key & recovery key

When the patient data is in locked status, you can unlock it with user entered key and recovery key.

You can insert the USB with recovery key, or you can input the password or recovery key manually to unlock the system.

NOTE: *If you press **Cancel**, the system will stay in locked status and some of the functions will be not available.*



Figure 16-95. Unlock Dialog

Disk Decryption

1. For Disk Encryption of Removable Media on R1.1.x and R1.2.x, if you want to decrypt the patient data, you can press **Utility -> Admin -> System Admin -> Disk Encryption**. Select **Encryption Off**.



Figure 16-96. Decryption 1

2. A confirmation dialog pops up, press **Yes** to continue.
3. Decryption of patient data is ongoing. Please don't use the system until the process is completed.



Figure 16-97. Decryption 2

4. When the decryption process is completed, press **Finish**.

Change System Password

Change System Password is a function to protect the privacy and prevent unauthorized access to the system especially when the user is not nearby.

To configure the system password, select **Utility -> Admin -> System Admin -> Change System Password**.

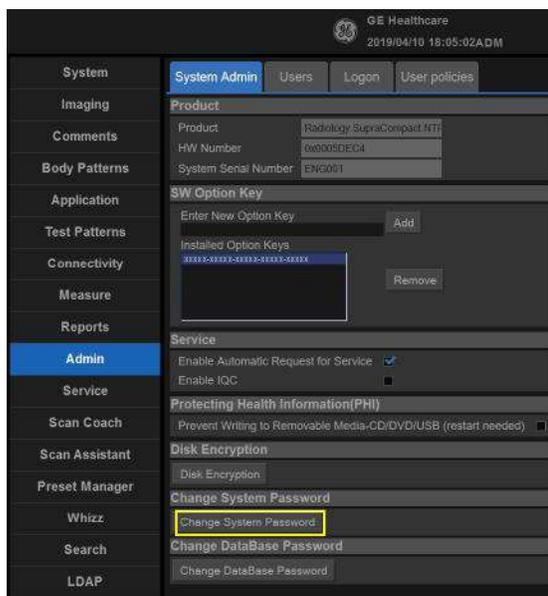


Figure 16-98. Change System Password 1

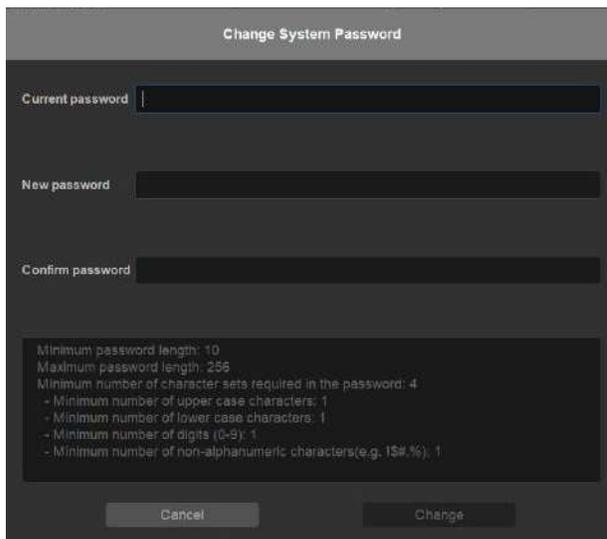


Figure 16-99. Change System Password 2

Users

The Users screen allows you to define user IDs. It also allows you to specify operators registration, operator's rights setting, and registration of staff related to an examination (for example, referring and interpreting physicians).

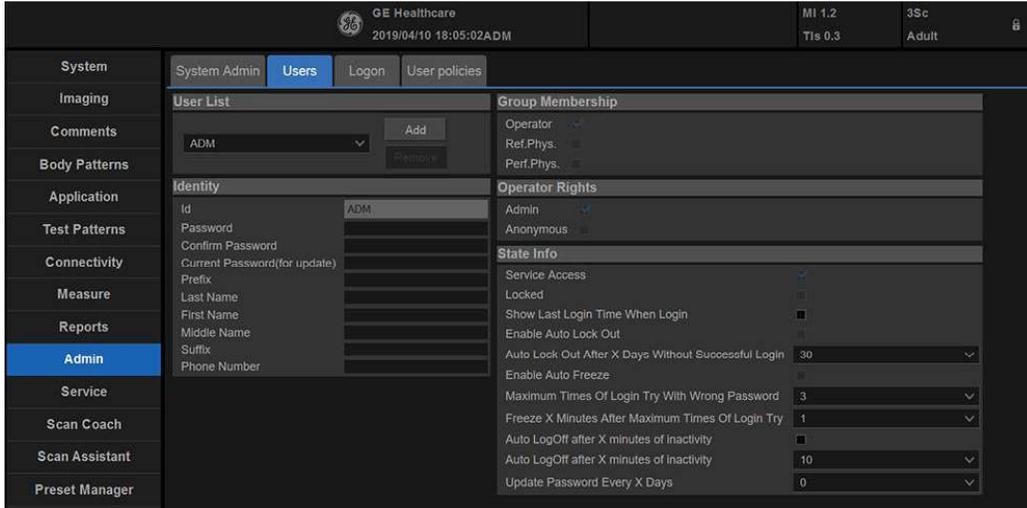


Figure 16-100. Users Preset Menu

Table 16-90: User List

Preset Parameter	Description
User List	Lists the user ID for all system users.
Identity	Type the operator's user ID, Password, Prefix, Last Name, First Name, Middle Name, Suffix, Phone Number.
Group Membership	Select the user's group: Operator (sonographers, doctors, or any person using the ultrasound system); Ref.Phys. (referring physician can be associated to the patient examination in the extended Patient information window(; Perf.Phys. – physician performing the exam can be associated to the patient examination in the extended Patient information window.
Operator Rights	Admin – If selected, the operator has extended rights with access to the administrative setup functionality. The operator can also perform advanced operations
State Info	Lists the state information for the selected operator.

Creating a user

1. Select **Add**.
2. Type the user ID. ENSURE that you DO NOT include the following characters in a user's ID: slash (/), dash (-), asterisk (*), question mark (?), an underscore (_), or blank spaces. Also, DO NOT set up a user with the same initials/signifier.
3. Type the user's information in the Identity section.
4. Select the user's group(s).
5. If the user needs full configuration and advanced operations access, select Admin.
6. Press Save.

NOTE: DO NOT add users with the same initials/signifier. The system allows you to do this; however, the first user is erased and only the second remains.

NOTE: When adding a new user, press Add first. Then edit the ID from the default of "NewUser" and edit the other fields. DO NOT press Add again unless you actually want to create another user. Press Save after adding one or more users. The user listed as NewUser on the list will be updated with the edited ID when you re-enter this screen.

Changing a user configuration

1. Move the **Trackball** to a user ID in the User List.
2. Make the desired changes.

Deleting a user

1. Move the **Trackball** to a user ID in the User List.
2. Select Remove.

The user is removed from the User List.

Logon

The Logon section defines log on procedures.

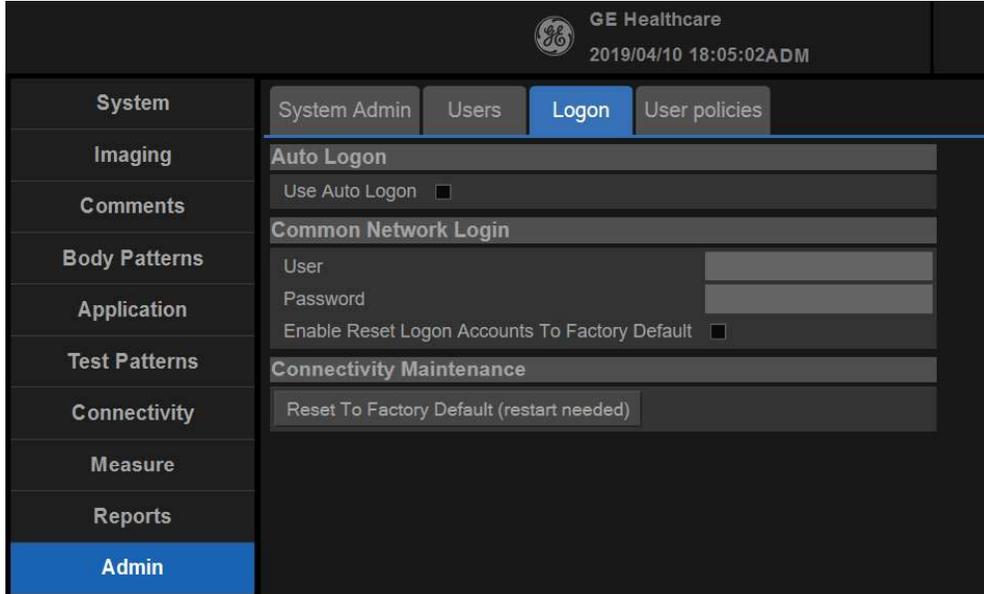


Figure 16-101. Administrative Logon Preset Menu

Table 16-91: Logon

Preset Parameter	Description
Auto Logon	Specifies logon procedures: <ul style="list-style-type: none"> • When blank, the user must select a user ID and enter a password when logging on. • When selected, the system is started automatically, using the last user logon.
Common Network Login	Specifies the user ID and password used to access the network. User – User ID for network access Password – Password for network access
Connectivity Maintenance	Reset to factory default.

User policies

The user policies section defines user policies procedures.

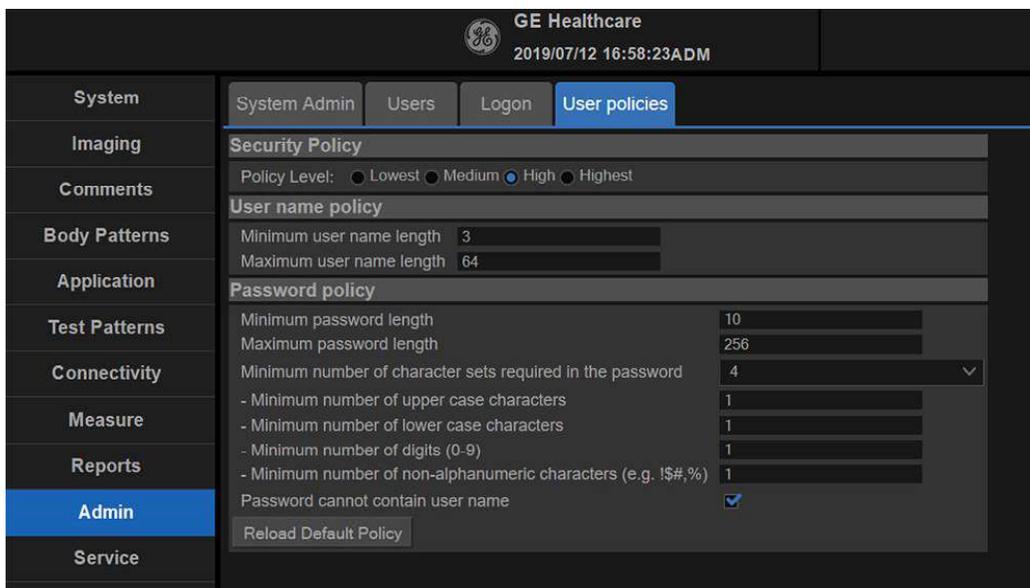


Figure 16-102. Administrative User policies Preset Menu

Table 16-92: User policies

Preset Parameter	Description
User policies	Specifies policy level: Lowest, Medium, High, Highest.
User name policy	Specifies minimum and maximum user name length.
Password policy	Specifies minimum and maximum password length, minimum number of character sets required in the password and password history. <ul style="list-style-type: none"> • Minimum number of character sets required (upper case/lower case/digits/non-alphanumeric): • Password cannot contain user name option. • Reload Default Policy

Table 16-93: Security Levels

Security Level	Complexity Rules
Lowest	Autologon available. No password complexity rules.
Medium	Autologon unavailable. Passwords must meet the following criteria: <ul style="list-style-type: none"> • Minimum password length of 8. • Minimum of 3 character sets. • Minimum of 1 upper case characters. • Minimum of 1 lower case characters. • Minimum of 1 digits. • Password cannot contain user name.

Table 16-93: Security Levels

Security Level	Complexity Rules
High	Autologon unavailable. Passwords must meet the following criteria: <ul style="list-style-type: none">• Minimum password length of 10.• Minimum of 4 character sets.• Minimum of 1 upper case characters.• Minimum of 1 lower case characters.• Minimum of 1 digits.• Minimum of 1 non-alphanumeric characters.• Password cannot contain user name.
Highest	Autologon unavailable. Passwords must meet the following criteria: <ul style="list-style-type: none">• Minimum password length of 14.• Minimum of 4 character sets.• Minimum of 1 upper case characters.• Minimum of 1 lower case characters.• Minimum of 1 digits.• Minimum of 1 non-alphanumeric characters.• Password cannot contain user name.

Service

Press **Service** to activate the Service browser interface.

Scan Coach

Scan Coach Manager

Please refer to Chapter 5 for information on using the Scan Coach Manager to Import and Export Scan Coach Programs. This section covers how to use the Scan Coach Creator and how to export the Scan Coach Creator from the Versana Active to a PC.

Activating the Scan Coach Creator

To activate the Scan Coach Creator on the Versana Active, press the Creator key.

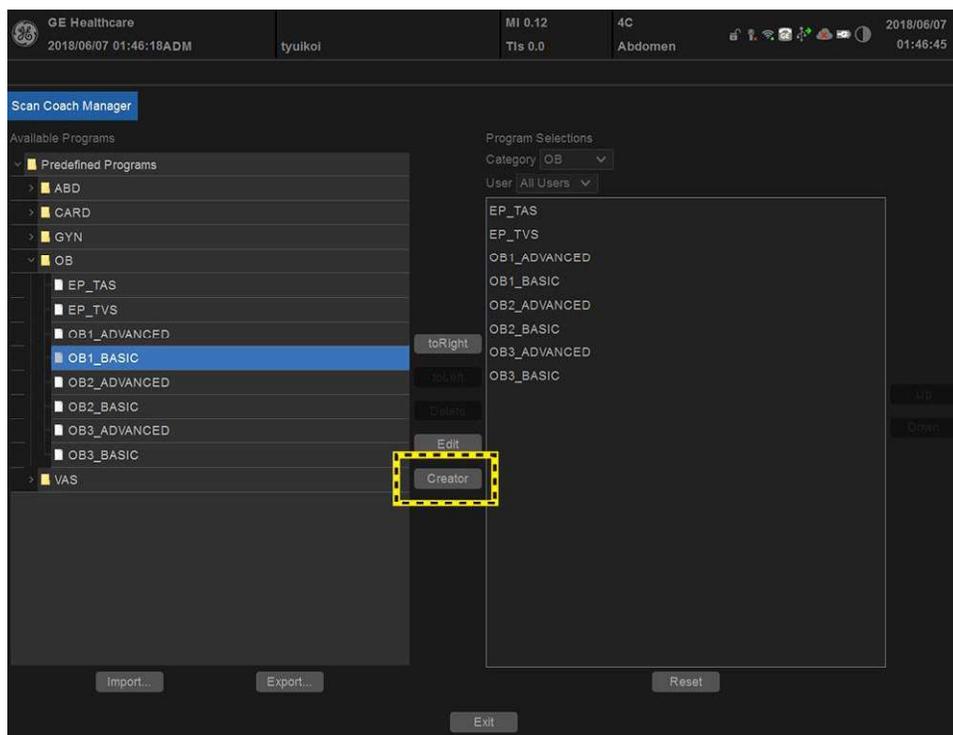


Figure 16-103. Scan Coach Manager

Scan Coach Creator

Overview

The Scan Coach Creator is used to build customized Programs that can be imported onto the Versana Active. These Programs automate many of the steps normally performed manually by the user, thereby reducing the number of user actions and the amount of time to perform an exam.

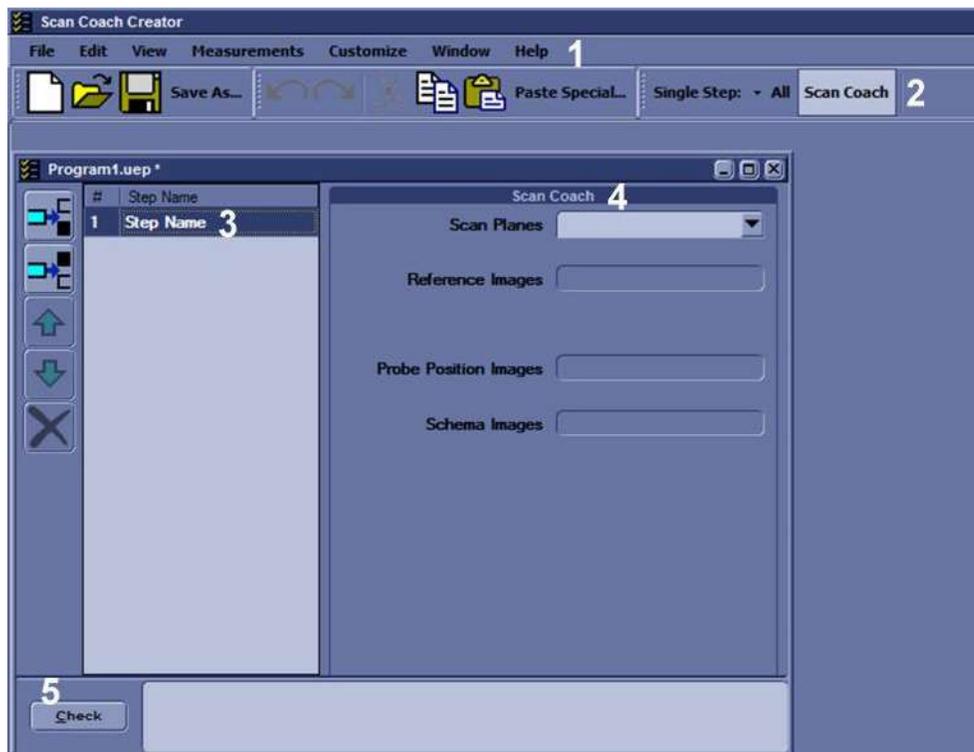


Figure 16-104. Tool Layout Overview

1. Menu and ToolBars
2. Scan Coach Button
3. Steps
4. Scan Coach Attributes
5. Rule Checking

NOTE: Scan Coach Button is not available for Scan Assistant, only for Scan Coach.

Overview (continued)

The Scan Coach Creator tool can be used both on the scanner and as an off scanner tool. Where there are differences in behavior, this user's guide uses the term 'on scanner' to indicate when the tool is running on the scanner and 'off scanner' to indicate when the tool is running off the scanner.

File Handling

When using Scan Coach Creator off the scanner, it is very important to organize the programs in a way that will make it easy to import the programs onto the scanner. Each Program is a computer file. While these computer files can be copied, pasted and deleted like any other computer file, the Program files are only viewable using the Scan Coach Creator.

Off-Scanner Directory Structure

The Scan Coach Creator organizes the Programs in a directory structure that allows easy importing into the Versana Active. In order to be imported, all Programs must be stored in a LOGIQ_SCAN_COACH Programs Directory. Within this directory, one or more user-specified directories are created. Within each of these user-specified directories are the category directories (VAS, ABD, etc.) that hold the actual Programs.

The dialog in the figure below allows the user to specify the location of the LOGIQ_SCAN_COACH directory (root directory) and to either select an existing User Program Directory or create a new one.

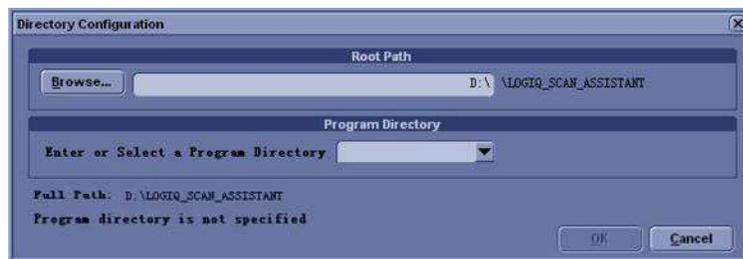


Figure 16-105. Directory Structure

Off-Scanner Directory Structure (continued)

The Directory Structure dialog can be accessed via the File menu.



Figure 16-106. File Menu



Figure 16-107. File Toolbar

File Extensions

Factory defined Programs have an .ep (exam Program) extension while user-defined Programs have an .uep (user exam Program) extension. Both factory and user-defined Programs can be read into the Scan Coach Creator, but only user-defined Programs are created. If a factory Program is read into the Scan Coach Creator and then edited, it is saved as a user-defined Program.

Upon installation of the Scan Coach Creator, files with a .ep or .uep extension are automatically associated with the Scan Coach Creator.

Exporting Programs from Versana Active

Factory or user-defined Programs on the Versana Active are easily exported for editing with the Scan Coach Creator.

On the Versana Active:

1. Insert a USB storage device (or CD/DVD).
2. Select **Utility** -> **Scan Coach**.
3. Select **Export**.
4. Select the media type and specify a directory. If a directory is specified that already exists, the Export adds the Programs along with any existing Programs. If the names of Programs are the same, use the resulting dialog to decide how to continue.
5. Select the Program to be exported and export them.

Importing Programs to Versana Active

Programs created with the Scan Coach Creator are easily imported to the Versana Active.

Copy the complete LOGIQ_SCAN_COACH directory from the system to a USB device (or CD/DVD). The LOGIQ_SCAN_COACH directory needs to be at the top level (not in a subdirectory) on the USB device (or CD/DVD).

Example of Directory structure:

```
LOGIQ_SCAN_COACH
  MyUserNameDirectory
    ABD
    CARD
    GYN
    OB
    VAS
```

On the Versana Active:

1. Insert the USB device (or CD/DVD).
2. Select **Utility -> Scan Coach**.
3. Select **Import**.
4. Select the media type.
5. Select the Programs to be imported and import them. If you attempt to import Programs that already exist with the same name, use the resulting dialog to decide how to continue.

Customizing Your System

Creating New Programs

A new Program is created by selecting File -> New, by clicking on the New document icon in the Toolbar, or by using the keyboard shortcut Ctrl+N.

1. Before creating a New Program, select **Single Step** in the Toolbar.



Figure 16-108. File Toolbar

2. Proceed to add/update your settings for the Step: Step Name, Instructions, etc.
3. Once finished, highlight the finished Step.

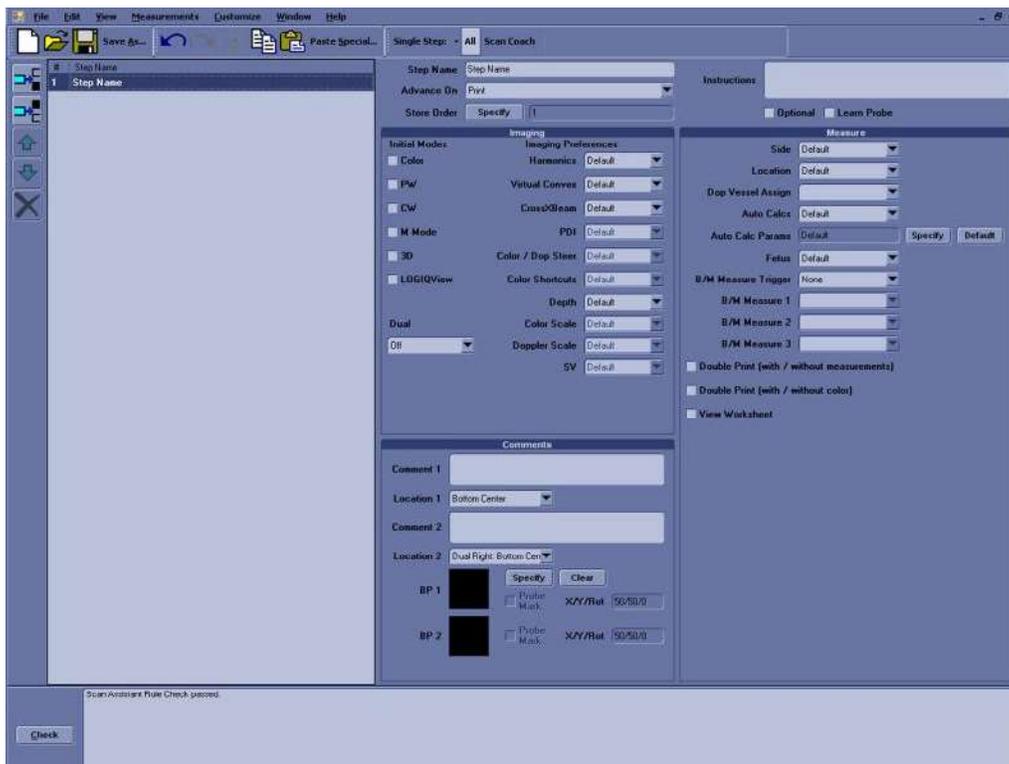


Figure 16-109. Highlight Step to Copy

Creating New Programs (continued)

4. Select **Edit** -> **Copy**

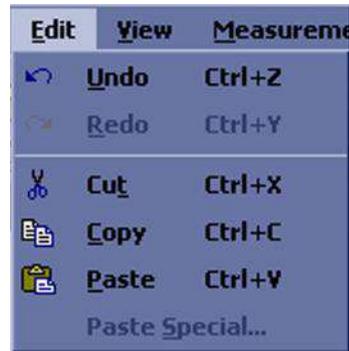


Figure 16-110. Edit -> Copy

5. In the Toolbar along the left, select **Insert Step Before Selected** or **Insert Step After Selected**.



Figure 16-111. Insert Step

6. Highlight the copied step and proceed to edit accordingly.
7. Proceed to follow the same procedure to add more steps to your Program.
8. When you are done, select **Check** to verify your Steps.



Figure 16-112. Rule Check and results area

9. The results are listed as to whether the Scan Coach Rule Check Passed or if any Issues were detected. Issues found when running the check do not mean the Program is unusable.

NOTE: *The rule check may report an unequal number of left and right steps. This may or may not be the expected result. If a change is made in response to the rule check results, a new rule check can be run to see if the issue has been resolved.*

Customizing Your System

Opening New Programs

Multiple Programs can be open at the same time by selecting File -> Open. Each Program will open within the primary Scan Coach Creator window.

Opening Existing Programs

An existing Program is opened by selecting File -> Open, by clicking on the File -> Open icon in the Toolbar, or by using the the shortcut Ctrl+O. Finding the Program file (.ep or .uep) and opening the file automatically opens the file in the Scan Coach Creator. Multiple Programs can be opened at the same time.

Saving Programs

Programs are saved via the Save or Save As functions available on the File Menu and the File Toolbar. Save is also available via the Ctrl+S keyboard shortcut. “Save” saves the Program using its current name and file location. “Save As” allows the name and file locations to be edited.

When Saving a Program, the Scan Coach Creator provides an opportunity to run a rule check on the Program before saving it as shown in the following figure. **Yes** runs the rule check, **No** bypasses the rule check and **Cancel** cancels the Save request. See ‘Rule Checking’ on *page 16-174* for more details on Rule Checking Programs.

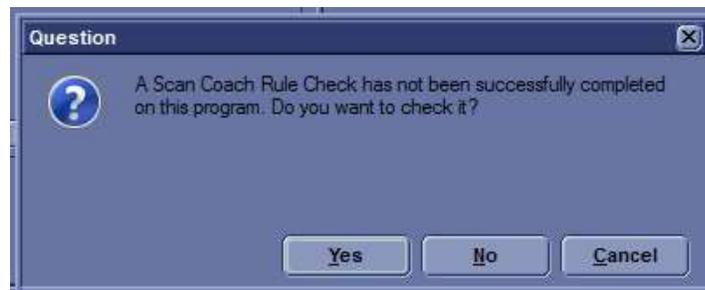


Figure 16-113. Program Rule Check Reminder

NOTE: *The name of a Program is appended with an asterisk (*) when the Program has been changed, but those changes have not yet been saved.*

A Program can be closed without saving it using the Close selection on the File Menu or by using the “X” in the upper right corner of the Program window.

Sharing Programs

If you want to share a program with someone else, the file can simply be sent via e-mail as an attachment or copied onto a media. If the person receiving the program has the Scan Coach Creator tool installed, he can simply open the file and then use “Save As” to save it to an appropriate directory. See Section 3.1. If the person receiving the program does not have the Scan Coach Creator tool installed, he can still load the program onto a scanner by creating the following directory structure on a media device, copying the file to one of the category directories and then importing the protocol onto the scanner.

Top Level Directory on media: LOGIQ_SCAN_COACH User
Program Directory: Any user name
Category Directories: Abd, Card, Gyn, OB, Ped, SMP, UR, Vas.

Views

A Program is made up of a series of steps. Each step is made up of various step attributes. The step and step attribute data can be viewed in many ways using the Scan Coach Creator. The different ways to look at the data are called Views. The view of choice is selected from the View Selection Menu or the View Toolbar Menu.



Figure 16-114. View Selection Menu



Figure 16-115. View Toolbar Menu

Customizing Your System

Single Step Views

There are two Single Step views: Basic and All. The Basic view shows the most common attributes of the selected step. The All view shows all of the attributes of a given step.

For both views, the step names are shown on the left with the active step highlighted. The step attributes appear on the right and are separated into four groupings:

General attributes at the top

Imaging and Comment attributes on the left

Measure attributes on the right.

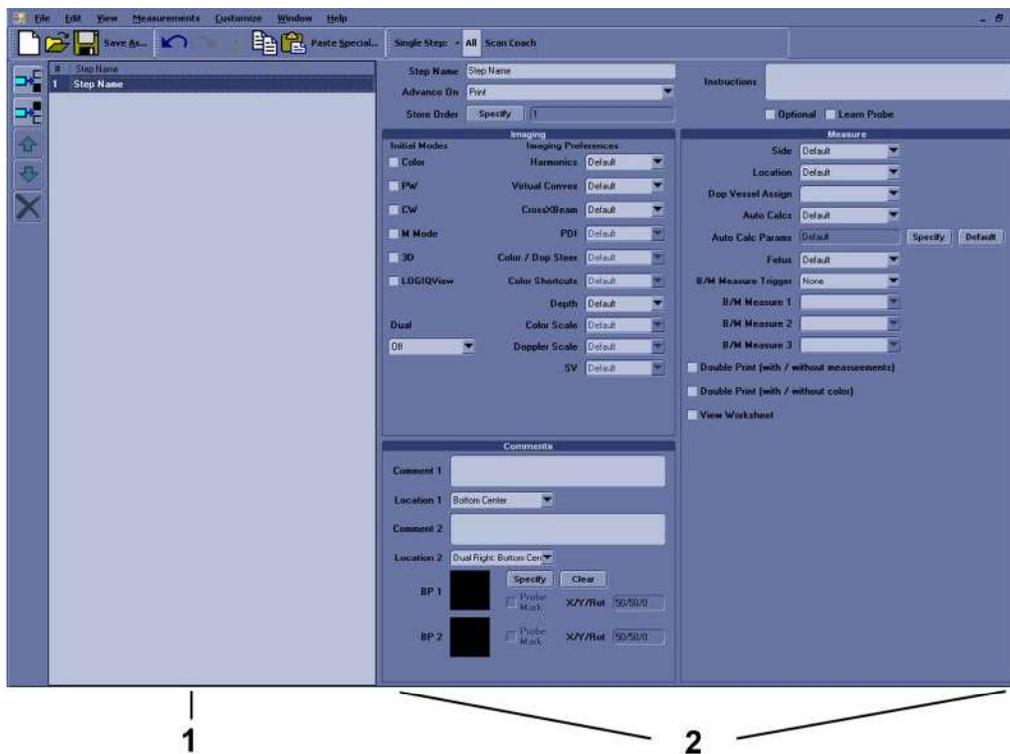


Figure 16-116. Basic Single Step View

1. Steps
2. Step Attributes

Scan Coach Features

Scan Coach allows the user to program the steps in an exam and to program certain attributes for each step. The attributes are what give the Scan Coach Program behavior. The tables below provide the names of all attributes along with a description of how each one is interpreted by the Scan Coach feature.

General Attributes

Table 16-94: General Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Store Order	(Not Applicable)	Button used to enable the Store Order Definition dialog so that the Store Order can be set		
Advance On	Store	Advance to the next step and go live after Print / Image Store (e.g P1 key). This can be a single image store or a loop store.	Print	Same as previous step
	Store & Unfreeze	Advance to the next step after Print / Image Store (e.g. P1 key) and unfreeze. This can be a single image store or a loop store.		
	User Selection	Advance to next step only after next step is manually selected (e.g. down arrow)		
Instructions	[Any Text]	User notes displayed in the Scan Coach Navigation menu when the step is active	Blank	Same as previous step
Optional	Optional (checked)	An optional step is given a check mark during Program execution even if no image is acquired	Mandatory	Same as previous step
	Mandatory (unchecked)	A mandatory step is given a check mark only if an image is acquired for the step		
Learn Probe	On (checked)	Learn and change the probe for the user	Off	Off
	Off (unchecked)	No probe change		

Comment Attributes

Table 16-95: Comment Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Comment 1, Comment 2	[Any Text]	User annotation associated with the step. When editing in a Multi Step View, use Alt+Enter to create a new line.	Same as Step Name attribute	Same as Step Name attribute
Location 1, Location 2	Top Left	Annotation is placed in the top left corner of the image area	Location 1: Bottom Center	Same as previous step
	Middle Left	Annotation is placed in the middle left side of the image area		
	Bottom Left	Annotation is placed in the bottom left corner of the image area	Location 2: Dual Right: Bottom Center	
	Top Center	Annotation is placed in the top center of the image area		
	Bottom Center	Annotation is placed in the bottom center of the image area		
	Top Right	Annotation is placed in the top right corner of the image area		
	Mid Right	Annotation is placed in the middle right side of the image area		
	Bottom Right	Annotation is placed in the bottom right corner of the image area		
	Dual Left: Bottom Center	Annotation is placed on the bottom center of the left image in dual screen		
	Dual Left: Top Left	Annotation is placed on the top left of the left image in dual screen		

Table 16-95: Comment Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
	Dual Right: Bottom Center	Annotation is placed on the bottom center of the right image in dual screen		
	Dual Right: Top Left	Annotation is placed on the top left of the right image in dual screen		
BP1, 2	Blank	Body Pattern not specified. Scan Coach does not set Body Pattern.	Blank	Same as previous step
BP1, 2	Body pattern graphics with or without probe position	Selected Body Pattern with or without probe position will be set.	Blank	Same as previous step
BP Specify	(Not applicable)	Button used to enable the Body Pattern Selection dialog so that the Body Pattern graphic can be selected and probe position can be set		
BP Clear	(Not applicable)	Clears BP1, BP2 defined for the step		
BP Probe	On (checked)	BP Probe mark will be set by Scan Coach	Off	Same as previous step
	Off (unchecked)	Probe mark not specified. Scan Coach does not set Probe mark.		

Imaging Mode Attributes

The probe and application associated with a program is not configurable. Instead, the scanner remembers the last probe and application used for a given Scan Coach program and automatically selects them the next time the program is started.

Table 16-96: Imaging Mode Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Color Mode	On (checked)	Color Doppler is on	Off	Same as previous step
	Off (unchecked)	Color Doppler is off		
PW Doppler Mode	On (checked)	PW Doppler is on. If PW Doppler is not on and the new activated step indicates that Doppler should be on, the Mode Cursor is displayed or, if the Mode Cursor is already displayed, then PW Doppler is turned on.	Off	Same as previous step
	Off (unchecked)	PW Doppler is off		
M Mode	On (checked)	M-Mode is on	Off	Same as previous step
	Off (unchecked)	M-mode is off		
CW Mode	On (checked)	CW Mode is on	Off	Same as previous step
	Off (unchecked)	CW Mode is off		

Table 16-96: Imaging Mode Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Dual	Off	Dual screen not in use	Off	Same as previous step
	Left Active	Dual screen is active and the left image is the active image.		
	Right Active	Dual screen is active and the right image is the active image.		
	DualView (simul)	DualView is active (both left and right images are live)		
	Dual on Freeze	DualView is active on freeze		
3D	On (checked)	3D on	Off	Same as previous step
	Off (unchecked)	3D off		
LOGIQView	On (checked)	LOGIQView on	Off	Same as previous step
	Off (unchecked)	LOGIQView off		

Imaging Preference Attributes

Imaging Preferences work slightly different than other attributes. For example, if an abdomen Program has 20 steps and all steps have the Harmonics attribute set to Default, then Scan Coach will not affect the harmonics setting. Now, assume that steps 10-12 are gallbladder steps and that the harmonics attribute has been set to on for these steps. When transitioning into this group of steps (step 9 to step 10, e.g.), harmonics will be turned on (or remain on if it was previously on). If harmonics is then manually turned off in step 10 then Scan Coach will not turn it back on when advancing to step 11. In other words, a group of consecutive steps with the same Imaging Preference are treated as a group by Scan Coach and not as individual steps.

Table 16-97: Imaging Preference Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Harmonics	Off	Harmonics off	Default	Same as previous step
	On	Harmonics on		
	Default	Harmonics not specified. Scan Coach does not set Harmonics on or off.		
Virtual Convex	Off	Virtual Convex off	Default	Same as previous step
	On	Virtual Convex on		
	Default	Virtual Convex not specified. Scan Coach does not set Virtual Convex on or off.		
CrossXBeam	Off	CrossXBeam off	Default	Same as previous step
	On	CrossXBeam on		
	Default	CrossXBeam not specified. Scan Coach does not set CrossXBeam on or off.		

Customizing Your System

Table 16-97: Imaging Preference Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
PDI	Off	PDI off	Default	Same as previous step
	On	PDI on		
	Default	PDI not specified. Scan Coach does not set PDI on or off.		
Color/Doppler Steer	Left	Color/Doppler steered to the left	Center	Same as previous step
	Center	Color/Doppler not steered		
	Right	Color/Doppler steered to the right		

Measurement Attributes

Table 16-98: Measure Attributes

Attribute Name	Selections	Description	First Step Default	Other Steps Default
B/M Measure Trigger	Measure Key	Initiate "Measure 1" attribute when the Measure key is manually selected.	None	None
	Freeze Key	Initiate "Measure 1" attribute when the image is frozen.		
	Store Image	Initiate "Measure 1" attribute when the Measure key is manually selected or the image is stored. This is used to store / print an image and then measure on it and then store it again. Therefore, the Advance On Print attribute is ignored on the first store / print when the Measure Trigger attribute is set to Image Store.		
	None	Measurements are not triggered by Scan Coach. The "Measure 1" attribute is ignored.		
Side	Rt	The side measurement qualifier is set to Right side of the body	Rt	Derived from Step Name attribute if possible. Otherwise, same as previous step
	Lt	The side measurement qualifier is set to Right side of the body		
	None	The side measurement qualifier is not used (neither Right nor Left)		

Table 16-98: Measure Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Fetus	A	The fetus measurement qualifier is set to Fetus A	A	Same as previous step
	B	The fetus measurement qualifier is set to Fetus B		
	C	The fetus measurement qualifier is set to Fetus C		
	D	The fetus measurement qualifier is set to Fetus D		
Location	Prox	The location measurement qualifier is set to Proximal	Prox	Same as previous step
	Mid	The location measurement qualifier is set to Middle		
	Dist	The location measurement qualifier is set to Distal		
	None	The location measurement qualifier is not used		
Measure 1	Various 2D or M-mode measurements	Specifies the first 2D or M-mode measurement to be initiated. The point at which the measurement is initiated is based upon the Measure Trigger attribute. See Section 6 for more information.	Blank	Blank

Table 16-98: Measure Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Measure 2	Various 2D or M-mode measurements	Specifies the second 2D or M-mode measurement to be initiated after the measurement associated with the Measure 1 attribute is completed. See Section 6 for more information	Blank	Blank
Measure 3	Various 2D or M-mode measurements	Specifies the second 2D or M-mode measurement to be initiated after the measurement associated with the Measure 2 attribute is completed. See Section 6 for more information.	Blank	Blank
Dop Vessel Assign	Various Doppler measurement Vessel folders	Specifies the Vessel folder to assign auto calcs to. The assignment happens when the image is stored / printed (P1 key, e.g.). See Section 6 for more information.	Blank	Blank
Auto Calcs	Default	Auto Calcs state not specified. Scan Coach does not set Auto Calcs state.	Default	Same as previous step
	Off	Auto Calcs state set to Off		
	Frozen	Auto Calcs state set to Frozen		
	Live	Auto Calcs state set to Live		

Table 16-98: Measure Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Auto Calc Params	Various Auto Calc parameters	Specifies the auto calc parameters to be used.	Default	Same as previous step
	Default	Auto Calc parameters are not specified. Scan Coach does not set the Auto Calc parameters.		
Auto Calc Specify	[Not Applicable]	Button used to enable the Auto Calcs Parameter Selection dialog so that the Auto Calc Params attribute can be set	[Not Applicable]	[Not Applicable]
Auto Calc Default	[Not Applicable]	Button used to set the Auto Calcs Params attribute to Default.	[Not Applicable]	[Not Applicable]
Double Print	On (checked)	If an Image Store / Print (P1 key, e.g.) is performed on an image with measurements, the image is stored / printed two times, once with the measurements and once without.	Off	Same as previous step
	Off (unchecked)	No special Store / Print behavior.		

Table 16-98: Measure Attributes (Continued)

Attribute Name	Selections	Description	First Step Default	Other Steps Default
Double Print	On (checked)	If an Image Store / Print (P1 key, e.g.) is performed on an image with color, the image is stored / printed two times, once with color and once without. If double print on color and double print on measurements are both configured to be on, the image is stored / printed two times, once with the measurements and once without.		
	Off (unchecked)	No special Store / Print behavior.		
View Worksheet	On (checked)	The worksheet is turned on	Off	Off
	Off (unchecked)	The worksheet is not turned on		

Measurements

Because there are many measurements available on the Versana Active and because the measurement package is highly customizable, there is some special handling for measurements. The Measurement attributes affected by this special handling are Measure 1-3 and Vessel.

Selecting a Measurement Package

The Measurement selection menu can be used to specify which measurement package is to be used for the Program. The Measurements packages are organized by category and subcategory. The choices for the Measure 1-3 and Vessel attributes are limited by the selection of category and subcategory. To select a subcategory, select a category, move to the subcategory list and select a subcategory. To select all subcategories for a given category, select the category and then reselect the Measurements menu item to remove the menu.

A single Program is not allowed to have measurements from multiple categories, but it may have measurements from multiple subcategories.



Figure 16-117. Measurements Menu

User-Defined Measurements

User-defined subcategories and individual measurements can be used with the Scan Coach feature. To do so, the Scan Coach Creator needs to know about the user-defined measurements on the Versana Active.

On the Versana Active, use the Scan Coach utility menu to Export Programs to a USB storage device (or CD/DVD). On the export menu, check the “Export user config data” checkbox to store the user-defined measurement information to the Program User Directory on the media. The name of the file is UserConfigSystemFile.res. When this file exists in the Program User Directory, then it is used. Otherwise, the default file installed with the Scan Coach Creator is used.

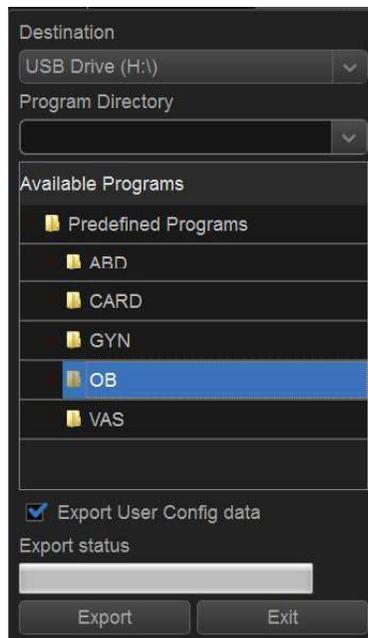


Figure 16-118. Program Export Menu on Versana Active

Navigating Programs

In addition to moving the windows pointer and selecting an item, there are several keyboard controls that navigate a Program.

Table 16-99: Keyboard Program Navigation

Keyboard Entry	Step Selected	Step Attribute Selected
Up Arrow	Moves to previous step	Single Step View: Varies based on the step attribute selected. Multi Step View: Moves to same step attribute in the previous step.
Down Arrow	Moves to next step	Single Step View: Varies based on the step attribute selected. Multi Step View: Moves to same step attribute in the next step.
0~9	Press Arabic numeral button, then the program will jump to the correspondent step. If the step is higher than 9, please press two key rapidly.	Single Step View: Varies based on the step attribute selected. Multi Step View: Moves to the previous step attribute.

Editing Programs

When editing Programs, changes can be made at both the step level and the step attribute level. Steps can be added, inserted, moved, deleted, copied and pasted. Step attributes can be modified for a given step or across multiple steps.

Editing Steps

The step toolbar allows steps to be inserted, moved up and down, and deleted. For steps to be moved, one or more consecutive steps must be selected. Some of the controls have shortcuts (Control Key + another key).

When the last step in a Program is selected, the Enter key automatically appends a new step to the end of the Program and selects the new step. When the Enter key is pressed on any other step, the next step is activated. The up and down arrows can also be used to move between steps.



Figure 16-119. Step Toolbar

1. Insert Step above selected step (Ctrl+I)
2. Insert Step below selected step
3. Move selected step(s) up (Ctrl+Up Arrow)
4. Move selected step(s) down (Ctrl+Down Arrow)
5. Delete selected step(s)

Editing Steps (continued)

The Edit Menu and Edit toolbar provides access to the Cut, Copy, Paste and Paste Special features. The Undo and Redo actions also appear on Edit Menu and Edit Toolbar.

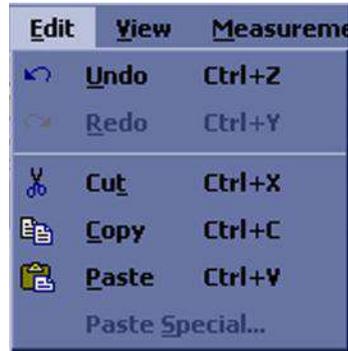


Figure 16-120. Edit Menu



Figure 16-121. Edit Toolbar

When selecting multiple steps for Cutting or Copying, the Shift + Left Mouse and Ctrl + Left Mouse key combinations can be used. Multiple steps are also selected by holding the Left Mouse key and dragging across the steps of interest. When pasting steps they are added after the currently selected step.

The Paste Special control allows copied steps to be pasted with some modification. For example, the steps associated with the Right Kidney can be Copied and Pasted so that they are converted into Left Kidney steps during the paste. The Paste Special dialog is shown in the figure below. Simply select the desired Conversion and choose the "Paste" key.

Editing Steps (continued)

- Step Name (Text)
- Comment 1 (Text)
- Comment 2 (Text)
- Side (Measurement qualifier)
- Location (Measurement qualifier)
- Fetus (Measurement qualifier)

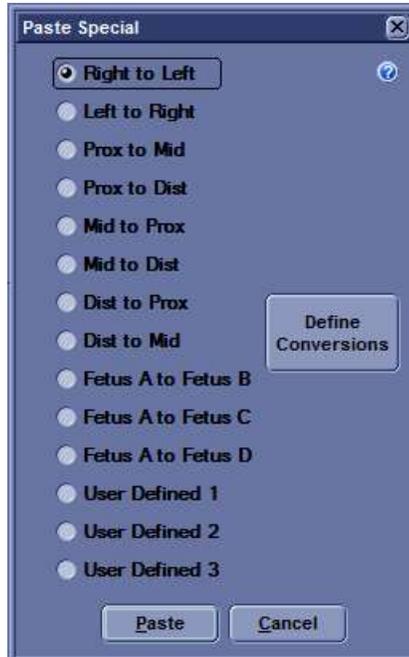


Figure 16-122. Paste Special Dialog

Editing Steps (continued)

The Define Conversions key is used to define the text that is converted. An example is shown in the figure below. If an exact case match is found, it is used for the conversion. If there is a match, but with different case, it is used only if there is not an exact case match.

There are 3 user-defined conversions that can be edited and named. These user-defined conversions can also be used to perform a find and replace capability.

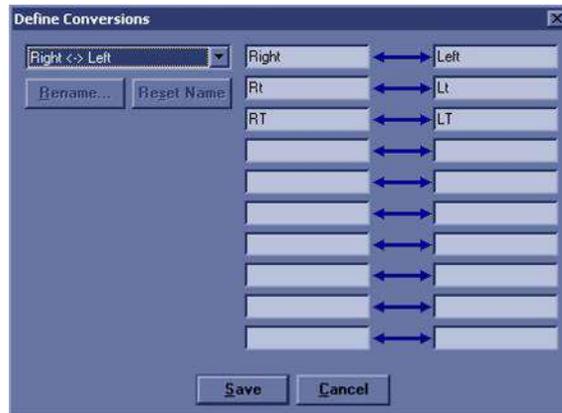


Figure 16-123. Define Conversions Dialog

Editing Step Attributes

To edit a step attribute simply select the step attribute and edit it, such as picking from a drop down menu, checking or unchecking a box or typing in text.

This will take the original step's content and copy it down the highlighted steps. This is also available when multiple attributes are selected within the same step.

If a step attribute is not editable, it may be because the attribute requires a different attribute to be set a particular way in order to become enabled. These dependencies are outlined below.

Table 16-100: Step Attribute Dependencies

Step Attribute	Dependency
PDI	Color step attribute must be checked
Color / Dop Steer	Color or PW step attribute must be checked
Measure 1	Measure Trigger must not be set to None
Measure 2	Measure 1 must be set
Measure 3	Measure 1 and Measure 2 must be set

Undo/Redo

The Undo feature allows the previous action to be undone. For example, pressing undo 6 times will undo the last 6 changes. Redo cancels the Undo of an action. For example, pressing undo 6 times will undo the last 6 changes and then pressing Undo 2 times will cause only the last 4 actions to be undone.

Editing the Current Program on the Scanner

If you are currently using a Scan Coach program and choose to edit that program while using it, the program will be reloaded when scanning is restarted. If the number of steps is changed, the checkmarks that were in place before editing are cleared. If the number of steps in the program has not changed, the checkmarks that were in place before editing are maintained.

The current program can be restarted at any time by selecting the Stop button on the Scan Coach navigation window and selecting restart.

Editing Predefined Programs

1. Enter **Utility->Scan Coach->Scan Coach Manager->Predefined Programs**. Select preferred predefined program.
2. Press **Edit** to display the Scan Coach Creator window. Edit the predefined program via the toolbar at the left side.
3. Save the program.
4. Enter **Utility -> Scan Coach ->Scan Coach Manager -> Custom Programs**. Press arrow button to move the edited program to the Program Selections column.
5. Press Scan Coach key on the control panel to activate the Scan Coach function.
6. Select the edited program.

You can follow the procedure below to edit the Predefined Program while using it:

1. Press Stop Button, then select **Edit** and the system will open the Scan Coach Creator window.
2. Edit the predefined program via the toolbar at the left side.
3. Save the program. Press Stop button, then exit the Scan Coach.
4. Enter **Utility -> Scan Coach ->Scan Coach Manager -> Custom Programs**. Press arrow button to move the edited program to the Program Selections column.
5. Press Scan Coach key on the control panel to activate the Scan Coach function.
6. Select the edited program.

Editing the Custom Programs

1. Enter **Utility->Scan Coach->Scan Coach Manager->Custom Programs**. Select preferred custom program.
2. Press **Edit** to display the Scan Coach Creator window. Edit the custom program via the toolbar at the left side.
3. Save the programs.
4. Enter **Utility -> Scan Coach ->Scan Coach Manager -> Custom Programs**. Press arrow button to move the edited program to the Program Selections column.
5. Press Scan Coach key on the control panel to activate the Scan Coach function.
6. Select the edited program.

You can follow the procedure below to edit the Custom Program while using it:

1. Press Stop Button, then select **Edit** and the system will open the Scan Coach Creator window.
2. Edit the predefined program via the toolbar at the left side.
3. Save the program.
4. Press Stop Button, then select **Restart**. The edited program is activated.

Rule Checking

Scan Coach Creator allows Programs to be checked. During a rule check, Scan Coach Creator applies a series of rules against the Program being checked and reports any inconsistencies between the rules and the Program. This rule check is intended to find potential issues in the Program before it is tested on a Versana Active. Issues found when running the check do not mean the Program is unusable. It means that if there happens to be a problem with running the Program, the first place to look would be at the Issue noted when you ran the Check.

For example, if there is a step name Right Kidney and the Measurement Location is set to “Left”, the rule check would report this inconsistency.

Running a Rule Check

The “Check” button below the Program area is used to initiate a rule check. The results are displayed in the Rule Check Results window to the right of the button. A rule check is also initiated when attempting to save a Program that has not previously passed a rule check.

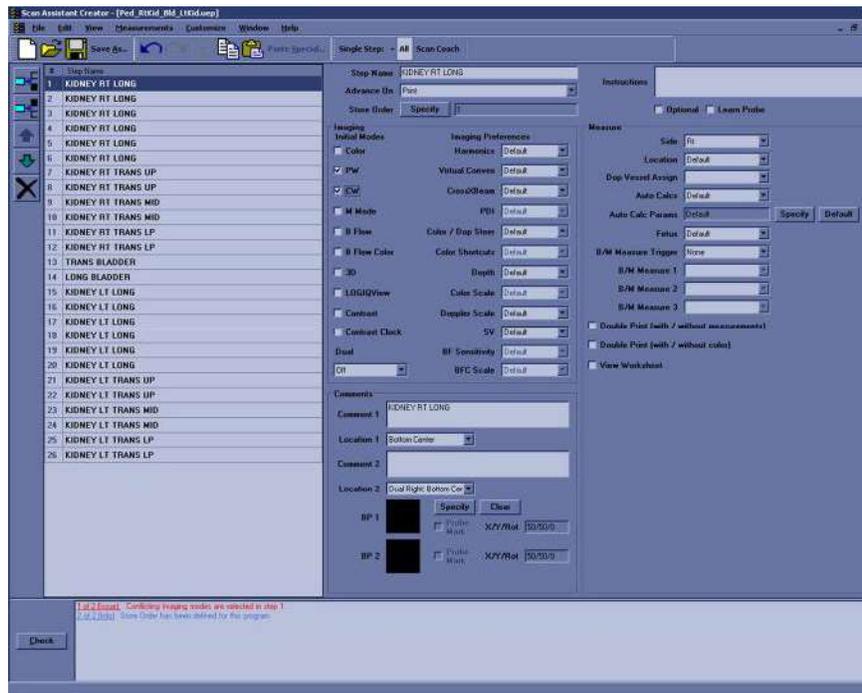


Figure 16-124. Rule Check Button and Rule Check Results

Rule Check Results

If the issue is specific to a particular step, double-clicking on the issue number in the Rule Check Results window selects the step associated with the issue. The results are intended to be potential issues and therefore may be ignored at the discretion of the user. For example, the rule check may report that there are an unequal number of left and right steps. For a particular Program, this may be the expected result. If a change is made in response to the rule check results, a new rule check can be run to see if the issue has been resolved.

Customization

The Customize Menu is shown below:



Figure 16-125. Customize Menu

The column widths of the steps and step attributes are customizable. The desired width is set by selecting and dragging the line separating column headers. These adjustments are remembered for the next time the Scan Coach Creator is used.

The locations of the toolbars are customizable. The location is set by selecting and dragging the toolbar gripper as shown in the figure below. The toolbars can be placed at the top, left, right or bottom of the Scan Coach Creator.



Figure 16-126. Gripper used for Toolbar placement

- | |
|--------------------|
| 1. Toolbar Gripper |
|--------------------|

Help

Help is available via the About Menu or the F1 key.

Scan Assistant

Scan Assistant Manager

Please refer to Chapter 6 for information about how to use Scan Assistant and how to use the Scan Assistant Manager to Export Scan Assistant Programs. Please refer to 'Scan Coach' on *page 16-138* about how to use the Scan Assistant Creator and how to export the Scan Assistant Creator from the Versana Active.

Activating the Scan Assistant Creator

To activate the Scan Assistant Creator on the Versana Active, press the Creator key.

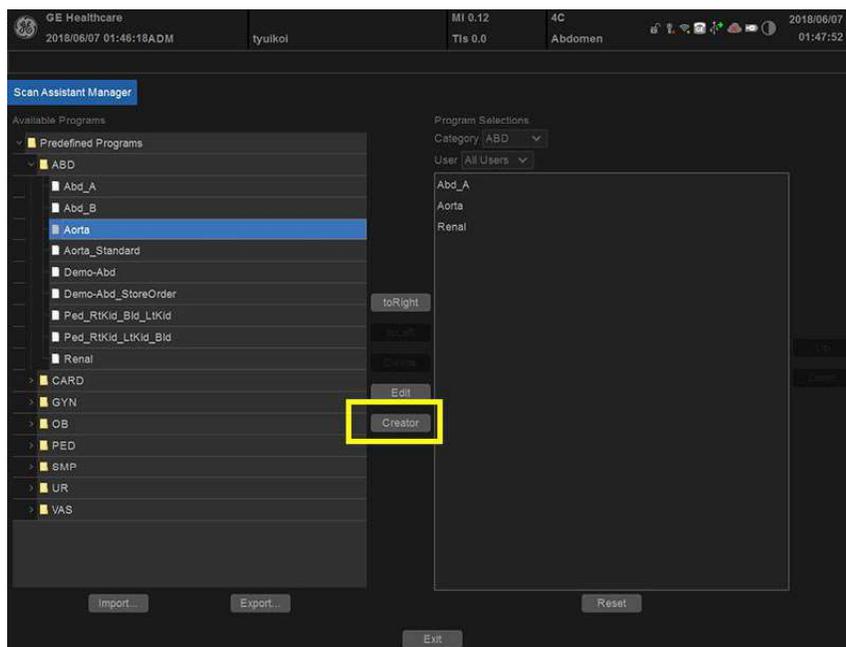


Figure 16-127. Scan Assistant Manager

Search

Opens up a search window to find a parameter on the utility pages.

To search for a utility parameter,

1. Select **Search**.
2. Type in the search string. For instance, if you're searching for **Patient info**, you could just type 'patient'.

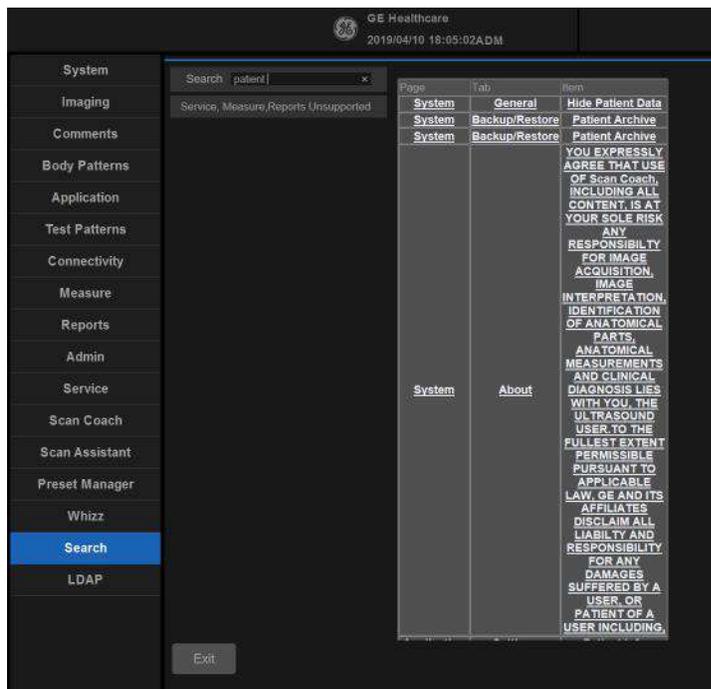


Figure 16-128. Search Example

3. A list of possible matches appears to the right. Select the correct match.

NOTE: You cannot perform a search on the Measure, Reports, or Service utility pages.

3D/4D

Overview

NOTE: *3D/4D presets are only available for R1.1.x and R1.2.x.*

3D/4D presets allow you to set up application-specific settings (presets) for each 4D image acquisition type. You can define different application-specific settings for RAB2-6-RS probe. Refer to Chapter 5 for more information.

4D Presets

To set up 4D presets:

1. Press **Utility** on the control panel.
2. Select **3D/4D**.
The system displays the 4D Presets screen. Click on the plus sign (+) that appears next to RAB2-6-RS probe.
3. To select the application, click on the plus sign (+) that appears next to the desired application.
4. To select the acquisition type, click on the plus sign (+) that appears next to the desired application.
5. Click the desired application under the acquisition type. The Display tab is selected.

Display tab

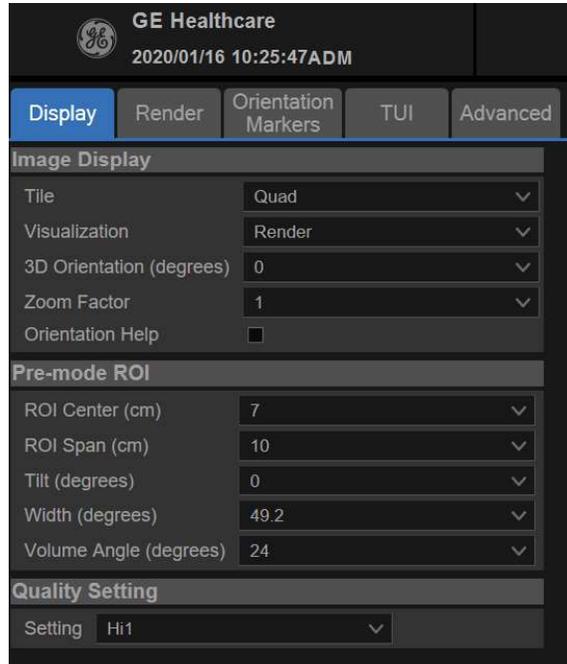


Figure 16-129. Display Preset Parameters

Table 16-101: Image Display

Preset Parameter	Description
Tile	Determines the number of display windows. Values include: 1 (Single), 2 (Dual), and 4 (Quad).
Visualization	Determines the method of display for working with images. Selections available: Sectional, Render, TUI.
3D Orientation (degrees)	Determines the orientation of the ROI on the monitor display. Values include: 0, 90, 180, 270.
Zoom Factor	Determines the magnification factor of the zoom.
Orientation Help	Activate Orientation Help.

Table 16-102: Pre-mode ROI

Preset Parameter	Description
ROI Center (cm)	Determines the vertical center of the region of interest. Values vary by probe.
ROI Span (cm)	Determines the height of the region of interest. Values vary by probe.
Tilt (degrees)	Determines the degree of tilt from the vertical center location of the ROI. Values vary by probe.

Table 16-102: Pre-mode ROI (Continued)

Preset Parameter	Description
Width (degrees)	Determines the width of the ROI. Values vary by probe.
Volume Angle	Set the range of the volume sweep. Values vary by probe. Listed in degrees for curved probes, cm for linear probes.

Table 16-103: Quality Setting

Preset Parameter	Description
Setting	Set quality setting -- balances speed with line density. Selections are Low, Mid1, Mid2, Hi1. High combines the highest density with the slowest speed. Low combines the lowest density with the highest speed.

Render Tab

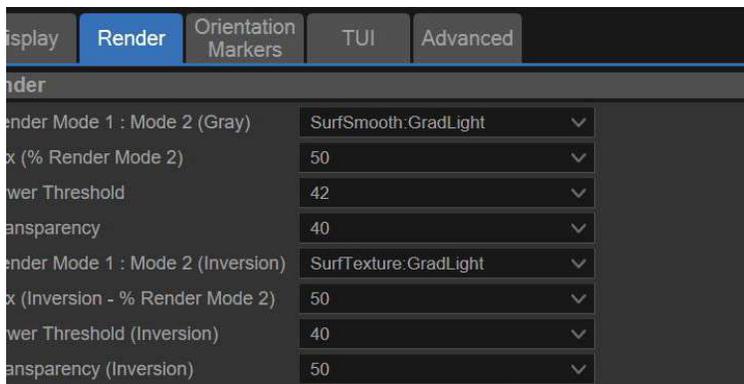


Figure 16-130. Render tab

Table 16-104: Render

Preset Parameter	Description
Render Mode 1:Mode2	Set render mode values. Surface Smooth, Surface Texture, Transp Max, Transp X-Ray, or TransMin (Render 1). Surface Smooth, Light, Gradient Light, Transp Max, Transp X-Ray, or Transp Min (Render 2).
Mix (% Render Mode 2)	Set mix of Render 1 / Render 2 Mode, 0-100.
Lower Threshold	Set a lower threshold below which weaker echoes are removed, 0-255.
Transparency	Set the transparency of the image, 10/20-250. The higher the number, the more transparent the gray scale information.
Render View Direction	Set the direction in which the ROI is viewed.

Orientation Markers tab

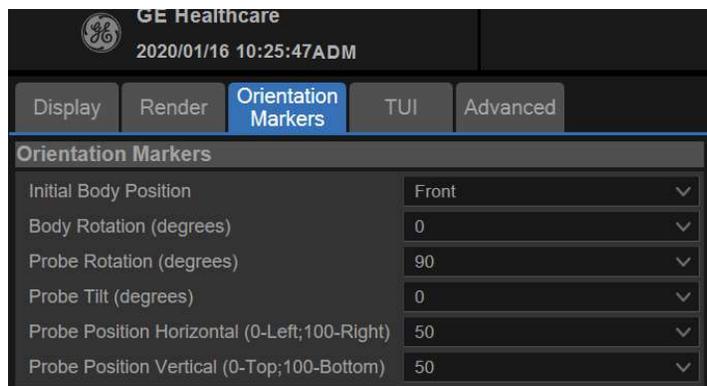


Figure 16-131. Orientation Markers tab

Table 16-105: Orientation Markers

Preset Parameter	Description
Initial Body Position	Set Head, Feet, Front, or Back
Body Rotation (degrees)	Set 0, 45, 90, 135, 180, 225, 270, or 315.
Probe Rotation (degrees)	Set 0, 45, 90, 135, 180, 225, 270, or 315.
Probe Tilt (degrees)	Set 0, 45, 90, -45, or -90.
Probe Position Horizontal (0-Left;100-Right)	Set 0-100.
Probe Position Vertical (0-Top;100-Bottom)	Set 0-100.

TUI tab

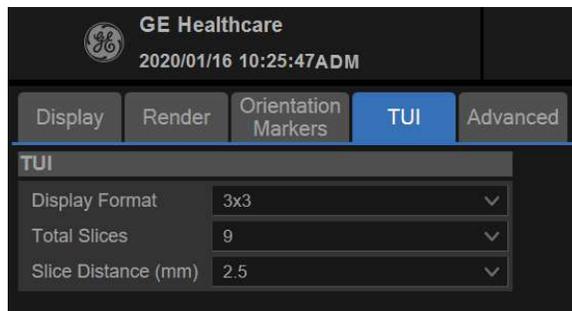


Figure 16-132. TUI Tab

Table 16-106: TUI

Preset Parameter	Description
Display Format	Set 1x1, 1x2, 2x2, or 3x3.
Total Slices	Set 3, 5, 7, 9, 11, 13, 15, 17, or 19.
Slice Distance (mm)	Set from 0.5 ~ 40.

Advanced tab

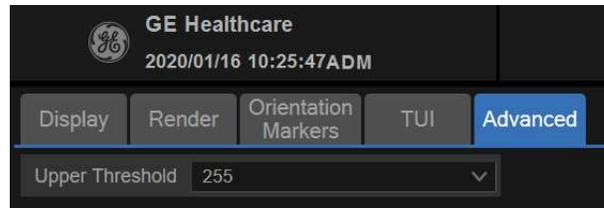


Figure 16-133. Advanced tab

Table 16-107: Advanced

Preset Parameter	Description
Upper Threshold	Sets the higher threshold above which weaker echoes are removed.

Chapter 17

Probes and Biopsy

This chapter consists of the information of each probe and describes some special concerns, biopsy kits and accessories as well as basic procedures for attaching a biopsy guide to the different types of probes.

Probe Overview

Ergonomics

Probes have been ergonomically designed to:

- Handle and manipulate with ease.
- Connect to the system with one hand.
- Be lightweight and balanced.
- Have rounded edges and smooth surfaces.
- Stand up to typical wear by cleaning and disinfectant agents, contact with approved gel, etc.

Cables have been designed to:

- Connect to system with appropriate cable length.

Cable handling

Take the following precautions with probe cables:

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

Probe orientation

Each probe is provided with an orientation marking. This mark is used to identify the end of the probe corresponding to the side of the image having the orientation mark on the display.

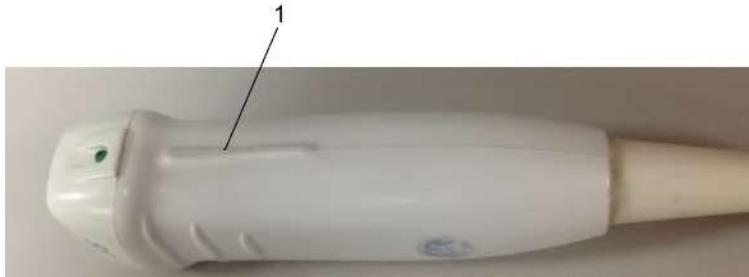


Figure 17-1. Orientation Marking on Probe (Example)

1. Orientation Mark

Labeling

Each probe is labeled with the following information:

- Seller's name and manufacturer
- GE part number
- Probe serial number
- Month and year of manufacture
- Probe designation-provided on the probe grip and the top of the connector housing, so it is easily read when mounted on the system and is also automatically displayed on the screen when the probe is selected.

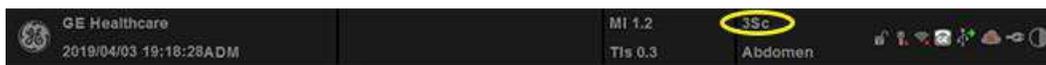


Figure 17-2. Displayed Probe Information

Probe Naming Conventions

Table 17-1: Probe Naming Convention

Type	Frequency	Connector Type
C = Convex L = Linear S = Sector	"4" in 4C-RS	RS

Probe Usage

For details on connecting, activating, deactivating, disconnecting, transporting and storing the probes, See 'Probes' on *page 3-40 for more information.*

Care and Maintenance

Environmental Requirements

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



CAUTION

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

Table 17-2: Probe Environmental Requirements

	Operational	Storage	Transport
Temperature	10° - 40° C 50° - 104° F For RAB2-6-RS: 18° - 30° C 65° - 86° F	0° - 55° C 32° - 131° F For RAB2-6-RS: -10° - 50° C 14° - 122° F	-40° - 55° C -104° - 131° F For RAB2-6-RS: -10° - 50° C 14° - 122° F
Humidity	5 - 85% non-condensing	5 - 85% non-condensing	5 - 85% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa



CAUTION

Check the room temperature before you use the probe.



CAUTION

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

Planned maintenance program



CAUTION

Improper handling can lead to early probe failure and electric shock hazards.

DO follow the specific cleaning and disinfection procedures provided in this chapter and the chemical manufacturers instructions.

Failure to do so will void probe warranty.



CAUTION

Transesophageal, endocavity and intraoperative probes require a special handling. Refer to the user documentation enclosed with these probes.

It is recommended to keep a maintenance log and note all probe malfunctions. Follow the maintenance schedule below to ensure optimum operation and safety:

After each use:

- Inspect the probe.
- Clean the probe.
- Disinfect the probe.

Before each use:

- Inspect the probe.

Inspecting the probe



CAUTION

If any damage is found, DO NOT use the probe until it has been inspected and released for further use by a GE service representative.

After each use:

1. Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage. Look for any damage that would allow liquid to enter the probe. If any damage is found, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.
2. Look for damage that might allow liquid into the probe.

Before each use:

1. Inspect the probe.



CAUTION

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

Inspect the probe's lens, cable, casing, and connector for cracks, cuts, tears, and other signs of physical damage.

2. Look for damage that might allow liquid into the probe.
3. Test the functionality of the probe.

1. Housing
2. Strain relief
3. Seal
4. Lens

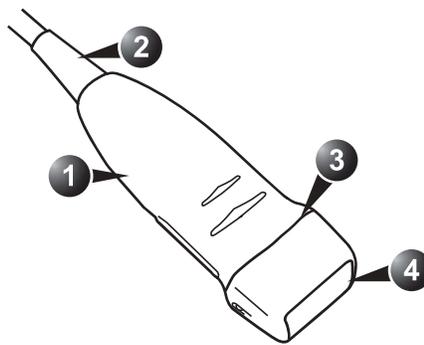


Figure 17-3. Probe parts

Probe Care Cards

The Probe Care Card contains a list of chemicals that have been tested for compatibility with GE Ultrasound probes. The reprocessing instructions provided in this document have been validated with the chemicals specified in Table 17-8 on page 17-29.

The Probe Care Card is supplied with every probe and can also be downloaded from:

Table 17-3: Documentation Web Site

Documentation Web Site
Support Documentation Library Web Site:
http://www3.gehealthcare.com/en/Support/Support_Documentation_Library

Adequate cleaning and disinfection between patient cases are necessary to prevent disease transmission. All probes must be thoroughly cleaned prior to disinfection. The level of disinfection required is based on patient contact.

- Probes that contact mucosal or non-intact skin require cleaning followed by High-Level Disinfection by either soaking or use of a Trophon EPR. Verify probe compatibility on the GE probe website shown below.
- Probes that contact intact skin require cleaning followed by Intermediate-Level Disinfection (wipe or spray).

Table 17-4: Probe Web Site

Probe Web Site
Ultrasound Probe Web Site
http://www.gehealthcare.com/transducers

Probe Care Cards (continued)

With the exception of the chemicals listed in Table 17-8, the chemicals listed in Table 17-10, Table 17-11 and Table 17-12 have been validated for compatibility only. Therefore, only those agents listed in Table 17-8 are recommended due to validated efficacy, and any reprocessing performed using chemicals not listed in Table 17-8 must be validated by the user.

- Verify probe compatibility using Table 17-5, Table 17-8, Table 17-10, Table 17-11, and Table 17-12, as well as the Ultrasound Probe Website listed above.

Table 17-5: Automated High-level Disinfectants Compatible with Non-TEE probes

Chemical Name	Manufacturer	3G-RS	6S-RS	12S-RS	12L-RS	L8-181-RS	4C-RS	E8C-RS	E8Cs-RS	LK760-RS	9L-RS	8C-RS	L6-12-RS	RAB2-6-RS
trophon EPR	Nanosonics Limited	X	X	X	X	X	X	X	X		X	X	X	X
trophon2	Nanosonics Limited	X	X	X	X	X	X	X	X		X	X	X	X



CAUTION

CREUTZFELD-JACOB DISEASE

This device is not indicated for neurological use. Neurological contact on patients with this disease **MUST BE** avoided. If a device/probe becomes contaminated, there is no adequate means to disinfect it. In this case, the contaminated device/probe **MUST BE** discarded in accordance with local biologic waste hazard procedures.



Biological Hazard

Probe Pre-Treatment at the Point of Use (Required for All Probes)

The pre-treatment step is for removal of gel and gross contamination.

1. After each use, remove protective sheath from the probe and gently remove all coupling gel from the probe by wiping with soft, lint-free cloth.



DO NOT use abrasive paper products when cleaning or wiping a GE Ultrasound probe. The use of abrasive wipes can damage the soft lens (acoustic window).

2. Wipe the probe with one of the wipes listed in Probe Care Card from the strain relief to the lens. Use a second wipe and wipe from the strain relief, down the cable. Wipe the cable with a lint-free cloth dampened with potable water to remove chemical residue. Dispose of the cloth, wipe and gloves in the clinical trash.

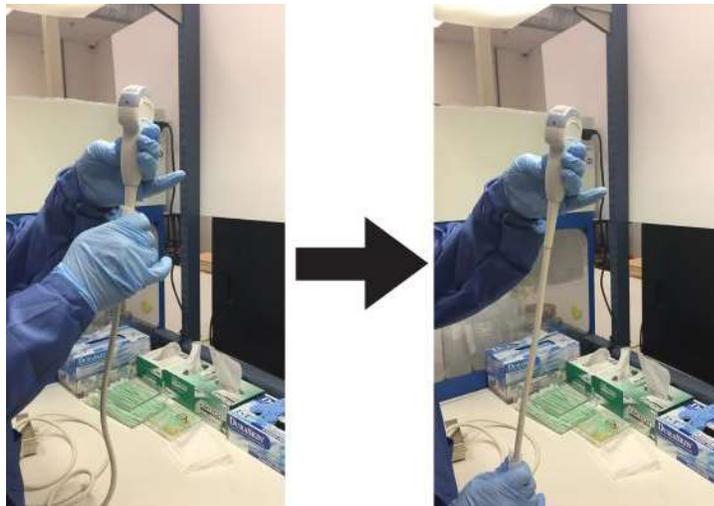


Figure 17-4. Cleaning the Probe Cable

NOTE: *Use of wipes listed in the Probe Care Card may result in discoloration of the cable.*

Probe Pre-Treatment at the Point of Use (Required for All Probes)

(continued)



Use caution when cleaning the connector. This cable connector should only be cleaned with a slightly dampened cloth or wipe. Exposure to excessive moisture will result in damage to the probe and possibly the ultrasound console. **DO NOT** wet the connector/console interface surface or labels.

3. After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe. If the probe is damaged, do not place it into any liquid (e.g. for disinfection) and do not use it until it has been inspected and repaired/replaced by a GE Service Representative.

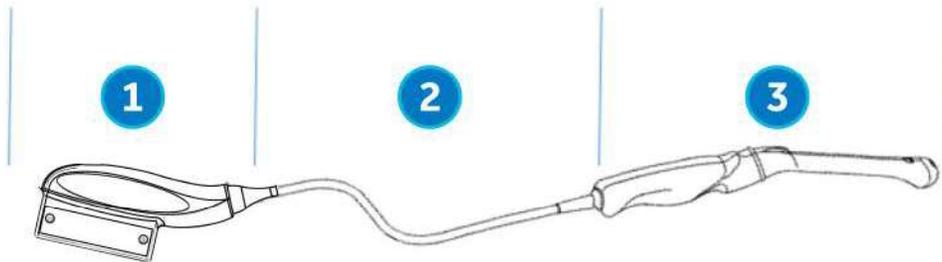


Figure 17-5. Inspect the Lens, Cable, and Probe House After Each Use

1. Cleaning only portion
2. Cleaning only or cleaning and disinfection portion
3. Cleaning followed by appropriate level of disinfection

Cleaning with Wipes

Manual cleaning is required to ensure the probes are cleaned to the extent necessary for further processing. Choose the most appropriate method, either the wipe or enzymatic soak.

1. Hold the probe at the proximal end near the strain relief cable. **DO NOT** suspend or hold the probe by the cable as this may damage the probe.
2. Dispense a cleaning wipe from the wipe canister.
3. Gently wipe the probe with a cleaning wipe from the cable strain relief to the distal end. Gently wipe the probe's lens.

NOTE:

Pay special attention to lens, edges, and grooves.

4. Turn the probe and continue wiping until the entire surface of the probe has been cleaned. As the wipe becomes visibly soiled, discard the wipe into clinical trash and dispense fresh wipes as needed.
5. Wrap a clean wipe around a soft nylon bristle brush to access crevasses, such as biopsy notches, on the surface of the probe.
6. Visually inspect the probe for any remaining soil and, if necessary, repeat steps 3 through 5 until the probe is visibly clean.

Probe Manual Cleaning Instructions – Enzymatic Detergent

1. Ensure the probe has been disconnected from the console. Put on a clean pair of gloves and fill a sink or basin with warm potable water (30 - 40°C) to a level allowing immersion of the probe up to the immersion line shown in the user manual.
2. Prepare the cleaning solution in accordance with the detergent manufacturer's instructions.
3. Immerse the probe in the prepared cleaning solution up to the immersion line and ensure no air bubbles are trapped on the surface. Do not submerge probe beyond the immersion line shown in the user manual and in Figure 17-13 on page 17-24.
4. Brushing with a clean, soft, nylon bristle brush from the base of the cable strain relief to the distal tip is critical to ensure cleaning and disinfection efficacy.



Figure 17-6. Cleaning the probe using a brush



CAUTION

Do not use the brush on the probe lens.

Probe Manual Cleaning Instructions – Enzymatic Detergent (continued)

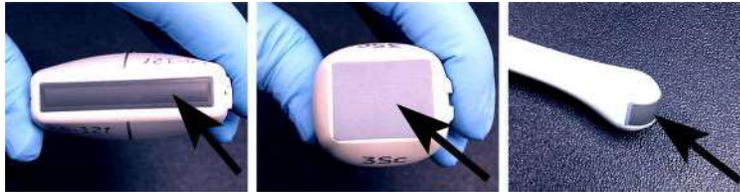


Figure 17-7. Probe Lens Examples

5. Continue brushing the probe for not less than the minimum contact time listed on the detergent manufacturer's label.
6. Visually inspect the probe for soil. Repeat Steps 3 through 5 until all visible soil has been removed from the surface of the probe.
7. Rinse the probe under running warm potable water (30 - 40°C) for not less than 2 minutes. Scrub the surface of the probe with a clean, soft, nylon bristle brush from the base of the cable strain relief to the distal tip.



CAUTION

DO NOT use the brush on the probe lens.

8. Visually inspect the device in a well-lit area to ensure all surfaces are free from residual cleaning solution. Repeat Step 7 if visible cleaning solution is observed.
9. Thoroughly dry the probe using a clean lint-free soft and dry cloth or wipe.



CAUTION

DO NOT use a twisting motion or abrasive paper products when wiping the probe as this may damage the soft lens.

Cable and Connector Manual Cleaning



WARNING

Use caution when cleaning the connector. This cable connector should only be cleaned with a slightly dampened cloth or wipe. Exposure to excessive moisture will result in damage to the probe and possibly the ultrasound console. **DO NOT** wet the connector/console interface surface or labels.

1. The cable and connector surfaces can be cleaned with the cleaners or wipes listed in the Probe Care Card.

NOTE:

Use of wipes listed in the Probe Care Card may result in discoloration of the cable.

2. Wipe the cable with a lint-free cloth dampened with potable water to remove chemical residue.

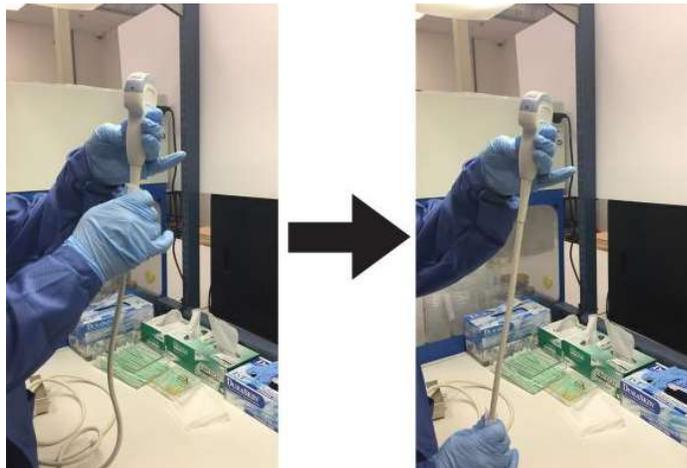


Figure 17-8. Cleaning the Probe Cable

Probe Intermediate-Level Disinfection - Spray

For Intermediate-Level Disinfection of surface-contacting probes, choose either the spray or wipe method.

NOTE: *Probes that contact only intact skin may be disinfected in this manner. All probes that contact non-intact skin or mucous membranes (e.g., endocavitary, Transesophageal) require High-Level Disinfection.*



After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe. If the probe is damaged, do not place it into any liquid (e.g. for disinfection) and do not use it until it has been inspected and repaired/replaced by a GE Service Representative.

1. Put on a new pair of gloves and spray enough disinfectant solution to saturate a new disposable lint-free wipe or cloth.
2. Holding the probe near the strain relief, apply the dampened cloth to the patient contacting lens. Wipe the probe from the lens to the strain relief, slightly rotating the probe after each wiping pass.
3. After the probe has been completely wiped, dampen a second wipe with disinfectant and starting at the probe lens begin wiping the probe in a rotating motion moving down towards the strain relief. Spray disinfectant directly on the recessed areas and ridges to saturate.

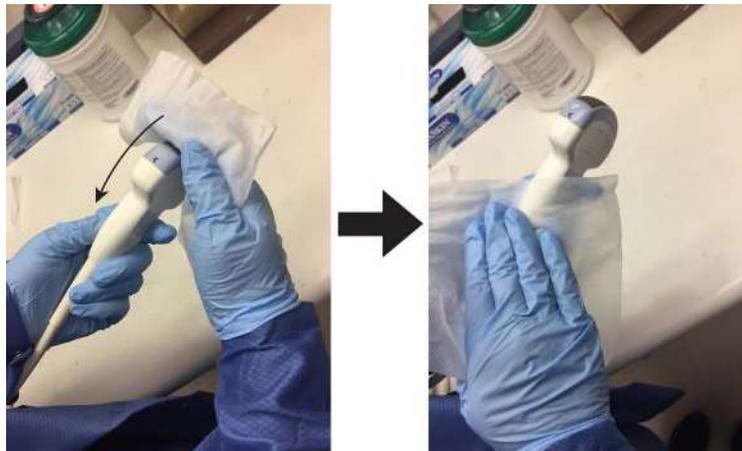


Figure 17-9. Disinfecting the Probe Moving from Lens to Strain Relief

Probe Intermediate-Level Disinfection - Spray (continued)

4. Once the probe has been completely wiped, dampen a third wipe with disinfectant and continue wiping the probe as needed to ensure the surface remains wet for the required exposure time. Use as many wipes as needed and respray disinfectant on recessed areas and ridges, to ensure all surfaces remain wet for the minimum required contact time listed in the disinfectant manufacturer's instructions for use.
5. Dry all surfaces of the probe using a soft, lint-free wipe or cloth.
6. Saturate a soft, lint-free wipe with de-ionized or purified water (remove excess water, wipe should be damp but not dripping) and thoroughly wipe all surfaces of the probe to remove chemical residue. Discard the wipe.
7. A total of three (3) rinses are required. Repeat Step 6 two additional times using new wipes and water.



WARNING

Failure to properly rinse probes with water following disinfection may cause skin irritation.

8. Thoroughly dry all surfaces of the probe using a soft, lint-free wipe or cloth, changing wipes/cloths when necessary to ensure the probe is completely dry. Visually inspect the probe to ensure all surfaces are dry. Repeat drying steps if any moisture is visible.
9. If the probe is not immediately reused, store the probe in a manner that will protect and keep the probe from being recontaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

Probe Intermediate-Level Disinfection - Disinfectant Wipe



CAUTION

After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe. If the probe is damaged, do not place it into any liquid (e.g. for disinfection) and do not use it until it has been inspected and repaired/replaced by a GE Service Representative.

1. Put on a new pair of gloves. Holding the probe near the strain relief, apply the wipe to the patient contacting lens. Wipe the probe from the lens to the strain relief, slightly rotating the probe after each wiping pass.
2. After the probe has been completely wiped, use a second wipe and starting at the probe lens begin wiping the probe in a rotating motion moving down towards the strain relief. Wring the wipe above recessed areas, seams, and ridges to drip disinfectant directly onto these less accessible surfaces.

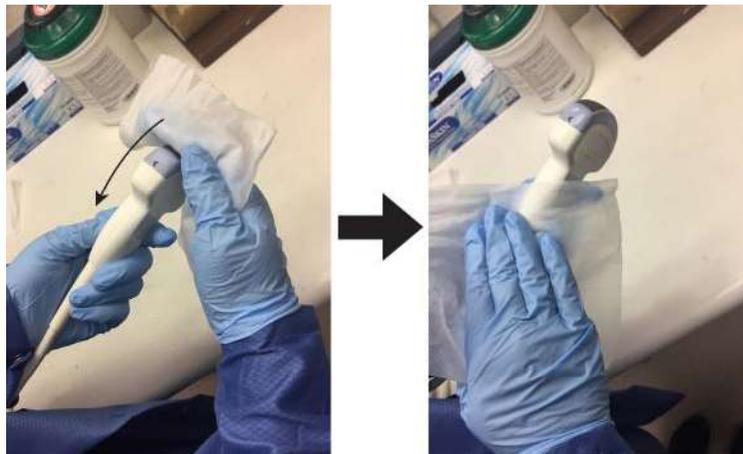


Figure 17-10. Disinfecting the Probe Moving from Lens to Strain Relief

NOTE:

Probes that contact only intact skin may be disinfected in this manner. All probes that contact mucous membranes (e.g., endocavitary, Transesophageal) require High-Level Disinfection.

Probe Intermediate-Level Disinfection - Disinfectant Wipe (continued)

3. Once the probe has been completely wiped, use a third wipe and continue wiping the probe as needed to ensure the surface remains wet for the required exposure time. Use as many wipes as needed and drip additional disinfectant on recessed areas and ridges, to ensure all surfaces remain wet for the minimum required contact time listed in the disinfectant manufacturer's instructions for use.

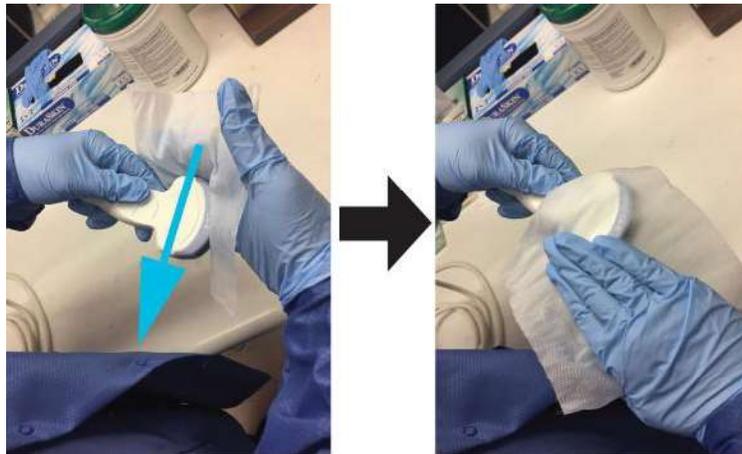


Figure 17-11. Disinfecting the Probe

4. Dry all surfaces of the probe using a soft, lint-free wipe or cloth.
5. Saturate a soft, lint-free wipe with de-ionized or purified water (remove excess water, wipe should be damp but not dripping) and thoroughly wipe all surfaces of the probe to remove chemical residue. Discard the wipe.
6. A total of three (3) rinses are required. Repeat Step 5 two additional times using new wipes and water.



Failure to properly rinse probes with water following disinfection may cause skin irritation.

Probe Intermediate-Level Disinfection - Disinfectant Wipe (continued)

7. Thoroughly dry all surfaces of the probe using a soft, lint-free wipe or cloth, changing wipes/cloths when necessary to ensure the probe is completely dry. Visually inspect the probe to ensure all surfaces are dry. Repeat drying steps if any moisture is visible.
8. If the probe is not immediately reused, store the probe in a manner that will protect and keep the probe from being recontaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

Probe High Level Disinfection – Soak

High-Level Disinfection is required for devices that contact intact mucous membranes or non-intact skin. High Level Disinfection can be performed using either a disinfectant soaking method or an automated system such as Trophon® EPR.



CAUTION

After each use, inspect the lens, cable, and housing of the probe. Look for any damage that would allow liquid to enter the probe. If the probe is damaged, do not place it into any liquid (e.g. for disinfection) and do not use it until it has been inspected and repaired/replaced by a GE Service Representative.

1. Ensure the probe has been disconnected from the console. Put on a clean pair of gloves and fill a sink or basin with High-Level Disinfectant diluted in accordance with the disinfectant manufacturers instructions to a level allowing immersion of the probe up to immersion line shown in the Ultrasound console's user manual.

NOTE: *Cleaning and disinfection instructions for Transesophageal probes are documented in the Transesophageal Probe Care Card and User Manual.*

NOTE: *All semi-critical probes* that contact mucous membranes require High-Level Disinfection.*

*Semi-critical probes are probes that contact mucous membranes or non-intact skin.

NOTE: *Handles of semi-critical probes that are not submerged during High-Level Disinfection require low or Intermediate-Level Disinfection to avoid cross contamination.*

Probe High Level Disinfection – Soak (continued)

2. Immerse probe in the disinfectant up to the immersion line and ensure no air bubbles are trapped. Ensure the probe remains in the disinfectant for at least the minimum contact time listed in the disinfectant manufacturer's instructions for use.

NOTE: *Over-exposing ultrasound probes to high-level disinfectants may damage the ultrasound probe. NEVER exceed the disinfectant manufacture's maximum exposure time.*



Ensure that the probe is suspended. The probe face should not be resting against the tank/basin surface and should be in full contact with the liquid. Carefully place the probe in the basin, taking care not to damage the transducer lens.



Figure 17-12. Probe suspended in disinfectant basin

3. Thoroughly rinse the probe by immersing it in a large volume of critical (purified) water for a minimum of 1 (one) minute. Remove the probe and discard the rinse water. Do not reuse the water. Always use fresh volumes of water for each rinse. Repeat Step 3 two additional times, for a total of 3 (three) rinses.



Failure to properly rinse probes with water following disinfection may cause skin irritation.

Probe High Level Disinfection – Soak (continued)

4. Thoroughly dry all surfaces of the probe using a soft, lint-free wipe or cloth, changing wipes' cloths when necessary to ensure the probe is completely dry. Visually inspect the probe to ensure all surfaces are clean and dry. Repeat drying steps if any moisture is visible.
5. If the probe is not immediately reused, store the probe in a manner that will protect and keep the probe from being recontaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

The instructions provided above have been validated to properly prepare GE Ultrasound probes for re-use. It remains the responsibility of the processor to ensure that the processing is performed as specified in this document. This may require verification and routine monitoring of the process.

Probe High Level Disinfection – Soak (continued)

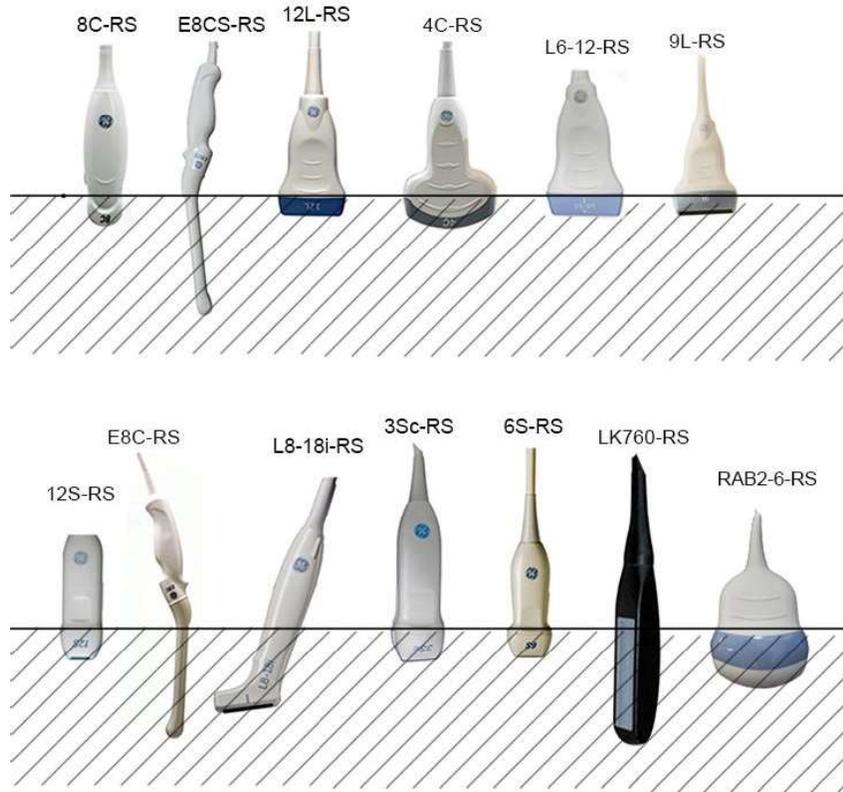
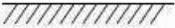


Figure 17-13. Probe Immersion Levels, 1=Fluid Level

Table 17-6: Description of Pictogram for Probe Immersion Levels

Pictogram	Description
	Fluid Level

Probe High Level Disinfection – Soak (continued)



WARNING

Use only high-level disinfectants that are listed in the Probe Care Card enclosed with the probe. In addition, refer to the local / national regulations.

Do not steam autoclave or subject the probe to Ethylene Oxide (ETO).



WARNING

Do not immerse the probe in liquid beyond the level specified for that probe (see Figure 17-13).

Never immerse the probe connector or probe adapters in liquid. The probe should not be exposed to the disinfectant longer than specified to achieve the desired effect.

DO NOT soak or saturate probes with solutions containing alcohol, bleach, ammonium chloride compounds or hydrogen peroxide.



WARNING

CREUTZFELDT-JACOB DISEASE

Neurological use on patients with this disease must be avoided. If a probe becomes contaminated, there is no adequate disinfecting means.



CAUTION

Ensure that you follow the probe disinfection procedure provided by GE.

Table 17-7: Description of Pictogram on Probe Care Cards

Pictogram	Description	Standard
	“ATTENTION” - Consult accompanying documents” is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.	ISO 7000-0434A
	“CAUTION” - Dangerous voltage (the lightning flash with arrowhead) is used to indicate electric shock hazards.	IEC 60417-6042

Probes and Biopsy

Table 17-7: Description of Pictogram on Probe Care Cards (Continued)

Pictogram	Description	Standard
	Biohazard - Patient/user infection due to contaminated equipment. Usage • Cleaning and care instructions • Sheath and glove guidelines	ISO7000-0659
	Ultrasound probes are highly sensitive medical instruments that can easily be damaged by improper handling. Use care when handling and protect from damage when not in use.	N/A-by GE Healthcare
	Do not immerse the probe into any liquid beyond the level specified for that probe. Refer to the user manual of the ultrasound system.	N/A-by GE Healthcare
	Since there is a possibility of having negative effects on the probe, observe the specified immersing time by the germicide manufacturer strictly. Do not immerse the probe in liquid chemical germicides more than the time prescribed in the care card.	N/A-by GE Healthcare
	"Consult accompany document" - Refer to the ultrasound system user manual for important probe care and cleaning instruction.	ISO 7010-M002



CAUTION

Review the probe care card that is packed with each probe.



CAUTION

Please refer to the probe care card for GE approved probe disinfectants.

Probe High-Level Disinfection - Trophon® EPR

When performing High-Level Disinfection of GE ultrasound probes with the Trophon® EPR, it is not necessary to disconnect the probe from the ultrasound system. The probe must be inactive (not selected) during the disinfection cycle.

1. Upon completion of probe cleaning, ensure the probe has been thoroughly dried with a clean, lint-free soft and dry cloth or wipe. Carefully dry the probe by wiping from the distal tip to the strain relief.



DO NOT use abrasive paper products when cleaning or wiping a GE Ultrasound Probe. The use of abrasive wipes can damage the soft lens (acoustic window).



DO NOT use a twisting motion when wiping the probes as this may damage the soft lens.

2. Visually inspect the probe to ensure the probe is visibly clean.
3. Follow the Trophon instructions for probe placement and operation of the Trophon system. Incorrect positioning of the probe may lead to High-Level Disinfection not being achieved.



Damage to the probe may occur if the probe is placed in contact with the Trophon chamber wall. Curved probes must be correctly positioned in the chamber using the Curved Probe Positioner (CPP) supplied with the Trophon system.

4. Once the Trophon High-Level Disinfection cycle is complete, don a new set of gloves and promptly remove the probe from the Trophon machine. DO NOT allow the probe to remain in the machine for extended periods of time.

Probe High-Level Disinfection - Trophon® EPR (continued)

5. Hold the probe at the proximal end near the strain relief cable. DO NOT suspend or hold the probe by the cable, as this may damage the probe.
6. Wipe the probe from the distal end to the proximal end with a clean, lint-free soft and dry cloth or wipe to remove any residual hydrogen peroxide from the probe surface.



CAUTION

DO NOT use a twisting motion or abrasive paper products when wiping the probe.

7. If the probe is not immediately reused, store the probe in a manner that will protect and keep the probe from being recontaminated. This may be accomplished by placing the probe in a storage cabinet with filtered air flow and/or by using a disposable storage cover placed over the probe.

Chemicals Used for Efficacy Validation

The table below lists the products and intended use (clean, Intermediate-Level Disinfection, High-Level Disinfection) that were validated.

Table 17-8: Chemicals used for Efficacy Validation

Product Type	Trade Name	Manufacturer	Minimum Contact Time	Active Ingredient
Cleaning (Wipe)	Oxivir® Tb	Diversey	N/A	Hydrogen Peroxide
Enzymatic Detergent (Soak)	Enzol® (Cidezyme®)	Advanced Sterilization Products® (J&J)	1-Minute Soak	Proteolytic Enzymes
	MetriZyme™	Metrex™		
	Prolystica® 2X Concentrate Presoak & Cleaner	Steris		
Intermediate-level Disinfectant (wipe)	Oxivir® Tb	Diversey	10-Minute Exposure	Hydrogen Peroxide
High-level Disinfectant (Soak)	Cidex® OPA	Advanced Sterilization Products (J&J)	10-Minute Soak	Ortho-phthalaldehyde
	McKesson OPA/28	McKesson		

A full list of chemicals tested for compatibility is available at the GE Probe Web Site:

Table 17-9: Probe Web Site

Probe Web Site
Ultrasound Probe Web Site
http://www.gehealthcare.com/transducers

Probes and Biopsy

Table 17-10: Cleaners Compatible with Non-TEE probes

Trade Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
AniosClean Excel D	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X	X	X	X
Aniosyme X3	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X	X	X	X
Aniosyme DD1	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X
Bodex Forte	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X
Cidezyme / Enzol	Advanced Sterilization Products	X	X	X	X	X	X	X	X	X	X		X	X
Eco-Zyme Multi-Tiered Enzymatic Detergent	Pro-Line Solutions Inc.	X	X	X	X	X	X	X	X	X	X		X	X
EmPower	Metrex	X	X	X	X	X	X	X	X	X	X		X	X
Endozime	The Ruhof Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Endozime Sponge	The Ruhof Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Endozime AW Triple Plus with APA	The Ruhof Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Endozime SLR	The Ruhof Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Endozime SLR Sponge	The Ruhof Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Enzyclean II Dual Enzyme Detergent	Micro-Scientific (Weiman)	X	X	X	X	X	X	X	X	X	X	X	X	X
gigasept AF	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
gigazyme	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
gigazyme X-tra	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
Intercept Detergent	Mediavators	X	X	X	X	X	X	X	X	X	X		X	X
Matrix	Whiteley Medical	X	X	X	X	X	X	X	X	X	X		X	X
Metrizyme	Metrex	X	X	X			X	X		X	X		X	X
Polystica 2X Concentrate Enzymatic Presoak and Cleaner	STERIS Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Polystica	STERIS Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Pure Enzymatic Detergent	EndoChoice	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 17-10: Cleaners Compatible with Non-TEE probes

Trade Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Revital-Ox Enzymatic Detergents (with or without dye and fragrance)	STERIS Corporation	X	X	X	X	X	X	X	X	X	X	X	X	X
Sekusept MultiEnzyme	Ecolab	X	X	X	X	X	X	X	X	X	X		X	X
Septanios MD	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X
Cygnus Simple2 Multi-Tiered Enzymatic Detergent (bottle or sponge kits)	Cygnus Medical	X	X	X	X	X	X	X	X	X	X		X	X
Soft Soap	All manufacturer	X	X	X	X	X	X	X	X	X	X		X	X
Valsure Enzymatic Cleaner	STERIS Corporation	X	X	X	X	X	X	X	X	X	X	X	X	X

Probes and Biopsy

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Liquid/ Spray	Accel INTERVention RTU	Diversey (Sealed Air)	X	X	X			X	X	X	X	X		X	X
	Accel TB RTU	Diversey (Sealed Air)	X	X	X			X	X	X	X	X		X	X
	Acryl-Des	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
	Acrylan	Antiseptica Chem. Phar. Produkte	X	X	X	X	X	X	X	X	X	X		X	X
	Alcohol 70% Ethanol on a wipe	All manufacturer	X	X	X	X	X	X	X	X	X	X		X	X
	Alcohol 70% Isopropanol on a wipe	All manufacturer	X	X	X	X	X	X	X	X	X	X		X	X
	Bacillol 30 Foam	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X
	Bacillol AF	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X
	Bacillol plus	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X
	Biguacid-S	Antiseptica Chem. Phar. Produkte	X	X	X	X	X	X	X	X	X	X		X	X
	CaviCide	Metrex	X	X	X	X	X	X	X	X	X	X		X	X
	CaviCide 1	Metrex	X	X	X	X	X	X	X	X	X	X		X	X
	CaviCide AF	Metrex	X	X	X	X	X	X	X	X	X	X	X	X	X
	Cidalkan	Alkapharm	X	X	X	X	X	X	X	X	X	X		X	X
	Clinell Universal Spray	GAMA Healthcare Ltd	X	X	X	X	X	X	X	X	X	X		X	X
	Clorox broad spectrum quaternary disinfectant cleaner	CloroxPro	X	X	X	X	X	X	X	X	X	X		X	X

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Liquid/ Spray	Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Liquids and Spray	CloroxPro	X	X	X			X	X	X	X	X		X	X
	Hibitane (5% Chlorhexidine gluconate)	All manufacturer		X					X		X	X		X	X
	Mikrozid sensitive liquid	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
	Optim 33TB RTU	SciCan	X	X	X			X	X	X	X	X		X	X
	Oxivir Tb RTU	Diversey (Sealed Air)	X	X	X			X	X	X	X	X		X	X
	PCS 1000 Oxidizing Disinfectant/ Disinfectant Cleaner	Process Cleaning Solutions Ltd	X	X	X	X	X	X	X	X	X	X	X	X	X
	Protex disinfectant spray	Parker Laboratoires Inc.	X	X	X	X	X	X	X	X	X	X		X	X
	SurfaSafe	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X
	Surfa'Safe Premium	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X	X	X	X
	Transeptic Spray	Parker Laboratoires Inc.		X						X		X			
Liquid/ Spray	Tristel Duo ULT	Tristel Solutions Limited	X	X	X	X	X	X	X	X	X	X		X	X

Probes and Biopsy

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS	
Wipes	Accel INTERVention Wipes	Diversey (Sealed Air)	X	X	X			X	X	X	X	X		X	X	
	Accel TB Wipes	Diversey (Sealed Air)	X	X	X			X	X	X	X	X		X	X	
	Anios Quick Wipes	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X	
	Asepti-Wipes II	Ecolab	X	X	X	X	X	X	X	X	X	X	X	X	X	
	Bacillol 30 Tissues	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X	
	Bacillol AF Tissues	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X	
	Bactinyl Lingettes desinfectantes inodores	Laboratoire Garcin-Bactinyl	X	X	X	X	X	X	X	X	X	X	X		X	X
	CaviWipes	Metrex	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	CaviWipes 1	Metrex	X	X	X	X	X	X	X	X	X	X		X	X	
	CaviWipes AF	Metrex	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Cidalkan Wipes	Alkapharm	X	X	X	X	X	X	X	X	X	X		X	X	
	Cleanisept Wipes	Dr. Schumacher GmbH	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Cleanisept Wipes forte	Dr. Schumacher GmbH	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Clinell Clorox Wipes	GAMA Healthcare Ltd	X	X	X	X	X	X	X	X	X	X		X	X	
Clinell Universal Sanitising wipes or Clinell Universal wipes	GAMA Healthcare Ltd	X	X	X	X	X	X	X	X	X	X		X	X		

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Wipes	Clorox Healthcare Bleach Germicidal wipes	CloroxPro	X	X	X	X	X	X	X	X	X	X		X	X
	Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Wipes	CloroxPro	X	X	X			X	X	X	X	X		X	X
	Clorox Healthcare Multi-Surface Quat Alcohol Cleaner Disinfectant Wipes	CloroxPro	X	X	X	X	X	X	X	X	X	X		X	X
	Clorox Healthcare VersaSure Cleaner Disinfectant Wipes	CloroxPro	X	X	X	X	X	X	X	X	X	X		X	X
	Dispatch hospital cleaner disinfectant towels with bleach	CloroxPro	X	X	X	X	X	X	X	X	X	X		X	X
	General purpose disinfectant wipes	Total Solutions	X	X	X	X	X	X	X	X	X	X		X	X
	Intercept Wipes	Medivators	X	X	X	X	X	X	X	X	X	X		X	X
	Matrix Wipes	Whiteley Medical	X	X	X	X	X	X	X	X	X	X		X	X
	Mikrobac tissues	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X
	Mikrozid sensitive wipes	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
	Mikrozid universal liquid and Mikrozid universal wipes	Schulke & Mayr GmbH	X	X	X	X	X	X	X	X	X	X		X	X
Optim 33TB Wipes	SciCan	X	X	X				X	X	X	X		X	X	

Probes and Biopsy

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Wipes	Oxivir Tb Wipes	Diversey (Sealed Air)	X	X	X			X	X	X	X	X		X	X
	PCS 1000 Oxidizing Disinfectant/ Disinfectant Cleaner Wipes	Process Cleaning Solutions Ltd	X	X	X	X	X	X	X	X	X	X	X	X	X
	Protex disinfectant wipes	Parker Laboratories Inc.	X	X	X	X	X	X	X	X	X	X		X	X
	Protex ULTRA Disinfectant Wipes	Parker Laboratories Inc.	X	X	X	X	X	X	X	X	X	X	X	X	X
	Reynard Premier Disinfectant Wipes	Reynard Health Supplies	X	X	X	X	X	X	X	X	X	X		X	X
	Reynard Neutral Detergent Wipes	Reynard Health Supplies	X	X	X	X	X	X	X	X	X	X		X	X
	Sani-Cloth Active	Ecolab	X	X	X	X	X	X	X	X	X	X	X	X	X
	Sani-Cloth Active	PDI	X	X	X	X	X	X	X	X	X	X	X	X	X
	Sani-Cloth AF Germicidal Disposable Wipe	PDI	X	X	X	X	X	X	X	X	X	X		X	X
	Sani-Cloth AF3 Germicidal Disposable Wipe	PDI	X	X	X	X	X	X	X	X	X	X		X	X
	Sani-Cloth Bleach Germicidal Disposable Wipe	PDI	X	X	X	X	X	X	X	X	X	X		X	X
	Sani-Cloth Plus Germicidal Disposable Cloth	PDI	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Wipes	Sani-Cloth Prime Germicidal Disposable Wipe	PDI	X	X	X	X	X	X	X	X	X	X		X	X
	Saraya Surface Sanitizing wipes	Saraya	X	X	X	X	X	X	X	X	X	X		X	X
	Septiwipes	Dr. Schumacher GmbH	X	X	X	X	X	X	X	X	X	X	X	X	X
	Shodokku Super wipes	Hakujuji	X	X	X	X	X	X	X	X	X	X		X	X
	Sofuraito disinfecting wipes	Asahi Kasei Chemicals Corporation	X	X	X	X	X	X	X	X	X	X		X	X
	SONO Ultrasound Wipes	Advanced Ultrasound Solutions Inc.	X	X	X	X	X	X	X	X	X	X		X	X
	Sukitto-Cloth wipes	Osaki Medical Corporation	X	X	X	X	X	X	X	X	X	X		X	X
	Sukitto-Cloth wipes refill	Osaki Medical Corporation	X	X	X	X	X	X	X	X	X	X		X	X
	Super Sani-Cloth Germicidal Disposable Wipe	PDI	X	X	X	X	X	X	X	X	X	X		X	X
	Tristel Pre-Clean Wipes	Tristel Solutions Limited	X	X	X	X	X	X	X	X	X	X		X	X
	Tristel Rinse Wipes	Tristel Solutions Limited	X	X	X	X	X	X	X	X	X	X		X	X
	Tristel Sporidical Wipe - Activated Wipe	Tristel Solutions Limited	X	X	X	X	X	X	X	X	X	X		X	X
	Tristel Trio Wipes System	Tristel Solutions Limited	X	X	X	X	X	X	X	X	X	X		X	X
	trophon Companion Cleaning Wipes	Nanosonics Limited	X	X	X	X	X	X	X	X	X	X	X	X	X
	trophon Companion Drying Wipes	Nanosonics Limited	X	X	X	X	X	X	X	X	X	X	X	X	X
Tuffle 5	Vernacare Ltd	X	X	X	X	X	X	X	X	X	X		X	X	

Probes and Biopsy

Table 17-11: Low and Intermediate-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
Wipes	V Wipes	Whiteley Medical	X	X	X	X	X	X	X	X	X	X		X	X
	Wet Wipe Chlorine Disinfection	Wet Wipe A/S	X	X	X	X	X	X	X	X	X	X		X	X
	Wet Wipe PHMB Disinfection	Wet Wipe A/S	X	X	X	X	X	X	X	X	X	X		X	X
	Wet Wipe Triamin Disinfection	Wet Wipe A/S	X	X	X	X	X	X	X	X	X	X	X	X	X
	Wet Wipe Universal	Wet Wipe A/S	X	X	X	X	X	X	X	X	X	X		X	X
	Wip'Anios Excel	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X	X	X	X
	Wip'Anios Premium	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X

Table 17-12: High-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	33C-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS	
High-Level Disinfectant	Aidal Plus (Only HLD, not sterilization)	Whiteley Medical	X	X	X	X	X	X	X	X	X	X		X	X	
	Anioxy-Twin	Laboratoires Anios		X					X	X	X	X		X	X	
	Anioxyde 1000	Laboratoires Anios		X					X	X	X	X		X	X	
	Bacillocid rasant	BODE Chemie GmbH (HARTMANN)	X	X	X	X	X	X	X	X	X	X		X	X	
	Cidex	Advanced Sterilization Products	X	X	X	X	X	X	X	X	X	X		X	X	
	Cidex OPA	Advanced Sterilization Products	X	X	X	X	X	X	X	X	X	X		X	X	
	Cidex Plus	Advanced Sterilization Products	X	X	X	X	X	X	X		X	X		X	X	
	gigasept FF neu	Schulke & Mayr GmbH	X	X	X				X	X		X	X		X	X
	gigasept PAA Concentrate	Schulke & Mayr GmbH		X					X	X	X	X		X	X	
	McKesson OPA 28	McKesson	X	X	X	X	X	X	X	X	X	X	X		X	X
	Metricide 14	Metrex	X	X	X	X	X	X	X	X	X	X	X		X	X
	Metricide 28	Metrex	X	X	X	X	X	X	X	X	X	X	X		X	X
	Metricide Plus 30	Metrex	X	X	X	X	X	X	X	X	X	X	X		X	X
	Metricide OPA Plus	Metrex	X	X	X				X	X	X	X	X		X	X
Opal	Whiteley Medical	X	X	X	X	X	X	X	X	X	X	X		X	X	

Probes and Biopsy

Table 17-12: High-level Disinfectants Compatible with Non-TEE probes

Product type	Chemical Name	Manufacturer	4C-RS	E8C-RS	3Sc-RS	6S-RS	12S-RS	L6-12-RS	9L-RS	RAB2-6-RS	12L-RS	L8-18i-RS	LK760-RS	E8Cs-RS	8C-RS
High-Level Disinfectant	Opaster Anios	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X
	Opidex OPA	Firson Co. Ltd.	X	X	X	X	X	X	X	X	X	X		X	X
	Rapicide High-Level Disinfectant and Sterilant (glutaraldehyde, use as HLD only)	Medivators Inc	X	X	X	X	X	X	X		X	X		X	X
	Rapicide OPA 28	Medivators Inc	X	X	X	X	X	X	X	X	X	X		X	X
	Revital-Ox Resert High Level Disinfectant	STERIS Corporation		X					X		X	X		X	X
	Steranios 2% (use as HLD only)	Laboratoires Anios	X	X	X	X	X	X	X	X	X	X		X	X
	Wavicide-01	Medical Chemical Corporation	X	X	X	X	X	X	X	X	X	X		X	X
Powder	Gigasept pearls	Schulke & Mayr GmbH		X					X	X	X	X		X	X
	HMC NF (HMC 9)	mdd Company GmbH		X					X	X	X	X		X	X
	Rely+On PeraSafe	The Chemours Company		X					X	X	X	X		X	X
	Sekusept Aktiv	Ecolab		X					X	X	X	X		X	X
	Sekusept Easy	Ecolab		X					X	X	X	X		X	X

Covering the Transducer using a Sterile, Protective Sheath



CAUTION

Protective barriers may be required to minimize disease transmission. Probe sheaths are available for use with all clinical situations where infection is a concern. Use of legally marketed, sterile probe sheaths is mandatory for intra-cavitary and intra-operative procedures.

1. Place an appropriate amount of gel inside the protective sheath and/or on the transducer face.

NOTE: *Failure to use imaging gel may result in poor image quality.*

2. Insert transducer into sheath, making sure to use proper sterile technique. Pull cover tightly over transducer face to remove wrinkles and air bubbles, taking care to avoid puncturing the sheath.



Figure 17-14. Applying the Sheath

1. Secure the Sheath with a rubber band.
2. The probe sheath should extend past the end of the probe to the probe's cable.

NOTE: *No gel was applied to the probe in this photo.*

3. Secure the sheath in place.

NOTE: *Failure to use a sheath that fully covers the transducer to the cable strain relief may lead to cross-contamination of the transducer.*

4. Inspect the sheath to ensure there are no holes or tears. If the sheath becomes compromised, stop the procedure and replace immediately.

Probe Safety

Handling precautions



Ultrasound probes are highly sensitive medical instruments that can easily be damaged by improper handling. Use care when handling and protect from damage when not in use. **DO NOT** use a damaged or defective probe. Failure to follow these precautions can result in serious injury and equipment damage.

Electrical shock hazard



The probe is driven with electrical energy that can injure the patient or user if live internal parts are contacted by conductive solution:

- **DO NOT** immerse the probe into any liquid beyond the level indicated by the immersion level diagram. Refer to the immersion illustration in the Probe Cleaning Process section. Never immerse the probe connector or probe adaptors into any liquid.
- **DO NOT** drop the probes or subject them to other types of mechanical shock or impact. Degraded performance or damage such as cracks or chips in the housing may result.
- Prior to each use, visually inspect the probe lens and case area for cracks, cuts, tears, and other signs of physical damage. **DO NOT** use a probe which appears to be damaged until you verify functional and safe performance. You must perform a more thorough inspection, including the cable, strain relief, and connector, each time you clean and disinfect the probe.
- Before inserting the connector into the probe port, inspect the probe connector pins. If a pin is bent, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.
- **DO NOT** kink, tightly coil, or apply excessive force on the probe cable. Insulation failure may result.
- Electrical leakage checks should be performed on a routine basis by GE Service or qualified hospital personnel. Refer to the service manual for leakage check procedures.

Mechanical hazards



CAUTION

A defective probe or excessive force can cause patient injury or probe damage:

- Observe depth markings and do not apply excessive force when inserting or manipulating intracavitary probes.
- Inspect probes for sharp edges or rough surfaces that could injure sensitive tissue.
- **DO NOT** apply excessive force to the probe connector when inserting into the probe port. The pin of a probe connector may bend.

Special handling instructions

Using protective sheaths



CAUTION

Protective barriers may be required to minimize disease transmission. Probe sheaths are available for use with all clinical situations where infection is a concern. Use of legally marketed, sterile probe sheaths is mandatory for intra-cavitary and intra-operative procedures.

Instructions. Custom made sheaths are available for each probe. Each probe sheath kit consists of a flexible sheath used to cover the probe and cable and elastic bands used to secure the sheath.

Sterile probe sheaths are supplied as part of biopsy kits for those probes intended for use in biopsy procedures. In addition to the sheath and elastic bands, there are associated accessories for performing a biopsy procedure which are included in the kit. Refer to the biopsy instructions for the specific probes in the Discussion section of this chapter for further information.

Reordering. To reorder sheaths, please contact your local distributor or the appropriate support resource.



CAUTION

Devices containing latex may cause severe allergic reaction in latex sensitive individuals. Refer to FDA's March 29, 1991 Medical Alert on latex products.



CAUTION

Do not use pre-lubricated condoms as a sheath. In some cases, they may damage the probe. Lubricants in these condoms may not be compatible with probe construction.



CAUTION

DO NOT use an expired probe sheath. Before using probe sheaths, verify whether the term of validity has expired.

Endocavitary Probe Handling Precautions

If there is disinfectant leaking from the probe, DO NOT use the probe until it has been inspected and released for further use by a GE service representative.



Sterile/sanitary sheaths are to be used on the probe during its actual use with patients. Wearing gloves protects the patient and operator.



Disinfectant Exposure to Patient: contact with a disinfectant to the patient's skin or mucous membrane may cause an inflammation. If this happens, refer to the disinfectant's instruction manual.

Disinfectant Exposure from Probe Handle to Patient: DO NOT allow the disinfectant to contact the patient. Only immerse the probe to its specified level. Ensure that no solution has entered the probe's handle before scanning the patient. If disinfectant comes into contact with the patient, refer to the disinfectant's instruction manual.

Disinfectant Exposure from Probe Connector to Patient: DO NOT allow the disinfectant to contact the patient. Only immerse the probe to its specified level. Ensure that no solution has entered the probe's connector before scanning the patient. If disinfectant comes into contact with the patient, refer to the disinfectant's instruction manual.

Probe handling and infection control

This information is intended to increase user awareness of the risks of disease transmission associated with using this equipment and provide guidance in making decisions directly affecting the safety of the patient as well as the equipment user.

Diagnostic ultrasound systems utilize ultrasound energy that must be coupled to the patient by direct physical contact. Depending on the type of examination, this contact occurs with a variety of tissues ranging from intact skin in a routine exam to recirculating blood in a surgical procedure. The level of risk of infection varies greatly with the type of contact.

One of the most effective ways to prevent transmission between patients is with single use or disposable devices. However, ultrasound transducers are complex and expensive devices that must be reused between patients. It is very important, therefore, to minimize the risk of disease transmission by using barriers and through proper processing between patients.



Risk of Infection. ALWAYS clean and disinfect the probe between patients to the level appropriate for the type of examination and use FDA-cleared probe sheaths where appropriate.



Adequate cleaning and disinfection are necessary to prevent disease transmission. It is the responsibility of the equipment user to verify and maintain the effectiveness of the infection control procedures in use. Always use sterile, legally marketed probe sheaths for intra-cavitary and intra-operative procedures.

Probe handling and infection control (continued)



CAUTION

In order for liquid chemical disinfectants to be effective, all visible residue must be removed during the cleaning process. Thoroughly clean the probe, as described earlier before attempting disinfection.

You **MUST** disconnect the probe from the Versana Active prior to cleaning/disinfecting the probe. Failure to do so could damage the system.

DO NOT soak probes in liquid chemical disinfectant for longer than is stated by the disinfectant instructions for use. Extended soaking may cause probe damage and early failure of the enclosure, resulting in possible electric shock hazard.



WARNING

Ultrasound transducers can easily be damaged by improper handling and by contact with certain chemicals. Failure to follow these precautions can result in serious injury and equipment damage.

- Do not immerse the probe into any liquid beyond the level specified for that probe. Never immerse the transducer connector or probe adapters into any liquid.
- Avoid mechanical shock or impact to the transducer and do not apply excessive bending or pulling force to the cable.
- Transducer damage can result from contact with inappropriate coupling or cleaning agents:
 - Do not soak or saturate transducers with solutions containing alcohol, bleach, ammonium chloride compounds or hydrogen peroxide
 - Avoid contact with solutions or coupling gels containing mineral oil or lanolin
 - Avoid temperatures above 50°C.
- Inspect the probe prior to use and after use for damage or degeneration to the housing, strain relief, lens and seal. Do not use a damaged or defective probe.

Coupling gels



WARNING

Do not use unrecommended gels (lubricants). They may damage the probe and void the warranty. Please refer to the probe care card for GE approved probe gels.

Applying

In order to assure optimal transmission of energy between the patient and probe, a conductive gel or couplant must be applied liberally to the patient where scanning will be performed.



CAUTION

Do not apply gel to the eyes. If there is gel contact to the eye, flush eye thoroughly with water.

Precautions

Coupling gels should not contain the following ingredients as they are known to cause probe damage:

- Methanol, ethanol, isopropanol, or any other alcohol-based product
- Mineral oil
- Iodine
- Lotions
- Lanolin
- Aloe Vera
- Olive Oil
- Methyl or Ethyl Parabens (para hydroxybenzoic acid)
- Dimethylsilicone
- Polyether glycol based
- Petroleum



WARNING

User should select the Non-toxic and nonirritating GEL.

Planned Maintenance

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

Table 17-13: Planned Maintenance Program

Do the Following	Daily	After Each Use	As Necessary
Inspect the Probes	X	X	X
Clean the Probes		X	X
Disinfect Probes		X	X

Returning/Shipping Probes and Repair Parts

US Department of Transportation and GE policy requires that equipment returned for service **MUST** be clean and free of blood and other infectious substances.

When you return a probe or part for service (Field Engineer or customer), you need to clean and disinfect the probe or part prior to packing and shipping the equipment.

Ensure that you follow probe cleaning and disinfection instructions provided in the Basic User Manual/User Guide.

This ensures that employees in the transportation industry as well as the people who receive the package are protected from any risk.

Sterile Ultrasound Procedures

ONLY ultrasound gel that is labeled as sterile, is sterile.

Ensure you always use sterile ultrasound gel for those procedures that require sterile ultrasound gel.

Once a container of sterile ultrasound gel is opened, it is no longer sterile and contamination during subsequent use is possible.

Probe Discussion

Introduction

The Versana Active supports the following types of probes:

- **Convex Array.** Convex Array probes.
- **Linear Array.** Linear Array probes.
- **Sector Phased Array.** Sector Phased Array probes.
- **Volume Probes.** 4D probe: Convex Array.



Probes for transvaginal and transrectal applications require special handling. Transvaginal/transrectal examinations and probe insertions should be performed only by personnel with adequate training. Refer to the user documentation enclosed with these probes.

Application

Table 17-14: Probe Indications for Use

Probe Application		3Sc-RS	6S-RS	12S-RS	4C-RS	8C-RS	E8C-RS	E8Cs-RS	L6-12-RS	12L-RS	L8-18i-RS	9L-RS	LK760-RS	RAB2-6-RS
Fetal/Obstetrics					X		X	X						X
Abdominal		X			X							X		X
Gynecology					X		X	X						X
Urology					X		X	X						X
Pediatric			X	X	X	X			X	X		X		
Small Organ (includes breast, testes, thyroid)									X	X	X	X		
Neonatal Cephalic			X	X		X								
Adult Cephalic		X												
Cardiac - Adult		X												
Cardiac - Pediatric		X	X	X		X								
Vascular/Peripheral Vascular					X				X	X	X	X		
Musculoskeletal Conventional					X	X			X	X		X	X	
Musculoskeletal Superficial									X	X	X	X		
Thoracic/Pleural		X			X				X	X		X		
Transcranial		X	X	X										
Transrectal							X	X						
Transvaginal							X	X						
Interventional guidance	Tissue biopsy	X			X		X	X	X	X		X		
	Fluid drainage	X			X		X	X	X	X		X		X
	Vascular access								X	X		X		
	Non-vascular access	X			X		X	X	X	X		X		

Features

Table 17-15: Probe Features

Probe Application	3Sc-RS	6S-RS	12S-RS	4C-RS	8C-RS	E8C-RS	E8Cs-RS	L6-12-RS	12L-RS	L8-18i-RS	9L-RS	LK760-RS	RAB2-6-RS
B Mode	X	X	X	X	X	X	X	X	X	X	X	X	X
M Mode	X	X	X	X	X	X	X	X	X	X	X	X	X
PW Doppler Mode	X	X	X	X	X	X	X	X	X	X	X	X	X
CW Doppler Mode	X	X	X										
Color Doppler Mode	X	X	X	X	X	X	X	X	X	X	X	X	X
Color M Doppler Mode	X	X	X										
Power Doppler Mode	X	X	X	X	X	X	X	X	X	X	X	X	X
Harmonic Imaging	X	X	X	X	X	X	X	X	X	X	X	X	X
Coded Pulse ²				X	X	X	X	X	X		X	X	X
3D, 4D Imaging mode													X
TUI													X
Combined modes ¹	X	X	X	X	X	X	X	X	X	X	X	X	X
Breast Care								X	X	X	X		
Strain Elastography Imaging								X	X		X		
Contrast Imaging				X									
LOGIQ View	X	X	X	X	X	X	X	X	X	X	X	X	X
Easy 3D	X	X	X	X	X	X	X	X	X	X	X	X	
Auto IMT								X	X	X	X		
Scan Assistant	X	X	X	X	X	X	X	X	X	X	X	X	X
Scan Coach	X	X	X	X	X	X	X	X	X	X	X	X	X
AMM	X	X	X	X	X								X
CAMM	X	X	X										
TVM	X	X	X										
TVI/TVD	X	X	X										
Stress Echo	X												
Bflow/Bflow Color				X				X	X		X		

Table 17-15: Probe Features

Probe Application	3Sc-RS	6S-RS	12S-RS	4C-RS	8C-RS	E8C-RS	E8Cs-RS	L6-12-RS	12L-RS	L8-18i-RS	9L-RS	LK760-RS	RAB2-6-RS
Sono Biometry				X									X
Advanced 3D	X	X	X	X	X	X	X	X	X	X	X	X	
Auto EF	X												
Breast Productivity								X	X	X	X		
Thyroid Productivity								X	X	X	X		
Auto Bladder				X		X	X						X
Follow-up tool	X	X	X	X	X	X	X	X	X	X	X	X	X
Needle Recg.				X				X	X		X		
Whizz	X	X	X	X	X	X	X	X	X	X	X	X	X
My Trainer													
Biopsy	X			X		X	X	X	X		X		X

1. Combined modes are B/M, B/Color M, B/PWD or CWD, B/Color/PWD or CWD, B/Power/PWD or CWD.
 2. Coded Pulse is for digitally encoded harmonics.

NOTE: *Not all features, products, probes or peripherals described in this document may be available or cleared for sale in all markets. Please contact your local GE Ultrasound representative to get the latest information.*

Specifications

Table 17-16: System Probe Definitions

Probe Designation	Center Image Frequency (MHz)	Frequency Range (MHz)	Doppler Frequency Range (MHz)
4C-RS	3.1 MHz \pm 10%	2.0~5.0	2.0~3.3
E8Cs-RS	6.5 MHz \pm 20%	4.0~10.0	4.0~6.0
3Sc-RS	2.75 MHz \pm 10%	1.7~4.0	1.7~3.3
L6-12-RS	7.75 MHz \pm 20%	4.0~13.0	4.0~6.0
12L-RS	7.5 MHz \pm 20%	4.2~13.0	4.2~7.7
6S-RS	4.5 MHz \pm 10%	2.5~7.0	2.5~4.5
12S-RS	7.75 MHz \pm 10%	4.1~12.0	4.1~6.7
LK760-RS	7.15 MHz \pm 10%	3.5~10.0	3.5~5.0
E8C-RS	6.5 MHz \pm 20%	4.2~10.0	4.2~6.3
8C-RS	6.5 MHz \pm 20%	4.2~10.0	4.2~6.3
9L-RS	5.25 MHz \pm 20%	4.0~10.0	4.0~5.0
L8-18i-RS	9.5 MHz \pm 20%	6.7~18.0	6.7~10.0
RAB2-6-RS	3.3 MHz \pm 10%	2.0~6.0	2.0~4.0

Slice Thickness Specification

Table 17-17: Slice Thickness Specification

Probe Designation	Probe Slice Thickness Specification [mm]
4C-RS	<= 12.0mm
E8Cs-RS	<= 13.0mm
3Sc-RS	<= 16.0mm
L6-12-RS	<= 8.0mm
12L-RS	<= 8.0mm
6S-RS	<= 8.0mm
12S-RS	<= 8.0mm
LK760-RS	<= 12.0mm
E8C-RS	<= 13.0mm
8C-RS	<= 13.0mm
9L-RS	<= 14.0mm
L8-18i-RS	<= 8.0mm
RAB2-6-RS	<= 12.0mm

Probe Illustration

Convex Probe

Table 17-18: Convex Probe Illustration

Probe	Illustration	Probe	Illustration
4C-RS		E8C-RS	
8C-RS		E8Cs-RS	

Linear Probe

Table 17-19: Linear Probe Illustration

Probe	Illustration	Probe	Illustration
L6-12-RS		12L-RS	
L8-18i-RS		LK760-RS	
9L-RS			

Sector Probe

Table 17-20: Sector Probe Illustration

Probe	Illustration	Probe	Illustration
3Sc-RS		6S-RS	
12S-RS			

4D Probe

Table 17-21: 4D Probe Illustration

Probe	Illustration	Probe	Illustration
RAB2-6-RS			

Biopsy Special Concerns

Precautions Concerning the Use of Biopsy Procedures



WARNING

Do not freeze the image during a biopsy procedure. The image must be live to avoid a positioning error.

Biopsy guidezones are intended to assist the user in determining optimal probe placement and approximate the needle path. However, actual needle movement is likely to deviate from the guideline. Always monitor the relative positions of the biopsy needle and the subject mass during the procedure.



CAUTION

The use of biopsy devices and accessories that have not been evaluated for use with this equipment may not be compatible and could result in injury.



CAUTION

The invasive nature of biopsy procedures requires proper preparation and technique to control infection and disease transmission. Equipment must be cleaned as appropriate for the procedure prior to use.

- Follow the probe cleaning and disinfection procedures and precautions to properly prepare the probe.
- Follow the manufacturer's instructions for the reprocessing of biopsy devices and accessories.
- Use protective barriers such as gloves and probe sheaths.
- After use, follow proper procedures for decontamination, cleaning, and waste disposal.

Precautions Concerning the Use of Biopsy Procedures (continued)



CAUTION

Improper reprocessing methods and the use of certain cleaning and disinfecting agents can cause damage to the plastic components that will degrade imaging performance or increase the risk of electric shock.

See 'Probe Safety' on page 17-42 for more information.



WARNING

NEVER reuse the TR5° disposable biopsy guide attachment and Disposable sterile Ultra-Pro II Needle guide kits.



CAUTION

Wear sterile gloves during the biopsy procedure. Be mindful of touching any non-sterilized surfaces to avoid cross contamination.

Preparing for a Biopsy

Displaying the Guidezone

Activate the Biopsy Kit by selecting it from the B-Mode.

The available biopsy options appear when Biopsy Kit is selected. There are fixed and adjustable angle biopsy kits and plastic/disposable and reusable biopsy guides available with the Versana Active depending on the probe. Select the desired biopsy kit.

Displaying the Guidezone (continued)

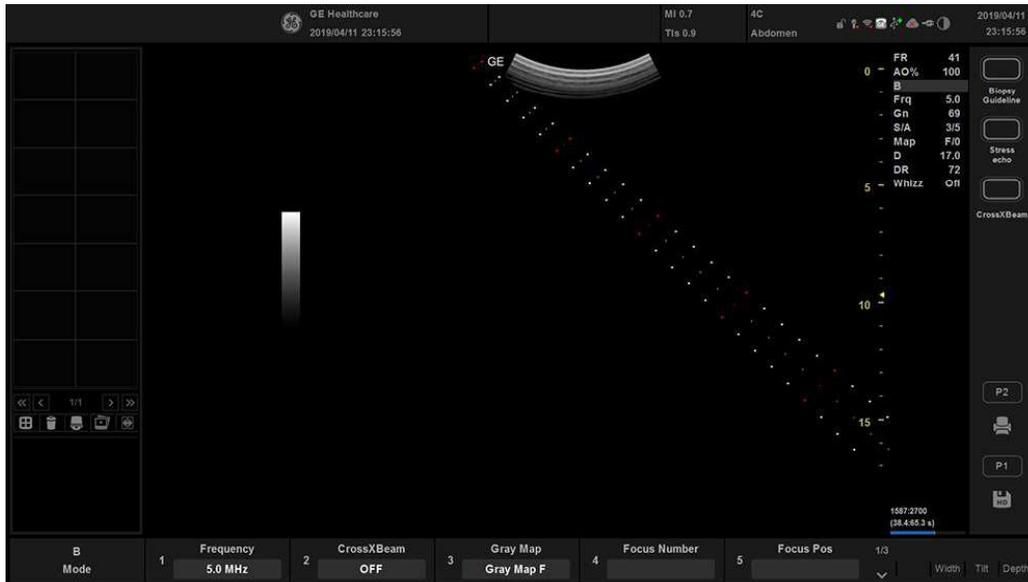


Figure 17-15. Biopsy Guidezones for the 4C-RS Probe

The biopsy guidezone represents a path of the needle. The dots which make up the guidezones is the depth readout where:

- Yellow represent 1 cm increments.
- Red represents 5 cm increments.

The display should be carefully monitored during a biopsy for any needle deviation from the center line or guidezone.

Before scanning, verify the needle can be visualized within the imaging plane. User appropriate needle length to reach target area.

Displaying the Guidezone (continued)

The Biopsy Guidezone adjusts along with image adjustments, such as image inversion/rotations, zoom and depth changes.

The needle may vary from the center line or guidezone for various reasons:

- Needle barrel to needle clearance or strength.
- Bracket manufacturing tolerance.
- Needle deflection due to tissue resistance.
- Needle size chosen. Thinner needles may deflect more.

Table 17-22: Biopsy Guide Availability

Probe	Fixed Angle	Multi-Angle		
		MBX1 (cm)	MBX2 (cm)	MBX3 (cm)
4C-RS		4	6	10
E8Cs-RS	TR5: 85 Degree (15.3 cm) RU: 90 Degree			
3Sc-RS		4.2	5.7	8.2
L6-12-RS		1.5	2.5	3.5
12L-RS		1.5	2.5	3.5
E8C-RS	TR5: 85 Degree (15.3 cm) RU: 90 Degree			
9L-RS		4	5.5	7
RAB2-6-RS		4	6	8



Failure to match the guidezone displayed to the guide may cause the needle to track a path outside the zone.

It is extremely important that when using the adjustable angle biopsy guides, the angle displayed on the screen matches the angle set on the guide, otherwise the needle will not follow the displayed guidezone which could result in repeated biopsies or patient injury.

Preparing the Biopsy Guide Attachment

Convex, Sector and Linear probes have optional biopsy guide attachments for each probe. The guide consists of a reusable bracket to attach to the probe, disposable needle clip to attach to the bracket, sheath, gel (sterile gel if necessary) and disposable needle barrels.

The disposable needle barrels are available for a variety of needle sizes.



Please refer to the manufacturer's instructions included in the biopsy kit.

The bracket is packaged non-sterile and is reusable. To avoid possible patient contamination, ensure bracket is properly cleaned, sterilized or disinfected before each use.

Disposable components are packaged sterile and are single-use only. Do not use if integrity of packing is violated or if expiration date has passed.

Fixed Needle Biopsy Guide Assembly



WARNING

DO NOT use the needle with the catheter (soft tube). There is a possibility of breaking the catheter in the body.



CAUTION

Before inserting the needle, scan the patient to determine the correct puncture depth and site. Only the sterile/sanitary sheath and rubber band are on the probe during the pre-needle placement scanning.

Preparation

To prepare the endocavitary probe for use:

1. Remove the probe from the box and carefully examine it for any damage.
2. If the biopsy guide is to be attached, use the filling removal tool to clean out the attachment area on the probe head.

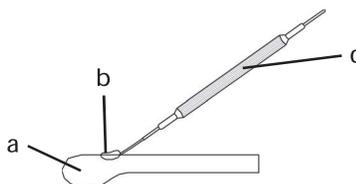


Figure 17-16. Attachment Filling Removal

- a. Probe Head
 - b. Attachment
 - c. Filling Removal Tool
3. Clean, then disinfect the probe.

NOTE: *Ensure that protective gloves are worn.*

Installing the sheath

To install the sheath:

1. Remove the sheath from its package. Do not unroll the sheath.

NOTE: *Remember to rinse all sanitary probe sheaths of powder before placing on the probe. Powder can degrade the displayed image.*

2. Place an adequate amount of ultrasound gel inside the sheath tip (the gel is between the sheath inner surface and the probe aperture).

NOTE: *Ensure that only acoustic coupling gel is used for this purpose.*

3. Place the sheath tip over the probe aperture and then pull the sheath end toward the probe handle.
4. Inspect the sheath for nicks, cuts or tears.

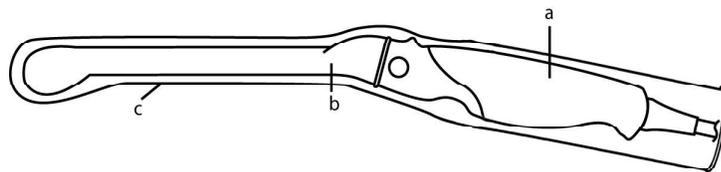


Figure 17-17. E8C-RS Probe with Sheath

- a. Probe Handle
 - b. Probe Body
 - c. Sanitary Sheath
5. Rub a finger over the tip of the probe to ensure all air bubbles have been removed.

Biopsy Guide Preparation

1. If a biopsy is to be performed, snap the metal or plastic biopsy guide on to the probe over the sheath.



Patient injury or repeated biopsies may result. The needle placement will not be as intended if the needle guide is not properly seated and secure.

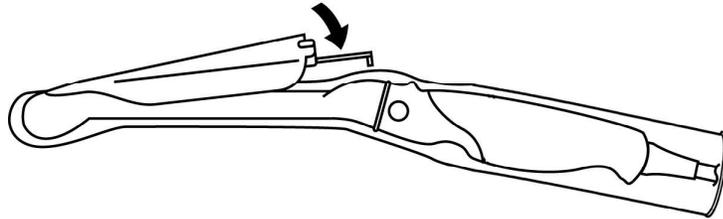


Figure 17-18. Disposable Biopsy Guide 5 degree Angle

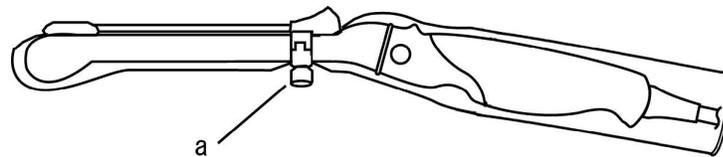


Figure 17-19. Reusable Biopsy Guide

- a. Fix with a screw
2. Place an adequate amount of ultrasound gel on the gel-filled sheath tip's outer surface.
 3. Ensure the guide is properly seated and secure by pushing forward on the needle insertion end of the guide until the attachment node is firmly in place in it's hole.

Multi Angle Biopsy Guide Assembly



WARNING

DO NOT attempt to use the biopsy bracket and needle guide until the manufacturer's instructions, provided with the biopsy bracket and needle guide in the kit, have been read and thoroughly understood.

1. Scan the patient and identify the target for biopsy. Move the probe to locate the target to the center of the image. Enable the system biopsy guidezone and try guidezone angles MBX1 to MBX3 to decide the best angle setting for needle path.



Figure 17-20. Example

2. Pull up on the knob (Figure 17-21 a) to freely move the needle guide attachment. Align the knob with the selected position of the needle guide attachment. Push the knob down (Figure 17-21 b) into the desired slot to secure the angle position of the needle guide attachment.



Figure 17-21. Pull up and push down the knob

Multi Angle Biopsy Guide Assembly (continued)

3. Fit a convex of the biopsy bracket (a) in a concave of the probe (b).

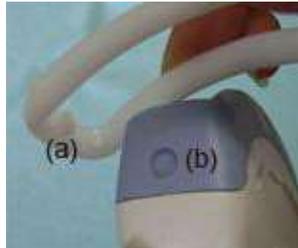


Figure 17-22. Probe/Bracket Alignment

Hold the side (a) and tuck down the needle guide side (b) until it clicks or locks in place.



Figure 17-23. Probe/Multi-angle Bracket Alignment 2

4. Place an adequate amount of coupling gel on the face of the probe.

Multi Angle Biopsy Guide Assembly (continued)

5. Place the proper sanitary sheath tightly over the probe and biopsy bracket. Use the rubber bands supplied to hold the sheath in place.

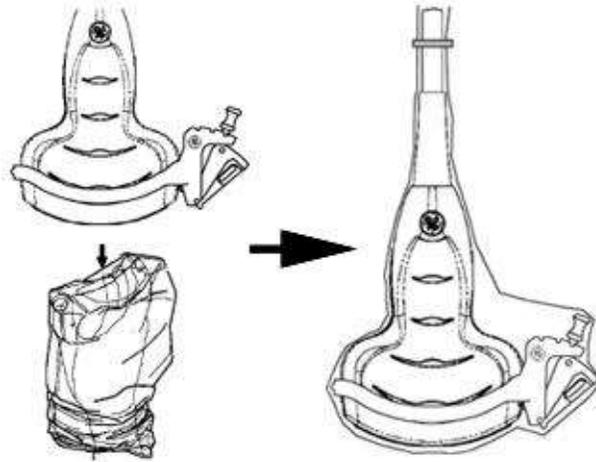


Figure 17-24. Applying Sanitary Sheath

6. Snap the needle guide onto the biopsy guide bracket.

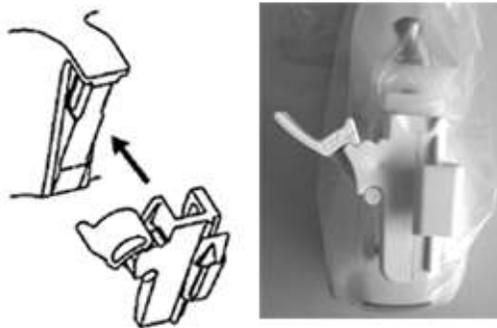


Figure 17-25. Snap the needle guide

Multi Angle Biopsy Guide Assembly (continued)

7. Push the locking mechanism towards the bracket to secure the lock (a). Make sure the needle guide is firmly attached to the bracket.



Figure 17-26. Lock the Needle guide

8. Choose the desired gauge (size) needle barrel. Twist it back and forth to remove it from the plastic tree.



Figure 17-27. Needle Barrel

9. Place the needle barrel into the needle clip with the desired gauge facing the needle clip and snap into place.



Figure 17-28. Needle Barrel Installation

Multi Angle Biopsy Guide Assembly (continued)

Remove the biopsy guide

1. Hold the other side and push out the needle clip attachment side. See Figure 17-29.



Figure 17-29. Remove the biopsy guide



CAUTION

Prevent damage to the probe lens with finger nails.

Releasing the needle

According to the following procedure, you remove the needle from a probe and an assembly without moving the needle.

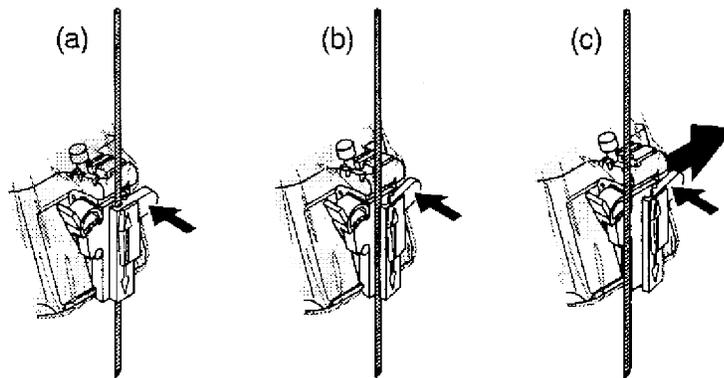


Figure 17-30. Release the needle from assembly

- a. Push the knob portion of a sleeve in the direction of the arrow.
- b. The needle is released from the assembly.
- c. Push the probe and the assembly in the direction of the larger arrow to remove the needle.

4D Biopsy Guide Assembly - Representative Example

4D Probe



Figure 17-31. Mounting the Biopsy Needle Guide to the 4D Probe

1. Fit the biopsy guide bracket onto the probe.
2. Fix the bracket by locking the frame on the opposite side of the needle guide.
3. Snap the needle guide onto the biopsy guide bracket, refer to 'Multi Angle Biopsy Guide Assembly' on *page 17-68* for detailed information.

NOTE: *Needle guide sterilization with autoclave possible.*

4D Probe Biopsy Needle Path Selection

To select the needle path and verify that the path of the needle is accurately indicated within the guidezone on the system monitor, perform the following before use:

1. Properly install the bracket and biopsy guide.
2. Scan in a container filled with water (47° C).
3. Select **Biopsy kit**. The available biopsy options from the Primary Menu.

Select the biopsy guidezone where the needle echo passes through the center of the guidezone. Use the selected biopsy guidezone when performing the biopsy.

Biopsy Needle Path Verification

To verify that the path of the needle is accurately indicated within the guidezone on the system monitor, perform the following:

- Properly install the bracket and biopsy guide.
- Scan in a container filled with water (47° C).
- Display the biopsy guidezone on the monitor.
- Ensure that the needle echo falls within the guidezone markers.

The Biopsy Procedure



WARNING

Biopsy procedures must only be performed on live images.

1. Place coupling gel on the scanning surface of the probe/sheath/biopsy guide assembly.
2. Activate the biopsy guidezone on the system through the B-Mode menu. When using multi-angle guides, ensure that the proper guidezone angle is displayed.
3. Scan to locate the target. Center the target in the electronic guidezone path.

NOTE:

Enabling color flow would allow for visualization of the vascular structure around the area to be biopsied.

4. Place the needle in the guide between the needle barrel and needle clip. Direct it into the area of interest for specimen retrieval.



WARNING

Please wear sterilized gloves during the biopsy procedure, meanwhile do not operate the console and any non-sterilized area in case any cross infection.



WARNING

Please wear sterilized gloves during scanning with TV+TR probe and cover the probe with a sterile sheath to avoid cross contamination.



CAUTION

For surgery/intra-operative procedures, a sterile environment is required. Therefore, both the operator and probe sheath need to be sterile.

Post Biopsy

When the biopsy is complete, remove the needle barrel, needle clip and probe sheath. Properly dispose of these items in accordance with current facility guidelines.

Clean and disinfect the probe. See 'Care and Maintenance' on *page 17-5 for more information.*

The biopsy bracket can be cleaned and disinfected in a recommended disinfecting agent and reused. Please refer to biopsy guide manufacturer's manuals for further information.



When the biopsy needle guide kit is opened, all parts must be discarded after the procedure whether they have been used or not.

Chapter 18

User Maintenance

This chapter supplies assistance information, system care and maintenance instructions, Quality Assurance and Privacy and Security.

Clinical Measurement Accuracy

Basic Measurements

The following information is intended to provide guidance to the user in determining the amount of variation or measurement error that should be considered when performing clinical measurements with this equipment. Error can be contributed by equipment limitations and improper user technique. Be sure to follow all measurement instructions and develop uniform measurement techniques among all users to minimize the potential operator error. Also, in order to detect possible equipment malfunctions that could affect measurement accuracy, a quality assurance (QA) plan should be established for the equipment that includes routine accuracy checks with tissue mimicking phantoms.

Please be advised that all distance and Doppler related measurements through tissue are dependent upon the propagation velocity of sound within the tissue. The propagation velocity usually varies with the type of tissue, but an average velocity for soft tissue is assumed. This equipment is designed for, and the accuracy statements listed on are based on, an assumed average velocity of 1540 m/s. The percent accuracy when stated applies to the measurement obtained (not the full scale range). Where the accuracy is stated as a percent with a fixed value, the expected inaccuracy is the greater of the two.

Basic Measurements (continued)

Table 18-1: System Measurements and Accuracies

Measurement	Units	Useful Range	Accuracy	Limitations or Conditions
Depth	mm	Full Screen	<=10%	
Angle	degree	Full Screen	<=5%	
Distance:				
Axial	mm	Full Screen	<5%	
Lateral	mm	Full Screen	<5%	Linear Probes
Lateral	mm	Full Screen	<5%	Convex Probes
Lateral	mm	Full Screen	<5%	Sector Probes
Circumference:				
Trace	mm	Full Screen	<=10%	Linear Probes, Convex Probes, Sector Probes
Ellipse	mm	Full Screen	<=5%	Linear Probes, Convex Probes, Sector Probes
Area:				
Trace	mm ²	Full Screen	<=5%	Linear Probes, Convex Probes, Sector Probes
Ellipse	mm ²	Full Screen	<=5%	Linear Probes, Convex Probes, Sector Probes
Time	s	Timeline Display	<5%	M mode, AM mode, CM mode, PWD mode, CWD mode
Slope	mm/s	Timeline Display	<=10%	M mode, AM mode, CM mode,
Doppler SV Position	mm	Full Screen	<=2 mm	PWD mode
Doppler Velocity	cm/s	From 0 to 100 cm/s From 100 to 130 cm/s	<15% <10%	PWD mode, CWD mode
Doppler Angle Correction	cm/s	From 0-80°	<=5%	PWD mode

Clinical Calculation Accuracy

Estimate the overall inaccuracy of a combined measurement and calculation by including the stated inaccuracy from the basic measurement accuracy statements.



Diagnostic errors may result from the inappropriate use of clinical calculations. Review the referenced source of the stated formula or method to become familiar with the intended uses and possible limitations of the calculation.

Calculation formulas and databases are provided as a tool to assist the user, but should not be considered an undisputed database, in making a clinical diagnosis. The user is encouraged to research the literature and judge the equipment capabilities on an ongoing basis in order to assess its utility as a clinical tool.

Anti-Virus Software Note

Anti-virus software IS NOT present on the Versana Active system. Since the Versana Active is already protected against attack by the measures listed below, no Anti-virus software is deemed necessary.

- Only communication ports required for system operation are enabled.
- Only operating system services required by system application software are enabled.
- Software programs CANNOT be loaded onto the Versana Active (e.g., e-mail, web browser, etc.).
- An auto-executable file CANNOT be run automatically on the Versana Active.
- The Versana Active software includes the latest MS Windows security protection.

We have worked diligently to develop a combination of the safety measures noted above and the security standards of Windows 10 Enterprise 2016 LTSC to provide a degree of safety against Viruses, Worms, Trojan Horses, etc., especially for a system used in a professional hospital grade networking environment that also typically features its own sufficient safety measures.

System Care and Maintenance

Overview

The user must ensure that safety inspections are performed at least every 12 months according to the requirements of the patient safety standard IEC 60601-1 (1988). Refer to the Service manual, Chapter 10.

Only trained persons are allowed to perform the safety inspections mentioned above.

Technical descriptions are available on request.

To ensure that the unit constantly operates at maximum efficiency we recommend that the following procedures be observed as part of the customer's internal routine maintenance program.

Contact the local Service Representative for parts or periodic maintenance inspections.



Do not perform system care and maintenance in the patient environment.

Expected Service Life Description

The expected service life for the Versana Active system and probes is identified in this table:

Table 18-2: Expected Service Life

Equipment/Accessory	Expected Service Life
Versana Active system	The expected service life for the Versana Active is at least seven (7) years from the manufacturing date under the provision of regular maintenance by authorized service personnel.
Versana Active probes	The expected service life for the Versana Active probes meets or exceeds five (5) years from the date the probe is placed in service, under the provision that the customer follows the care instructions provided on the Probe Care Card that accompanies the Versana Active instructions for Use.

Inspecting the System



CAUTION

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

Maintenance Schedule

Follow this Maintenance Schedule to maintain optimum system function and patient care:

Table 18-3: Versana Active Maintenance Schedule

Monthly	Weekly	Daily	After Each Patient
Inspect the following on a monthly basis: <ul style="list-style-type: none"> • Connectors on cables for any mechanical defects. • Entire length of electrical and power cables for cuts or abrasions. • Equipment for loose or missing hardware. • Control panel and keyboard for defects. • Casters for proper movement and locking operation (for Cart only). 	Clean and disinfect the following on a weekly basis: <ul style="list-style-type: none"> • Console <ul style="list-style-type: none"> • System Cabinet • Removable Trackball/Trackball • Air Filters (weekly, or as needed, for Cart only) • Footswitch (for Cart only) • B/W Printer(for Cart only) • CD/DVD-R Multi Drive(for Cart only) • Monitor, Monitor Frame and Cart • Operator Controls 	Clean and Disinfect the following areas where Cross Contamination can occur: <ul style="list-style-type: none"> • Operator Panel • Monitor Frame • Front and Rear Handles 	Clean and Disinfect the following after each patient: <ul style="list-style-type: none"> • Probe • Biopsy Bracket, as applicable. Additionally, Clean and Disinfect any area on the system that has visible contamination from the previous exam Note: Biopsy Accessories must be cleaned and disinfected or disposed of after each patient. Refer to the Probes Chapter, for instructions on probe cleaning, disinfection and inspection.



WARNING

Do not perform system care and maintenance in the patient environment.

Maintenance Schedule (continued)



CAUTION

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

If any defects are observed or malfunctions occur, do not operate the equipment but inform a qualified service person. Contact a Service Representative for information.



CAUTION

When performing cleaning and disinfection procedures, to prevent the risk of system damage, always observe the following precautions:

- Use only cleaning and disinfection materials and solutions as recommended in the procedures described below.
- Never use thinner, benzene, ethanol or methanol alcohol, abrasive cleaners, or other strong solvents, as these may cause damage to the cabinet or LCD panel. Only use isopropyl alcohol, when instructed to do so.
- Do not spray any liquid directly onto the Versana Active covers, LCD Display or keyboard.
- Do not allow any chemical agents to drip or seep into device openings or connections.
- Use only recommended cleaners or disinfectants on system surfaces. Immersion-type disinfectants are not approved for use on system surfaces.
- DO NOT scratch or press on the panel with any sharp objects, such as pencils or pens, as this may result in damage to the panel.
- Make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.
- Prior to cleaning, turn OFF power to the system and disconnect the mains cable.

Disinfection

Effective Disinfection is always a balance between safe inactivation of infectious agents and undesirable side effects. Due to the generally uneven and irregular surface of Ultrasound consoles, a comprehensive surface disinfection process cannot be recommended by the manufacturer.

Cleaning and Disinfecting the system

These cleaners/disinfectants can be used anywhere on the console (Operator Panel, Monitor, Probe Holders, Cart, etc.), except for the probes. Refer to 'Care and Maintenance' on page 17-5 for probe disinfectant information and web links.

Always consult the cleaner or disinfectant manufacturer's instructions for proper use of their product. Wear appropriate personal protective equipment (PPE) as indicated by the manufacturer.

Appropriate cleaners/disinfectants for the console that have been validated for compatibility are shown below:



WARNING

Ensure that you follow the cleaning procedure and use the cleaning agents provided in this manual.

Table 18-4: Compatible Chemicals for Cleaning/Disinfectants

	Manufac-turer	Graphic	System Cabinet	Operator Control Panel	Monitor	Cart (top table/ body/ base)
Cleaning agents						
PDI Easy Screen Cleaning Wipe	Professional Disposables International, Inc.		X	X	X	X
70% isopropyl alcohol	General		X	X	X	X
Wet Wipe	General		X	X	X	X
Disinfectants ^[1]						

Table 18-4: Compatible Chemicals for Cleaning/Disinfectants

	Manufac-turer	Graphic	System Cabinet	Operator Control Panel	Monitor	Cart (top table/ body/ base)
PDI Sani-Cloth Plus	Professional Disposable International, Inc.		X	X	X	X
Protex Ultra	PARKER LABORATORIES INC.		X	X	X	X
Tristel Wipes	Tristel Solution Limited		X	X	X	X
Sono Ultrasound Wipes	Advanced Ultrasound Solutions Inc.		X	X	X	X
Clorox wipes	The Colorox Company		X	X	X	X
CaviWipes	Metrex Research		X	X	X	X

User Maintenance

Table 18-4: Compatible Chemicals for Cleaning/Disinfectants

	Manufac-turer	Graphic	System Cabinet	Operator Control Panel	Monitor	Cart (top table/ body/ base)
PDI Super Sani-Cloth Plus	Professional Disposables International, Inc.		X	X	X	X
<p>[1]: Effective Disinfection is always a balance between safe inactivation of infectious agents and undesirable side effects. Due to the generally uneven and irregular surface of Ultrasound consoles, a comprehensive surface disinfection process cannot be recommended by the manufacturer.</p>						

NOTE: *The graphics in the table are only for illustrational purposes. Refer to the actual cleaners for the specific information.*

Cleaning and Disinfecting the system (continued)



CAUTION

Do not use T-Spray I (Original T-Spray) or SaniCloth Plus (red cap).



WARNING

Ensure that you follow the cleaning procedure and use the cleaning agents provided in this manual.



WARNING

All cleaners and disinfectants **NOT** on this list are **unapproved** by GE. Failure to follow guidelines could result in damage to the device.



CAUTION

When processing the operator control panel, make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.



CAUTION

Avoid using ALCOHOL (ISOPROPANOL) 70% inside the trackball. ALCOHOL (ISOPROPANOL) 70% may also compromise the durability of the paint used on the console controls.



CAUTION

To avoid liquids entering the product, **DO NOT** spray any liquid directly onto the surfaces. **ALWAYS** use a cloth or wipe.

Console

Cleaning the Versana Active Console

The Versana Active Console includes the System enclosure, Monitor, Monitor Frame, Operator Panel, Probe Holders and Cart. For Probes Reprocessing, see 'Care and Maintenance' on page 17-5.

Always clean visible soil from surfaces first before disinfecting the Console.

Follow the cleaning/disinfecting frequency suggested in 'Maintenance Schedule' on page 18-8.

To clean the system,

1. Moisten a soft, non-linting cloth with a mild, general purpose, non-abrasive soap and water solution or approved cleaning/disinfecting agent.

NOTE: *The cloth/wipe should be damp, not dripping wet and running. Moisture should not drip into the crevices anywhere on the console.*

NOTE: *Refer to Table 18-4 on page 18-10 for a list of compatible solutions to be used on the Console.*

2. Use a gentle wiping action to clean any surface on the console.



HINTS

A scrubbing action with the wipe may be necessary to help remove stubborn soil from the surfaces. However be careful with this action over cervices and gaps in the surface to prevent liquid from being scraped off the wipe and entering the product.

3. Wipe off excess cleaning agents.

NOTE: *Do not spray any liquid directly into the unit.*

NOTE: *DO NOT scratch or press on the panel with any sharp objects, such as pencils or pens, as this may result in damage to the panel.*

Disinfecting the Versana Active Console

For disinfectants to be effective, the surface must first be clean. Refer to 'Cleaning the Versana Active Console' on *page 18-14*.

ALWAYS follow the manufacturer's instructions concerning the use of the disinfectant and follow the contact time to be sure the disinfectant's kill claims are accomplished.

Follow the cleaning/disinfecting frequency suggested in 'Maintenance Schedule' on *page 18-8*.

Disinfect the desired surfaces of the console. To prevent cross contamination, surfaces that are often touched during exams should be disinfected after every patient. To disinfect the system,

1. Moisten a non-linting cloth with a liquid disinfectant or remove pre-moistened disinfectant wipe from the container.



If a cleaner/disinfectant wipe was used to clean off visible soil per the above section, a second, fresh cleaner/disinfectant product should be used for the disinfectant step.

2. Wet the surfaces by gently applying the cloth or wipe. Avoid high pressure or squeezing the wipe to avoid having the liquid enter the gaps and cervices of the Console. Scrubbing is not necessary in the disinfecting step; evenly applying the liquid is the goal.
3. Let the surface remain wet for the appropriate contact time.
4. If the surface does not remain wet for the full contact time, apply an additional application of the disinfectant, as necessary, to extend the time.
5. After the contact time has expired, remove excess liquid with a dry sterile cloth.
6. To avoid disinfectant buildup, or to remove disinfectant residue which may cause skin irritation, perform a rinse step with a sterile damp cloth.

Monitor and Monitor Frame

Monitor

To clean the Monitor:

1. Moisten a soft, non-linting cloth with a mild, general purpose, non-abrasive soap and water solution.

NOTE: *The cloth should be damp, not dripping wet.*

- Wipe down the top, front, back, and both sides of the monitor.

2. Wipe off excess cleaning agents with a non-linting cloth.

NOTE: *Never use thinner, benzene, alcohol (ethanol, methanol, or isopropyl alcohol), abrasive cleaners, or other strong solvents, as these may cause damage to the monitor.*

For disinfection for this part, refer to system level disinfection Page 'Disinfecting the Versana Active Console' on page 18-15.

Monitor Frame

To clean the monitor frame:

1. Moisten a soft, non-linting cloth with a mild, general purpose, non-abrasive soap and water solution.

NOTE: *The cloth should be damp, not dripping wet.*

2. Wipe down the top, front, back, and both sides of the monitor frame.

3. Wipe off excess cleaning agents with a non-linting cloth..

NOTE: *DO NOT scratch or press on the panel with any sharp objects, such as pencils or pens, as this may result in damage to the panel.*

For disinfection for this part, refer to system level disinfection Page 'Disinfecting the Versana Active Console' on page 18-15.

Control panel and keyboard

NOTE: *Diligent cleaning of the console reduces the risk of spreading infection from person to person, and also helps to maintain a clean working environment.*

Only use the following cleaners on the Control panel:

- A non-abrasive soap and water solution (e.g. Palmolive Dishwashing Liquid, manufactured by Colgate-Palmolive)
- Sani Wipes Alcohol-free (manufactured by Microgen Inc.)
- T-Spray II (manufactured by Pharmaceutical Innovations, Inc.)

To clean the Control panel:

1. Turn off the power of the system.
2. Moisten a soft, non-linting cloth with water or a mild, non-abrasive soap and water solution.
3. Gently wipe the surface of the console.
4. Use a cotton swab to clean around keys or controls. Use a toothpick to remove solids from between keys and controls.
When cleaning the operator control panel, make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.
5. In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, non-linting cloth. Wipe the surface of the console. Make sure no liquid drips on or between the keys. Allow to dry.

To clean the keyboard:

1. Clean the keyboard as described above for the Control panel.
2. In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, dust-free cloth. Wipe the surface of the key caps. Make sure no liquid drips on or between the keys. Allow to dry.

For disinfection for this part, refer to system level disinfection Page 'Disinfecting the Versana Active Console' on *page 18-15*.

Probe Cleaning Notes

Cleaning and disinfection solution for Probe and Console are different, please avoid control panel damage while cleaning/ disinfecting probes.



CAUTION

NEVER use any cleaner or disinfectant containing alcohol.

Probe shall not stay in probe holder on the Ultrasound system during cleaning/disinfection.

If you use a spray cleaner, spray AWAY from the Ultrasound system. Spray can damage the TGC controls.



Figure 18-1. DO NOT Spray a Probe While in its Holder

Cleaning the Trackball

Dust is often building up behind the ball, so it interferes with the ball rotation and for optical trackballs the light used for sensing. To get access for cleaning, you need to remove the ball.

The ball is held in position by the Dust Gasket.

1. Power off the system.
2. Rotate the retainer counterclockwise until it can be removed from the keyboard.

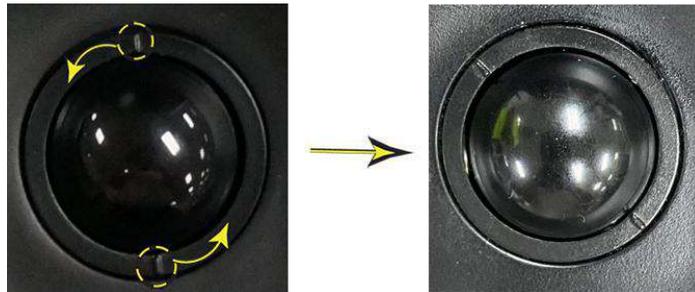


Figure 18-2. Rotate the retainer

3. Separate the trackball and the retainer. Wipe off any oil or dust from the trackball, retainer and the trackball housing using a cleaner or cotton swab.
4. Assemble the trackball and retainer, then put it into the housing and rotate it clockwise until its notches are set in position.



When cleaning, make sure not to spill or spray any liquid into the trackball housing (keyboard or system).

Probe holder (for Cart only)

1. Clean the probe holders with warm water and a damp cloth to remove all traces of gel.
2. In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a non-linting cloth. Wipe the surface of the probe holder. Make sure no liquid drips into the system. Allow to dry.

For disinfection for this part, refer to system level disinfection Page 'Disinfecting the Versana Active Console' on *page 18-15*.

System cabinet

1. Moisten a soft, non-linting cloth with a mild, general purpose, non-abrasive soap and water solution or a general purpose disinfectant.
2. Wipe down the top, front, back and both sides of the cabinet. Do not spray any liquid directly onto the unit.
3. In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, dust-free cloth. Wipe the system cabinet and allow to dry.

For disinfection for this part, refer to system level disinfection Page 'Disinfecting the Versana Active Console' on *page 18-15*.

Footswitch (for Cart only)

To clean the footswitch:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.
2. Wipe the external surfaces of the unit then dry with a soft, clean, cloth.
3. In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, dust-free cloth. Wipe the footswitch and allow to dry.

For disinfection for this part, refer to system level disinfection Page 'Disinfecting the Versana Active Console' on *page 18-15*.

Cleaning the air filter (for Cart only)

Clean the system's air filter to ensure that a clogged filter does not cause the system to overheat and reduce system performance and reliability. It is recommended the filter be cleaned every two weeks, but the requirements will vary due to your system use.



DO NOT operate the unit without the air filter in place.

Allow the air filter to dry thoroughly before re-installing it on the unit.

1. Power off the system.
2. Remove the air filter with hand.



Figure 18-3. Remove the Air Filter

User Maintenance

Cleaning the air filter (for Cart only) (continued)

3. Dust the filter with a vacuum cleaner and/or wash it with a mild soapy solution.
If washed, rinse and dry the filter before re-installation.
4. Put back the air filter in the direction as marked on the bottom cover.

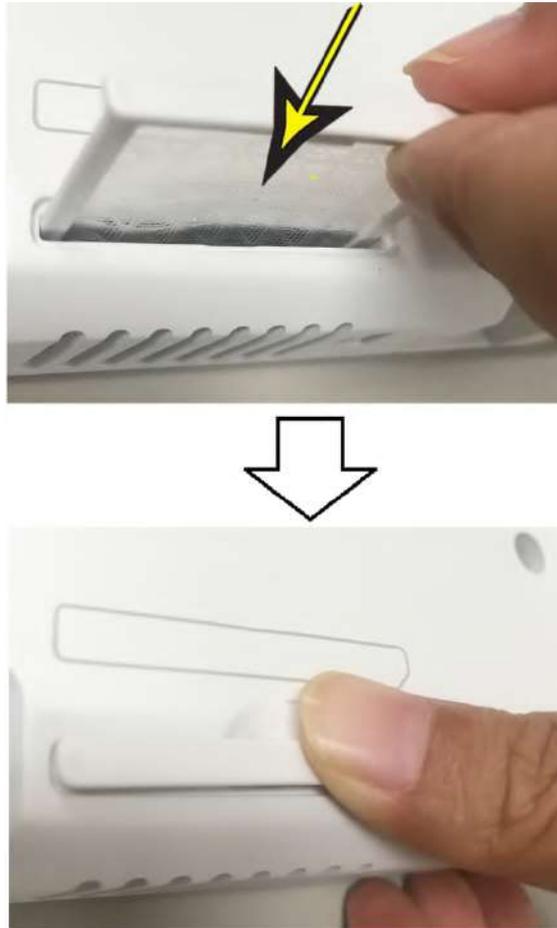


Figure 18-4. Install the Air Filter

Other Maintenance

Replacing illuminated key caps/lamps

Contact a local Service Representative when a key cap or lamp needs to be replaced.

Battery Replacement and Disposal

Battery replacement every three years is recommended.

Contact a local Service Representative for the replacement of the battery. Used batteries will be discarded appropriately by GE.

NOTE: Disposing of the battery should meet local law and regulatory requirements.

Prevention of static electricity interference

Interference from static electricity can damage electronic components in the system. The following measures help to reduce the likelihood of electrostatic discharge:

- Wipe the alphanumeric keyboard and monitor with lint-free tissue or a soft cloth dampened with anti-static spray on a monthly basis.
- Spray carpets with anti-static spray because constant walking on carpets in or near the scanning room may be a source of static electricity.

Disposal

Table 18-5: WEEE symbol

	Rear of the system and Probe connector
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This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.

Troubleshooting

Please refer Service Manual if other messages appear on the monitor display.

Table 18-6: Error messages

 <p>The system has detected the lower air filter requires cleaning. Please clean the lower air filter.</p>	<p>The system has detected the lower air filter requires cleaning. Please clean the lower air filter.</p> <ol style="list-style-type: none"> 1. Shutdown the system. 2. Clean the air filter according to 'Cleaning the air filter (for Cart only)' on <i>page 18-21</i>.
 <p>System temperature is too high. System will shut down.</p>	<p>System temperature is too high. System will shut down.</p> <ol style="list-style-type: none"> 1. Shutdown the system. 2. Clean the air filter according to 'Cleaning the air filter (for Cart only)' on <i>page 18-21</i>.
 <p>System voltage fault. System will shut down.</p>	<p>System voltage fault. System will shut down.</p> <ol style="list-style-type: none"> 1. Select OK and reboot the system. 2. If the same message appears after reboot, shut down the system. Then turn on the system according to 'Power On' on <i>page 3-23</i>.
 <p>System Error. Please Restart the system.</p>	<p>System Error. Please reboot the system.</p> <ol style="list-style-type: none"> 1. Select OK and reboot the system. 2. If the same message appears after reboot, shut down the system. Then turn on the system according to 'Power On' on <i>page 3-23</i>.

Assistance

Supplies/Accessories



CAUTION

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



CAUTION

Use only GE approved internal equipment when replacing an internal peripheral.

The user or the operator should never install/replace the internal peripheral. Service representatives authorized by GEHC will install/replace the internal peripheral.

Not all features, products, probes or peripherals described in this document may be available or cleared for sale in all markets. Please contact your local GE Ultrasound representative to get the latest information.

Contact the distributor, GE affiliate or sales representative for approved peripherals. For HCATs, contact your sales person.

The following supplies/accessories have been verified to be compatible with the system:

Peripherals

Table 18-7: Peripherals and Accessories for Versana Active system

Accessory	Units
Sony UP-D898MD Printer	Each
Sony UP-D25MD Printer	Each
Thermal Printer Media (Note: Printer Paper)	Each
Portable CD/DVD Writer	Each
Footswitch MKF 2-MED GP26	Each
Footswitch FSU-1000	Each
USB Stick	Each
USB HDD	Each
ECG-USB1: ECG module and ECG patient cable	Each
Wireless Adapter	Each
Bluetooth Adapter	Each
Printer USB Isolator	Each
Battery	Each
Power adapter without cord (ACDC only)	Each
VSN A Base Cart	Each
Versana Active Advanced Fixed Cart	Each
Versana Active Advanced Height-Adj Cart	Each
Video Output Adapter	Each
Versana Active Spare Battery Charger	Each

User Maintenance

Peripherals (continued)

Table 18-8: Peripherals and Accessories for Versana Active Advanced Cart

Accessory	Units
Cart Battery	Each
EMI Filter	Each
Gel Warmer	Each
Power Transformer	Each
3-Probe Port	Each
Printer (DC or AC)	Each
4D Box	Each
Paper Tray	Each
Accessory Tray	Each
Printer and DVD Shelf	Each
Print Base Plate	Each
ECG Module Shelf	Each

NOTE: *Versana Active Advanced Cart includes Versana Active Advanced Fixed Cart and Versana Active Advanced Height-adj Cart.*

Some peripherals have separate operator manuals. Please refer to Table 18-9 for the detailed User Instruction list.

Table 18-9: User Instructions

Accessory	User Instruction Description
VSN A Base Cart	VSN A Base Cart User Instruction
Versana Active Advanced Fixed Cart	Versana Active Advanced Cart User Instruction
Versana Active Advanced Height-Adj Cart	Versana Active Advanced Cart User Instruction
Video Output Adapter	Video Output Adapter User Instruction
Versana Active Spare Battery Charger	Versana Active Spare Battery Charger User Instruction
Versana Active Advanced Cart Battery	Versana Active Advanced Cart Battery User Instruction

Probe

Table 18-10: Probes and Accessories

Probe	HCAT	Biopsy Guide	Biopsy Guide HCAT	Biopsy Guide HCAT
4C-RS Convex	H4000SR	Multi-angle, disposable needle guide with a reusable plastic bracket	E8385NA	
8C-RS Convex	H40402LS	Not Available	N/A	N/A
E8C-RS Convex	H40402LN	Fixed angle, disposable needle guide with a reusable plastic bracket	E8385MJ	
		Fixed angle, reusable with a stainless steel bracket	H40412LN	
E8Cs-RS Convex	H48062AF	Fixed angle, disposable needle guide with a reusable plastic bracket	E8385MJ	
		Fixed angle, reusable with a stainless steel bracket	H40412LN	
3Sc-RS Sector	H45041DL	Multi-angle, disposable needle guide with a reusable plastic bracket	H46222LC	
6S-RS Sector	H45021RP	Not Available	N/A	N/A
12S-RS Sector	H44901AB	Not Available	N/A	N/A

Table 18-10: Probes and Accessories

Probe	HCAT	Biopsy Guide	Biopsy Guide HCAT	Biopsy Guide HCAT
L6-12-RS Linear	H48062AC	Multi-angle (in plane biopsy kit), disposable needle guide with a reusable plastic bracket	H40432LC	
12L-RS Linear	H40402LY	Multi-angle (in plane biopsy kit), disposable needle guide with a reusable plastic bracket	H40432LC	
		Infinite-angle (in plane biopsy kit), disposable needle guide with a reusable plastic bracket	H48392LT	
		Transverse bracket (out of plane biopsy kit), disposable needle guide with a reusable plastic bracket	H48392LL	
LK760-RS Linear	H44901AF	Not Available	N/A	N/A
L8-18i-RS Linear	H40462LF	Not Available	N/A	N/A
9L-RS Linear	H40442LL	Multi-angle, disposable needle guide, with a reusable plastic bracket	H4906BK	N/A
RAB2-6-RS 4D	H48681WR	Multi-angle, disposable needle guide, with a reusable plastic bracket	H48681ML	

System Data

Features/Specifications

Table 18-11: Physical Attributes

<p><u>Dimensions and Weight</u></p> <ul style="list-style-type: none"> • Height: within 58 ± 5 mm • Width: within 362 ± 5 mm • Length: within 390 ± 5 mm • Weight: less than 6 kg with battery, but without any probes or peripherals <p>• <u>Console Design</u></p> <ul style="list-style-type: none"> • SSD (At least 200GB) • 1T SSD (option) • Integrated speakers • User adjustable audio output control on keyboard • Ergonomic design • Handle <p><u>Keyboard</u></p> <ul style="list-style-type: none"> • Alphanumeric keyboard • Interactive back-lighting • Protective film <p><u>15.6" Monitor</u></p> <ul style="list-style-type: none"> • High-Resolution monitor • Opening angle adjustment: 170 degrees. • Horizontal/Vertical View angle: 80 degrees • Brightness and contrast adjustment 	<p><u>Electrical Power</u></p> <ul style="list-style-type: none"> • Voltage:100-240 VAC (+/-10%) • Frequency: 50/60 Hz • Power: Consumption less than 2.0A, 175VA with on- board peripherals (if powered by ACDC adapter); Consumption less than 450VA with on-board peripherals (if powered by Versana Active Advanced Cart) <p><u>Cart Design</u></p> <ul style="list-style-type: none"> • Wheels • Integrated transducer cable management facility • Handle • Gel Holder • Probe Holder <p><u>Cart Options (for Versana Active Advanced Cart only)</u></p> <ul style="list-style-type: none"> • Gel Warmer • Cart Battery • Power Transformer • 3-Probe Port • EMI filter • UP-D898DC Printer
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Table 18-12: Inputs and Outputs Signal

<p>External Inputs and Outputs</p> <ul style="list-style-type: none"> • HDMI port • Ethernet port • USB ports • Composite Video out and S-Video out through an external Video Adapter from HDMI 	
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Table 18-13: System Overview

<p><u>Operating Modes</u></p> <ul style="list-style-type: none"> • B-Mode • Harmonic Imaging (Phase Inversion Harmonic) • M-Mode • Color Flow Mode (CFM) • Power Doppler Imaging (PDI) • Directional Power Doppler Imaging • PW Doppler (with HPRF) • Cine Mode • Anatomical M-Mode • Color M-Mode • CW (Continued Wave) Doppler (option) • Static 3D/ Realtime 4D (option) • TVI(Tissue Velocity Imaging), TVD(Tissue Velocity Doppler) and TVM(Tissue Velocity M Mode image) 	<p><u>System Options</u></p> <ul style="list-style-type: none"> • DICOM • LOGIQ View • Auto-IMT • SonoBiometry (AFB) • Auto EF (ejection fraction) measurement • TUI (Tomographic Ultrasound Imaging) • Stress Echo • Advanced 3D/ Easy 3D • B-Flow/ B Flow color • Needle recognition • Follow-up tool • Auto Bladder Volume measurement • Thyroid productivity • Breast productivity • Breast care • Elastography • Contrast Imaging • Scan Coach • Tricefy <p><u>Peripheral Options</u></p> <ul style="list-style-type: none"> • B/W image printer • Color image printer • Report printer • ECG • Wireless adapter • Removable storage medium • Footswitch • Battery • CD/DVD drive • Spare battery charger • Bluetooth adapter • Video output adapter • VSN A Base Cart • Versana Active Advanced Fixed Cart • Versana Active Advanced Height-Adj Cart
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Quality Assurance

Introduction

A good Quality Assurance Evaluation program consists of periodic systematic actions that provide the user with adequate confidence that their diagnostic ultrasound system will produce consistently high quality images and quantitative information.

Therefore, it is in the best interests of every ultrasound user to routinely monitor equipment performance.

The frequency of Quality Assurance evaluations should be based on user's specific needs and clinical practice.

Periodic monitoring is essential in order to detect the performance changes that occur through normal aging of system components. Routine equipment evaluations may also reduce the duration of exams, number of repeat exams, and maintenance time required.

For details on system and peripheral routine preventive maintenance instructions, See 'System Care and Maintenance' on *page 18-6 for more information.*

Typical Tests to Perform

Quality assurance measurements provide results relating to system performance. Typically these are:

- Axial Measurement Accuracy
- Lateral Measurement Accuracy
- Axial and Lateral Resolution
- Penetration
- Functional & Contrast Resolution
- Gray Scale Photography.

With these tests, a performance baseline can be set at installation with the phantom in your department. Future test results can be compared to the baseline in order to maintain a record of system performance trends.

Frequency of tests

Quality assurance tests are used to determine whether a scanner is providing the same level of performance from day to day.

The frequency of testing varies with the amount of system usage and modes to be tested. It is recommended that the user perform quality assurance tests at least every three months or every 400 patient studies. Tests should also be performed when a question about system performance exists.

A mobile system may require more frequent tests.

Image quality should also be tested immediately after the following events:

- Service calls
- System upgrades/modifications
- Dropped probe, power surge, etc.

Phantoms

Quality Assurance Evaluations should be done with phantoms and test objects that are applicable to the parameters being evaluated or to the user's clinical practice.

Typical phantoms are composed of material that acoustically mimic human tissue. Pins, anechoic and echogenic targets are physically positioned to provide information for a variety of tests.

Doppler phantoms are currently expensive and complicated to deal with on the user level. If a problem with any Doppler parameters or measurement is suspected, contact a local service representative for evaluation.

The RMI 403GS phantom is still available. Due to the superior penetration and resolution capabilities of GE ultrasound systems, the RMI 405GSX is recommended. It is the most current one available to our field service personnel and will provide the targets and extended life necessary for consistent system testing.

Phantoms (continued)

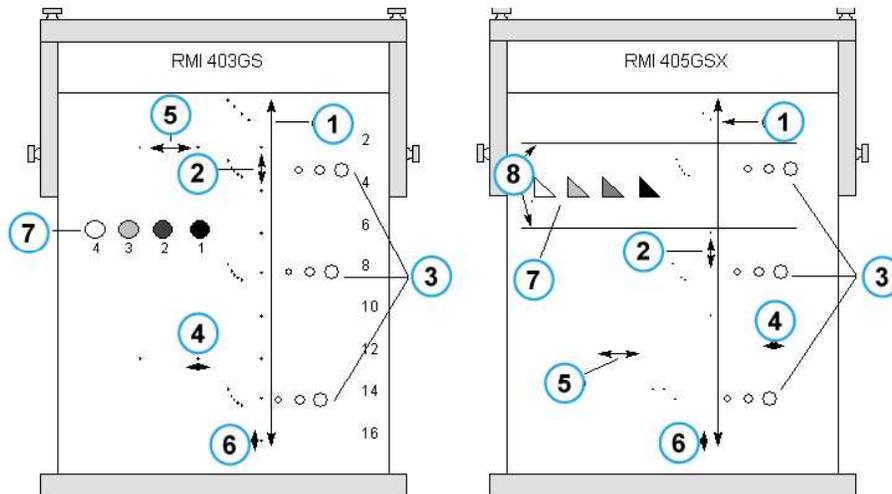


Figure 18-5. Phantoms

1. Penetration
2. Axial Distance Measurement
3. Functional Resolution
4. Lateral Resolution
5. Lateral Distance Measurement
6. Axial Resolution
7. Contrast Resolution and Gray Scale Photography
8. Gray Scale Plane Targets

Baselines

An absolute necessity for a quality assurance program is establishing baselines for each test or check. Baselines are established after the system has been verified to be working properly at installation or after a repair. If a probe or major assembly is replaced, new baselines should be generated.

Baselines can be made by adjusting system parameters to prescribed levels or to the best possible image. The key factor to remember is reproducibility. The same conditions must be reproduced for each periodic check.

All system parameters not displayed on the monitor should be recorded for the permanent record.

Periodic Checks

Periodic checks should be performed in accordance with your facility's quality assurance requirements. For the data to be valid, periodic checks should mimic the baseline setup parameters.

The resulting image, when scanning the phantom exactly as before, should be recorded and compared to the baseline. When a matching image is obtained, it can be assumed that the system performance has not degraded from the baseline.

If a significant difference between the baseline and periodic check is noted, double check the system setup and repeat the test. If the difference between the baseline and periodic check persists, contact a local Service Representative.

Failing to reproduce the control settings as in the baselines will introduce errors in the data and potentially invalidate the results.

Results

Lack of standardization among test instruments, the wide range of acceptance criteria, and incomplete knowledge regarding the significance of certain performance parameters prohibit the establishment of absolute performance criteria for these tests.

Quality Assurance Evaluation results should be compared to previously-recorded results.

Performance trends can then be detected. Unacceptable performance or diminishing trends should be identified for maintenance or repair before a malfunction or inappropriate diagnosis occurs.

The user should determine the best method for recording and archiving the baseline and periodic checks. In most cases the choice is hard copy.

It is important to maintain good consistent records for inspections that may arise, as well as to detect system performance trends.

System Setup

The user should tailor the tests to their particular needs. It is certainly not necessary to make all checks with all probes. A representative example, with the probes used most often by the customer, should be adequate in judging system performance trends.

Use a gray scale phantom as the scan object for the tests. Commercial phantoms are supplied with its own operator manual. Be familiar with proper phantom operating procedures prior to use for quality assurance evaluations.

1. Adjust image monitor. Brightness and contrast should be set to the normal viewing of a good gray scale image.
2. Check all recording devices for proper duplication of image monitor. Ensure that what is seen is what is recorded.
3. Annotate non-displayed image processing controls.
4. Set TGC slide pots to center (detent) position.
5. Place focal zone marker(s) in area of interest for an optimum image.

Test Procedures

The following are recommended Quality Assurance tests. A brief description of the test, the benefit it provides and steps to accomplish the test are supplied.

The importance of recording scan parameters and consistent record keeping cannot be stressed enough. Reproducibility to monitor system trends is the key to quality assurance evaluations.

Using the system's dual image display format is often very convenient and saves recording media.

Axial distance measurements

Description

Axial measurements are the distance measurements obtained along the sound beam. See Figure 18-5 for more information.

Benefit

The accurate measurement of the size, depth and volume of a structure is a critical factor in determining a proper diagnosis. Most imaging systems use depth markers and/or electronic calipers for this purpose.

Method

Axial distance should be measured in the near, mid and far fields as well as in zoom. If necessary, different depths or fields of view can be tested.

Procedure

To measure axial distance:

1. Scan a test phantom with precisely-spaced vertical pin targets. Adjust all scan controls, as necessary, for the best image of the pin targets to typical depths for the probe being used.
2. Press **Freeze** to stop image acquisition and perform a standard distance measurement between the pins at different points in the image. Record all images for archiving.
3. Scan the vertical pins in zoom or at different depth/scale factors.
4. Press **Freeze** to stop image acquisition; repeat the distance measurements between pins and record the images for archiving.
5. Document the measurements for reference and future comparison.

Contact a Service Engineer if vertical measurements differ by more than 1.50% of the actual distance.

Lateral distance measurements

Description

Lateral measurements are distance measurements obtained perpendicular to the axis of the sound beam. See Figure 18-5 on page 18-36 for more information.

Benefit

The purpose is the same as vertical measurements. Precisely-spaced horizontal pin targets are scanned and results compared to the known distance in the phantom.

Method

Lateral distance should be measured in the near, mid and far fields as well as in zoom. If necessary, different depths of fields of view can be tested.

Procedure

To measure lateral distance:

1. Scan a test phantom with precisely-spaced horizontal pin targets. Adjust all scan controls, as necessary, for the best image of the pin targets from side to side.
2. Press **Freeze** to stop image acquisition and perform a standard distance measurement between the pins at different points in the image. Record all images for archiving.
3. Scan the horizontal pins in zoom or at different depth/scale factors.
4. Press **Freeze** to stop image acquisition; repeat the distance measurements between pins and record the images for archiving.
5. Document the measurements for reference and future comparison.

Contact a Service Engineer if horizontal measurements differ by more than 3mm or 3% of that depth, whichever is greater.

Axial resolution

Description

Axial resolution is the minimum reflector separation between two closely-spaced objects to produce discrete reflections along the axis of the sound beam. It can also be monitored by checking the vertical size of known pin targets. See Figure 18-5 on page 18-36 for more information.

Axial resolution is affected by the transmitting section of the system and the probe.

Benefit

In clinical imaging, poor axial resolution displays small structures lying close together as a single dot. This may lead to improper interpretation of the ultrasound image.

Procedure

To measure Axial resolution:

1. Scan a test phantom with precisely-spaced vertical pin targets.
2. Adjust all scan controls, as necessary, for the best image of the pin targets to typical depths for the probe being used.
3. Press **Freeze** to stop image acquisition.
4. Perform a standard distance measurement of the pin vertical thickness at different points in the image. Record all images for archiving.
5. Scan the vertical pins in zoom or at different depth/scale factors.
6. Press **Freeze** to stop image acquisition; repeat the vertical thickness measurements of the pins and record the images for archiving.
7. Document the measurements for reference and future comparison.

Axial resolution should remain stable over time. Contact a Service Engineer if any changes are observed.

Lateral resolution

Description

Lateral resolution is the minimum reflector separation between two closely spaced objects to produce discrete reflections perpendicular to the axis of the sound beam. It can also be monitored by checking the horizontal size of known pin targets. See Figure 18-5 on page 18-36 for more information.

Lateral resolution is dependent upon the beam width produced by the probe. The narrower the beam, the better the lateral resolution.

The beam width is affected by the frequency, degree of focusing, and distance of the object from the face of the probe.

Benefit

Clinically, poor lateral resolution will display small structures lying close together as a single dot. This may lead to improper interpretation of the ultrasound image.

Procedure

To measure lateral resolution:

1. Scan a test phantom with precisely-spaced horizontal pin targets.
2. Adjust all scan controls, as necessary, for the best image of the pin targets from side to side.
3. Press **Freeze** to stop image acquisition and perform a standard distance measurement of the horizontal thickness of a pin at different points in the image. Record all images for archiving.
4. Scan the horizontal pins in zoom or at different depth/scale factors.
5. Press **Freeze** to stop image acquisition; repeat the horizontal thickness measurements of the pins and record the images for archiving.
6. Document the measurements for reference and future comparison.

Pin width should remain relatively constant over time ("1mm). Dramatic changes in pin width may indicate beam forming problems. Contact a Service Engineer if beam width changes consistently over 2 to 3 periodic tests.

Penetration

Description

Penetration is the ability of an imaging system to detect and display weak echoes from small objects at large depths. See Figure 18-5 on page 18-36 for more information.

Penetration can be affected by the system's:

- Transmitter/receiver
- Degree of probe focusing
- Attenuation of the medium
- Depth and shape of reflecting object
- Electromagnetic interference from local surroundings.

Benefit

Weak reflecting echoes are commonly produced from the internal structure of organs. Definition of this tissue texture is important in the interpretation of the ultrasound findings.

Method

Scan a phantom to see how echoes begin to fade as depth is increased. The maximum depth of penetration is the point at which homogeneous material in the phantom begins to lose brightness.

Procedure

To measure penetration:

1. Set the front panel TGC slide pots to their center (detent) position.
2. Gain and acoustic output can be adjusted, as necessary, since these values are displayed on the monitor.
3. Scan a test phantom along the vertical pin targets to typical depths for the probe being used.
4. Perform a standard distance measurement from the top of the image displayed to the point at which homogeneous material in the phantom begins to lose brightness.
5. Document the depth measurement for reference and future comparison.

Contact a Service Engineer if the depth of penetration shifts more than one centimeter (1cm) when using the same probe and same system settings.

Functional resolution

Description

Functional resolution is an imaging system's ability to detect and display the size, shape, and depth of an anechoic structure, as opposed to a pin target. See Figure 18-5 on page 18-36 for more information.

The very best possible image is somewhat less important than reproducibility and stability over time. Routine tests at the same settings should produce the same results.

Benefit

The data obtained will give a relative indication of the smallest structure the system is capable of resolving at a given depth.

Procedure

To measure functional resolution:

1. Set the front panel TGC slide pots to their center (detent) position.
2. Gain and acoustic output can be adjusted as necessary, since these values are displayed on the monitor.
3. Scan a test phantom with a vertical row of anechoic cyst targets to typical depths for the probe being used.
4. Evaluate the cysts at various depths for a good (round) shape, well-defined borders and no fill in. Remember, TGC slide pots are centered and should remain fixed. This may NOT provide optimal cystic clearing.
5. Document all results for future reference and comparison.

Contact a Service Engineer if a greatly distorted image is obtained.

Contrast resolution

Description

Contrast resolution is the ability of an imaging system to detect and display the shape and echogenic characteristics of a structure. See Figure 18-5 on page 18-36 for more information.

Specific values measured are less important than stability over time. Routine tests at the same settings should produce the same results.

Benefit

A correct diagnosis is dependent upon an imaging system's ability to differentiate between a cystic or solid structure versus echo patterns from normal surrounding tissue.

Method

A phantom with echogenic targets of different sizes and depths should be used.

Procedure

To measure contrast resolution:

1. Set the front panel TGC slide pots to their center (detent) position. Set dynamic range to 54 db.
2. Gain and acoustic output can be adjusted, as necessary, since these values are displayed on the monitor.
3. Scan a test phantom with echogenic targets at the depths available.
4. Evaluate the echogenic targets for contrast between each other and between the surrounding phantom material. Remember, TGC slide pots are centered and should remain fixed. This may NOT provide an optimal scan image.
5. Document all results for future reference and comparison.

Contact a Service Engineer if the echogenic characteristics or shapes of the targets appear distorted.

Gray Scale photography

Description

Poor photography will cause loss of low level echoes and the lack of contrast between large amplitude echoes. See Figure 18-5 on page 18-36 for more information.

Benefit

When photographic controls and film processors are properly adjusted, weak echoes, as well as strong echoes, are accurately recorded on film.

Procedure

1. Adjust the camera according to the manufacturer's instructions until the hard copy and video display are equal.
2. Scan the phantom and it's echogenic contrast targets.
3. Make a hard copy photograph of the display and compare it to the image on the video monitor for contrast and weak echo display.
4. Document all results for future reference and comparison.

Contact a Service Engineer if camera cannot duplicate what is on the image monitor.

NOTE: *Optimization of brightness/contrast controls on the display monitor is imperative in order to make sure that the hardcopy and monitor look alike.*

The display monitor is adjusted first. The hardcopy camera or printer is adjusted to match the display monitor.

Setting up a Record Keeping System

Preparation

The following is needed:

- Quality Assurance binder.
- Hard copy or electronic file of images.
- Quality Assurance Checklists.
- Display the following information while testing quality assurance:
 - Acoustic Output
 - Gain
 - Depth
 - Probe
 - Dynamic Range
 - Set up new patient to be the name of the test.
- Annotate the following:
 - Any control where its value is **NOT** displayed.
 - Significant phantom information.

Record Keeping

Complete the following:

1. Fill out the Ultrasound Quality Assurance Checklist for each probe, as scheduled.
2. Make a hard copy or archive the image.
3. Compare images to baseline images and acceptable values.
4. Evaluate trends over previous test periods.
5. File hard copy or electronic file of images and checklist in Quality Assurance binder.

Ultrasound Quality Assurance Checklist

Table 18-14: Ultrasound Quality Assurance Checklist (Part 1)

Performed By	Date	
System	Serial Number	
Probe Type	Probe Model	Serial Number
Phantom Model	Serial Number	Room Temperature
Acoustic Output	Gain	Focal Zone
Gray Map	TGC	Depth
Monitor Setting		
Peripheral Settings		
Other Image Processing Control Settings		

Table 18-15: (Part 2)

Test	Baseline Value Range	Tested Value	Image Hardcopy/ Archived	Acceptable? Yes/No	Service Called (Date)	Date Resolved
Vertical Measurement Accuracy						
Horizontal Measurement Accuracy						
Axial Resolution						
Lateral Resolution						
Penetration						
Functional Resolution						
Contrast Resolution						
Gray Scale Photography						

Privacy and Security

Introduction

This section describes Privacy & Security considerations for Ultrasound System of Versana Active, the Privacy & Security capabilities, and how they are configured and used appropriately.

For general usage of the system and how to access the configuration of the Privacy & Security features described, please refer to 'Customizing Your System' on *page 16-1*.

This manual assumes that the reader understands the concepts of Privacy & Security. Privacy is the property of protecting the personal private interests of patients. Security protects both system and information from risks to confidentiality, integrity, and availability. Security protects Privacy but also protects more broadly against these risks. Privacy requires security. In Healthcare one must balance privacy, security, and safety. Most of the time there isn't a conflict between these three domains of risk. The healthcare provider organization is encouraged to use risk management procedures to assess and prioritize privacy, security, and safety risks. Through the use of risk management, one can determine how to best leverage the capabilities provided in the Versana Active products.

Abbreviations and Definitions

Abbreviations

Table 18-16: Abbreviations

DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communication in Medicine
DNS	Dynamic Name System
DS	Directory Server
GE	General Electric
GEHC	GE Healthcare
ID	Identity
LAN	Local Area Network
MDS2	Manufacturer Disclosure Statement for Medical Device Security
OS	Operating System
PACS	Picture Archiving and Communication System
PHI	Protected Health Information
PI	Personal Information
SOP	Service-Object Pair (DICOM)
SSL	Secure Socket Layer
TLS	Transport Layer Security
UID	Unique Identifier (DICOM)
USB	Universal Serial Bus
XML	Extensible Markup Language

Definitions

Table 18-17: Definitions

Data flow	Communication between the Versana Active product and other information providers on the network takes the form of dataflows. Each dataflow defines the transfer of patient information and images between the system and the input/output sources.
Encryption at rest	Encryption of patient data stored on the system.
Encryption in transit	Encryption of patient data when in transit between the device and an external device, like a PACS.
InSite Agent	The client part of the InSite ExC service platform. The Agent is integrated in the Ultrasound System.
InSite ExC	A GE Healthcare remote service platform.
InSite Server	The server part of the InSite ExC service platform.
Local Archive	Archive containing images and patient information, residing locally on the Ultrasound System.
System administrator	A user having an Ultrasound System user account with administrator privileges.
Versana Active Ultrasound System	A GE Healthcare ultrasound scanner.

Privacy and Security Environment

The GE Healthcare Versana Active Ultrasound Systems has been designed for an intended use with the following expectations of Privacy & Security protections included in the environment where this product will be used:

- The system should be connected to a secured network, not open to unintended users.
- The Versana Active Ultrasound System computer should be physically secured in a way that it is not accessible for unintended users.
- External media containing images, patient data, reports and logs should be secured. When no longer used, the data should be securely deleted and/or the media should be securely deleted.
- The monitors of the Versana Active Ultrasound System computer should be placed in a way limiting the visibility of the screen content to the user only.

Privacy and Security Capabilities

The GE Healthcare Versana Active Ultrasound System Software incorporate a broad assortment of capabilities to enable Privacy & Security. This section describes the capability and use of these Privacy & Security capabilities.

Access Controls

The access control features may be used to help control access to sensitive information. Access control includes user account creation and assigning privileges.

It is supported for access control by local user management on the device.

Local user management on the system

It describes the user management and access control integrated on the system.

Identity Provisioning

The provisioning of user accounts includes the steps of account creation, maintenance, and suspension of the account when it is no longer needed. A user account is created for the use by a specific individual. It is associated with access rights and is recorded in security audit logging.

Identity Provisioning (continued)

Management of user accounts

User accounts are created, maintained and suspended by users with administrator privileges (see User manual for details).

When received from factory the system has two predefined user accounts:

- “ADM”: An administrative user account.
- “USER”: A normal user account without administrative privileges.

When receiving the Versana Active Ultrasound System, it is recommended to do the following steps to ensure control of the user accounts on the system:

- Set password of the “ADM” account.
- Create user accounts for each individual user of the system:
 - Give each user the needed privileges.
 - Make sure to give administrative privileges only to users intended to do administrative tasks on the system, like configuring dataflows, managing users on the system, inspecting audit logs etc. As administrative privileges give the user access to privacy and security related configurations on the system, there should be a limited number of users with these privileges.
 - It is recommended to create individual users for each person going to use the system. This is essential for the audit logging, to associate actions performed on the system with individual persons.

Maintenance of user accounts

It is recommended to establish administrative routines for removing user accounts no longer being used.

Identity Provisioning (continued)

User information stored on the system

The following information can be entered for a user defined on the system:

- ID (Mandatory)
- Password (Mandatory)
- Prefix (Optional)
- Last name (Optional)
- First name (Optional)
- Middle name (Optional)
- Suffix (Optional)
- Phone number (Optional)

The user password is not stored in cleartext on the system.

Username and password restrictions

The restrictions for usernames and passwords are:

- Usernames can be 3 - 64 characters long.
- Password can be 6- 64 characters long.

It is recommended to enable and configure username and password policies to ensure sufficient user name length and to force usage of strong password. See 'Username and password policies' on *page 18-59*.

Identity provisioning by use of Backup/Restore

Users defined on a system cannot be copied from one system to another by use of the system's built in Backup/Restore functionality (See 'System/Backup and Restore Preset Menu' on *page 16-20* for more details about Backup/Restore functionality).

Username and password policies

Rules for the local user accounts can be set by enabling the username and password policies from Config/Admin/User Policies, and by customizing these policy settings.

The following settings are available:

- Maximum Times Of Login Try with Wrong Password: 3/5/10.
- Auto Lock Out After X Days Without Successful Login: 30/60/90.
- Minimum number of character sets (upper case/lower case/digits/non-alphanumeric):
 - Minimum upper case characters: 1 character.
 - Minimum lower case characters: 1 character.
 - Minimum digits: 1 character.
 - Minimum non-alphanumeric chars: 0 character.
- Update Password Every X Days: 0/30/60/90 (0=disabled).

The defined username and passwords policies cannot be backed-up and restored by use of the normal Backup/Restore functionality.

User Authentication

The user authentication verifies that the user attempting to use the system is indeed the user associated with the account given.

To be authenticated on the system, the username and password entered in the login dialog must match what is registered in the system's local user management system. A successful user authentication will grant the user access to the system.

Assigning Access Rights

The assigning of access rights is the administrative process to associate permissions with user accounts.

On the Versana Active Ultrasound System Software this is done by granting the user account membership to zero or more role based groups in the system. Each of these groups has a set of predefined user rights assigned.

Only users with the "Admin" rights have access to manage user accounts.

See User Manual for details about user groups and the rights/permissions associated with each user group.

User Maintenance

Blocking / unblocking of users

If configured, a user account can be blocked for a time limited period due to the user entering incorrect password multiple times. In addition, a system administrator can manually block a user account.

User accounts being blocked manually must be unblocked manually. User accounts blocked due to consecutive incorrect passwords will be blocked for preconfigured time, according to the settings in the User Policies. These accounts can also be unblocked manually by a system administrator.

Change user password

User's password can be changed by the user himself at login, or by a system administrator from Utility/Admin/Users.

Automatic logon

The Versana Active Ultrasound System has an "Autologon" feature. If enabled, this will automatically log in the last logged in user or a predefined user to the system, without any access control.

For privacy and security reasons, it is recommended NOT to use this functionality on the Versana Active Ultrasound System.

LDAP

Versana Active Ultrasound System support integration with LDAP compliant directory servers. If the system is configured to use LDAP (Utility/LDAP), the access control and user authentication is performed with use of services from the connected directory server. The authentication will be done by the directory server, while the access control to the system is done with data received from the directory server.

Identity Provisioning

Management of user accounts

When using LDAP, the user accounts on the directory server (DS) must be managed outside the Versana Active Ultrasound System. It will not be possible to change user passwords or any other properties of the user accounts from the Versana Active Ultrasound System.

User information stored on the system

In general, there should be no user information stored on the system if LDAP is used. Users that are defined in the local user management system will remain on the system, with exception of the ADM user, these accounts will not be active.

To be able to log on to the system with no network connectivity, the system has an option for caching of LDAP user information. This can be enabled by a system administrator.

If caching is enabled, the system will have time limited storage of user information received from the DS. See 'Caching of users' on *page 18-60* for more information.

Username and password restrictions

The systems restrictions for usernames and passwords are:

- Usernames can be 1 - 32 characters long.
- Password can be 0 - 256 characters long.

Username and password policies

When using LDAP, username and password policies are managed by the DS. The local username and password policy on the system will then have no effect on LDAP users.

User Authentication

When a user is logging in, the system will send an authentication request with the entered user credentials to the configured DS. If the authentication is successful and the user has access rights to the system, the user will be granted access.

Assigning Access Rights

The access right to the system is controlled by the DS authentication of the user, together with use of the user's DS group membership. To get access to a system, a user must be a member of one or more DS groups specified on the Versana Active Ultrasound system.

DS group membership is used to assign the user privileges on the system.

When configuring a Versana Active Ultrasound System to use LDAP, proper user groups must be created or identified on the DS. The users of the system must be assigned the proper DS group membership.

For example, users that are going to use the system as "Sonographer" can be part of a "Versana_Active_Ultrasound_Sonographers" DS group, while users going to be have "Sys admin" rights could be part of a "SysAdmin" group.

There is a group mapping tool in the system's Utility/LDAP page. Use this tool to map DS groups to operator groups on the Versana Ultrasound system.

Caching of users

To enable off line usage, the systems support caching of user information and off-line authentication. The caching can be turned on / off by a system administrator.

For a user to be able to log on when off line, he/she must previously have performed a successful logon on the system when on-line, and still have valid (i.e. not timed out) cached user information on the system.

The caching is time-limited per individual user. The lifetime of the cached information is configurable. If the lifetime has expired, the user will not be able to log on when offline. The time stamp is reset when a successful on-line authentication is done by the user.

Service access

An on-site GE service engineer can gain special access to the Versana Active Ultrasound System by the use of a Secure Service Access. Secure Service Access is a secure service key platform for GE medical devices. It is intended to provide increased protection of GE's proprietary service tools and also to eliminate the need for periodic replacement of service keys. With the service access the service engineer will gain access to the system, including access to the Windows desktop and the system's file system.

If configured and accepted by a user of the Versana Active Ultrasound System, a GE service engineer can access the system remotely via the InSite remote service platform. A remote service session must be initiated by a user of the system.

Patient Privacy Consent Management

Patient Privacy Consent Management is the process of supporting the patient expressing their privacy requirements. This is distinct from other forms of consent such as the consent to treat.

There is no integrated functionality in the system for Patient Privacy Consent Management. If needed operational routines must be established.

Privacy & Security Audit Logging and Accountability Controls

Privacy & Security Audit Logging and Accountability Controls support security surveillance, privacy investigations and reporting.

The Versana Active Ultrasound System Software have integrated functionality for audit logging, including audit logging of privacy related events. The audit log functionality includes search and display capabilities for logged events on the system.

Access to audit logging information

Both system administrators and users can access the audit log information.

Audit logging content

The following events are captured by the audit logging of the Versana Active Ultrasound System Software:

- User login and logout of the system
- Images added and removed
- Save As

Information elements of the audit log:

- Event type
- User ID
- Time stamp, including date and time
- System name
- Dataflow name
- Study or Series Instance UID
- SOP instance UID

The information elements are logged for the events where they are applicable.

Management of Audit logs

Back up of audit logs

Back up of audit logs can be done by exporting audit logs to an external device. User shall have Service Access before performing the exportation. Press Alt + D to request the audit log exporting. If user have the Operator Right of Anonymous, he/she can choose whether to Anonymous the audit logs in the dialog.

Remember that audit logs and exported audit log files do contain Personal Information (PI) if Anonymous is not chosen and must be handle according to applicable regulations and guidelines for handling of PI / PHI.

Note that exported audit log files are stored unencrypted as text files (*.txt) and compressed as zip files.

Audit log retention

There is no limitation in the audit log retention, except the available disk space on the system.

Information Protection

This section of the manual focuses on Privacy & Security operations, and contains information to guide in the preparation of a secure environment for the Versana Active Ultrasound Systems.

Security operations, best implemented as part of an overall “defense in depth” information assurance strategy, are used throughout an Information Technology system that addresses personnel, physical security and technology. The layered approach of defense in depth limits the risk that the failure of a single security safeguard will allow compromise of the system.

System interconnections

Network connectivity is required for several of the system’s features:

- DICOM connectivity to other DICOM devices.
- Remote archive storage on another networked, compatible GE system.
- Image storage via the “Save As” feature to network share.
- Patient data XML export to network share.
- Viewing external video stream on the Versana Active Ultrasound System.
- Remote service capabilities given by GE’s InSite ExC remote service platform.

The interconnections are described in more detail in Table 18-18, and illustrated in Figure 18-6. For a particular installation, typically a subset of the interconnections is utilized.

Table 18-18: System interconnections

Source/ Destination	Network Service	Description
PACS / DICOM server	DICOM	Optional connection to PACS / DICOM server for patient and image archiving / retrieval. DICOM storage, DICOM Query/Retrieve and DICOM Worklist are supported.
Image Vault	Remote Sybase connection and Network file sharing	Optional connection to Image Vault archive, for patient and image archiving / retrieval.
Network file share	Network file sharing	Save As dataflows can be configured to use a network share as output.

Table 18-18: System interconnections

Source/ Destination	Network Service	Description
InSite server	HTTPS - initiated from the Versana Active Ultrasound System.	Optional connection to InSite remote service server.
DICOM printer	DICOM	Optional connection to DICOM printer.
Printer	N/A	Optional connection to Windows/network printer.
CD/DVD	Optional internal CDC/DVD player	Optional DVD player can be used for reading and writing of images and patient data.
USB storage device	USB	If feature is enabled, an USB storage device can be connected for reading and writing of images and patient data.
Bluetooth	Bluetooth	Optional bluetooth usb dongle can be used for sending images to paired devices.
Tricefy	Remote archive	Optional connection to tricefy server for patient and image archiving / retrieval.

For details regarding protocols, port numbers and firewall configurations, please see 'Inbound firewall configuration' on page 18-67 and 'Outbound firewall configuration' on page 18-67



Figure 18-6. System Interconnections

Network Requirements

Minimum Throughput

- Response time 50 ms maximum.
- Recommended minimum 100 Mbit/sec for wired network for large image file transfer.

Host Characteristic

- TCP/IP network.
- Both DHCP and static IP allocation are supported.
- The Versana Active Ultrasound Systems cannot be a Windows Domain member.

Network Protocols

Physical and Link Layer Interface

- Ethernet IEEE 802.3 10BASE-T, 100BASE-TX and 1000BASE-T.
- Isolated LAN connection (to prevent increased leakage current).

Internet Protocol Version

- IPv4.

Network Security

GE strongly recommends that medical information systems are operated in a secure network environment that is protected from unauthorized intrusion. There are many effective techniques for isolating and protecting medical information systems, including implementing firewall protection, demilitarized zones (DMZs), Virtual Local Area Networks (VLANs) and network enclaves.

The Versana Active Ultrasound System is supported with an internal firewall. The following two sections describe the configuration of the firewall and the guidance for configuring the IT infrastructure where it is connected.

Inbound firewall configuration

All inbound connections are blocked by the Versana Active Ultrasound System's internal firewall, with the exemptions listed in the table below.

Table 18-19: Inbound firewall exemption for the system

Local port	Remote port	Protocol	Application Controlled
Any	Any	ICMPv4	Any
Any	Any	UDP	EchoLoader MFC Application
Any	Any	TCP	EchoLoader MFC Application
3306	Any	TCP	Any

Outbound firewall configuration

All outbound connections are blocked by the Versana Active Ultrasound System's internal firewall, with the exemptions listed in the table below..

Table 18-20: Outbound firewall configuration for the system

Local port	Remote port	Protocol	Application Controlled
Any	Any	Any	python
Any	Any	ICMPv4	Any
Any	445	TCP	Any
Any	80	TCP	Any
Any	515, 9100	TCP	Any
Any	123	UDP	Any
Any	161	UDP	Any
Any	80, 443	TCP	svchost

Local Archive - Security capabilities

The Versana Active Ultrasound System Software are provided with an internal archive, for storing images and patient data locally on the system. The Local Archive's file repository and patient database are not supporting file sharing or remote connection. These can only be accessed locally. The patient database is in addition to having no remote access possibilities, also protected by database authentication.

DICOM connections - Security capabilities

The DICOM connection works as defined by DICOM guidelines. The application accepts connection only to/from DICOM entities with IP-address, AE Title and port number matching the configured parameters in the Versana Active Ultrasound System Software.

The communication sessions are on demand, always initiated locally from the system.

The Versana Active Ultrasound System's internal firewall will have exemptions for ports used by the defined DICOM dataflows in the system. Defining a new DICOM dataflow, or changing an existing, will cause the internal firewall configuration to change automatically. This will ensure that only ports configured for a dataflow will have an exemption in the internal firewall.

Transport Layer Security (TLS) protocol provides privacy and data integrity between two or more communicating computer applications. The user can enable this feature for DICOM by checking on the "Enable Encryption" in Utility/Connectivity/Service.

Network shares

Network file share access can be secured by a defining a dedicated user on the server side. The user credentials for the network share user must be entered in the configuration UI on the Versana Active Ultrasound System Software. If no user credentials are configured, the system will try connecting with default credentials.

Remote Service - Security capabilities

See 'Remote Service' on *page 18-81* for description of the Remote Service and the Remote Service security capabilities.

Wireless Security

Due to the broadcast nature of wireless communication, wireless devices require special security consideration. There are effective techniques and tools for improving the security of wireless communication devices.

Wireless protocols on the System

The following wireless protocols are supported:

- IEEE 802.11a
- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n
- IEEE 802.11ac

The following security protocols are supported on the wireless interface:

- None
- WEP
- WPA/WPA2 Personal
- WPA/WPA2 Enterprise

To increase the wireless security, it is recommended to use WPA2 Enterprise with AES encryption.

NOTE: *Less-secure wireless encryption type WPA and AES is not supported on this device anymore, please use other methods instead.*

Wireless Adaptor is an optional device of the Versana Active systems.

Removable Media Security

PI/PHI stored on removable media

USB storage device can be set as encrypted by system while CDs and DVDs does not support the encryption. Users with the Operator Right of Admin can access the Disk Encryption configuration page and set the security level for patient data stored on the removable USB storage device to Encryption ON. Key is stored on USB /password is entered manually.

Data stored on removable media as USB storage devices (Security level for patient data is Encryption OFF), CDs and DVDs, is stored unencrypted on the media. The data could contain personal information (PI) / personal health information (PHI). As a result, these storage devices and the content on the storage device must be physically protected and handled according to applicable regulations and guidelines for handling personal information (PI) / protected health information (PHI).

If not in conflict with the purpose of storing data to removable media, it is strongly recommended to anonymize the data when storing data to external media. See 'De-Identification Capabilities' on *page 18-75*. This reduces the risk of disclosing PI/PHI if the media is lost, left unattended etc.

If data containing PI/PHI is to be stored on removable media, it is recommended to consider the use of removable USB storage device with the setting of security level for patient data as Encryption ON, or other USB storage media with build in security functionality, like encrypted USB drives with integrated keypad.

Removable media on the System

The Versana Active Ultrasound System supports removable CD/DVD drive (optional) and it supports USB connected storage devices. CD/DVD discs and USB storage device are used for:

- Exporting and importing patient data and images.
- System back-up and export of audit logs.
- Upgrading system and application software.
- Storing service logs during service sessions.

Optional CD/DVD drive

Removable CD/DVD drive is an option for the Versana Active Ultrasound System.

Data stored on CD/DVD media is stored unencrypted.

AutoPlay disabled

AutoPlay (known as “AutoRun” on older OS) is disabled on the system to prevent automatic execution of software stored on removable media connected to the Versana Active Ultrasound System.

Data destruction

Versana Active Ultrasound Software does not have internal functionality for secure deletion of data stored on the removable devices.

Approved procedures and tools should be used for secure removal of data stored on removable media, according to applicable regulations and guidelines for handling patient information / personal information (PI) / protected health information (PHI).

Data at Rest Security

Versana Active Ultrasound System

The Versana Active Ultrasound System supports encryption of patient data stored on the system.

By default, the User Partition is Encryption ON and other partitions encryption are OFF.

To improve the protection and confidentiality of patient data stored on the system, it is strongly recommended to enable the “Disk Encryption” feature on the Local Patient Data Drive before starting using the system.

Encryption at rest

A system administrator can enable “Disk Encryption” from the system’s configuration page. When enabling disk encryption for the local patient data drive, the user has to set a user defined password to be used to unlock the encrypted patient information. Before starting the encryption process the system will generate a recovery key, which can be used to unlock the encrypted disk in case the password is forgotten.

The selected encryption password and the recovery key must be stored and managed in a safe and secure manner. It is the responsibility of the user and the owner of the system to take care of these keys. If the keys are lost, the patient data stored on the system will be lost. There is no way for GE Healthcare to recover the data if the keys are lost.

The disk encryption is using 256-bit encryption key length for protecting patient data stored on the system. The encrypted data includes both the patient data and the ultrasound images stored on the system.

The security of the system, with respect to encryption at rest, relies on the user’s protection of the recovery key and the encryption password. If adversary gets hold on an encrypted system, or the system’s hard-disk, together with either of these keys, the encryption at rest will have no effect and give no protection of the data.

For those using automatic unlock with recovery key stored on USB, it is recommended to remove the USB when the system is not used.

Versana Active Ultrasound System (continued)

Unlocking an encrypted system

When starting up a system with encryption enabled, the encrypted patient information must be unlocked. This can be done in three ways:

- The user enters the encryption password.
- The user enters the recovery key.
- A USB storage device containing the recovery key is connected to the system and the system unlocks the encrypted patient data automatically at startup.

NOTE: When an encrypted system is unlocked, it will remain unlocked until the system is restarted.

Encryption password is lost

If the encryption password is lost, the patient information can be unlocked by use of the recovery key. When unlocked, a system administrator can set a new encryption password on the system from the configuration page on the system.

Changing the keys

The encryption password can be changed by both system administrator and user.

Encryption at rest is disabled

If the disk encryption is disabled, data is stored unencrypted on the system.

File system protection

Access to the systems Windows desktop and the file system is prevented for both users with and without system administrative privileges. To access Windows desktop and the systems file system, service access is required see 'Service access' on *page 18-61*.

Back-up

The Versana Active Ultrasound System Software back-up feature stores data unencrypted to the back-up target. This includes back-up of images and patient information. The back-up data will be unencrypted even if the “Security level for Patient data stored on the system” is Encryption ON on the Versana Active system.

The target for the back-up, either removable media or servers, must be secured to ensure the privacy and security of the backed-up data.

External dataflows

The Versana Active Ultrasound System supports interconnections to external storage systems (DICOM servers). The privacy and security of data stored on the external system are outside the scope of this document.

Data Integrity Capabilities

Integrity assurance is implemented to software updates packages for the Versana Active Ultrasound System. Software Upgrade USB flash is of USB CD ROM format to prevent from malicious modifications, and the installation of the malicious software will be prohibited.

De-Identification Capabilities

The Versana Active Ultrasound System Software contain de-identification (anonymization and pseudonymizing) capabilities to limit privacy and security risks to sensitive information.

When exporting images by the Save As function, there is an option to anonymize the image. Check the check box to activate de-identification when saving. The check box is unchecked by default. After generation of the new patient, the anonymized patient data can be transferred to removable storage device.

De-identification is done by clearing or overwriting all meta data containing PI / PHI in the image files. Note that the image itself (the pixel data) may still contain PI / PHI, e.g. in labels or captions in the image.

Business Continuity

To ensure business continuity several options must be considered related to the data storage. The target for the images and patient archive must be chosen to ensure safe storage of the data. Both internal and external alternatives are supported.

Patient archive solutions

The Versana Active Ultrasound System supports several alternatives for storing images and patient information, both internal and external:

- Local Archive: local storage on the Versana Active Ultrasound System Software computer.
- DICOM storage: storage on DICOM / PACS server.

See 'System interconnections' on *page 18-64* for overview of the Versana Active Ultrasound System Software interconnections, and the user manual for further details about the available dataflows.

Securing data on Local Archive

If Local Archive is used on the Versana Active Ultrasound System, backup and/or transfer procedures must be established for the Local Archive.

Securing data on DICOM/PACS servers

If external archive is used, make sure to establish backup procedures for the external archive. The business contingency planning of data stored on DICOM / PACS servers is outside the scope of this document.

Secure Wipe

Secure wipe is intended to erase all the patient data with the software on the system before the system will be shipped for service.

System Protection

The System needs to be configured and maintained in a way that continually protects Privacy & Security.

Malicious Software Protection

The computing environment is increasingly hostile, and threats continue to grow from malicious software, including computer viruses, worms, Trojan horses, denial of service attacks, and other malware. Vigilant defense on many levels is required to keep systems free from compromise by malicious software. In most cases, effective protection requires cooperation and partnership between GE and our customers.

The Versana Active Ultrasound System

Commercial Anti-virus software is commonly used on general-purpose computers to detect the presence of malicious software (virus, Trojan horse, worm, etc.). Anti-virus software is useful on general-purpose computers as they typically cannot be sufficiently hardened against the attack vectors used by malicious software.

The Versana Active Ultrasound Systems however, are single purpose (dedicated) devices that have controlled intended use. For the Versana Active Ultrasound Systems, “whitelisting” protection is a better solution for protecting the systems against malware. The Versana Active systems utilizes the “DeviceGuard” whitelisting provided with Windows 10. Only binaries trusted by the Versana Active white-list (the “CI Policy”) will run. All other binaries will be blocked by DeviceGuard.

UEFI “SecureBoot” is enabled on the systems to prevent adversary from booting the system from a not trusted, bootable media. SecureBoot and Windows “TrustedBoot” will protect the system from malware targeting the systems boot process.

Additional reading

For more information on Malicious Software Protection, refer to the following two whitepapers by the Joint NEMA/COCIR/JIRA Security and Privacy Committee:

- “Defending Medical Information Systems Against Malicious Software”, December 2003, <http://www.medicalimaging.org/policy-and-positions/joint-security-and-privacy-committee-2/>
- “Patching Off-the-Shelf Software Used in Medical Information Systems”, October 2004, <http://www.medicalimaging.org/policy-and-positions/joint-security-and-privacy-committee-2/>

The Versana Active Ultrasound System - system protection

The Versana Active Ultrasound System contains additional features to improve local operational security.

No Windows desktop access

Users of the Versana Active Ultrasound System do not have access to the Windows desktop nor to the Windows file system on the Versana Active Ultrasound System.

The users will have no access to internet web-browsing, e-mail clients, installing any software on the system nor adding files (except for application related files through the application).

Windows features disabled

The following Windows features are disabled:

- Remote Desktop Connection
- Remote Assistance
- Windows AutoPlay feature
- Administrative Shares (the Administrative Shares are hidden)
- C: drive visibility

Windows services disabled

Many Windows services are unused and disabled on the Versana Active Ultrasound System.

See full list of disabled Windows services in Table 18-22.

GE Healthcare service access

To access the Versana Active Ultrasound System in service mode, an SSA USB service dongle and a service password are required. A GE Healthcare field engineer will be needed for accessing the system in service mode.

When in service mode the field engineer will have access to Windows desktop and file system.

The Versana Active Ultrasound System - system protection (continued)

Automatic screen lock

The Versana Active Ultrasound System has a configurable inactivity screen feature. It can be configured to lock the screen after a predefined inactivity time. The inactivity time can be configured to 10 minutes or higher. When screen is locked, no patient information is visible on the screen. To unlock, the user must enter the password of the current logged in user.

It is recommended to enable screen lock after minimum time of inactivity.

Windows user and password

To access the Windows OS functionality of the Versana Active Ultrasound System, a service dongle and password are required. However, a system administrator can still change the password of the underlying Windows user from Utility/Admin/System Password. Users of the system will never need to use this password. The only reason to change the password will be if the user, for security reasons, prefer to define his own password instead of the factory defined default password.

The Versana Active Ultrasound System Change Management

Versana Active Ultrasound System operative system

Table 18-21: Operative system

FAMILY	PRODUCT Description and Version
Windows 10 IoT	Windows 10 IoT Enterprise 2016 LTSC High End (ESD), 64 Bit

The Versana Active Ultrasound System is based on Microsoft Windows 10 IoT.

Windows 10 IoT Enterprise is a full version of Windows 10 with specialized features to create dedicated devices locked down to a specific set of applications and peripherals. Windows 10 IoT LTSC has a different lifecycle plan than standard Windows 10.

Security updates / patches

GE Healthcare is constantly monitoring for security vulnerabilities applicable for the products. This includes vulnerabilities in the application software, third party components and the underlying operative system. For the operative system, this includes regular review of vulnerability announcements from Microsoft.

Announced vulnerabilities in the operative system or other third-party components, are assessed based on the Versana Active Ultrasound System's configuration and use.

When needed, GE Healthcare release security updates / patches for the products and makes these available to customers through GE Healthcare Service.

How to contact GE

For privacy and security concerns regarding GE products, please see:

<http://www.ge.com/security>

Remote Service

Often the fastest, most efficient and cost-effective manner to provide service is to connect to the Versana Active Ultrasound System remotely. Every effort is made to ensure that this connection is as secure as possible.

The GE Healthcare InSite ExC remote service platform is integrated in Versana Active Ultrasound System. InSite ExC enables real-time application support, problem diagnosis and repair.

InSite ExC remote service

The two major technical components of InSite are the Agent and the Server. The Agent is installed on the Versana Active Ultrasound system, while the Server resides within GE Healthcare. The Agent establishes secure communications to the Server via the Internet.

Key Security Features

The key security features of the InSite platform include the following:

- Communication from the Agent to the Server is initiated by the on-site user securely via an outbound connection over port 443 (HTTPS). No fixed IP address is required on the device.
- The Agent always connects to a known IP address (the Server). The ability to identify the Server is therefore guaranteed, because the Server is visible to the Agent only via a known IP address.
- The Agent communicates with the Server via transmissions that require password authentication. Data transmissions are encrypted using the Secure Socket Layer (SSL) protocol over port 443.
- Inbound Firewall on the Versana Active Ultrasound System is not compromised. Web services standard protocol using only outbound HTTPS Port 443.

Data Privacy

In some cases, GE Healthcare may encounter personal information (PI) / protected health information (PHI) as part of the troubleshooting procedures or under data access rights granted to GE Healthcare. Access to this data is limited to GE Healthcare authorized personnel only. Personal information (PI) / protected health information (PHI) encountered as part of remote service sessions will be handled according to GE Healthcare's standards for handling personal information (PI) / protected health information (PHI).

Personal Information Collected by the Product

Information collection and use

The Versana Active Ultrasound System Software are collecting patient demographic information, personal or protected health information for the use within the system.

Information entered for user accounts defined in the systems local user management is also stored on the system.

The following types of information are collected for the purposes of patient medical diagnosis, user management, audit logging and/or debug logging:

- Patient demographics.
- Medical diagnostics and measurements.
- Ultrasound images.
- Facility information.
- Provider information.
- Device data

Patient information collected is either entered manually by the user of the system, or it is received through one or more of the system's dataflows.

Details on what data is collected, used and disclosed can be achieved by contacting GE Healthcare.

Manual information collection

Only PI needed for the purpose of treatment or healthcare operations should be collected. The system supports collection of PI that is related for such usage only. However, the system might support collection of more data than will be used for a particular installation. The user should limit the collect of PI to what is really needed.

The user should be careful not entering personal identifiable information in free text fields in the system, as this information is not anonymized by the de-identification procedure, see 'De-Identification Capabilities' on *page 18-75*.

Information disclosure

If the Versana Active Ultrasound System are connected to remote network shares and external media, like CD/DVD and USB storage devices, patient demographics, medical diagnostics, measurements and ultrasound images will be communicated to/from the connected device, see 'System interconnections' on *page 18-64*.

Retention and destruction of personal information

Retention and destruction of patient data

The information collected is stored on the system until it is manually removed.

Requirements and policies for limited collection and/or destruction of Patient Information on the system must be implemented by establishing appropriate operational procedures.

Patients and exams can be deleted from the Local Archive on the system by a system administrator manually selecting and deleting patients / exams.

Retention and destruction of user information, local user accounts

User information for user accounts created and managed locally on the system will remain on the system until manually removed.

Requirements and policies for limited collection and/or destruction of user information on the system must be implemented by establishing appropriate operational procedures.

User accounts can be deleted from the system by a system administrator manually selecting and deleting user accounts.

Retention and destruction of user information, LDAP user accounts

See 'Caching of users' on *page 18-60* for caching of LDAP user information.

Secure deletion of PI / PHI

GEHC Service has procedures and tools for secure deletion all PI / PHI on the system.

Individuals authorization for collection, use and disclosure of PI/PHI

Some users of Versana Active systems might face requirements and policies for letting individuals (the patients) authorize the collection, use and disclosure of PI/PHI. There is no support for such functionality in the system. Such requirements can only be implemented by operational procedures.

Information to individuals of collection, use and disclosure of PI/PHI

Some users of Versana Active systems might face requirements and policies for informing individuals (the patients) about the collection, use and disclosure of PI/PHI. There is no support for such functionality in the system. Such requirements can only be implemented by operational procedures.

Security Vulnerability Scanning

Potential security vulnerabilities of the Versana Active Ultrasound System are revealed using “Nessus” from Tenable Network Security. This is a security scanning tool that United States Department of Defense and Hospital IT organizations use to check for vulnerabilities on their networks. Identified vulnerabilities are mitigated as appropriate based on risk assessment of the product.

Security scanning is performed during the development of the Versana Active Ultrasound Products.

Potential Hazardous Situations Resulting from Failures of the IT Network

Hazardous situations

The following general hazardous situations have been identified as potentially hazardous as a result of the IT network failing to provide the required characteristics specified above.

- Delayed or impaired access to images or other exam information or patient data.
- Permanent loss of images or other exam information or patient data.
- Corruption of images or other exam information or patient data.
- LAN connection loss during operation may cause loss of data, and damage data integrity.

Warning

In addition to the hazardous situations identified above, connection of the Versana Active Ultrasound System Software to a network that includes other equipment could result in other unidentified risks to patients, operators or third parties. The responsible organization should identify, analyze, evaluate and control these risks on an ongoing basis including after changes to the network such as those listed below, which could introduce new risks and require additional analysis.

- Changes in network configuration.
- Connection of additional items to the network.
- Disconnecting items from the network.
- Update of equipment connected to the network.
- Upgrade of equipment connected to the network

MDS²

The “Manufacturer Disclosure Statement for Medical Device Security” MDS² is provided as a statement of the security and privacy capabilities using a well-known standard disclosure format.

Please see MDS² for Versana Active as below:

MDS2 (continued)

Manufacturer Disclosure Statement for Medical Device Security – MDS ²			
DEVICE DESCRIPTION			
Device Category	Manufacturer	Document ID	Document Release Date
15976 Scanning	GE Healthcare	DOC2111350	2019/4/11
Device Model	Software Revision		Software Release Date
Versana Balance/Versana Active	Version R1.X.X		2019/3/26
Manufacturer or Representative Contact Information	Company Name	Manufacturer Contact Information	
	GE Healthcare	Phone: 800-437-1171	
	Representative Name/Position	Web: http://apps.gehealthcare.com/usen/security/index.html	
	Zhou Yuan/Program Manager		
Intended use of device in network-connected environment:			
This is an ultrasound diagnostic imaging system, which is used to create a patient image, present the image for diagnostic purposes, and/or transmit the image to a storage device, remote reading workstation or filming device.			
MANAGEMENT OF PRIVATE DATA			
Refer to Section 2.3.2 of this standard for the proper interpretation of information requested in this form.			Yes, No, N/A, or See Note
			Note #
A	Can this device display, transmit, or maintain private data (including electronic Protected Health Information [ePHI])?	Yes	—
B	Types of private data elements that can be maintained by the device :		
B.1	Demographic (e.g., name, address, location, unique identification number)?	Yes	—
B.2	Medical record (e.g., medical record #, account #, test or treatment date, device identification number)?	Yes	—
B.3	Diagnostic/therapeutic (e.g., photo/radiograph, test results, or physiologic data with identifying characteristics)?	Yes	—
B.4	Open, unstructured text entered by device user/operator ?	Yes	—
B.5	Biometric data ?	No	—
B.6	Personal financial information?	No	—
C	Maintaining private data - Can the device :		
C.1	Maintain private data temporarily in volatile memory (i.e., until cleared by power-off or reset)?	Yes	—
C.2	Store private data persistently on local media?	Yes	—
C.3	Import/export private data with other systems?	Yes	—
C.4	Maintain private data during power service interruptions?	Yes	1
D	Mechanisms used for the transmitting, importing/exporting of private data – Can the device :		
D.1	Display private data (e.g., video display, etc.)?	Yes	—
D.2	Generate hardcopy reports or images containing private data ?	Yes	—
D.3	Retrieve private data from or record private data to removable media (e.g., disk, DVD, CD-ROM, tape, CF/SD card, memory stick, etc.)?	Yes	—
D.4	Transmit/receive or import/export private data via dedicated cable connection (e.g., IEEE 1073, serial port, USB, FireWire, etc.)?	Yes	2
D.5	Transmit/receive private data via a wired network connection (e.g., LAN, WAN, VPN, intranet, Internet, etc.)?	Yes	—
D.6	Transmit/receive private data via an integrated wireless network connection (e.g., WiFi, Bluetooth, infrared, etc.)?	Yes	3
D.7	Import private data via scanning?	No	—
D.8	Other?	No	—
1: Privacy data can be stored in different destinations, locally on the device or in a network destination, depending of the configuration of the device. Newly entered privacy data, not yet stored, will not be maintained after a power interruption. Privacy data stored will be maintained. 2: Import/export to a USB storage is supported. 3: Device support wifi, Bluetooth			
Management of Private Data notes:			

Figure 18-7. Versana Active MDS²

MDS2 (continued)

Device Category	Manufacturer	Document ID	Document Release Date	
15976 Scanning	GE Healthcare	DOC2111350	2019/4/11	
Device Model	Software Revision	Software Release Date		
Versana Balance/Versana Active	Version R1.X.X	2019/3/26		
SECURITY CAPABILITIES				
Refer to Section 2.3.2 of this standard for the proper interpretation of information requested in this form.			Yes, No, N/A, or See Note	Note #
1	AUTOMATIC LOGOFF (ALOF) The device 's ability to prevent access and misuse by unauthorized users if device is left idle for a period of time.			
1-1	Can the device be configured to force reauthorization of logged-in user(s) after a predetermined length of inactivity (e.g., auto-logoff, session lock, password protected screen saver)?	Yes		
1-1.1	Is the length of inactivity time before auto-logoff/screen lock user or administrator configurable? (Indicate time [fixed or configurable range] in notes.)	Yes		
1-1.2	Can auto-logoff/screen lock be manually invoked (e.g., via a shortcut key or proximity sensor, etc.) by the user ?	No		
ALOF notes:				
2	AUDIT CONTROLS (AUDT) The ability to reliably audit activity on the device .			
2-1	Can the medical device create an audit trail ?	Yes		
2-2	Indicate which of the following events are recorded in the audit log:			
2-2.1	Login/logout	Yes		
2-2.2	Display/presentation of data	No		
2-2.3	Creation/modification/deletion of data	Yes		
2-2.4	Import/export of data from removable media	Yes		
2-2.5	Receipt/transmission of data from/to external (e.g., network) connection	No		
2-2.5.1	Remote service activity	Yes		
2-2.6	Other events? (describe in the notes section)	No		
2-3	Indicate what information is used to identify individual events recorded in the audit log:			
2-3.1	User ID	No		
2-3.2	Date/time	Yes		
AUDT notes:				
3	AUTHORIZATION (AUTH) The ability of the device to determine the authorization of users.			
3-1	Can the device prevent access to unauthorized users through user login requirements or other mechanism?	Yes		
3-2	Can users be assigned different privilege levels within an application based on 'roles' (e.g., guests, regular users , power users , administrators, etc.)?	Yes		
3-3	Can the device owner/operator obtain unrestricted administrative privileges (e.g., access operating system or application via local root or admin account)?	No		
AUTH notes:				

Figure 18-8. Versana Active MDS²

MDS2 (continued)

Device Category	Manufacturer	Document ID	Document Release Date	
15976 Scanning	GE Healthcare	DOC2111350	2019/4/11	
Device Model	Software Revision	Software Release Date		
Versana Balance/Versana Active	Version R1.X.X	2019/3/26		
Refer to Section 2.3.2 of this standard for the proper interpretation of information requested in this form.			Yes, No, N/A, or See Note	Note #
4	CONFIGURATION OF SECURITY FEATURES (CNFS) The ability to configure/re-configure device security capabilities to meet users' needs.			
4-1	Can the device owner/operator reconfigure product security capabilities ?		See Note	4
CNFS notes:	4: Certain functions can be restricted to administrators or allowed to all users by the administrator			
5	CYBER SECURITY PRODUCT UPGRADES (CSUP) The ability of on-site service staff, remote service staff, or authorized customer staff to install/upgrade device's security patches.			
5-1	Can relevant OS and device security patches be applied to the device as they become available?		Yes	5
5-1.1	Can security patches or other software be installed remotely?		Yes	
CSUP notes:	5: GEHC validated and supplied updates can be applied when they become available			
6	HEALTH DATA DE-IDENTIFICATION (DIDT) The ability of the device to directly remove information that allows identification of a person.			
6-1	Does the device provide an integral capability to de-identify private data ?		Yes	—
DIDT notes:				
7	DATA BACKUP AND DISASTER RECOVERY (DTBK) The ability to recover after damage or destruction of device data, hardware, or software.			
7-1	Does the device have an integral data backup capability (i.e., backup to remote storage or removable media such as tape, disk)?		Yes	—
DTBK notes:				
8	EMERGENCY ACCESS (EMRG) The ability of device users to access private data in case of an emergency situation that requires immediate access to stored private data .			
8-1	Does the device incorporate an emergency access ("break-glass") feature?		No	—
EMRG notes:				
9	HEALTH DATA INTEGRITY AND AUTHENTICITY (IGAU) How the device ensures that data processed by the device has not been altered or destroyed in an unauthorized manner and is from the originator.			
9-1	Does the device ensure the integrity of stored data with implicit or explicit error detection/correction technology?		No	—
IGAU notes:				

Figure 18-9. Versana Active MDS²

MDS2 (continued)

Device Category	Manufacturer	Document ID	Document Release Date		
15976 Scanning	GE Healthcare	DOC2111350	2019/4/11		
Device Model	Software Revision	Software Release Date			
Versana Balance/Versana Active	Version R1.X.X	2019/3/26			
Refer to Section 2.3.2 of this standard for the proper interpretation of information requested in this form.				Yes, No, N/A, or See Note	Note #
10 MALWARE DETECTION/PROTECTION (MLDP)					
The ability of the device to effectively prevent, detect and remove malicious software (malware).					
10-1	Does the device support the use of anti-malware software (or other anti-malware mechanism)?			Yes	—
10-1.1	Can the user independently re-configure anti-malware settings?			No	—
10-1.2	Does notification of malware detection occur in the device user interface?			No	—
10-1.3	Can only manufacturer-authorized persons repair systems when malware has been detected?			No	—
10-2	Can the device owner install or update anti-virus software ?			No	—
10-3	Can the device owner/ operator (technically/physically) update virus definitions on manufacturer-installed anti-virus software ?			No	—
MLDP notes:					
11 NODE AUTHENTICATION (NAUT)					
The ability of the device to authenticate communication partners/nodes.					
11-1	Does the device provide/support any means of node authentication that assures both the sender and the recipient of data are known to each other and are authorized to receive transferred information?			No	—
NAUT notes:					
12 PERSON AUTHENTICATION (PAUT)					
Ability of the device to authenticate users					
12-1	Does the device support user/operator -specific username(s) and password(s) for at least one user ?			Yes	—
12-1.1	Does the device support unique user/operator -specific IDs and passwords for multiple users?			Yes	—
12-2	Can the device be configured to authenticate users through an external authentication service (e.g., MS Active Directory, NDS, LDAP, etc.)?			No	—
12-3	Can the device be configured to lock out a user after a certain number of unsuccessful logon attempts?			Yes	—
12-4	Can default passwords be changed at/prior to installation?			Yes	—
12-5	Are any shared user IDs used in this system?			See Note	6
12-6	Can the device be configured to enforce creation of user account passwords that meet established complexity rules?			Yes	—
12-7	Can the device be configured so that account passwords expire periodically?			Yes	—
PAUT notes: 6:Creation, allocation and usage of user IDs is at the discretion of the customer					
13 PHYSICAL LOCKS (PLOK)					
Physical locks can prevent unauthorized users with physical access to the device from compromising the integrity and confidentiality of private data stored on the device or on removable media .					
13-1	Are all device components maintaining private data (other than removable media) physically secure (i.e., cannot remove without tools)?			Yes	—
PLOK notes:					

Figure 18-10. Versana Active MDS²

MDS2 (continued)

Device Category	Manufacturer	Document ID	Document Release Date		
15976 Scanning	GE Healthcare	DOC2111350	2019/4/11		
Device Model	Software Revision	Software Release Date			
Versana Balance/Versana Active	Version R1.X.X	2019/3/26			
Refer to Section 2.3.2 of this standard for the proper interpretation of information requested in this form.				Yes, No, N/A, or See Note	Note #
14	ROADMAP FOR THIRD PARTY COMPONENTS IN DEVICE LIFE CYCLE (RDMP)				
	Manufacturer's plans for security support of 3rd party components within device life cycle.				
14-1	In the notes section, list the provided or required (separately purchased and/or delivered) operating system(s) - including version number(s).			See Note	7
14-2	Is a list of other third party applications provided by the manufacturer available?			No	—
RDMP notes:	7: Windows 10 LTSB 1607				
15	SYSTEM AND APPLICATION HARDENING (SAHD)				
	The device's resistance to cyber attacks and malware .				
15-1	Does the device employ any hardening measures? Please indicate in the notes the level of conformance to any industry-recognized hardening standards.			Yes	8
15-2	Does the device employ any mechanism (e.g., release-specific hash key, checksums, etc.) to ensure the installed program/update is the manufacturer-authorized program or software update?			No	—
15-3	Does the device have external communication capability (e.g., network, modem, etc.)?			Yes	—
15-4	Does the file system allow the implementation of file-level access controls (e.g., New Technology File System (NTFS) for MS Windows platforms)?			Yes	—
15-5	Are all accounts which are not required for the intended use of the device disabled or deleted, for both users and applications?			Yes	—
15-6	Are all shared resources (e.g., file shares) which are not required for the intended use of the device , disabled?			Yes	—
15-7	Are all communication ports which are not required for the intended use of the device closed/disabled?			Yes	—
15-8	Are all services (e.g., telnet, file transfer protocol [FTP], internet information server [IIS], etc.), which are not required for the intended use of the device deleted/disabled?			Yes	—
15-9	Are all applications (COTS applications as well as OS-included applications, e.g., MS Internet Explorer, etc.) which are not required for the intended use of the device deleted/disabled?			Yes	—
15-10	Can the device boot from uncontrolled or removable media (i.e., a source other than an internal drive or memory component)?			Yes	—
15-11	Can software or hardware not authorized by the device manufacturer be installed on the device without the use of tools?			No	—
SAHD notes:	8: All unneeded ports, software, and services are removed and/or disabled by default.				
16	SECURITY GUIDANCE (SGUD)				
	The availability of security guidance for operator and administrator of the system and manufacturer sales and service.				
16-1	Are security-related features documented for the device user ?			Yes	—
16-2	Are instructions available for device /media sanitization (i.e., instructions for how to achieve the permanent deletion of personal or other sensitive data)?			Yes	—
SGUD notes:					

Figure 18-11. Versana Active MDS²

MDS2 (continued)

Device Category	Manufacturer	Document ID	Document Release Date		
15976 Scanning	GE Healthcare	DOC2111350	2019/4/11		
Device Model	Software Revision	Software Release Date			
Versana Balance/Versana Active	Version R1.X.X	2019/3/26			
Refer to Section 2.3.2 of this standard for the proper interpretation of information requested in this form.				Yes, No, N/A, or See Note	Note #
17	HEALTH DATA STORAGE CONFIDENTIALITY (STCF) The ability of the device to ensure unauthorized access does not compromise the integrity and confidentiality of private data stored on device or removable media .				
17-1	Can the device encrypt data at rest?			Yes	—
STCF notes:					
18	TRANSMISSION CONFIDENTIALITY (TXCF) The ability of the device to ensure the confidentiality of transmitted private data .				
18-1	Can private data be transmitted only via a point-to-point dedicated cable?			No	—
18-2	Is private data encrypted prior to transmission via a network or removable media ? (If yes, indicate in the notes which encryption standard is implemented.)			See Note	9
18-3	Is private data transmission restricted to a fixed list of network destinations?			See Note	10
TXCF notes: 9: DICOM communication on network support encryption. 10: External device must be explicit defined in the workflow. This function can be limited to administrator.					
19	TRANSMISSION INTEGRITY (TXIG) The ability of the device to ensure the integrity of transmitted private data .				
19-1	Does the device support any mechanism intended to ensure data is not modified during transmission? (If yes, describe in the notes section how this is achieved.)			Yes	11
TXIG notes: 11: DICOM communication is sent over the TCP protocol which has data integrity mechanisms included in the protocol.					
20	OTHER SECURITY CONSIDERATIONS (OTHR) Additional security considerations/notes regarding medical device security.				
20-1	Can the device be serviced remotely?			Yes	—
20-2	Can the device restrict remote access to/from specified devices or users or network locations (e.g., specific IP addresses)?			Yes	—
20-2.1	Can the device be configured to require the local user to accept or initiate remote access?			Yes	—
OTHR notes:					

Figure 18-12. Versana Active MDS²

Disabled Windows Services

The following Windows services are unused and disabled on the Versana Active Ultrasound System:

Table 18-22: Disabled Windows Services

Name	Description	Startup Type
Auto Time Zone Updater	Automatically sets the system time zone.	Disabled
Internet Connection Sharing (ICS)	Provides network address translation, addressing, name resolution and/or intrusion prevention services for a home or small office network.	Disabled
Microsoft App-V Client	Manages App-V users and virtual applications.	Disabled
Net.Tcp Port Sharing Service	Provides ability to share TCP ports over the net.tcp protocol.	Disabled
Remote Registry	Enables remote users to modify registry settings on this computer. If this service is stopped, the registry can be modified only by users on this computer. If this service is disabled, any services that explicitly depend on it will fail to start.	Disabled
Routing and Remote Access	Offers routing services to businesses in local area and wide area network environments.	Disabled
Shared PC Account Manager	Manages profiles and accounts on a SharedPC configured device.	Disabled
Smart Card	Manages access to smart cards read by this computer. If this service is stopped, this computer will be unable to read smart cards. If this service is disabled, any services that explicitly depend on it will fail to start.	Disabled
User Experience Virtualization Service	Provides support for application and OS settings roaming	Disabled
Windows Time	Maintains date and time synchronization on all clients and servers in the network. If this service is stopped, date and time synchronization will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Disabled

All Third-Party or Open-Source Software

The following software is used on the Versana Active Ultrasound System:

Table 18-23: Third-Party or Open-Source Software

Product (Title of the OTS Software)	Manufacturer	Version
Intel Network Driver	Intel	20.2.241.0
Intel Graphic Driver	Intel	26.20.100.7985
Intel Management Engine Components	Intel	11.0.0.1177
Intel Rapid Storage Technology	Intel	14.6.0.1029
Realtek High Definition Audio Driver	Realtek Semiconductor Corp.	6.0.1.7534
VC++ 2005 x64	Microsoft	8.0.56336
VC++ 2005 x64	Microsoft	8.0.61000
VC++ 2010 x64	Microsoft	10.0.30319
VC++ 2010 x86	Microsoft	10.0.30319
VC++ 2013 x64	Microsoft	12.0.30501.0
VC++ 2015 x86	Microsoft	14.0.22816.0
VC++ 2015 x64	Microsoft	14.0.22816.0
VC++ 2017 x64	Microsoft	14.16.27024.1
VC++ 2017 x86	Microsoft	14.16.27024.1
MySQL Server	Oracle	6.3.7
Notepad++	-	5.9
7z	Igor Pavlov	18.05
HP Universal Printing PCL 6 Driver	HP	-
Sony UP-898 Series Printer Driver	Sony	-
Sony UP-D25MD Printer Driver	Sony	-
Susi	Advantech	4.1.14940.0
Norav	Norav Medical.	2.2.7600.16385
Cisco Aironet Installation Program	Cisco Aironet	7.1
CSD	GE Healthcare	1.0.0.1
Python 3.6.8	Python	3.6.8150.0
Qt	Qt	4.8.6

Index

Symbols

- % Stenosis, 9-33
 - generic measurement, 7-69
 - M-Mode, 9-38
- 'SaveAs' Images, 15-15

Numerics

- 3D Acquisition, 5-179
- 3D/4D imaging
 - introduction, 5-189
 - manipulating the volume of interest, 5-221
 - operational controls, 5-199
 - principles of operation, 5-191
- 3D/4D presets, changing
 - Advanced, 16-185

A

- A/B Ratio
 - Doppler generic measurement, 7-84
 - generic measurement, 7-76
 - M-Mode generic measurement, 7-78
 - M-Mode measurements, 9-38
- abdomen exam
 - general guidelines, 8-2
- Abdominal Circumference (AC), measuring, 9-10
- Acceleration time (AT)
 - OB/GYN vessel measurement, 7-87
- Acceleration, measuring, 7-87
- accessories
 - ordering, 1-8
 - requesting a catalog, 1-8
- accessory
 - connector panel, 3-16
- accessory connector panel illustration, 3-17
- Acclimation time, 3-22
- accuracy
 - clinical calculation, 18-4
 - clinical measurement, 18-2
- acoustic output
 - default levels, 2-41
- Active Images, 4-33
- Admin
 - overview of Utility screen, 16-114
- Admin screen
 - Logon, 16-134, 16-135
 - System Admin, 16-115
 - Users, 16-132
- administrator
 - specifying system, 16-132
- AFI, see Amniotic Fluid Index (AFI)
- ALARA (as low as reasonably achievable), bioeffects, 2-5
- Alpha Hip, pediatric measurement, 13-7
- Amniotic Fluid Index (AFI), measuring, 9-21, 9-23
- Anatomical M-Mode
 - activating, 5-42
 - overview, 5-41
- Angle Correct, adjusting
 - Doppler Mode, 5-74
- Angle Steer, adjusting
 - Color Flow, 5-52
 - Doppler Mode, 5-75
- Angle, B-Mode generic measurement, 7-75
- annotating an image
 - introduction, 6-15
 - text overlays, 6-18
 - using the annotation library, 6-20
 - using typed words, 6-19
- Annotations Libraries Presets Menu, 16-50, 16-55
- annotations, presets, 16-53
- Antero-postero trunk diameter and transverse trunk diameter (APTD-TTD), 9-23
- Antero-postero trunk diameter by transverse trunk diameter (AxT), 9-24
- application presets
 - selecting, 4-35
 - user-defined, 4-35
- Applications
 - setting presets, 16-62
- Applications Preset Menu, 16-60
- area measurements
 - ellipse, 7-43
 - spline, 7-46
 - trace, 7-44, 7-45, 7-46
- AUA
 - OB worksheet, 9-43
- Audio Volume, adjusting in Doppler Mode, 5-76
- Auto Optimize (Auto), adjusting, 5-8
- Auto Vascular Calculation, see also Manual Vascular Calculation
 - overview, 11-9
- Auto Vascular Calculation, see also Manual Vascular calculations

- activating, *11-10*
- setting up calculation parameters, *11-10*

AutoEF

- Results, *10-33*
- the endocardial border, *10-24*
- the endocardial border trace, *10-26*
- Tracking Validation, *10-31*

B

- backing up data
 - EZBackup/Move, see EZBackup/Move, using
- Backup and Restore Preset Menu, *16-20*
- Baseline, adjusting
 - Color Flow, *5-51*
 - Doppler Mode, *5-78*
- biological hazards, *2-12, 2-14*
- Biparietal Diameter (BPD), *9-14*
- Bladder volume, measuring, *12-5*
- B-Mode imaging
 - intended uses, *5-2*
 - optimizing, *5-2*
 - scanning hints, *5-4*
 - typical exam protocol, *5-3*
- B-mode measurement
 - Echo Level, *7-48*
- B-Mode measurements
 - Gynecology exam, *9-81*
 - OB, *9-10*
- B-Mode measurements, general, *7-41*
- B-Mode measurements, generic
 - % Stenosis, *7-69*
 - A/B Ratio, *7-76*
 - Angle, *7-75*
 - Volume, *7-71*
- B-Mode measurements, mode
 - circumference and area (ellipse), *7-43*
 - circumference and area (spline trace), *7-46*
 - circumference and area (trace), *7-44*
 - distance, *7-42*
- body pattern application libraries, selecting, *16-61*
- Body Patterns, *6-22*
 - General tab, *16-59*
- Body Patterns Preset Menu, *16-59*
- brightness, video, *3-56*
- Buttons screen
 - Connectivity, *16-99*

C

- Calculations
 - selecting, *7-8*
- calculations
 - OB worksheet, *9-45, 9-46*
 - urology, *12-3*
- calipers, description, *7-5*
- Cardio-Thoracic Area Ratio (CTAR), *9-25*
- Care and maintenance

- cleaning the system, *18-10*
- inspecting the system, *18-7*

Caution icon, defined, *2-4*

- CF/PDI Auto Sample Volume, adjusting, *5-57*
- CF/PDI Center Depth, adjusting, *5-58*
- CF/PDI Frequency, adjusting, *5-58*
- CF/PDI Width, adjusting, *5-50*

CINE loop

- previewing only, *15-6*
- storing and previewing, *15-6*
- storing without previewing, *15-6*

CINE mode

- activating, *6-11*
- introduction, *6-11*
- synchronizing loops, *6-13*
- using, *6-12*

circumference measurements

- ellipse, *7-43*
- spline, *7-46*
- trace, *7-44, 7-45, 7-46*

Clinical

- calculation accuracy, *18-4*
- measurement accuracy, *18-2*

Coded Harmonic Imaging (CHI), activating, *5-13*

Color Flow imaging

- intended uses, *5-44*
- optimizing, *5-44*
- Power Doppler, *5-59*

colorizing an image, *5-23*

comments, see annotating an image

Compression, adjusting

- Doppler Mode, *5-79*

Connectivity

- Buttons, *16-99*
- configuring, *16-69*
- overview of screens, *16-69*
- presets, *16-69*
- TCPIP, *16-71*

console

- transporting, *3-39*

contacts

- clinical questions, *1-8*
- Internet, *1-8*
- service questions, *1-8*

Control Panel

- description, *3-46*

controls

- annotation function, *3-52*
- display function, *3-51*
- measurement function, *3-52*
- mode function, *3-51*
- operator, *3-46*
- record function, *3-51*

Crown Rump Length (CRL), measuring, *9-14*

CUA

- OB worksheet, *9-43*

Cursor Moving, adjusting, *5-82*

Curved Anatomical M-Mode, *5-43*

CW Doppler
 activating, 5-83
 exiting, 5-83
 overview, 5-83
 steerable, 5-83

D

D/S ratio, 7-83
Danger icon, defined, 2-4
Data transfer
 MPEGvue, 15-24
dD Ratio, pediatric measurement, 13-8
Depth, adjusting, 5-5
device labels, 2-45
devices
 acceptable, 2-36
 unapproved, 2-36
distance measurement
 general, 7-42
Doppler Auto Calc Average Cycle, using, 7-55
Doppler measurements
 OB/GYN, 9-39
Doppler measurements, generic
 A/B Ratio, 7-84
 D/S ratio, 7-83
 Heart Rate, 7-83
 Pulsatility Index (PI), 7-82
 Resistive Index (RI), 7-82
Doppler measurements, mode
 TAMAX/TAMEAN, 7-52
 time interval, 7-51
 velocity, 7-50
Doppler Mode
 generic study, 7-80
Doppler Mode, general measurements, 7-50
Doppler Mode, PW
 intended uses, 5-67
 optimizing, 5-67
 typical exam protocol, 5-68
DVD Multi drive
 location, 15-35
Dynamic Range, adjusting
 B-Mode, 5-20

E

Easy 3D, 5-181
Echo level measurement, 7-48
Edge Enhance, adjusting, 5-24
editing
 patient information, 4-26
 user-defined calculations, 7-34
EFW growth percentile
 OB worksheet, 9-45
Elastography, 5-134
Elastography, 2D measurement, 5-139
Elastography, how to use, 5-137

electrical
 configurations, 3-3
electrical hazard, 2-11
electromagnetic compatibility (EMC), 2-19
ellipse measurement, general, 7-43
EMC (electromagnetic compatibility), 2-19
End diastole (ED)
 OB/GYN vessel measurement, 7-87
Endometrium thickness (Endo), GYN exam, 9-85
Environmental requirements
 probes, 17-5
environmental requirements, 3-4
equipment safety, 2-11
Erasing
 measurements, 7-11
Estimated Fetal Weight (EFW), 9-26
exam
 definition of terms, 7-3
 deleting, 4-18
 OB, 9-2
 workflow, 7-3
explosion hazard, 2-13
EZBackup/Move, using, 16-29

F

Fast Key, 6-27
fast key, create, 6-27
fast key, start, 6-29
Femur Length (FL), measuring, 9-15
Fetal growth bar graph, 9-49, 9-56
Fetal growth curve graph, 9-49
 description, 9-50
 multiple fetus, 9-60
 quad view, 9-52
 selecting, 9-51
Fetal trending
 fetal growth curve graph, 9-54
Fetal Trunk Area (FTA), measuring, 9-27
Fetus
 entering number of, 9-57
 selecting on an OB worksheet, 9-43
Fetus Compare
 multiple fetus, 9-60
Flash Suppression, adjusting, 5-56
Flow Volume, 7-58, 7-85
focal zone, see Focus, adjusting
Focus, adjusting, 5-7
folders, measurement
 adding, 7-29
Follicle measurements, GYN exam, 9-82
Foot Length (Ft), measuring, 9-31
Footswitch, 3-18
Frame Average, adjusting
 B-Mode, 5-24
 Color Flow, 5-55
freezing an image, 6-9
Frequency, adjusting, 5-14

FV, 7-58, 7-85

G

Gain, adjusting
 B-Mode, 5-6
 Color Flow, 5-48
Gels, coupling, 17-48
General imaging
 changing presets, 16-49
generic studies and measurements, 7-66
Generic study
 Doppler mode, 7-80
Gestational Sac (GS), 9-16
GYN exam
 endometrium thickness, 9-85
 follicle measurements, 9-82
 ovaries measurements, 9-86
 uterus measurements, 9-87
Gynecology exam, 9-79
 B-Mode measurements, 9-81
 starting, 9-80

H

hazards, 17-9
 biological, 17-44
 electrical, 17-42
 mechanical, 17-43
hazards, safety symbols, 2-5
hazards, types
 biological, 2-12, 2-14
 electrical, 2-9, 2-11
 explosion, 2-13
 mechanical, 2-9
Head circumference (HC), 9-17
Heart Rate
 Doppler generic measurement, 7-83
 M-Mode generic measurement, 7-79
Hip Dysplasia, pediatric measurement, 13-5
Humerus Length (HL), measuring, 9-32

I

iLinq, using, 6-30
images
 deleting, 4-18
 recalling from clipboard, 15-9
 reviewing, 4-33
 storing, 15-5
Imaging presets, changing
 General, 16-49
Imaging presets, overview, 16-46
Indications for Use, 1-7
information, requesting, 1-8
Intravessel ratio, calculating, 11-28

L

labeling probes, 17-3
Libraries Preset Menu, 16-56
Line Density Zoom, adjusting B-Mode, 5-22, 5-53
Line Density, adjusting
 B-Mode, 5-22
 Color Flow, 5-53
log on procedures
 defining, 16-134, 16-135
Logon
 Admin screen, 16-134, 16-135

M

M Color Flow imaging, 5-65
M color flow, activating, 5-66
managing images
 media handling tips, 15-37, 15-40
Manual Vascular Calculation, 11-14
Map values, changing, 5-25
Measurement & Analysis screen
 accessing, 7-14, 9-63
 selecting a study or measurement, 7-17
measurement controls, location, 7-4
Measurement information
 OB worksheet, 9-44
measurement parameters, changing or adding, 7-33
Measurements, 9-39
 % Stenosis, 9-33
 % Stenosis (M-Mode), 9-38
 erasing, 7-11
 general instructions, 7-7, 7-12
 OB, 9-8
 AFI, 9-21, 9-23
measurements, general, 7-6
measurements, generic
 overview, 7-66
Measurements, types
 AxT, 9-24
 cardio-thoracic area ratio, 9-25
measurements, types
 abdominal circumference, 9-10
 amniotic fluid index (AFI), 9-21, 9-22
 antero-postero trunk diameter and transverse
 trunk diameter (APTD-TTD), 9-23
 biparietal diameter, 9-14
 crown rump length, 9-14
 estimated fetal weight, 9-26
 femur length, 9-15
 fetal trunk area, 9-27
 foot length, 9-31
 gestational sac, 9-16
 head circumference, 9-17
 humerus length, 9-32
 nuchal translucency, 9-32
 occipitofrontal diameter, 9-33
 spinal length, 9-34

- thorax transverse diameter, 9-36
- tibia length, 9-37
- transverse abdominal diameter, 9-35
- transverse cerebellar diameter, 9-35
- ulna length, 9-37
- measurements, using
 - adding, 7-29
 - automatically starting in workflow, 7-27
 - calipers, 7-5
 - changing, 7-28
 - deleting, 7-35
 - selecting in different category, 7-9
- Method
 - OB worksheet, 10-54
- method, OB worksheet, 9-44
- Minimum diastole (MD)
 - OB/GYN vessel measurement, 7-87
- M-Mode
 - CAMM, 5-43
- M-Mode imaging
 - intended uses, 5-38
 - optimizing, 5-38
 - scanning hints, 5-40
 - typical exam protocol, 5-38
- M-Mode measurements, 9-38
 - OB, 9-38
- M-Mode measurements, generic
 - % Stenosis, 7-77
 - A/B Ratio, 7-78
 - Heart Rate, 7-79
- M-Mode measurements, mode
 - time interval, 7-60
 - tissue depth, 7-59
- M-Mode, general measurements, 7-59
- Mode Cursor, displaying
 - B-Mode, 5-16
- moving the system, 3-39
 - during transport, 3-39
- MPEGvue, 15-24
 - E-mail support, 15-30
- Multiple fetuses, 9-57
 - identifying, 9-58
 - on OB worksheet, 9-61

N

- Network Storage Service, 15-44
- new patient
 - scanning, 4-10
- nl
 - Calculation Formulas
 - Left Ventricular, 10-3
 - Cardiac Output, 10-57
 - Automatic Calculation, 10-57
 - Cardiology
 - Cubed Method, 10-3
 - Cubed Method, 10-3
 - General Calculations

- Cardiac Output (CO), 10-57
- Left Ventricular
 - Calculation Formulas, 10-3
- Measurements
 - Cubed Method, 10-3
- Nuchal Translucency (HL), measuring, 9-32

O

- OB
 - graph, 9-49
 - identifying multiple fetuses, 9-58
 - measurements, 9-8
 - patient data, 9-5
- OB exam
 - preparing, 9-2
 - starting, 9-4
- OB graphs, 9-49
 - fetal growth bar graph, 9-56
 - patient data, 9-55
 - viewing, 9-50
- OB measurements
 - B-Mode, 9-10
 - Doppler mode, 9-39
 - M-Mode, 9-38
- OB measurements, types
 - abdominal circumference (AC), 9-10
 - amniotic fluid index, 9-22
 - amniotic fluid index (AFI), 9-21
 - antero-postero trunk diameter and transverse trunk diameter (APTD-TTD), 9-23
 - antero-postero trunk diameter by transverse trunk diameter, 9-24
 - biparietal diameter, 9-14
 - cardio-thoracic area ratio, 9-25
 - crown rump length, 9-14
 - estimated fetal weight, 9-26
 - femur length, 9-15
 - fetal trunk area, 9-27
 - foot length, 9-31
 - gestational sac, 9-16
 - head circumference, 9-17
 - humerus length, 9-32
 - nuchal translucency, 9-32
 - OB/GYN vessels, 9-39
 - occipitofrontal diameter, 9-33
 - spinal length, 9-34
 - thorax transverse diameter, 9-36
 - tibia length, 9-37
 - transverse abdominal diameter, 9-35
 - transverse cerebellar diameter, 9-35
- OB multigestational, 9-57
- OB worksheet, 9-42
 - AUA, 9-43
 - calculations, 9-45, 9-46
 - CUA, 9-43
 - EFW growth percentile, 9-45
 - measurement information, 9-44

- method, 9-44, 10-54
 - multiple fetuses, 9-61
 - patient data, 9-43
 - selecting ultrasound age, 9-43
 - OB/GYN vessel measurements, 7-87
 - acceleration, 7-87
 - acceleration time, 7-87
 - end diastole, 7-87
 - minimum diastole, 7-87
 - peak systole, 7-87
 - selecting, 9-41
 - OB/GYN vessel study, 9-39
 - Occipitofrontal Diameter (OFD), measuring, 9-33
 - optimizing images
 - B-Mode, 5-2
 - Color Flow, 5-44
 - Doppler, PW, 5-67
 - M-Mode, 5-38
 - options
 - system, 16-115
 - Orientation Help, 3D/4D imaging, 5-209
 - ovaries, measurement, 9-86
- P**
- Packet Size, adjusting, 5-57
 - Patient data
 - OB, 9-5
 - OB graphs, 9-55
 - OB worksheet, 9-43
 - patient data
 - deleting, 4-18
 - searching, 4-20
 - patient exam
 - reviewing, 4-32
 - patient list
 - entering, 4-13
 - printing, 4-19
 - patient safety, 2-7
 - Peak systole (PS)
 - OB/GYN vessel measurement, 7-87
 - Peak systole/end diastole ratio, Doppler generic measurements, 7-83
 - pediatric exam
 - calculations, 13-3
 - preparing, 13-2
 - pediatric measurements, types
 - alpha HIP, 13-7
 - dD ratio, 13-8
 - hip dysplasia, 13-5
 - peripherals
 - connector panel, 3-16
 - connector panel illustration, 3-17
 - peripherals, digital
 - setting up, 15-47
 - Phantoms, 18-35
 - Plot Both, fetal trending, 9-54
 - Position, adjusting color, 5-50
 - post-processing controls, overview, 6-10
 - Power, 3-19
 - connection
 - USA, 3-19
 - Cord, 3-39
 - On/Off, 3-23
 - switch, location, 3-23
 - power
 - power up sequence, 3-24
 - shut down, 3-33
 - Power Doppler imaging, 5-59
 - Preset Program menu
 - Acoustic Output
 - Fetal Exposure, 9-3
 - General Warning, 9-3
 - Prudent Use, 9-3
 - presets
 - organizing folders and measurements, 7-22
 - presets, changing
 - Annotations/Libraries, 16-50
 - Body Patterns, 16-56, 16-59, 16-60
 - Connectivity, 16-69
 - Imaging, 16-46
 - System, 16-3
 - presets, overview, 16-2
 - PRF, adjusting, 5-24
 - PRF, adjusting
 - Color Flow, 5-48
 - print keys
 - assigning to a device or dataflow, 16-99
 - Privacy and Security, 18-50
 - Probe handling and infection control, 17-46
 - probe orientation, 3D.4D imaging
 - abdominal, 5-198
 - Probes
 - connecting, 3-41
 - probes
 - activating, 3-43
 - cable handling, 3-43, 17-2
 - coupling gels
 - coupling gels, probes, 17-48
 - deactivating, 3-43
 - disconnecting, 3-44
 - environmental requirements, 17-5
 - ergonomics, 17-2
 - immersion levels, 17-24
 - labeling, 17-3
 - planned maintenance, 17-49
 - probe orientation, 17-3
 - safety, 17-42
 - using protective sheaths, 17-44
 - storing, 3-45
 - transporting, 3-45
 - Prostate volume, measuring, 12-6
 - prudent use, 2-4
 - PS/ED or ED/PS Ratio, measuring, 7-83
 - Pulsatility Index (PI), Doppler generic measurement, 7-82

Q

- QAnalysis, 5-156
 - Drift Compensation, 5-169
 - Exit, 5-172
 - generating a trace, 5-160
 - manipulating the sample area, 5-163
 - Select Image Range, 5-159
 - smoothing, 5-168
- QAPlot Control
 - horizontal sweep, 5-169
- Quality Assurance, 18-33
 - baselines, 18-37
 - frequency of tests, 18-34
 - Introduction, 18-33
 - periodic checks, 18-37
 - phantoms, 18-35
 - record keeping, 18-48
 - system setup, 18-39
 - test descriptions, 18-39
 - typical tests, 18-34
- Quick Angle, adjusting, 5-74

R

- Read Zoom, activating, 6-3
- real-time 4D imaging
 - acquiring data, 5-214
 - stopping acquisition, 5-221
- Record keeping, 18-48
- rejecting low level echos, 5-25
- removable media
 - verifying, 16-102
- Renal volume, measuring, 12-9
- Render view, 3D/4D imaging, 5-208
- Report Writer reports
 - activating, 14-4
 - creating, 14-3
 - editing, 14-9
 - factory templates, 14-8
 - inserting images, 14-19
- Resistive Index (RI), Doppler generic measurement, 7-82
- Results window, 7-7
- reverse, adjusting, 5-21
- rotating an image, 5-26

S

- S/D Ratio, Doppler measurement, 7-83
- safety
 - electromagnetic compatibility (EMC), 2-19
 - equipment, 2-11
 - hazards, 2-5, 2-11, 2-13, 2-14, 2-41, 17-42, 17-43, 17-44
 - biological, 17-9
 - smoke and fire, 2-12
 - labels, 2-45

- patient, 2-7
 - acoustic output hazard
 - hazard, types
 - acoustic output, 2-10
 - electrical hazards, 2-9
 - mechanical hazards, 2-9
 - patient identification, 2-7
 - patient training, ALARA, 2-10
 - personnel, 2-11
 - precaution icons, defined, 2-4
 - precaution levels, defined, 2-4
 - probes, 17-42
 - handling precautions, 17-46
- Sample Volume, adjusting, 5-57
- sample volume, adjusting
 - gate position, 5-73
 - length, 5-73
- Scale, adjusting
 - Doppler Mode, 5-80
- Scalpel, 3D/4D imaging, 5-224
- Scan Assistant
 - Availability, 5-246
 - Definitions, 5-247
 - Description, 5-248
 - Exporting Programs, 5-256
 - Setting Up, 5-249
 - Using, 5-254
- Sectional view, 3D/4D imaging, 5-207
- service, requesting, 1-8
- Simultaneous, activating, 5-77
- site requirements, before the system arrives, 3-3
- Size, adjusting
 - Color Flow, 5-50
- small parts exam
 - thyroid measurements, 8-5, 8-6
- Spatial Filter, adjusting, 5-56
- Spectral Doppler, see Doppler Mode, PW
- Spectral Trace method, 5-82
- Spinal Length (SL), measuring, 9-34
- starting an OB exam, 9-4
- Static 3D imaging, 5-226
 - acquiring data, 5-226
- Steer, adjusting, 5-15
- studies
 - OB/GYN vessels, 9-39
- study
 - adding, 7-29
 - definition, 7-3
 - deleting, 7-35
 - generic, 7-66
 - organizing, 7-22
- Sweep Speed, adjusting, 5-40
- System
 - acclimation time, 3-22
- system
 - electrical configurations, 3-3
 - environmental requirements, 3-4
 - options, 16-115

- power down, 3-33
- System Admin
 - Admin screen, 16-115
- System Imaging Preset Menu, 16-13
- System Measure Preset menu, 16-16
- System presets, changing
 - General, 16-5
 - System About, 16-45
 - System Imaging, 16-13
 - System Measure, 16-16
 - System Peripherals, 16-41
 - System/Backup and Restore, 16-20
- System presets, overview, 16-3
- System/General Preset Menu, 16-5

T

- TAD (transverse abdominal diameter), 9-35
- TAMAX/TAMEAN, Doppler mode measurement
 - manual trace, 7-52
- TCD (transverse cerebellar diameter), 9-35
- TCPIP
 - Connectivity, 16-71
- Test Patterns
 - overview, 16-68
- TGC, adjusting, 5-18
- Thorax transverse diameter (ThD), 9-36
- Threshold, adjusting, 5-55
- Thyroid measurements, 8-5, 8-6
- Tibia Length, measuring, 9-37
- TIC analysis
 - activating, 5-96
 - curve fitting, 5-125
 - exiting, 5-97
 - generating a trace, 5-102
 - manipulating the sample area, 5-110
 - smoothing, 5-118
- TIC Plot Control
 - horizontal sweep, 5-117
 - line style, 5-117
 - overview, 5-115
 - vertical auto scaling, 5-116
- Tilt, adjusting, 5-19
- Time Gain Compensation, see TGC, adjusting, 5-18
- Time interval
 - Doppler mode measurement, 7-51
 - M-Mode measurement, 7-60
- Tissue depth, M-Mode measurement, 7-59
- Tissue Velocity Imaging, 5-61
- Trace Direction, adjusting, 5-82
- Trace measurement, general, 7-44, 7-45, 7-46
- Trace Sensitivity, adjusting, 5-82
- Transparency Map, adjusting, 5-56
- Transverse Abdominal Diameter (TAD), 9-35
- Transverse Cerebellar Diameter (TCD), 9-35
- TVI, 5-64
 - Quantitative Analysis, 5-156

U

- Ulna Length, OB measurements, types, 9-37
- Ultrasound age
 - selecting on OB worksheet, 9-43
- Update, activating, 5-77
- urology exam, preparing, 12-2
- urology measurements
 - bladder volume, 12-5
 - prostate volume, 12-6
 - renal volume, 12-9
- user IDs
 - defining, 16-132
- user-defined calculations, editing, 7-34
- user-defined measurement, adding, 7-31
- Users
 - Admin screen, 16-132
- Uterine cavity, amniotic fluid index (AFI), 9-21
- Uterus measurements, 9-87
- Utility function
 - changing measurements and studies, 7-36
- Utility screens
 - Admin, 16-114
 - connectivity, 16-69

V

- Vascular exam preparation, 11-2
- Vascular worksheets
 - editing, 11-23
 - saving and printing, 11-33
 - typing examiner's comments, 11-27
 - vessel summary, 11-30
 - viewing, 11-20
- Velocity, Doppler measurement, 7-50
- verifying
 - removable media, 16-102
- Vessel summary, vascular exam, 11-30
- Virtual Convex, adjusting, 5-17
- Volume measurement, B-Mode generic measurement, 7-71

W

- Wall Filter, adjusting
 - Color Flow, 5-49
 - Doppler Mode, 5-81
- Warning icon, defined, 2-4
- width, adjusting, 5-19
- word wrap, annotation, 6-19
- Worksheet
 - changing data, 7-62
 - OB, 9-42
 - viewing, 7-61
- Write Zoom, activating, 6-3

XYZ

zooming an image

bioeffects, 6-2

introduction, 6-2



